An Examination of Quality Management in Support Functions of Elementary and Secondary Education Using the Malcolm Baldrige National Quality Award’s Criteria for Performance Excellence

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“No one is wise enough by himself.”
- Titus Plautus

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CHAPTER ONE
INTRODUCTION

Quality in the Context of Elementary and Secondary Education

Public elementary and secondary education is a sizable enterprise in the United States. Serving 48.8 million students, its annual expenditures exceed $424 billion (Zhou, Honegger, & Gaviola, 2007). It is a service that is called on to fill purposes established by stakeholders - including students, parents, community members, institutions of higher learning, and employers - with differing expectations and priorities (Cuban, 1990; Rothstein, 2000). As such, “education remains a top public concern” (Dolph, 2006, p. 30).

Quality implies fitness of use (Juran, 1995) or the ability of a product or service to meet or exceed customer expectations (Reeves & Bednar, 1994). In the United States, policymakers have played a significant role in shaping the quality of public education. For example, education policy in the 1960s focused on issues of access and equity which continued to be emphasized until the early 1990s (Bellamy, 1970; Ravitch & Vinovskis, 1993). Educational inputs, including per pupil expenditures, class size, teacher characteristics, student characteristics, and family characteristics (Ehrenberg & Brewer, 1994; Grissmer, 1998; Hadderman, 1998; Hanushek, 1986; Loeb, 2001; Monk, 1994) served as indicators of the quality of public education during much of this time (Hunter, 2002).

Student learning, the primary outcome of the education process, is another important measure of quality. Learning among elementary and secondary students is monitored at the national level through the achievement test known as the National Assessment of Educational Progress. Trend data suggests that achievement growth among students has stagnated despite the fact that “real spending per student more
than tripled between 1960 and 1995" (Hanushek & Raymond, 2001, p. 367). This pattern coupled with a widening achievement gap between white and minority students helped policymakers turn their focus on educational inputs as measures of quality to a focus on outcomes (Hanushek & Raymond, 2001).

"The change to public concern and attention to student outcomes is a major improvement in the area of educational policy" (Hanushek & Raymond, 2001, p. 365) and is reflected in recent legislation, like Goals 2000 and the No Child Left Behind Act (NCLB). These pieces of legislation led to the development of state-level accountability systems (Hanushek & Raymond, 2001; Hanushek & Raymond, 2005). Accountability systems establish content standards (that identify what students should know and be able to do in different subject areas), goals for performance, performance measures, and consequences for varying levels of performance (Hanushek & Raymond, 2001). "The landmark NCLB codified a developing policy view that standards, testing, and accountability were the path to improve performance" (Hanushek & Raymond, 2005, p. 297). Under NCLB, instructional staff must meet qualifications based on their level of education or training. Schools must demonstrate that all students are progressing toward proficiency in core subjects as measured by scores on statewide achievement tests. Outcome data, including test scores and graduation rates, is disaggregated and reported publicly. Schools face consequences ranging from being put on a watch list to being reconstituted for failing to make annual yearly progress toward goals (Ohnemus, 2002).

Management theory and literature on quality emphasize that an organization’s performance is dependent on aligning efforts throughout its entire system. In elementary and secondary education, the impact of policy on defining quality and shaping continuous improvement efforts has not systematically extended beyond the
core work of school districts. At the same time, school districts are receiving pressure from stakeholders to account for the use of all of their funds (Griscom, 1993), including those dedicated to support services. Operations and maintenance, food service, student transportation, purchasing and warehousing, human resources, finance and accounting, technology, and other departments provide critical services to students, district employees, community members, and other stakeholders. Nationally, support service personnel number 1.8 million (in full-time equivalent units), making up 30.1% of school district employees (Zhou et al., 2007). While their roles are diverse and necessary to the smooth operation of school systems, concerns regarding the amount of taxpayer dollars spent to support non-instructional areas are growing (Traaen, 1998).

An initiative called the “65% solution: is one example of the growing public scrutiny of non-instructional programs and services in education. Proponents of the initiative favor the passage of legislation in all 50 states that ensures 65% or more of a district’s budget is spend on direct classroom instruction (Fermanich, 2006). Supporters argue that such laws “will force districts to make more efficient use of their resources” (Fermanich, 2006, p. 29) in order to “spend more on students, not bureaucracy” (Glasser, 2006, p. 34). “They also see it as a way to increase instructional spending without raising taxes or increasing overall spending” (Fermanich, 2006, p. 29). Opponents argue that the threshold is arbitrary and that there is no research demonstrating that this level of instructional spending yields higher test scores (Fermanich, 2006).

In an effort to decrease costs in support functions and tighten their focus on student learning, some districts have turned to privatization (General Accounting Office [GAO], 1996; Stevenson, 2001). Privatization occurs when a “school district contracts
for a necessary and on-going service by way of annual or multi-year contracts with a private for-profit agency” (Stevenson & Wood, 1997, p. 15). A 1996 survey randomly sampled 1,853 members of the Association of School Business Officials International to learn more about privatization practices; 676 respondents made up the U.S. sample (Stevenson & Wood, 1997). Generally, school business officials in the U.S. were not supportive of privatizing services although 50% stated their districts would likely increase the practice in the next five years (Stevenson & Wood, 1997). Half believed that contract services reduced or controlled costs while only 25% felt they improved service quality (Stevenson & Wood, 1997). Respondents in rural areas felt that privatization was not very likely since the potential for profit would be small for companies given their district’s size. Privatization can also have negative effects on the district, its employees, and the community (GAO, 1996; Stevenson & Wood, 1997).

Problem Statement

Accountability measures in elementary and secondary education define and monitor quality in teaching and learning and perpetuate continuous improvement of the core processes of school districts. Similar mechanisms do not exist for support functions, which on average account for over 33% of district expenditures (Zhou et al., 2007). Quality management is an approach to achieving and sustaining high quality products and/or services by focusing on the continuous improvement of processes throughout all levels and functions of an organization in order to meet or exceed customer requirements (Flynn, Schroeder, & Sakakibara, 1994). Elementary and secondary education could benefit from a model that guides continuous improvement leading to enhanced outcomes for both core and support functions.

Purpose of the Study
The purpose of the study is three-fold: (1) to describe the current state of quality management in support functions of public elementary and secondary education based on the perceptions of front-line workers, (2) to examine the strength and direction of the relationships among quality management constructs in the support functions of elementary and secondary education, and (3) to determine the extent to which the nature of the relationships between areas of quality management, as proposed by the Malcolm Baldrige National Quality Award (MBNQA) program, exist within support functions in elementary and secondary education.

Research Questions

1. How do support personnel in public elementary and secondary education settings perceive quality management on the job in terms of leadership, data, planning, the workforce, work processes, stakeholders, and results?

2. How do quality management constructs relate to one another in the support functions of public elementary and secondary education?

3. Is the quality management model proposed by the Malcolm Baldrige National Quality Award program applicable for use within support functions in public elementary and secondary education?

Need for the Study

There is a need to study quality management in the support functions of K-12 education for three reasons. First, the availability of sufficient financial resources is a recurring issue in the field. Funds come from federal (9.2%), state (46.8%), and local (44%) sources (Zhou et al., 2007). Throughout the country, the frequency of districts approaching taxpayers to support learning or facility related initiatives beyond what they already contribute to their state’s general education aid formula has increased sharply (Dolph, 2006). “State funding formulas that limit inflationary growth in revenue,
or mandates that require additional resources, and changes in tax laws all contribute to this growing phenomenon" (Dolph, 2006, p. 30). “In the average school district approximately 70% of levy voters are not parents” (Dolph, 2006, p. 31). This statistic, coupled with the fact that there will be higher percentages of taxpayers on fixed-incomes as the baby boomers age, suggests that districts will find it increasingly difficult to secure additional education dollars from state and local taxpayers.

Districts are also concerned about the rising costs of maintaining a workforce. “According to Standard & Poor’s benefits and pension analysis: in 2003, in 33 states, the benefit payments by school districts consumed between 15% and 20% of the total budget” (Durante & Willis, 2005, p. 21). Cook (2004) noted a Kaiser Family foundation study, released in 2003, that found out-of-pocket health care costs for employees rose 48% from 1999 to 2002. Even when health insurance increases can be predicted in the short-term, some collective bargaining agreements prevent school districts from increasing employee responsibility for health care for several years at a time (Cook, 2004) which adds to the financial stress from rising costs. In terms of pensions, private sector companies have been shifting to plans where the employee and company contribution is defined (Durante & Willis, 2005). This helps provide the company with “financial stability since the payments are known in advance and do not change substantially from year to year” (Durante & Willis, 2005, p. 21). In contrast, “the overwhelming majority of education pension plans are ‘defined benefit plans’ that guarantee employees a pre-set benefit upon retirement” (Durante & Willis, 2005, p. 21). While states and school districts are trying to move toward defined contribution plans for new school employees, the cost savings won’t be evident for many years to come (Durante & Willis, 2005).
Constraints on access to and use of funds coupled with rising costs associated with employee benefits and pensions demonstrate the concern for the availability of financial resources in elementary and secondary education. Quality management has been shown to increase the efficiency and profitability of organizations in a variety of sectors (Hendricks & Singhal, 2001; Kaynak, 2003; Milakovich, 1990; Reed, Lemak, & Mero, 2000; Samson & Terziiovski, 1999). By utilizing quality management throughout the system, in both instructional and support functions, districts will be better-equipped to operate and improve with existing levels of resources.

Second, this study is important because support service functions in elementary and secondary education are facing new and substantial challenges that may not be met successfully without understanding and responding to stakeholder needs, both of which are primary goals of quality management. Examples from food service and operations and maintenance illustrate this point. The growing rate of obesity among Americans, including children, has resulted in mandates for district wellness policies and a more careful monitoring of the nutritional content of school meals, both of which will require increased training and involvement for cafeteria workers and managers (Frombach, 2005). “Successful programs will have to serve food that is more nutritious, more attractive and tasty to students than the alternatives, and such programs will need to educate children about healthful eating habits” (O’Looneyny & D’Hoore, 1996, p. 44). As the student population becomes more diverse, menus will need to reflect changing food preferences in order to maintain or increase participation rates in meal programs (White, Sneed, & Martin, 1992).

In terms of facilities, school districts are facing and impending crisis as “thirty percent of the country’s schools require extensive repairs, whereas another 40% need replacement of at least major components” (Geiger, 2002, p. 43). Facility maintenance
and construction projects are often pushed to the side as capital improvement funds get reallocated to the operating fund in order to address other district needs (Durante & Willis, 2005; Geiger, 2002). Sielke (2002) reported that school infrastructure funding more than doubled between the 1993-1994 and 1998-1999 school years and that most funding for school infrastructure projects does not come from the states but instead relies on voter-approved bond issues at the local level.

A U.S. General Accounting Office (2000) report stated that for fiscal year 1998, only 19 states had data on bond issues. These data showed that within those 19 states, 455 bond referenda were held. Only 54% passed and represented $9.052 billion, which was approximately 54% of the amount requested. (Sielke, 2002, p. 26)

This demonstrates that funding school infrastructure projects through bond issues can be problematic for districts.

Even a successful bond issue does not mean that needs are being met. Most states have debt limits which means that a school district can bond only for a certain percentage of its taxable property base. A school district with a small tax base will be severely limited in the amount it can request through a bond issue. Another limitation in some states is that bond issues must be approved by a supermajority of either voters or eligible voters. (Sielke, 2002, p. 27)

Quality management practices can help support functions, like food service and operations and maintenance, to identify and understand stakeholder requirements and use this understanding to create goals and action plans for meeting them. Since, for example, local taxpayer support is critical to securing funds for school infrastructure projects, it is necessary for the district to know what citizens expect from school facilities in terms of size, physical condition, amenities, and shared use so that district plans convey solutions to identified needs and problems that voters can support.

Third, the study has potential to make important contributions to the literature and to practice. There is a paucity of scholarly literature focusing on quality management in the support functions of elementary and secondary education. This study will add to the literature by collecting perceptual data describing the current state
of quality management practices in food service, operations and maintenance, transportation, business services and human resources, and administrative support. To this researcher’s knowledge, the study also represents the first attempt to empirically verify the Baldrige model as a whole in the K-12 setting. District recipients of the MBNQA have demonstrated that, when used throughout the organization, quality management leads to enhanced outcomes for students, employees, and the district as a whole (Chugach School District, 2001; Community Consolidated School District 15, 2003; Jenks Public Schools, 2005; Pearl River School District, 2001). Providing empirical data about the relationships between quality management constructs and the model’s overall fit using data from the support functions of elementary and secondary education will lend more credibility to practices that the K-12 education community associates heavily with the business community and not with themselves (Barney & Kirby, 2004; Kirby, 2004).

Definitions of Key Terms

**Criteria for Performance Excellence (Criteria):** A document that is published annually by the National Institute of Standards and Technology in the United States that serves as the basis for determining recipients of the Malcolm Baldrige National Quality Award and for giving feedback to Award applicants. The Criteria can also be used by organizations as a self-assessment of their quality management efforts. As the Award has expanded, different versions of the Criteria have been published and tailored to the business/non-profit sector, the health care sector, and the education sector.

**District:** “An agency at the local level whose primary responsibility is to operate public schools or to contract for public school services” (Zhou et al., 2007, p. 20). Also referred to as a local education agency (LEA)

**Elementary and secondary education:** “Programs providing instruction, or assisting in providing instruction, for students in prekindergarten, kindergarten, grades 1 through 12, and ungraded programs” (Zhou et al., 2007, p. 19). Also referred to as K-12 education.

**Food services:** “Activities that provide food to students and staff in a school or LEA [local education agency]. These services include preparing and serving regular and incidental meals or snacks in connection with school activities as well as delivery of food to schools” (Zhou et al., 2007, p. 20).
**Instruction**: “Activities related to the interaction between teachers and students. [Expenditures for this area] include salaries and benefits for teachers and teacher aides, textbooks, supplies and purchased services” (Zhou et al., 2007, p. 20).

**Malcolm Baldrige National Quality Award (MBNQA)**: A national award in the United States recognizing organizations for achievement in quality and overall performance excellence.

**National Center for Education Statistics (NCES)**: The federal entity mandated by Congress to collect, analyze, and report data related to education in the United States and other countries for use by individuals and entities including the U.S. Department of Education, Congress, policymakers, educators, and the general public (Dalton, Sable, & Hoffman, 2006).

**Operations and maintenance**: Activities related to the “operation of buildings, the care and upkeep of grounds and equipment, vehicle operations (other than student transportation) and maintenance, and security” (Zhou et al., 2007, p. 21).

**Other support services**: Activities that provide business, fiscal, and other support services to the district that are not tied directly to the superintendent, school board, school administrators, or students (Zhou et al., 2007). Services provided by accounting, food service, human resources, purchasing and warehousing, and technology departments are examples of “other support services.”

**Performance**: “Output results and their outcomes obtained from processes, programs, and services that permit evaluation and comparison relative to goals, standards, past results, and other organizations. Performance can be expressed in nonfinancial and financial terms” (National Institute of Standards and Technology [NIST], 2007, p. 73).

**Quality**: The ability of a product or service to meet or exceed customer requirements (Reeves & Bednar, 1994).

**Quality management**: An approach to achieving and sustaining high quality products and/or services by focusing on the continuous improvement of processes throughout all levels and functions of an organization in order to meet or exceed customer requirements (Flynn, Schroeder, & Sakakibara, 1994).

**Staff**: A term referring to individuals working within school districts. See also Workforce.

**Stakeholders**: “Groups that are or might be affected by an organization’s actions and success. Examples of key stakeholders might include parents, parent organizations, the workforce, collaborators, governing boards, alumni, employers, other schools, regulatory bodies, funding entities, taxpayers, policy makers, suppliers, partners, and local and professional communities” (NIST, 2007, p. 75).

**Support services**: A general term for activities provided by a district that are not considered part of instruction. When reported as an expenditure function, support services are “divided into seven subfunctions: student support services, instructional..."
staff support, general administration, school administration, operations and maintenance, student transportation, and other support services” (Zhou et al., 2007, p. 22).

**Total Quality Management (TQM):** An approach to “continuous improvement that is focused on responding to customer needs, basing decisions on data, and allowing everyone to participate in the process” (Law, 1993, p. 24).

**Workforce:** “All people actively involved in accomplishing the work” (NIST, 2007, p. 77) of an organization. The workforce comprises all paid employees, including administrators, supervisors, and managers, as well as contract employees that work under the direction of organization members.

**Limitations**

The proposed study has some limitations. First, the study’s population is limited to support service employees working for regular public elementary and secondary education districts in Minnesota. Second, participation was secured through convenience sampling techniques. Districts in the main study were invited to participate based on their familiarity with the study’s model or their known efforts in customer-focused continuous improvement. The quality management practices in the support functions of the participating districts may not be representative of practices found in the population of regular school districts in Minnesota which includes over three hundred districts without such known associations. Convenience sampling also influenced the size of the school district in which participants worked. Virtually all of the participants in the study worked in school districts that enrolled 1,000 or more students, yet half (51%) of the regular school districts in Minnesota serve fewer than 1,000 students (National Center for Education Statistics [NCES], 2006b). The study’s findings may not be able to be generalized to districts of a much smaller or larger size. Third, the individual serves as the unit of analysis in this study; however the observations may not be truly independent among employees from the same school district. Finally, the study utilizes self-report data which can be prone to measurement error.
CHAPTER 2

LITERATURE REVIEW

The literature will be reviewed in the following areas: Total Quality Management, the Malcolm Baldrige National Quality Award, and quality management in support services in elementary and secondary education. The Total Quality Management literature will be broken down into discussion of its history and veins of research. Literature on the Malcolm Baldrige National Quality Award (MBNQA) will address the history and evolution of the award followed by a review of its seven components of quality management: (1) leadership, (2) measurement, analysis, and knowledge management, (3) strategic planning, (4) workforce management, (5) process management, (6) customer focus, and (7) results. The review of the MBNQA will also include sections on praise and criticism of the Award and veins of research relating to it. The literature on quality management in support functions of elementary and secondary education will be broken down into discussion of strategic planning, workforce issues, customer focus, and results.

Total Quality Management

Total Quality Management is an approach to “continuous improvement that is focused on responding to customer needs, basing decisions on data, and allowing everyone to participate in the process” (Law, 1993, p. 24). TQM is based on the following assumptions: (1) quality costs less than poor quality, (2) people care about the quality of their work and will seek to improve it if their ideas are listened to and they are given the information and training they need, (3) since organizations are systems, the problems they face involve multiple functions, and (4) while quality is everyone’s job, the ultimate responsibility lies with top management (Hackman & Wageman, 1995).
History of TQM

The quality movement in the United States is based on the thoughts and practices advocated by a small group of individuals (Ehrlich, 2002; Hackman & Wageman, 1995), most notably W. Edwards Deming, Joseph M. Juran, Kaoru Ishikawa, and Philip R. Crosby. Deming, Juran, and Ishikawa are largely credited with guiding Japan to status an economic power following World War II which “drove the American electronics and automobile industries to their knees in the 1970s and 1980s” (Adams, Gray, Sprangers, & Henderson, 1999, p. 21).

Deming, Ishikawa, and Juran share the view that an organization’s primary purpose is to stay in business, so that it can promote the stability of the community, generate products and services that are useful to customers, and provide a setting for the satisfaction and growth of organization members (Juran, 1969: 1-5; Ishikawa, 1985: 1; Deming, 1986: preface). (Hackman & Wageman, 1995, p. 310)

Along with Crosby, their ideas eventually had substantial influence on the way organizations in the United States designed and delivered their products and services in order to remain competitive in the global economy.

Deming’s early work centered on statistical process control as a means of quality improvement. He was mentored by Shewart who was well-versed in that area and known for his Plan-Do-Check-Act continuous improvement cycle (Ehrlich, 2002). As his career evolved, Deming’s work expanded and he emphasized viewing organizations as systems, developing employees and involving them in continuous improvement efforts, and improving the quality of products and services by focusing on processes, not outcomes (Dean & Bowen, 1994). Deming is well-known for his 14 Points (1986) listed below:

1. Create constancy of purpose toward improvement of product and service, with the aim to become competitive and to stay in business, and to provide jobs.
2. Adopt the new philosophy. We are in a new economic age. Western management must awaken to the challenge, must learn their responsibilities, and take on leadership for change.
3. Cease dependence on inspection to achieve quality. Eliminate the need for inspection on a mass basis by building quality into the product in the first place.

4. End the practice of awarding business on the basis of price tag. Instead, minimize total cost. Move toward a single supplier for any one item, on a long-term relationship of loyalty and trust.

5. Improve constantly and forever the system of production and service, to improve quality and productivity, and thus constantly decrease costs.

6. Institute training on the job.

7. Institute leadership.

8. Drive out fear, so that everyone may work effectively for the company.


10. Eliminate slogans, exhortations, and targets for the work force asking for defects and new levels of productivity.


12. Remove barriers that rob the worker of his [sic] right to pride of workmanship.

13. Institute a vigorous program of education and self-improvement.

14. Put everybody in the company to work to accomplish the transformation. The transformation is everybody's job. (p. 23)

Juran (Juran & Gryna, 1988; Juran, 1988; Juran, 1989) had degrees in electrical engineering and law and, like Shewart and Deming, also worked for Western Electric at one point in his career (Ehrlich, 2002). He applied statistical process control to that plant’s business operations and approached defect analysis and reduction by using the Pareto principal, concentrating efforts on the indicators considered to be the vital few as opposed to the many that were trivial (Ehrlich, 2002). Juran’s approach to quality improvement centered on projects and he supported the use of quality circles or teams of employees who were part of the process being studied being the ones to suggest and test improvement ideas (Owen, 2002). Juran’s Quality Trilogy is presented below:

1. Quality planning: The process for developing quality goals and a plan to meet them. It involves understanding customer requirements and creating the process for meeting the requirements (targets).

2. Quality control: Ongoing measurement of process quality through measuring current performance and the gap between performance and targets. Action steps are taken to close the gaps and keep the process in statistical control.

3. Quality improvement: Identifying improvement projects based on quality control measurements, organizing improvement teams, diagnosing and proposing solutions to the problems, proving their effectiveness, and implementing them, with quality control measures in place for the new process. (Ehrlich, 2002, p. 16)
Kaoru Ishikawa (1981/1985) played an influential role in establishing and spreading the use of quality control throughout Japan through his work with the Union of Japanese Scientists and Engineers (JUSE). “To practice quality control is to develop, design, produce and service a quality product which is most economical, most useful, and always satisfactory to the customer” (Ishikawa, 1985, p. 44). He believed that quality control started and ended with education and that education was for everyone in the company. The Seven Tools (Pareto chart, cause and effect diagram, stratification, check sheet histogram, scatter diagram, and control chart) were essential components in this education since “as much as ninety-five percent of all problems within a company can be solved by means of these tools” (Ishikawa, 1985, p. 198).

As a corporate quality control manager for International Telegraph and Telephone, Crosby gained national recognition with the 1979 publication of his book titled *Quality is Free*. He believed the key to high quality was prevention and estimated that deviating from requirements cost service companies about 35% of their operating expenses (Ehrlich, 2002). He acknowledged that cultural transformation is required to bring about high quality in an organization. Crosby’s Four Absolutes of Quality Management are below:

1. Quality is defined as conformance to requirements rather than goodness of fit.
2. Prevention, rather than inspection for defects, is the only way to achieve quality.
3. Zero defects, rather than “that’s close enough,” is the appropriate performance standard
4. The true measure of quality is the price of nonconformance, rather than a percentage quality level measure. (Ehrlich, 2002, p. 17)

*Research on TQM*

Leaders in the quality movement have established broad frameworks for practice resulting in an abundance of practitioner-oriented literature on TQM (Hackman
& Wageman, 1995). Academic research, in contrast, has been hampered by the lack of
a theoretical grounding for TQM (Reed, Lemak, & Montgomery, 1996).

The Deming Management Method, based on Deming’s (1986) 14 Points, has been the focus of some attempts to develop a theory of TQM (Anderson &
Rungtusanatham, 1994; Anderson, Rungtusanatham, Schroeder, & Devaraj, 1995;
(1994) began with a careful examination of the 14 Points followed by the use of the
Delphi technique with a panel of industrial and academic experts. This process led to
the identification of 37 concepts which were further reduced to seven theoretical
constructs: (1) visionary leadership, (2) internal and external cooperation, (3) learning,
(4) process management, (5) continuous improvement, (6) employee fulfillment, and
(7) customer satisfaction (Anderson & Rungtusanatham, 1994). The theory proposed
several relationships including that visionary leadership directly influenced
organizational system factors of cooperation and learning which, in turn, influenced
process management. Process management, in turn, influenced the process outcomes
of continuous improvement and employee satisfaction which directly influenced levels
of customer satisfaction.

The theory underlying the Deming Management Method was later tested by
Anderson, Rungtusanatham, Schroeder, and Devaraj (1995). The data came from a
secondary data source associated with a World-Class Manufacturing project involving
managers, supervisors, and workers from 41 U.S. plants from 1989 and 1990. The
seven constructs above were operationalized using items from the World-Class
Manufacturing instrument and composite scores for each of the constructs were
calculated for each plant. Path analysis was employed to examine the proposed
relationships between the theoretical constructs. The relationship between leadership
and internal and external cooperation and learning was significant as was the relationship between process management and continuous improvement and employee fulfillment. The other proposed relationships were not supported.

A replication study was conducted with a sample of 43 Italian machine tool, electronic, and transportation-related manufacturing facilities (Rungtusanatham, Forza, Filippini, & Anderson, 1998). The instrument from the original study was translated and then revised slightly to improve the reliability of the scales. Data was standardized by industry due to the presence of significant industry effects. Plant-level data was analyzed using regression and the standardized regression coefficients were used as path coefficients for subsequent path analysis. The following paths were statistically significant at the .05 level: from leadership to internal and external cooperation; from internal and external cooperation to process management; from process management to continuous improvement (Rungtusanatham et al., 1998). When comparing results to those in the original study, the researchers noted four important relationships in both studies: those three listed above as well as the relationship between leadership and learning. The study demonstrated that even across different cultural contexts, organizational leaders play an important role in communicating a vision and establishing an organizational environment that is cooperative and embraces learning. This environment makes it easier for members to focus on managing processes (Rungtusanatham et al., 1998).

Aside from the studies reported above, most of the academic research on TQM has not been related to theory development. Ahire, Landeros, and Golhar (1995) reviewed TQM articles published between 1970 and 1993 and found 72% of the 226 articles analyzed were conceptual papers or case studies while only 29 (nearly 13%) were empirical studies. Empirical study of TQM was spurred by the development of an
instrument (Saraph, Benson, & Schroeder, 1989) measuring its critical factors. Sila and Ebrahimpour (2002) conducted a comprehensive review of the 347 survey based TQM studies published between 1989 and 2000 in business journals. Study objectives included examining critical factors of TQM, the impact of TQM on training, employee involvement and other human resource management practices, and issues related to implementation. During this time period there was “a shift of interest…from what constitutes TQM and how it is implemented to how well it works” (Sila & Ebrahimpour, 2002, p. 941). The most recently published studies in their review suggest that “the new trend in survey research may be in the direction of identifying causal relationships among TQM factors and between TQM factors and various performance measures” (Sila & Ebrahimpour, 2002, p. 925).

Malcolm Baldrige National Quality Award

The Malcom Baldrige National Quality Award (MBNQA) was established in 1987 with the passage of the Malcom Baldrige National Quality Act, PL 100-107. The competitive nature of the global economy and the growing requirements to succeed in the U.S. market provided impetus for the legislation’s passage (Belohlav, Cook, & Heiser, 2004). The award program aims to “recognize U.S. organizations for their achievements in quality and performance and to raise awareness about the importance of quality and performance excellence as a competitive edge” (NIST, 2003, para. 3). Since its inception, the number of categories for performance excellence recognized by the MBNQA has grown. From 1988 to 1998 only manufacturing companies, service organizations and small businesses could compete; health care and education criteria became available in 1995 (Meyer & Collier, 2001), though the award categories were not added until 1999 (Vokurka, 2001); a nonprofit category was added in 2007 (NIST,
2003, para. 3). Up to three awards can be given in each category per year (NIST, 2003, para. 3).

The U.S. Commerce Department’s National Institute of Standards and Technology manages the Baldrige Award program with assistance from the American Society for Quality (ASQ), a nonprofit professional association. “NIST develops and promotes measurements, standards, and technology to enhance productivity, facilitate trade, and improve the quality of life” (NIST, 2003, para. 46) and was chosen to oversee the program “because of its role in helping U.S. organizations compete, its world-renowned expertise in quality control and assurance” along with its reputation for impartiality as a non-regulatory agency (NIST, 2003, para. 46). Volunteers, who are experts from sectors including industry, government, education, and nonprofits, are rigorously selected and trained and are the key to the Baldrige Award’s review process (Kirby, 2004).

Model and Criteria

The Baldrige model is not aligned with a particular scholar or practitioner’s thinking but rather encompasses a variety of viewpoints on quality (Dean & Bowen, 1994).

The model consists of seven essential quality management constructs and the relationships between them. The constructs are described briefly below.

1. **Leadership**: Efforts taken by senior executives to guide the organization; approaches taken by the organization in addressing its responsibilities to the public and practicing good citizenship.

2. **Strategic planning**: Efforts taken by the organization to plan for its future success; establishing key goals for the future and developing related action plans to realize these goals.

3. **Customer and market focus**: Efforts taken to determine requirements and expectations of those served by the organization and its markets; building relationships with customers; acquiring, satisfying, and retaining customers.
4. **Measurement, analysis, and knowledge management**: Management, effective use, analysis, and improvement of data and information to support key organization processes and the organization’s performance management system.

5. **Human resource focus**: Efforts taken by the organization to enable its workforce to develop its full potential; alignment of the workforce with the organization’s objectives.

6. **Process management**: Efforts taken by the organization to design, manage, and improve core and support processes.


The *Criteria for Performance Excellence* is utilized for the Award selection process and involves the identification of organizational data, practices, and procedures for each model construct. Whether or not an organization is applying for the MBNQA, the Criteria can be used for designing, implementing and assessing its operations (Horine, Frazier, & Edmister, 1998; Kirby, 2004). Information about the constructs in the Baldrige model follow and include their treatment in quality management literature, connection to management and organizational theories, or related research.

**Leadership.** The founding fathers of the quality movement shared the belief that quality is "ultimately and inescapably the responsibility of top management" (Hackman & Wageman, 1995, p. 311). Deming (1986) argued that "the aim of leadership should be to improve the performance of man [sic] and machine, to improve quality, to increase output, and simultaneously to bring pride of workmanship to people" (p. 248). These ideas are also found in path-goal theory (e.g., House, 1971) which purports that leaders have the responsibility to provide workers with task-related guidance and emotional support in order for them to be satisfied with and effective in their jobs. These aims of leadership can be accomplished by improving processes, increasing the
consistency of performance among processes, and by providing help or recognition to workers based on process performance (Deming, 1986). Leadership for quality also involves giving top priority to quality issues through personal modeling, organizational planning, policy establishment, and continuous improvement monitoring (Ishikawa, 1985). These actions, on the part of senior leaders, are consistent with transformational leadership theory (e.g., Bass, 1998; Tichy & Devanna, 1986) which emphasize the importance of vision articulation and implementation and the alignment of values and actions.

Customer focus. Understanding and satisfying the customer is central to quality management. Quality management is concerned with the end users of products and services, often referred to as external customers. It also extends to internal customers, members of the organization who can be thought of as "the person next in line … who receives the product or output of the work, with each subsequent person adding something of value" (Siegel & Byrne, 1994, p. 22). By attending to the voice-of-the-customer (VOC), or input from customers regarding their needs and desires, organizational members are better able to design and deliver products and services that meet customer requirements (Ehrlich, 2002). Input can include how customers define and prioritize their needs and expectations about quality, cost, delivery, service, safety, and corporate responsibility related to the deliverables (Smith, Blakeslee, & Koonce, 2002).

While the role of the customer is prominent in quality management literature, the topic receives little attention in management and organization theory. Danet (1981, as cited in Dean & Bowen, 1994) observed that these disciplines are more accustomed to viewing “organizations from the top down (management’s perspective) or from the
inside out (employee’s perspective) but rarely from the outside in (customer’s perspective)” (pp. 408-409).

Measurement, analysis, and knowledge management. The Baldrige view of measurement, analysis, and knowledge management “examines an organization’s performance measurement system- how it selects, gathers, analyzes, manages, and improves its data information, and knowledge assets” (Evans, 2005, p. 519). This broad area encompasses the development and monitoring of performance measures, examining data in order to make effective decisions, and knowledge management.

The balanced scorecard (Kaplan & Norton, 1996) and the Baldrige Criteria for Performance Excellence are “the two most influential frameworks” (Evans, 2005, p. 517) for performance measurement in organizations. The balanced scorecard moves beyond conventional accounting measures to identify measures that are consistent with an organization’s vision and strategy. Performance measures are developed based on four perspectives (Kaplan & Norton, 1996):

1. **Financial perspective**: Measures that address the financial objectives of particular units within an organization and the organization as a whole. These measures may be related to “increasing revenues, improving cost and productivity, enhancing asset utilization, and reducing risk” (p. 62). Performance measures from the other perspectives should ultimately be tied to the measures from this part of the scorecard. Examples include revenue/employee, unit costs, return on investment, and cost reduction rates.

2. **Customer perspective**: Measures that focus on the customer segment(s) an organization has chosen to serve. Loyalty and satisfaction of customer segments are dependent upon attention to product/service attributes, relationships, and image and reputation. These areas can be addressed by
developing performance measures that address market share, customer acquisition, customer retention, customer satisfaction, and customer profitability. Examples include market share, customer retention rate, satisfaction ratings, and product return rate.

3. **Internal perspective**: Measures that relate to internal processes that are critical to meeting organizational objectives. Internal processes can be thought of as innovation processes, operations processes, and follow-up processes. Examples include cycle time, productivity, and ROI of new products/services.

4. **Learning and growth perspective**: Measures that relate to the organization's infrastructure and human resources. Work climate, employee competence, and the use of technology are influential in shaping organizational learning and growth. Example measures addressing these areas include presence of defined decision-making processes, employee satisfaction and empowerment ratings, skill and training levels, and growth in “intellectual assets” (Evans, 2005, p. 518).

Like the balanced scorecard, performance measures in the Baldrige Criteria also fall into categories. As the Criteria has evolved, so too have the performance measurement categories, but despite the changes over time they still are reflective of the quality management constructs in the model. The Criteria (NIST, 2008b) advocates measuring four types of performance:

1. **Product and service performance**: Measures relate to characteristics of products and services that customers value. Examples include defect rates, on-time delivery/response, and reliability.
2. **Customer-focused performance**: Measures of “customers’ perceptions, reactions, and behaviors. Examples include customer retention, complaints, and customer survey results” (p. 58).

3. **Financial and marketplace performance**: “Measures of cost, revenue, and market position, including asset utilization, asset growth, and market share” (p. 58). Examples include percent gain in market share, return on assets, and resource liquidity.

4. **Operational performance**: Measures effectiveness, efficiency, and accountability of the organization’s processes, workforce, leadership, and ethics. Examples include percent participation in training, cycle time, percent of revenue donated to community causes, and number of regulatory infractions.

**Process management.** The quality of goods and services is dependent upon the processes used to design and produce them (Deming, 1986; York & Miree, 2004). A process is “an organized group of related activities that work together to transform one or more kinds of input into outputs that are of value to the customer” (Hammer, 2001, as cited in American Society for Quality, n.d.). Deming (1986) believed that problems within organizations, including the creation of poor quality outputs, were more attributable to the organization’s processes than its people. Process management examines ways in which processes within an organization are designed, managed, and improved (NIST, 2006).

“Understanding the ways in which people are organized to work and do their work” (Siegel, 1994, p. 112) is a critical component of process management. In comparison to the manufacturing sector, it is more difficult to understand how work gets accomplished in the service sector because the flow of work often cannot be visually
25 tracked (George, 2003). Examples of service sector work in progress that may not be visible to a process observer include e-mails or calls waiting for responses, reports and orders yet to be written or processed, and customers on hold.

A process or value stream map is a tool used to understand how work is accomplished. These maps include a brief description of each sequential step in a particular process along with the amount of time it typically takes to complete each step. Lag-time between steps, if occurring, is also documented. Maps may also include the job titles or names of process owners, those responsible for each step. Maps are created, using existing and newly collected data, by a small team of people, a majority of whom are responsible for carrying out the process being examined. Using teams is important in value stream mapping because it is uncommon for a single person to know all that goes on in a particular process (Schmoker, 1993).

Once completed, each step in the process/value stream map is analyzed from the viewpoint of the both internal and external customers to determine which steps of the process add value to the product or service. Customers are willing to pay for value-added steps, but not for others, when given the choice. Steps that are not value-added but are required due to laws or regulations are also noted (Huls, 2005). The goal is to decrease waste in the process by eliminating or refining steps that are not required or don’t add value to the product or service based on the customer’s perspective.

Examples of waste (Ehrlich, 2002; George, 2003) include:

1. Overproduction: producing more than what is needed for immediate use
2. Wait time: delays between two consecutive steps in a process; can be attributable to machines or people
3. Transportation: unnecessary movement of materials, products, or information
4. Motion: unnecessary movement of workers (e.g., movement to different work areas, navigating among paper or electronic files and keystroke-intensive procedures on computers)

5. Process waste: inclusion of process steps that don’t add value in the eyes of the customer or are not mandated

6. Defects/rework: products or services not meeting customer requirements, and

7. Excess inventory.

George (2003) argued that service processes are more vulnerable to waste than manufacturing processes for three reasons. First, in service environments much of the work isn’t visible which makes it difficult to track its flow and collect data on work processes. As discussed above, value stream mapping can help to visually document how work is accomplished and pinpoint areas of waste which can be eliminated or reduced through subsequent process improvement efforts. The second and third reasons for vulnerability to waste among service processes relate to variation. In service environments, interactions with customers are more complex and variable than typical interactions with inventory in the manufacturing setting. Additionally, individuals typically have more control over how they accomplish their work in service settings whereas standardized processes are the norm in manufacturing environments.

Results. The Baldrige model, through its Criteria for Performance Excellence, suggests that organizational performance encompasses far more than profit and market share. Monitoring and improving results in the areas of organizational leadership, the workforce, customer relations, work processes, and relations with suppliers and other partners is also important in when striving for performance excellence.
Studies (e.g., Easton & Jarrell, 1998; GAO, 1991; Hendricks & Singhal, 1996, 1997; Nair, 2006) have examined the link between quality management and financial or market performance in organizations. A GAO study (1991) was commissioned to determine the impact of formal quality management practices on company performance. Twenty companies, of varying sizes and sectors, that were among the highest scoring applicants for the 1988 and 1999 MBNQA were selected for inclusion in the study. Market share, sales per employee, return on assets, and return on sales were the financial performance indicators examined in the study and were reported by annual average percent change from the year of TQM implementation to the most recent year available. Market share increased for 82% of the reporting companies with 13.7% being the annual average increase. Among the reporting companies, 100% had increases in sales per employee with the annual average increase at 6.8 percent, not adjusting for inflation. In terms of return on assets, 22% of companies reporting experienced a decline while the other 78% had increases that averaged 1.3% annually. Return on sales increased annually, on average of less than a half a percentage point, in 75% of reporting companies.

Hendricks and Singhal (1996, 1997) examined the impact that winning an independent or company sponsored quality award had on the market value of 91 publically traded firms. Among the hypotheses tested, Hendricks and Singhal (1996) posited that winning a quality award would have a positive impact on market value as measured by the average abnormal change in stock price. This hypothesis was supported by the evidence and was especially strong among small firms (those having less than the median total assets of firms in the sample) and among firms receiving awards from independent organizations versus a parent or partnering company.
Using daily stock returns and other accounting variables (e.g., net income/employee, sales/assets), Easton and Jarrell (1998) examined the impact of quality management implementation on performance in 108 firms manufacturing and service firms. Each firm’s performance was compared to matched control portfolio based on three firms not using quality management that had the same standard industrial classification code and were also matched on “expected future performance, market size, debt-to-equity ratios, and a market risk factor” (Easton & Jarrell, 1998, p. 261). Findings suggested that quality management implementation improved performance and that more advanced implementation led to even stronger performance results.

More recently, meta-analysis has been used to examine the links between quality management and results. Using 23 studies published between 1995 and 2004, Nair (2006) sought to identify whether management leadership, people management, process management, product design and management, quality data analysis, supplier quality management, and customer focus correlated with firms’ financial performance, operational performance, product quality, and customer service and aggregate firm performance. With the exception of product design and management, each of the quality management practices examined positively correlated with aggregate firm performance and collectively they explained 89% of its variation. The study also sought to identify whether the relationships between individual quality management practices and performance were direct or moderated. Moderating factors influenced the association of virtually all of the quality management practices with the four performance measures. Two exceptions were the positive relationships between process management and customer service and process management and financial performance, which were not moderated. The researchers acknowledged the need for
further study of factors that moderate the relationship between quality management practices and performance and the interrelationship among quality management practices and their interaction effects.

Praise and Criticism.

The MBNQA has heightened awareness of the importance of quality and the process of continuous improvement to the viability of organizations. It has spawned the creation of numerous state-level quality awards and its international influence is reflected in the existence of the European Quality Award, the Mexican National Quality Award, and similar others (Flynn & Saladin, 2001). While still in its infancy, “Knotts, Parrish, and Evans (1993) found a high degree of support for the MBNQA from the Fortune 500 industrial companies, the Fortune 500 service firms, 120 small manufacturers, and 120 small service businesses” (Wilson & Collier, 2000, p. 362).

Through its Criteria for Performance Excellence, the MBNQA has been said to have codified the principles of quality management (Garvin, 1991) and represents the “best established framework” (Black & Porter, 1996, p. 2) for its practice. Millions of copies of the Criteria have been provided through direct requests to NIST and through its website. The Criteria has been praised as a valuable organization assessment tool and guide to system-wide continuous improvement (Kirby, 2004).

Applying for the MBNQA has also been touted for its value. While there are multiple rounds to the award process, every applicant receives written feedback outlining strengths and areas for growth along with numerical scores for each construct (Vokurka, 2001). “Hundreds of organizations each year apply for the award simply to use the examiners as inexpensive quality consultants who can critique their practices and tell them how to make better use of quality techniques for the future” (Vokurka, 2001, p. 18). With application fees ranging from $1,000 for nonprofit K-12 education
organizations to $6,000 for manufacturing, service and health care organizations (NIST, 2007), completing the application and reviewing the feedback report provides organizations with a cost-effective comprehensive evaluation of their practices (Vokurka, 2001). Applicants making it to higher rounds of the award judging also receive a site visit by a team of judges and are assessed an additional fee (NIST, 2007).

The Baldrige model, consisting of quality management constructs and the relationships between them, has also been criticized. The proposed relationships among the model's constructs have changed significantly over time based on the input of expert practitioners (Vokurka, 2001) yet the changes lack empirical support (Flynn & Saladin, 2001). Additionally, model iterations often use two-headed arrows to connect the constructs. This suggests that the constructs are all related and that the direction of causation between them is unknown (Meyer & Collier, 2001). Since several of the model iterations have not been recursive causal models, systems of equations without reciprocal causation arrows or feedback loops (Bollen, 1989), the Baldrige model can be difficult for researchers to test empirically. The 1992-1996 model (see Figure 2.1) is recursive in nature and was selected for use in this study.

Veins of MBNQA Research

“Although the Baldrige criteria and framework are widely accepted in practice, there is surprisingly little theoretical and empirical evidence of their validity [Ford and Evans, 2000]” (Flynn & Saladin, 2001, p. 618). Instead of empirically validating the model, other types of Baldrige-based research has been more common in peer-reviewed journals. Researchers have used the MBNQA Criteria to operationalize TQM (e.g., Samson & Terzirovski, 1999) or specific quality management constructs (e.g., Dow, Samson, & Ford, 1999). Others (e.g., Pannirselvam & Ferguson, 2001) have
tested the relationships between quality management constructs using data from state quality awards that are similar to the Baldrige. Some have addressed the validity of the Criteria. For example, “Ford and Evans (2000) conducted a detailed analysis of the content validity of the strategic planning category. Evans and Ford (1997) examined the relationship between Baldrige core values and the processes embedded in the criteria” (Flynn & Saladin, 2001, p. 619).

A small number of studies have examined the validity of the Baldrige model as a whole using data from manufacturing (Flynn & Saladin, 2001; Wilson & Collier, 2000), health care (Meyer & Collier, 2001), and education (Badri et al., 2006; Winn & Cameron, 1998) sectors. These studies tested the model as depicted in Figure 2.1, or with slight variations. The relationships between the constructs were articulated this way by the MBNQA between 1992 and 1996 before being altered significantly in 1997 (Flynn & Saladin, 2001). This version of the model was in use when the pilot criteria for the health care and education sectors first became available. It, in comparison to other Baldrige model iterations, has been more frequently used by researchers in empirical studies because it is a recursive causal model amenable to testing.

While the context for these studies varied, the overall approach to the research was similar. First, the quality management constructs within the Criteria were indirectly measured. The constructs are essentially the same but their names vary somewhat in the studies based on what they were called in the Criteria. Researchers developed their own scales of survey items, or selected items from other instruments or data sets that closely mirror the Criteria for a given sector and year, in order to capture the breadth and depth of each model construct, thereby establishing content validity for their instrument. Once data was collected, regression analysis was used to examine the relationships between the constructs in the model individually. Multiple regression
was then used to determine how some constructs collectively influenced the outcome constructs. Finally, structural equation modeling was used to examine the strength of the model’s predictive relationships as well as the “extent to which the set of specified relationships is able to reproduce the relationships in the actual data set (goodness-of-fit)” (Winn & Cameron, 1998, p. 504). These studies and their findings are presented in more detail below.
Figure 2.1. Malcolm Baldridge National Quality Award Model, 1992-1996.
Wilson and Collier (2000) examined the validity of the Baldrige model for manufacturing using the 1995 model and *Criteria*. They developed a survey instrument with 101 items which was evaluated by Baldrige examiners and executive committee members of an ASQ chapter. The survey was sent to 128 manufacturing companies for pilot testing and 38 (30%) were returned. The survey’s scales demonstrated internal consistency with Cronbach’s alpha averaging .81.

In the main study, plant quality managers were targeted for participation. The survey was distributed to a sample of 800 automotive manufacturing firms. Of the returned surveys, 160 (20%) were suitable for analysis. Findings supported the premise that Leadership is the “driver” of an organization’s “system” since the leadership variable was significantly and positively related to the Information and Analysis, Strategic Planning, Human Resource Management, and Process Management variables, but had no significant direct effect on the outcome variables, Financial Results and Customer Focus/Satisfaction (Wilson & Collier, 2000). Two of the systems variables, Information and Analysis and Process Management, had positive and significant effects on Customer Focus/Satisfaction and Financial Results whereas the relationship between both Strategic Planning and Human Resource Management and either of the outcome variables was not significant. Process Management was found to have twice the impact on Customer Focus/Satisfaction as it did on Financial Results (Wilson & Collier, 2000). Fit statistics for the initial model did not fall within acceptable levels but were improved considerably with the addition of paths within the system variables. These paths linked Information and Analysis to each of the remaining system variables and also included a path from Strategic Planning to Human Resource Management and a path from Human Resource Management to Process Management.
Flynn and Saladin (2001) documented the evolution of the Baldrige model and its constructs and tested the relationships in three models using data from manufacturing settings. This study involved over 4,000 individuals from 164 manufacturing plants in the electronics, machinery, and transportation components industries. Plants were located in Germany, Italy, Japan, the United Kingdom, and the United States and were distributed fairly evenly across these countries. Items were selected from the World Class Manufacturing database to operationalize constructs in the Baldrige model as defined in 1988, 1992, and 1997. A total of 26 individuals were targeted for participation in each plant, with nearly half of the respondents being direct laborers. The content of questionnaires received by participants varied according to their position within the plant, but there was some overlap of items between questionnaires. The analysis used aggregated plant-level data based on the mean response per items.

The analysis found support for many of the relationships in the Baldrige model consisting of leadership as the driver of system variables which then in turn impact customer focus and operational results. Leadership was found to have a positive and statistically significant impact (p < .01) on each of the system variables. Of its relationship with the system variables, Leadership's relationship to Information and Analysis was the strongest. Customer Focus and Satisfaction was impacted significantly by Human Resource Development and Management (p < .05) and Management of Process Quality (p < .01) while Quality and Operational Results was significantly impacted by Leadership (p < .01), Strategic Planning (p < .05), and Management of Process Quality. The relationship between Information and Analysis and each of the outcome variables was not tested.
While Wilson and Collier (2000) and Flynn and Saladin (2001) empirically examined the appropriateness of the Baldrige model in manufacturing settings where the quality movement in the U.S. first took hold, Meyer and Collier (2001) tested it in a sector increasingly concerned about quality management—healthcare (Waldman & Schargel, 2006). The purpose of the study was three-fold: to develop a measurement model capturing the content of the Baldrige Health Care Pilot Criteria for Performance Excellence; to assess whether Baldrige model is a good fit for health care organizations; to determine the strength and direction of the causation among the seven model constructs. A questionnaire was developed to address the first aim of the study. “While the seven categories and the associated structural (causal) model in the original and health care criteria are similar, the specific measures addressed within each category (i.e. the measurement model) are significantly different” (Meyer & Collier, 2001, p. 405). Items were directly traceable to the seven constructs and their 28 dimensions as presented in the 1995 Health Care Pilot Criteria to ensure content validity. Pretesting was done with hospital quality administrators to obtain initial feedback on the questionnaire. Next, a pilot test was conducted with 51 hospitals to examine scale reliabilities. This was gauged using Cronbach’s alpha with 0.60 as the minimum threshold. Some items were dropped based on their alphas from the pilot test, but the authors choose to retain a few items that didn’t meet the threshold (alphas ranged from .56 to .96) since they believed dropping them would compromise the content validity of the instrument. The final questionnaire had 115 items with scale reliabilities from .74 to .93 based on data from the main study. Community or general acute care hospitals in the U.S. with more than 60 beds served as the population for the study. A questionnaire was sent only to hospitals with a Director of Quality, Vice
President of Quality, or a Quality Manager. In all, 814 questionnaires were mailed, 228 (28%) were returned, and 220 questionnaires were suitable for analysis.

In order to assess whether the constructs in the Baldrige model are a good fit for health care and to determine the strength and direction of their causation, 18 hypotheses were tested with the significance level was set at .05 (Meyer & Collier, 2001). Based on path weights, Leadership’s effect was significant on all variables except Customer Focus and Satisfaction. Information and Analysis had a significant effect on Strategic Planning, Human Resource Development and Management, and Process Management but not on Customer Focus and Satisfaction. Strategic Planning was not found to impact Performance or Customer Focus and Satisfaction. Both Human Resource Management and Process Management did not significantly impact Performance but they did have a significant impact on Customer Focus and Satisfaction. Finally, Performance was found to significantly impact Customer Focus and Satisfaction. Several measures of model fit were examined for confirmatory purposes and they suggested the model adequately represented the data. Modifying the model to obtain a higher degree of fit was not explored by the researchers.

One campus of a large Midwestern university served as the setting of a study that aimed to determine the appropriateness of the Baldrige model for higher education (Winn & Cameron, 1998). The study utilized data that was collected from selected items on a questionnaire, discussed further in Chapter 3, distributed to the population of 10,334 permanent non-instructional staff. The overall response rate was 47% based on the return of 4891 usable surveys.

Respondents represented seven functional areas in the institution—President’s Office (2%), Business and Finance (20%), Academic Affairs (60%), Student Affairs (10%), Research (6%), Development (1%), and University Relations (1%)—and five institutional job classifications – Professional and Administrative (51%), Specialists and Technicians (5%), Office Personnel (27%), Operations, Trades, and Maintenance (15%), and Health-Related Personnel (3%). (p. 499)
Regression analysis was used to test the Baldrige model’s assumption “that the organization’s leadership directly affects the organizations’ systems and outcomes, and the organization’s systems also have a direct impact on its outcomes” (Winn & Cameron, 1998, p. 501). The relationship between leadership and each of the system dimensions was relatively strong and statistically significant (p<.01). The direct relationship between leadership and the outcome dimensions was not supported because leadership’s relationship with operational results was not significant and the relationship with customer focus and satisfaction was statistically significant (the level was not reported) but still weak. Each system dimension had a statistically significant and “relatively strong” (p. 503) effect on both operational results and customer focus and satisfaction. Of the systems dimensions, human resource development and management and process management had the largest effects on operational results while process management and strategic quality planning had the largest effects on customer focus and satisfaction. Collectively, the systems dimensions accounted for 61% of the variation in the customer focus and satisfaction dimension and 35% of the variation in the operational results dimension. Leadership’s effects on the outcome dimensions were found to be “mediated through the organizational systems” (Winn & Cameron, 1998, p. 503).

Structural equation modeling was used to examine the Baldrige framework as a whole. Using LISREL maximum likelihood estimates, 14 predictive relationships were examined: from leadership to each of the four systems dimensions; from leadership to the two outcome dimensions; and from each systems dimension to both outcome dimensions. The maximum likelihood estimates were then used to calculate indicators of fit. The model was found to have poor fit, even when analyzing a random subset of the data (9% or 400 respondents) to compensate for the fact that LISREL is easily
influenced by large sample sizes. The researchers then used LISREL in an exploratory fashion to develop an alternative model consistent with the data set. Their alternative model added a path from Quality Information and Analysis to Strategic Planning; from Strategic Planning to Human Resource Development and Management; and from Human Resource Development and Management to Management of Process Quality. The alternative model showed that Customer Focus and Satisfaction was directly influenced by Management of Process Quality and Strategic Planning while Quality and Operational Results was impacted by Management of Process Quality and Human Resource Development and Management. The researchers concluded that the Baldrige model constructs were relevant to higher educational settings and that each was an important component of quality management.

A similar higher education study was conducted in an international context by Badri, Selim, Alshare, Grandon, Younis, and Abdulla (2006). The population consisted of colleges and universities in the United Arab Emirates that met accreditation and minimum size requirements. The institution served as the unit of analysis and there were 15 in the sample. Individuals who held a position with chancellor, advisor, dean, department chair, or unit head in their title were invited to complete the questionnaire. Questionnaire details are presented in Chapter 3.

Across sample institutions, 409 individuals were recruited for participation. In total, 224 (55%) email questionnaires were returned with 220 suitable for analysis. The data was used to examine 22 hypotheses. Like the previous model validation studies, predictive relationships were specified within the framework such that Leadership was hypothesized to have a positive direct effect on system variables (Measurement, Analysis, and Knowledge Management, Strategic Planning, Faculty and Staff Focus, and Process Management) as well as outcome variables (Student, Stakeholder and
Market Focus and Organizational Performance Results). Hypotheses tested the relationship between the systems variables and the two outcome variables. Researchers hypothesized several causal links among the system variables: between Measurement, Analysis, and Knowledge Management and the other system variables; between Strategic Planning and both Faculty and Staff Focus and Process Management; and between Faculty and Staff Focus and Process Management. Additionally, they hypothesized that Organizational Performance Results had a positive effect on Student, Stakeholder and Market Focus. The last hypothesis tested whether Winn and Cameron’s (1998) modified framework, the only other derived from data in a higher education setting, was a good fit with their data.

The predicted relationships between the constructs of the Baldrige model were supported by Badri et al.’s (2006) data. A positive and significant ($p < .01$) relationship existed between Leadership and the four system constructs as well as between each of the four system constructs and each outcome construct. Unlike the previous higher education study, Badri et al. found that the relationship between Leadership and each of the outcome variables was positive and statistically significant. Multiple regression analysis revealed that the system constructs, collectively, had strong and significant effects on the outcome dimensions, accounting for “approximately 84 percent of the variation in the student, stakeholder and market focus dimension and approximately 93 percent of the variation in the organizational performance dimension” (p. 1134). SEM provided support for the hypothesized causal relationships between the framework constructs and for the framework as a whole (Badri et al., 2006). Standardized path coefficients for the set of causal relationships were all significant ($p < .01$ or $p < .05$). Path coefficients from Leadership to each of the system constructs ranged in value from 0.60 to 0.75 while the path coefficient from Leadership to Student, Stakeholder
and Market Focus and to Organizational Performance Results was 0.22 and 0.54, respectively. The highest path estimate between the individual system constructs and the outcome constructs was 0.81 for the path from Process Management to Student, Stakeholder and Market Focus. The hypothesized causal paths between the systems constructs had path coefficients ranging from 0.32 (from Strategic Planning to Process Management) to 0.62 (from Faculty and Staff Focus to Process Management). Additionally, Organizational Performance Results had a significant effect on Student, Stakeholder and Market Focus with a path coefficient of 0.59. Finally, measures of model fit (root mean square error of approximation, comparative fit index, goodness of fit index, incremental fit index, and the fit index) provided support for Baldrige framework as well as the Winn and Cameron (Winn & Cameron, 1998) model. The researchers concluded that the Baldrige model and criteria “is a useful tool for developing and managing quality systems in higher education” (Badri et al., 2006, p. 1142).

Quality Management in Elementary and Secondary Education’s Support Functions

Continuous improvement of processes with the aim of providing better support services for customers in elementary and secondary education settings has not been well-documented in the literature. Literature focusing on four of the seven quality management constructs in the Baldrige model was reviewed here: Strategic Planning, Staff Focus, Stakeholder Focus, and Results. The literature on Staff Focus was broken down into discussion on site-based management and staff development. The literature on Results was broken down into discussion on financial results and staff-related results.

Strategic Planning in Support Functions
Strategic planning is “a disciplined effort to produce fundamental decisions and actions that shape and guide what an organization is, what it does and why it does it” (Bryson, 1995 as found in Lane, 2005, p. 197). It involves gathering and utilizing a wide variety of data and information, identifying and exploring alternative future actions, and considering the potential implications of present and future decisions (Lane, 2005). Strategic planning fosters awareness of roles people fulfill throughout the organization as well as an awareness of external stakeholders’ perspectives and subsequently helps individuals to go about their work keeping the organization’s future in mind (Rieger, 1994). While Hambright and Diamantes’ (2004) literature review suggested that “there exists no common conceptual framework for K-12 educational strategic planning,” (p. 237) efforts often have common elements. These elements include pre-planning, developing or examining existing vision and/or mission statements, determining core beliefs, conducting internal and external environmental scans, identifying strategic issues, prioritizing the issues, and developing action plans (Hambright & Diamantes, 2004). While some support service personnel may be involved in the district’s formal strategic planning process, the majority of such personnel will have a roles limited to learning of the goals and objectives stemming from the strategic issues and implementing related action plans.

Outside of school district efforts, strategic plans developed by state and national associations or interest groups also have potential impact on support service workers in educational settings. Strategic planning was a component of the conference titled *Trends: School Food Service in the Year 2000 and Beyond* sponsored by the National Food Service Management Institute in 1991 (White, Sneed, & Martin, 1992). Conference participants, ranging from front-line school cafeteria workers to district- and state-level school nutrition program directors from across the country, articulated the
vision that “every child will have the opportunity to enjoy the benefits of effective child nutrition programs, with healthy food choices, provided in pleasant surroundings, served by compassionate people” (White et al., 1992, p. 102). Environmental scanning led to the identification of trends likely to impact school food service programs including educational restructuring, an increase in public awareness of nutrition and its link to good health and learning, concern for the environment, advances in information systems and other technology, competition from within the school and from the private sector, changes in family demographics, and the federal government’s role in school nutrition programming (White et al., 1992). Strategic issues including empowering personnel to “effectively implement all aspects of the school nutrition program… assessing nutritional needs of children and evaluating program effectiveness” (p. 102) were identified.

One of the action plans stemming from the Trends conference involved the development of a national research agenda. A task force was later convened to address this agenda and its work led to the development of a financial management information systems (FMIS) model (Cater, Conklin, & Cross, 2005). The goal of the FMIS model was to standardize financial information across the industry for the purpose of decision making and program evaluation (Cater, 2007). A software program called FUNDamentals was developed based on the FMIS model and documentation showed it being used in over 1,650 school districts across the country at the beginning of the 2004-2005 school year (Cater, 2007).

Staff Focus in Support Functions

The people within an organization play a critical role in shaping its performance. In the Criteria (NIST, 2007), having a focus on the workforce means developing and engaging people to utilize their potential as they carry out the organization’s work.
Establishing a supportive work environment and ensuring that the organization is staffed appropriately, in terms of the number of workers and the knowledge and skills they possess, are additional aspects of a focus on the workforce (NIST, 2007). These elements of Staff Focus are reviewed using literature pertaining to support service personnel’s involvement in site-based management and staff development.

*Site-based management.* Site-based management (SBM) has been commonly used throughout school districts as a wage to engage school employees, parents, and community members in decision making regarding site goals, work practices, staffing, and resource allocation. Baldwin (1997) conducted a qualitative study based on interviews with 23 support service staff members from five schools in one state to begin to address the “dearth of material concerning the responsibilities and roles of the support service staff” (p. 27) working in schools with SBM. Interviewees worked at schools located in urban, rural, and suburban settings; two of the schools were junior high schools and the others were elementary schools. Two-fifths of the schools had five or more years of experience with SMB while the others were in the first year of implementation. Interviewees noted that before SBM, minimal attention was given to issues that were unrelated to instruction; the “impact of how things got done and how routines were established was secondary” (p. 28).

Baldwin’s (1997) study highlighted ways in which SBM affected the engagement of support personnel within schools and their working environment. Under SBM, 85% of the interviewees felt their roles within the school had been enlarged and that their opinions were valued by others in the school community. Support personnel experienced increased visibility and perceptions of higher levels of respect from faculty. SBM gave other staff members knowledge of the roles and responsibilities of support personnel which led to greater understanding of “how the actions of the professional
staff and the support service staff affected each other” (p. 29). On the negative side, SBM team meetings were typically held outside of work hours. Support staff serving on the team had to volunteer their time in order to participate as their contracts didn’t allow provisions for extra pay. Some reported receiving pressure from their peers for breaking the contract by attending the meetings. Another drawback was that schools that improved the efficiency of their operations under SBM were not allowed to keep the savings generated, thus negatively impacting morale.

Staff development. Staff development involves “processes that improve the job-related knowledge, skills, or attitudes of school employees” (Sparks & Loucks-Horsley, 1989, Definitions). In elementary and secondary education literature, the term staff development is used interchangeably with professional development, inservice or inservice education, and human resource development (National Staff Development Council [NSDC], 2007b). Pardini (2005) believed the paucity of literature on staff development for support personnel provides evidence that districts place a much higher priority on student and teacher learning and that when offered for support personnel, staff development “pales in comparison with the best professional development available to teachers” (p. 15). Yet, learning among employees, no matter what their role, is critical to reaching organizational goals. The National Staff Development Council, “the largest non-profit professional association committed to ensuring success for all students through staff development and school improvement” (NDSC, 2007a), echoes this sentiment by stating that “all who affect student learning — from board of education members to classified/support staff — must continually improve their knowledge, skills, and attitudes in order to ensure high levels of learning for all students” (Hirsh, 2001, Powerful Language).
Knowledge and skills are needed to effectively work toward meeting goals, whether department-, site-, or district-based. Differentiated staff development is needed for all staff members (Nowak, 1994). Role-related staff development for bus drivers may include learning how to effectively work with students with special needs, identifying root causes of common behavioral issues, emergency preparedness, and writing job-related reports (Welch & Daniel, 1997; Zepeda, 2000). Studies by Casanova (1991) and Fry (1991) confirm the need for role-related training for school secretaries noting that the majority of secretaries have had no specialized training for their roles prior to being hired (Casanova, 1991) and that their responsibilities have “grown tremendously in direct proportion to the increase in state legislated mandates and federal program accountability” (Fry, 1991, p. 3).

Organization-wide staff development should build sense of belonging, create awareness of the district’s goals and challenges, help employees gain a sense of the interdependence among people and functions in the district, and enhance skills leading to increased morale and teamwork (Zepeda, 2000). Learning about the district’s approach to customer service and approaches to resolving customer issues assists with these efforts (Owen, 2005) and is an important staff development component in districts winning the MBNQA (Chugach School District, 2003; Community Consolidated School District 15, 2003; Jenks Public Schools, 2005; Pearl River School District, 2001).

Staff development plays an important role in building workforce capability and capacity as some districts view these opportunities as a critical part of their succession planning (Andreson & Durant, 1991; Mayes, 2005; Owen, 2005) and job retention (Mayes, 2005) strategies for support personnel. Training employees can build the capacity of the district’s support personnel pool allowing individuals to be called on to
fill some types of vacancies, saving the district both time and money (Zepeda, 2000). It is also common for managers of classified staff to rise through the ranks and be promoted to such positions without having ample, if any, training for their managerial role (Andreson & Durant, 1991). Anecdotal reports of programs addressing these development needs are reported in the literature (e.g., Andreson & Durant, 1991; Mayes, 2005) and include topics like planning, organizing, and delegating; systems thinking and leadership; and teamwork, group-process techniques, and communication.

School districts face challenges to offering optimal training and development opportunities for employees. Lack of time is frequently identified as a challenge for effective teacher staff development and the same is true for support staff. Contracts specify certain hours within which work activities, including training, must occur and individuals receiving training outside of the work day are not typically compensated for their time (Baldwin, 1997; Siegel & Byrne, 1994). When training relies on people to voluntarily participate it is difficult to ensure that everyone within the system hears the same message or is uniformly equipped (Siegel & Byrne, 1994). Finding time for training during normal work hours is complicated by the fact that most districts do not have a substantial pool of substitutes for non-certified positions (Fry, 1991; Zepeda, 2000). Additionally, districts use non-student contact days, such as the days leading up to the start of the school year or days that follow the end of a marking period, for delivering staff development. Many bus drivers, food service workers, secretaries, and other support staff are not scheduled to work on those days (Mayes, 2005).

Other challenges to providing staff development for support personnel have been documented. Participation in staff development has been constrained by the lack of awareness and availability of opportunities (Casanova, 1991; Fry, 1991), lack of
incentives for improved job skills and the lack of reimbursement for training expenses (Fry, 1991). The delivery of staff development can also be challenging as school systems frequently rely on train-the-trainer strategies for reaching their employees (Siegel & Byrne, 1994). Pressure on in-house trainers include having to train others before mastering the skills themselves and assuming training duties on top of normal day-to-day work with little time or other compensation for their efforts (Siegel & Byrne, 1994). Despite these challenges, providing meaningful staff development helps to ensure that staff members have the skills and knowledge needed to work together to accomplish district goals (Welch & Daniel, 1997).

**Stakeholder Focus in Support Functions**

Customer satisfaction is important in school food service programs since meal program participation rates and other food sales impact the financial viability of programs (GAO, 2003; Meyer, 2002b). Practices that programs have used to build relationships with and satisfy student and adult customers include gathering student input for meal planning (GAO, 2003; Wilson & Alkire, 1995), taste testing (Would you? Could you?, 2006), offering choices (Buzalka, 2004; GAO, 2003; Wilson & Alkire, 1995) including those that reflect the diversity of the student population (Hmong dishes, 2004), and special events or incentives (Wilson & Alkire, 1995).

Measuring customer satisfaction of school food service programs has been aided by the work of the National Food Service Management Institute (NFSMI). Five surveys are available: high school (Meyer, Conklin, & Carr, 1997), middle/junior high (Meyer, 1998), upper elementary (Meyer, 2000), lower elementary (Meyer, 2001), and staff (Meyer, 2002a). The surveys are designed to measure perceptions of food service and overall levels of satisfaction of current and potential customers (students and staff who do not purchase meals or other food items from the food service program), with
the exception of the lower elementary survey that collects data from students’ parents (Meyer, 2002b). The surveys measure customer perceptions of food service and their overall levels of satisfaction based on five factors: food quality, staff, ambiance, time, and price.

A study by LeBlanc and Meyer (2005) highlighted the importance of seeking information directly from customers in school food service settings. In an application of the boundary spanner theory, the researchers compared student perceptions of food quality, staff, ambiance, and overall satisfaction with school foodservice employees’ perceptions of how they believed students would rate the factors. Forty-one schools in eight states using the Middle/Junior High School Foodservice Survey (Meyer, 1998) that contracted with the Foodservice Analysis and Benchmarking Service to analyze the surveys were invited to participate in the study. Consenting schools received employee surveys containing items that closely matched those found in the student survey. On the employee and student versions, factor items and one item measuring overall satisfaction with school food service were rated using a seven-point Likert-type scale (1 = very unhappy and 7 = very happy). Food service employees from 34 of the 41 schools returned surveys that could be included in the analysis, yielding a response rate of 83%. Mean scores for employee and student perceptions of overall satisfaction and the three service factors from each school were calculated. With the level of significance set at $p = .05$, there was a significant difference in the mean scores for overall satisfaction in 12 of the 34 schools (35%) with the employee mean being higher. “The aggregate mean scores for employee perception of overall satisfaction and the service factors were greater than the student mean scores” (Results, para. 3) and employees’ beliefs about student perceptions of food quality ($p < .001$), ambiance ($p < .01$), and staff ($p < .001$) were significantly higher than students’ perceptions of
these factors (LeBlanc & Meyer, 2005). “The students’ perception of food quality was correlated (p < 0.01) with ambiance (r = 0.58) and staff (r = 0.64). Ambiance was also correlated (p < 0.01) with staff” (Results, para. 3).

Results in Support Functions

The Results construct is multi-faceted as it examines both performance and improvements made in key areas. Existing literature on results in support services focus on financial performance and workforce outcomes.

Financial results in support functions. Of the support service functions in elementary and secondary education, food service programs have received the most attention in literature examining financial outcomes. Based on data solicited from a representative sample of 102 districts in Ohio, Wilson and Alkire (1995) found that 44% of food service programs operated at a financial gain while 56% operated at a loss during the 1990-1991 school year. The GAO (1996) found that 19% of programs operated at a deficit during the 1995-1996 school year. This study’s data was drawn from a simple random sample of 1,000 school food authorities (SFA), those “responsible for managing school food services for one or more schools or for a school district” (GAO, 1996, p. 4), from the universe of 19,248 such authorities in the 50 states and the District of Columbia and the entire universe of 1,462 authorities on record that year as contracting with a food service management company (FSMC). Among those using a FSMC, 61% operated at a deficit the year prior to contracting for services (GAO, 1996). Another study by the GAO (2003) examined school food service programs in Florida, Missouri, New York, Ohio, Texas, and Virginia for the 1996-1997 to 2000-2001 school years and found that “total expenditures increased by about 22 percent, while their total revenues increased by about 20 percent” (p. 4). This study
provided further evidence that obtaining positive financial results can be challenging for school food service programs.

Concern about the financial viability of food service programs in educational settings has prompted research examining factors contributing to their financial success. Wilson and Alkire’s (1995) study of food service programs in Ohio examined the impact of 17 variables, derived from the literature and in consultation with experts, on cost-to-revenue percentage. The only variable having a significant impact, at the .05 level, on this measure of financial performance was the availability of food choices as measured by the question “Does your school district offer choices for any of the four required food components?” (Wilson & Alkire, 1995, p. 16). Offering choices had a negative impact on cost-to-revenue percentage which the researchers thought “may be attributed to the waste factor and resulting expense incurred when some food choices are not selected” (p. 17). Another study examining the financial status of one state’s school nutrition programs was reported by March and Gould (2001). Findings suggested that as student enrollment increased, so did financial success. An enrollment of 400 students per school was needed in order for program operations to break even financially (March & Gould, 2001). Hwang and Sneed (2004) examined financial data from food service programs in districts with a student enrollment of 10,000 or greater. Responding districts, 191 of 862 receiving questionnaires, had enrollments ranging from 9,800 to 230,000 students. With an alpha level of 0.05 used for statistical tests, one-way ANOVA revealed a significant difference in total program revenue based on district enrollment, with total revenue increasing as school enrollment increased. Differences in food cost percentage were also significant with percentages decreasing as the district enrollment increased.

Staff-related results in support services. Research has been conducted
examining workforce-related results in support functions of elementary and secondary education. Studies (Banach & Kasprzyk, 1989; Casanova, 1991; Kuiper & Van Huss, 1981) suggested that workplace satisfaction levels among secretaries and clerical personnel working in school districts are generally positive. Banach and Kasprzyk (1989) interviewed 504 public school secretaries from throughout the United States; the majority of secretaries expressed satisfaction with their work and bosses. Casanova’s (1991) found that elementary school secretaries derived great personal satisfaction from their work.

Kupier and Van Huss (1981) examined satisfaction with work, compensation, co-workers, supervision, and promotion opportunities among 274 secretarial and clerical employees in a southeastern state school district. Of the satisfaction dimensions, pay was the lowest and school office personnel were significantly less satisfied with pay (p < .05) when compared to staff secretaries and other clerical workers. Satisfaction with supervisors and with co-workers was high among all groups of participants while satisfaction with opportunities for promotion was low. Satisfaction levels among participants in this study were also related to role ambiguity, “the degree to which clear information is lacking regarding (a) the expectations associated with a role, (b) methods for fulfilling known role expectations, and/or (c) the consequences of role performance” (VanSell, et. al., 1977 as cited in Kuiper & Van Huss, 1981, p. 1). Overall, role ambiguity was low for all three groups but school office personnel reported significantly higher levels of role ambiguity than the others, likely due to their contact with and demands from many stakeholders including students, parents, building and district administrators, and teachers. Role ambiguity was negatively correlated with each kind of satisfaction examined. Findings from these studies suggest that increasing pay (Casanova, 1991; Kuiper & Van Huss, 1981) and decreasing role
ambiguity (Kuiper & Van Huss, 1981), nursing duties (Banach & Kasprzyk, 1989; Casanova, 1991) and student discipline responsibilities (Banach & Kasprzyk, 1989; Casanova, 1991) will lead to higher levels of satisfaction among this group of support service personnel.
CHAPTER THREE

METHODS

The study’s methodology is discussed in the pages that follow. The chapter is organized into four sections. The first section focuses on general methods and includes a description of the research design followed by information on the target population and sample. Variable specifications are reviewed next. The steps taken to develop the study’s instrument are also presented followed by details relating to the Institutional Review Board. The second section of the chapter pertains to the pilot study. This section is broken down into discussion of data collection procedures, sample characteristics, and evaluation of the instrument. The main study is the focus of the chapter’s third section. This section is broken down into discussion of data collection procedures and sample characteristics. The fourth and final section of the chapter focuses on the study’s approach to data analysis.

Research Design

This study adopts a quantitative approach to survey research to address multiple purposes. The purposes are: (1) to describe the current state of quality management in support functions of public elementary and secondary education based on the perceptions of front-line workers, (2) to determine whether support function (role) relates to perceptions of quality management, (3) to examine the strength and direction of the relationships among quality management constructs, and (4) to determine whether the quality management model proposed by the Malcolm Baldrige National Quality Award program adequately describes perceptual data collected from support service employees in elementary and secondary education settings. The study’s purposes can be best addressed using a correlational research design (Gall et
Structural equation modeling served as the study’s primary analytic technique.

**Target Population and Sample**

The individual is the unit of analysis in this study. Support service personnel working for the 336 regular elementary and secondary education school districts in Minnesota (Minnesota Department of Education, 2007) make up this study’s population. This population includes (1) food service, (2) operations and maintenance, (3) transportation, (4) human resources or business services, and (5) administrative/other support service employees. Business services employees work in areas including accounting, finance, payroll, purchasing, and warehousing. The administrative/other support group includes employees providing secretarial, clerical or technical support for school- or district-level administrators, departments, or programs. Individuals from these support service areas were selected for participation in the study since they are not involved with instruction.

Employees from regular public school districts in Minnesota were targeted for four reasons. First, districts of this type serve as the frame of reference for the general public and are more common than other types of districts, such as those that provide management and/or instructional services for a group of school districts, or those with a primary focus on vocational or special education (Dalton, Sable, & Hoffman, 2006). Second, Minnesota has a state-level quality award program that uses the Baldrige model, which is examined in the study, and regular public school districts are among the recipients. Third, the researcher is familiar with the work of support service personnel based on previously employment in Minnesota school districts. Fourth, the geographical location of these districts made it possible for the researcher to conduct visits for recruitment and data collection purposes when needed.
The study excludes some support service personnel. Paraprofessionals, teacher’s aides, and media clerks were not included in the study since their services are considered part of instruction. Principals, counselors, deans, nurses, and social workers are also excluded from the study even though their salary and benefits are generally coded to support services for reporting purposes. Employees from charter schools were also excluded. Although publicly funded and considered to be their own district for state and national data collection and reporting purposes, charter schools were excluded from the study because they are not classified as regular school districts in Minnesota and they generally have a small number of support personnel. Support service personnel working for private elementary and secondary schools/districts are also excluded. Private education has different funding streams and is not subject to the same accountability measures and therefore may focus quality management efforts differently than their public education counterparts. Additionally, support service personnel who were employed by a contract service provider and not a public school district were also excluded from participation. This exclusion was made based on the availability of resources for the study.

Individual participation was secured through the convenience sampling of school districts. It was believed that school districts already familiar with the Baldrige model would be more inclined to participate in the study than those that were not. The Minnesota Quality Award, based on the MBNQA, recognizes varying levels of performance excellence among organizations from all sectors (Minnesota Council for Quality, 2007). Each district that received the Minnesota Quality Award between 1996 and 2006 was invited to participate in the study. The Baldrige model is also utilized by a partnership in Minnesota involving school districts, institutions of higher education, and businesses. For school districts, membership in the partnership requires a
commitment to system-wide continuous improvement and regular use of the *Education Criteria for Performance Excellence* for self-assessment and improvement planning. Districts in the partnership were invited to participate in the study if they employed more than 20 support staff. Three other districts were invited to participate based on referrals received from a Baldrige examiner familiar with the continuous improvement efforts of several school districts in Minnesota.

An introductory letter, providing a brief description of the study and an invitation to participate or obtain further information, was sent via e-mail to the superintendent of these districts. The letter used for districts that received the MN Quality Award is included in Appendix A. Other introductory letters were tailored slightly depending on the basis for participation. Follow-up contacts were made by phone. Additional information, including a sample letter of cooperation for IRB purposes, was provided to superintendents expressing interest in the study.

Six school districts (see Table 3.1) were recruited for the study using the process outlined above. District A was a recipient of the Minnesota Quality Award at the Advancement level. This district enrolled about 1,750 students and had approximately 25 support staff. District A used a contract service provider for food service operations. District B was a partnership member and enrolled just over 1,600 students. Food service operations were provided by a contract service company in this district. About 20 support service employees in District B were eligible for participation in the study. District C had approximately 24 support staff and utilized a contract service company for student transportation. This district was a partnership member and enrolled approximately 1150 students. District D, also a partnership member, enrolled approximately 1,250 students and employed over 30 support staff. All of the support services within the district were provided by district personnel. District E employed over
40 support staff and also used contract service companies for food service and transportation. Student enrollment in District E was approximately 2,220. A contract service provider handled student transportation for District F. This district had approximately 80 support staff and 2,230 students. Five of the six districts recruited ended up providing data for the main study.

Table 3.1

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<tr>
<th>District</th>
<th>Enrollment</th>
<th>Basis for Participation</th>
<th>Use of Contracted Services</th>
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<tbody>
<tr>
<td>A</td>
<td>1,750</td>
<td>MN Quality Award recipient, partnership member</td>
<td>Food Service</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>1,600</td>
<td>partnership member</td>
<td>Food Service</td>
<td>X</td>
</tr>
<tr>
<td>C</td>
<td>1,150</td>
<td>partnership member</td>
<td>Transportation</td>
<td>X</td>
</tr>
<tr>
<td>D</td>
<td>1,250</td>
<td>partnership member</td>
<td>NA</td>
<td>X</td>
</tr>
<tr>
<td>E</td>
<td>2,220</td>
<td>referral</td>
<td>Food Service &amp; Transportation</td>
<td>X</td>
</tr>
<tr>
<td>F</td>
<td>2,230</td>
<td>referral</td>
<td>Transportation</td>
<td>X</td>
</tr>
</tbody>
</table>

Variable Specifications

The study’s variables are derived from the previously described Baldrige model constructs. The constructs and corresponding dimensions, from the 2007 Education Criteria for Performance Excellence (NIST, 2007) are shown in Table 3.2. Table 3.3 follows with information on variable names and types.
Table 3.2

**Constructs and Dimensions in the Baldrige Model**

<table>
<thead>
<tr>
<th>Construct</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leadership</td>
<td>Senior Leadership</td>
</tr>
<tr>
<td></td>
<td>Governance and Social Responsibilities</td>
</tr>
<tr>
<td>Strategic Planning</td>
<td>Strategy Development</td>
</tr>
<tr>
<td></td>
<td>Strategy Deployment</td>
</tr>
<tr>
<td>Measurement, Analysis,</td>
<td>Measurement, Analysis, and Improvement and Managerial Performance</td>
</tr>
<tr>
<td>Knowledge Management</td>
<td>Management of Information, Information Technology, and Knowledge</td>
</tr>
<tr>
<td>Workforce Focus</td>
<td>Workforce Engagement</td>
</tr>
<tr>
<td></td>
<td>Workforce Environment</td>
</tr>
<tr>
<td>Process Management</td>
<td>Work Systems Design</td>
</tr>
<tr>
<td></td>
<td>Work Process Management and Improvement</td>
</tr>
<tr>
<td>Student, Stakeholder and</td>
<td>Student, Stakeholder, and Market Knowledge</td>
</tr>
<tr>
<td>Market Focus</td>
<td>Student and Stakeholder Relationships and Satisfaction</td>
</tr>
<tr>
<td>Results</td>
<td>Student Learning Outcomes</td>
</tr>
<tr>
<td></td>
<td>Student- and Stakeholder-Focused Outcomes</td>
</tr>
<tr>
<td></td>
<td>Budgetary, Financial, and Market Outcomes</td>
</tr>
<tr>
<td></td>
<td>Workforce-Focused Outcomes</td>
</tr>
<tr>
<td></td>
<td>Process Effectiveness Outcomes</td>
</tr>
<tr>
<td></td>
<td>Leadership Outcomes</td>
</tr>
</tbody>
</table>

Table 3.3

*Baldrige Constructs and Corresponding Study Variable Information*

<table>
<thead>
<tr>
<th>Construct</th>
<th>Variable Name</th>
<th>Variable Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Leadership</td>
<td>Leadership</td>
<td>Exogenous, predictor</td>
</tr>
<tr>
<td>2. Measurement, Analysis, and Knowledge Management</td>
<td>Data</td>
<td>Endogenous, predictor</td>
</tr>
<tr>
<td>3. Strategic Planning</td>
<td>Planning</td>
<td>Endogenous, predictor</td>
</tr>
<tr>
<td>4. Workforce Focus</td>
<td>Staff Focus</td>
<td>Endogenous, predictor</td>
</tr>
<tr>
<td>5. Process Management</td>
<td>Work Processes</td>
<td>Endogenous, predictor</td>
</tr>
<tr>
<td>6. Student, Stakeholder and Market Focus</td>
<td>Stakeholder Focus</td>
<td>Endogenous, outcome</td>
</tr>
<tr>
<td>7. Results</td>
<td>Results</td>
<td>Endogenous, outcome</td>
</tr>
</tbody>
</table>

*Instrumentation*

For this study, a measurement model was developed to reflect the seven constructs and corresponding dimensions (see Table 3.2) of the Baldrige model’s 2007 *Education Criteria for Performance Excellence* (NIST, 2007). The Student Learning Outcomes dimension was not included in the measurement model as it was not applicable to the support functions in the study. Constructs, like Leadership, Workforce Focus, and Results are conceptual in nature and therefore cannot be measured directly (Brown, 2006). They can, however, be measured approximately using survey items.

Several steps were taken in developing survey items to measure the study’s constructs. The process began with several careful readings of the *Criteria* (NIST, 2007) in order to develop a solid understanding of the seven quality management constructs and their dimensions. Next, instruments referred to in published model
validation studies in educational settings (Badri et al., 2006; Winn & Cameron, 1998) were examined.

Winn and Cameron (1998) reported results of a study attempting to validate the Baldrige model in a higher education setting. The survey, based on the 1995 version of the Criteria, was not presented in the report but could be traced back to Winn’s (1996) unpublished doctoral dissertation. Using conceptual definitions of the constructs as a guide, Winn (1996) selected a total of 67 items from Perceptions of the Work Environment to measure each Baldrige model construct. That instrument was developed by Peterson and Cameron (1994 as reported in Winn, 1996) and had a total of 197 items in 14 sections. Perceptions of the Work Environment was designed to measure “the culture, climate, and outcomes associated with total quality and continuous improvement in the university work environment” (Winn, 1996, p. 51). Its development was influenced by literature on quality management in higher education and a research questionnaire administered in nearly 1000 for-profit organizations (Winn & Cameron, 1998).

Factor analysis with an oblique rotation was used to test the construct validity of the items selected for each construct (Winn, 1996). Items loaded onto eight factors. Six of the factors corresponded with Quality Leadership, Information Utilization, Strategic Planning, Process Management, Performance Results, and Customer Focus. Items in the remaining two factors related to opportunities for development and workforce management issues so the factors were combined to correspond with the Human Resource Development and Management variable (Winn, 1996). Sixty-two items with factor loadings ranging from .34 to .92 were retained for the instrument (Winn, 1996). Reliability coefficients for the measurement scales ranged from .88 for Information
Utilization to .96 for Quality Leadership demonstrating strong internal consistency (Gall, Borg, & Gall, 1996).

Despite the fact that these scales demonstrated acceptable levels of validity and reliability, this researcher determined that they did not adequately capture the content in the 2007 Education Criteria. However, as shown in Appendix B, several individual items reported by Winn (1996) were used or revised for inclusion in this study’s instrument.

The instrument developed by Badri et. al (2006) was examined next. This instrument was based on the 2004 Education Criteria. In the 2004 version of the Criteria, the seven constructs had a total of 33 dimensions. Badri et. al (2006) examined instruments from previous quality management studies (e.g., Flynn & Saladin, 2001; Goldstein & Schweikhart, 2002; Meyer & Collier, 2001) and used or created items to capture the content of the 33 dimensions. Then their instrument was revised with the help of an unspecified number of faculty and administrators from various colleges and universities in the United Arab Emirates. A pilot study was conducted with 43 individuals to determine the reliability of the scales measuring the seven constructs. After dropping some items, 141 remained with scale alpha values ranging from .82 to .91 based on pilot test data (Badri et. al, 2006). Some of these items (see Appendix B) were adapted for use in this study.

Other sources for items were also utilized (see Appendix B). Are We Making Progress?, an instrument published by NIST (2004), was tapped. This instrument was organized according to the Baldrige model constructs but was not comprehensive enough to be the sole instrument used in the study. Additionally, information on the validity and reliability of this instrument was not successfully obtained from NIST (C. Alvarez, personal communication, July 31, 2007). After examining instruments from
other quality management studies published in peer-reviewed journals (e.g., Flynn, Schroeder, & Sakakibara, 1994; Meyer & Collier, 2001), this researcher crafted any additional items needed for this study’s survey.

Besides items measuring the study’s latent constructs, the survey contained several demographic items. Individuals were asked to identify the support service work group they belonged to along with their gender, age, and level of education. They also were asked to identify whether they served in a part- or full-time capacity and the number of years employed in their present position. Items regarding annual hours of training and development and management/supervisory responsibilities were also included.

This new instrument was reviewed by two Baldrige examiners. One reviewer served as an examiner for the MBNQA for six years and has continued an association with the Award program as a contributing writer. This reviewer’s business experience included leading change management, strategic planning, marketing, and sales management efforts in both manufacturing and service oriented companies in addition to higher education teaching and consulting. The other reviewer was employed as a quality manager in a Baldrige award-winning manufacturing company. This individual had served as an examiner for one year.

The goal of the instrument review was to establish content validity by ensuring that the survey items were rooted in the 2007 Education Criteria for Performance Excellence (NIST, 2007) and represented its constructs and dimensions. For each construct, reviewers were asked to determine if there were a sufficient number of items to cover the content of the Criteria. Reviewers identified items that could be removed because they were either redundant or would be too difficult for participants to answer. Reviewers also identified parts of the Criteria that were not adequately covered by the
items and in some cases offered potential items to fill these gaps. They also provided feedback on item wording to ensure that each item was clear and concise.

The feedback led to the creation of an instrument used in the pilot study. Most of the items were measured using a 6-point Likert scale (1 = Strongly Disagree and 6 = Strongly Agree). The Baldrige examiners felt that some of the items might not be applicable to all participants but were not in favor of adding a “Not Applicable” response to the rating scale. To address this concern, five survey items became multiple choice items with responses of “Yes,” “No,” or “I don’t know.” For three of these items, individuals answering “Yes” were asked to respond to one or more follow-up statements that utilized the 6-point rating scale.

Once items were finalized for the pilot survey, permission was gained from M. W. Peterson (personal communication, December 5, 2007) and M. A. Badri (personal communication, December 6, 2007) to use or revise items they had previously published. Permission to use items from Are We Making Progress? (NIST, 2004) was not required.

**Institutional Review Board**

The study was approved by the University of Minnesota’s Institutional Review Board (IRB). Appendix C contains the approval letter. An introductory letter (see Appendix D) was provided for each participant. It contained a consent statement that included background information about the study, data collection procedures, risks and benefits of participation, and information about compensation for participation. The statement also stressed the voluntary and confidential nature of the study and provided contact information for the researcher, the researcher’s advisor, and the IRB’s advocate line for research subjects. The consent statement was also embedded into the first page of the survey used in the pilot study and the main study.
Pilot Study

A pilot study was conducted. The procedures for data collection are outlined below followed by a description of the pilot study sample. This section concludes with an evaluation of the pilot study instrument.

Data Collection

Pilot testing of the instrument was conducted using convenience sampling. A request was sent to five school districts in the Minneapolis/St. Paul area seeking permission to post a recruitment flyer and envelope in selected district buildings. The envelope contained slips of paper stating eligibility criteria and the URL for accessing the online survey. Three school districts approved the request, which was made in accordance with district policies. Additionally, based on the snowball technique (Gall et al., 1996), the researcher gave 15 paper surveys with return envelopes to acquaintances to complete or pass along to others they knew who were eligible to participate. Pilot study data was collected over a span of five weeks in winter 2008.

Sample Characteristics

The sampling method described above yielded 74 survey participants for the pilot study. Of the 74 surveys collected, 59 (80%) contained complete sets of data on the seven quality management constructs and were used for subsequent analysis. Of the 59 individuals who were retained for the pilot study sample, 53 (90%) used the online survey format while six (10%) used the paper version. Among the sample, 10.9% of the participants worked in districts enrolling less than 1,000 students. The same percentage of pilot study participants worked in districts where student enrollment ranged from 1,000 to 4,999. Twenty percent of the pilot study participants worked in districts serving 5,000-24,999 students while the remaining participants (58.2%) were in districts with enrollments of 25,000 or more. Supplemental
characteristics of the pilot study participants, including work group, tenure, employment status, and job responsibilities, are shown in Table 3.4. In addition to the quality management and demographic items, the pilot survey asked respondents to identify how long it took them to complete the survey, to assess whether or not the survey’s wording was easy to understand, and to offer suggestions for improving the survey. Individuals completing the pilot survey were eligible to receive a $5 gift card and a chance to win $50. Nearly one-third (32.2%) of pilot study participants declined to receive this compensation.

Table 3.4

<p>| Role, Tenure, Employment Status, and Job Responsibilities of Pilot Study Participants |
|-------------------------------------------------|----------------|----------------|</p>
<table>
<thead>
<tr>
<th>N</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work Group</td>
<td>59</td>
<td></td>
</tr>
<tr>
<td>Food Service</td>
<td>8</td>
<td>13.56</td>
</tr>
<tr>
<td>Operations and Maintenance</td>
<td>4</td>
<td>6.78</td>
</tr>
<tr>
<td>Transportation</td>
<td>4</td>
<td>6.78</td>
</tr>
<tr>
<td>Human Resources or Business Services</td>
<td>9</td>
<td>15.25</td>
</tr>
<tr>
<td>Administrative/Other Support</td>
<td>34</td>
<td>57.63</td>
</tr>
<tr>
<td>Tenure in Current Position</td>
<td>51</td>
<td></td>
</tr>
<tr>
<td>Less than 1 year</td>
<td>5</td>
<td>9.80</td>
</tr>
<tr>
<td>1-4 years</td>
<td>6</td>
<td>11.76</td>
</tr>
<tr>
<td>5-10 years</td>
<td>15</td>
<td>29.41</td>
</tr>
<tr>
<td>11-15 years</td>
<td>7</td>
<td>13.72</td>
</tr>
<tr>
<td>More than 15 years</td>
<td>18</td>
<td>35.29</td>
</tr>
<tr>
<td>Job Status in District</td>
<td>51</td>
<td></td>
</tr>
<tr>
<td>Part-time employee</td>
<td>6</td>
<td>11.76</td>
</tr>
<tr>
<td>Full-time employee</td>
<td>45</td>
<td>88.24</td>
</tr>
<tr>
<td>Currently Manage/Supervise Others in Work Group?</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>40</td>
<td>80.00</td>
</tr>
<tr>
<td>Yes</td>
<td>10</td>
<td>20.00</td>
</tr>
</tbody>
</table>
Instrument Evaluation

Pilot test data was used to evaluate the instrument. The presence of the multiple choice items complicated the analysis for the Planning, Staff Focus, Stakeholder Focus, and Results scales. While the multiple choice items with corresponding follow-up items were included in the survey to allow participants to indicate whether or not particular quality management practices were part of their experience at work, open-ended comments (see Appendix E under “Other”) suggested that more of the items may not be applicable to their current situation. To address both of these issues, the researcher, in consultation with her advisor, decided that all of the items measuring a quality management construct would use the 6-point scale in the main study. The directions for the main study’s survey were revised to include the following advice to participants: “If an item does not apply to your work group, mark the appropriate level of disagreement with the statement.” Due to the above mentioned concerns with the multiple choice and follow-up items, they were not included in the analysis of the pilot study data. Table 3.5 identifies the survey items that were retained for the analysis of the pilot study survey.

Scale reliability was assessed for each of the seven quality management constructs. Reliability, as measured by Cronbach’s alpha, ranged from .86 (Results scale) to .93 (Data scale). As shown in Table 3.5, each of the scales displayed high levels of reliability.

Each scale was subject to exploratory factor analysis. Factors were extracted using principal component analysis with Varimax rotation. The analysis resulted in a single-factor solution for Leadership, Data, Planning, and Stakeholder Focus. A two-factor solution was obtained for Staff Focus, Work Processes, and Results. These findings should be interpreted with caution based on the pilot study sample size. Child
(2006) reviewed recommendations from other researchers regarding the sample size needed for factor analysis. Comrey and Lee (1992 as reported in Child, 2006) stated that N = 50 is too small and regarded N = 200 as satisfactory while Gorsuch (1983 as reported in Child, 2006) suggested a minimum of five participants per variable. Based on these recommendations, the analysis of the pilot study data, with only 59 subjects, should be interpreted with caution.

Table 3.5

<table>
<thead>
<tr>
<th>Analysis of Scales Using Pilot Study Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scale</td>
</tr>
<tr>
<td>Leadership</td>
</tr>
<tr>
<td>Data</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Planning</td>
</tr>
<tr>
<td>Staff Focus</td>
</tr>
<tr>
<td>Work Processes</td>
</tr>
<tr>
<td>Stakeholder Focus</td>
</tr>
</tbody>
</table>

Note: Extraction method: Principal Component Analysis; Rotation Method: Varimax with Kaiser Normalization

Main Study

Information regarding the main study follows. Data collection procedures are discussed first. The section concludes with descriptive information about respondents in the main study’s sample.

Data Collection
Self-administered paper and electronic surveys were used to collect data for the main study. Item content was identical in both formats; slight differences in wording were used on the Consent Statement, Directions, and Thank You pages. Based on employment records, cooperating districts provided the researcher with a list of employees belonging to the work groups included in the study and their work addresses. As holders of the employment records, each district was responsible for making initial contact with employees on behalf of the researcher. This initial contact was made by a liaison for the district, who was the superintendent in all but one district. Liaisons were responsible for notifying eligible employees about the study, informing them how and when the survey would be administered, and how the district planned to use the summary data received. Districts were also encouraged to provide time during the work day for employees to complete the survey to maximize the response rate. District liaisons were not required to inform the researcher whether or not time was set aside during the work day to allow for survey completion.

Eligible participants received up to three contacts from the researcher. The frequency and content of the contact was adapted based on Mangione’s (1995) recommendations for maximizing the response rate of mail surveys. For eligible participants using paper surveys the process went as follows:

1\textsuperscript{st} and 3\textsuperscript{rd} contact: Full packet of materials consisting of an introduction letter (Appendix D), survey, postage-paid return envelope, and postage-paid return postcard (see Appendix G). Liaisons were responsible for distributing the first packet of materials to participants either in person at a regularly scheduled meeting or workshop or through district mail.

2\textsuperscript{nd} contact: Reminder postcard

For participants using online surveys the process went as follows:
1st contact: Liaisons were responsible for distributing the introduction letter and postage-paid return postcard to participants either in person at a regularly scheduled meeting or workshop or through district mail. On the first day of the data collection period, the district liaison sent out an e-mail to eligible participants containing a link to the survey.

2nd contact: Reminder postcard including the URL needed to access the survey

3rd contact: Full packet of materials which consisted of an introduction letter, paper survey, postage-paid return envelope, and postage-paid return postcard

Return postcards served three purposes. First, they tracked non-respondents. Individuals who did not mail back their initial postcard received follow-up contacts at intervals approximately two weeks in length. This resulted in a data collection period spanning up to six weeks in each district. Second, eligible participants could use the postcard to request a copy of their district’s executive summary. Third, return postcards were used for the cash prize drawings. In each district, two postcards from individuals completing the survey were randomly selected. Selected individuals were awarded a $50 cash prize.

The researcher retained sole responsibility for managing the study’s data. Online survey data was collected and stored using the researcher’s professional SurveyMonkey account. Data collected from paper surveys was entered online manually. Other paper documents were either converted to electronic form and stored in password-protected folders on the researcher’s personal computer or were stored in a locked box. Data files were accessible only to the researcher, the researcher’s academic advisor, and a consultant from the University of Minnesota’s Statistics Clinic.

Sample Characteristics
Support service personnel working in five Minnesota public school districts participated in the main study. A total of 137 responses were received. About half (51%) of the respondents completed a paper survey and mailed it back to the researcher while the remaining 49% completed the survey online. Based on the information provided by the school district liaisons, the overall response rate for the main study was 61%. The response rate within individual districts ranged from 49% to 100%.

Information regarding work group affiliation, tenure, and job responsibilities of individuals in the sample is shown in Table 3.6. Just over half of the respondents (51.1%) belonged to the Administrative/Other Support work group. Food Service employees made up 20.4% of the sample while those working in the areas of Operations and Maintenance represented 12.4% of the sample. Transportation employees and Human Resources or Business Services employees both made up 8% of the sample. The largest percentage of respondents (30.5) had served in their current position for more than 15 years while those serving for 1-4 years and 5-10 years each made up roughly one-quarter of the sample. The ratio of full-time to part-time workers was 3:1. Respondents were predominantly front-line workers. Over 70% of them did not manage or supervise other employees in their work group while 17.7% of respondents reported having such responsibilities at one building or site.

Additional demographic information was gathered from respondents and is reported in Table 3.7. The gender ratio for females to males was nearly 8:2. In terms of age, the largest groups of participants fell in the 41-50 years and 51-60 years categories (35.7% and 36.4%, respectively). Education level varied among respondents. Nearly 27% earned a high school diploma or GED, over 35% had some
college or technical school coursework, and nearly 21% earned an Associate's degree or higher.

Table 3.6

**Role, Tenure, Employment Status, and Job Responsibilities of Main Study Participants**

<table>
<thead>
<tr>
<th>N</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work Group</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Food Service</td>
<td>28</td>
<td>20.44</td>
</tr>
<tr>
<td>Operations and Maintenance</td>
<td>17</td>
<td>12.41</td>
</tr>
<tr>
<td>Transportation</td>
<td>11</td>
<td>8.03</td>
</tr>
<tr>
<td>Human Resources or Business Services</td>
<td>11</td>
<td>8.03</td>
</tr>
<tr>
<td>Administrative/Other Support</td>
<td>70</td>
<td>51.09</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tenure in Current Position</th>
<th>N</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 1 year</td>
<td>10</td>
<td>7.81</td>
<td></td>
</tr>
<tr>
<td>1-4 years</td>
<td>29</td>
<td>22.66</td>
<td></td>
</tr>
<tr>
<td>5-10 years</td>
<td>33</td>
<td>25.78</td>
<td></td>
</tr>
<tr>
<td>11-15 years</td>
<td>17</td>
<td>13.28</td>
<td></td>
</tr>
<tr>
<td>More than 15 years</td>
<td>39</td>
<td>30.47</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Job Status in District</th>
<th>N</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part-time employee</td>
<td>33</td>
<td>25.78</td>
<td></td>
</tr>
<tr>
<td>Full-time employee</td>
<td>95</td>
<td>74.22</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Currently Manage/Supervise Others in Work Group?</th>
<th>N</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>92</td>
<td>70.77</td>
<td></td>
</tr>
<tr>
<td>Yes, at one building or site</td>
<td>23</td>
<td>17.69</td>
<td></td>
</tr>
<tr>
<td>Yes, at more than one site</td>
<td>5</td>
<td>3.85</td>
<td></td>
</tr>
<tr>
<td>Yes, for the entire district</td>
<td>10</td>
<td>7.69</td>
<td></td>
</tr>
</tbody>
</table>
Table 3.7

Gender, Age, and Level of Education of Main Study Participants

<table>
<thead>
<tr>
<th>Gender</th>
<th>N</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>103</td>
<td>79.23</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>27</td>
<td>20.77</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age</th>
<th>N</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 years and under</td>
<td>6</td>
<td>4.66</td>
<td></td>
</tr>
<tr>
<td>31-40 years</td>
<td>10</td>
<td>7.75</td>
<td></td>
</tr>
<tr>
<td>41-50 years</td>
<td>46</td>
<td>35.66</td>
<td></td>
</tr>
<tr>
<td>51-60 years</td>
<td>47</td>
<td>36.43</td>
<td></td>
</tr>
<tr>
<td>Over 60 years</td>
<td>20</td>
<td>15.50</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Level of Education</th>
<th>N</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Some high school</td>
<td>1</td>
<td>0.77</td>
<td></td>
</tr>
<tr>
<td>High school diploma/GED</td>
<td>35</td>
<td>26.92</td>
<td></td>
</tr>
<tr>
<td>Certificate or License</td>
<td>8</td>
<td>6.15</td>
<td></td>
</tr>
<tr>
<td>Some college/technical school courses</td>
<td>46</td>
<td>35.38</td>
<td></td>
</tr>
<tr>
<td>Associate's degree</td>
<td>13</td>
<td>10.00</td>
<td></td>
</tr>
<tr>
<td>Bachelor's degree</td>
<td>21</td>
<td>16.15</td>
<td></td>
</tr>
<tr>
<td>Some graduate courses</td>
<td>3</td>
<td>2.31</td>
<td></td>
</tr>
<tr>
<td>Master's degree or higher</td>
<td>3</td>
<td>2.31</td>
<td></td>
</tr>
</tbody>
</table>

One survey item in the Demographics section asked respondents about staff development (see Table 3.8). Respondents were asked to identify the number of hours of formal training or professional development they participated in within the past 12 months that was sponsored by or paid for by the school district. The largest groups of respondents reported participation in zero hours of staff development or more than 16 hours (23.1% and 22.3%, respectively). These figures were further analyzed by work group membership.
Table 3.8

**Characteristics of Staff Development for Main Study Participants**

<table>
<thead>
<tr>
<th>Hours of Staff Development in Past 12 Months</th>
<th>N</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 hours</td>
<td>30</td>
<td>130</td>
<td>23.08</td>
</tr>
<tr>
<td>1-4 hours</td>
<td>25</td>
<td>27</td>
<td>19.23</td>
</tr>
<tr>
<td>5-8 hours</td>
<td>27</td>
<td></td>
<td>20.77</td>
</tr>
<tr>
<td>9-12 hours</td>
<td>8</td>
<td></td>
<td>6.15</td>
</tr>
<tr>
<td>13-16 hours</td>
<td>11</td>
<td></td>
<td>8.46</td>
</tr>
<tr>
<td>More than 16 hours</td>
<td>29</td>
<td></td>
<td>22.31</td>
</tr>
</tbody>
</table>

Work Group of Those Reporting 0 Hours

<table>
<thead>
<tr>
<th>Services</th>
<th>N</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food Service</td>
<td>6</td>
<td>20.00</td>
</tr>
<tr>
<td>Operations and Maintenance</td>
<td>5</td>
<td>16.67</td>
</tr>
<tr>
<td>Transportation</td>
<td>1</td>
<td>3.33</td>
</tr>
<tr>
<td>Human Resources or Business Services</td>
<td>2</td>
<td>6.67</td>
</tr>
<tr>
<td>Administrative/Other Support</td>
<td>16</td>
<td>53.33</td>
</tr>
</tbody>
</table>

Work Group of Those Reporting 16+ Hours

<table>
<thead>
<tr>
<th>Services</th>
<th>N</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food Service</td>
<td>5</td>
<td>17.24</td>
</tr>
<tr>
<td>Operations and Maintenance</td>
<td>2</td>
<td>6.90</td>
</tr>
<tr>
<td>Transportation</td>
<td>1</td>
<td>3.45</td>
</tr>
<tr>
<td>Human Resources or Business Services</td>
<td>7</td>
<td>24.14</td>
</tr>
<tr>
<td>Administrative/Other Support</td>
<td>14</td>
<td>48.28</td>
</tr>
</tbody>
</table>

After all of the data had been collected, a decision was made to combine the pilot study and main study data for further analysis. Several reasons supported this decision. First, both the pilot study and the main study utilized convenience sampling to obtain subjects for participation. Second, all participants provided perceptual data using self-administered surveys. Third, while some changes had been made to the survey between the pilot and main study, the nature of the changes were minor and only impacted 10 of the 65 (15%) items measuring the quality management constructs. Fourth, many participant characteristics were similar across the pilot and main study.
groups. Examples included role (58% from the Admin/Other Support work group vs. 51%), job tenure (35% served in present role for more than 15 years vs. 31%), job responsibilities (72% without managerial or supervisory responsibilities vs. 71%), and gender (75% female vs. 79% female). Finally, by combining the pilot and main study data, the sample size (196) approximated the recommended size of 200 (Hair, Anderson, Tatham, & Black, 1995) for utilizing structural equation modeling techniques.

Hypotheses and Data Analysis

The SPSS 16.0 Graduate Pack and Analysis of Moment Structures (Amos) 16.0 (Arbuckle, 2007) software programs were used to analyze the collected data. As is customary in social science research, tests of statistical significance were evaluated at the .05 level. Descriptive statistics calculated in SPSS would be used to describe the current state of quality management in support functions of public elementary and secondary education. Several hypotheses were proposed to address the other research questions. There were 15 hypotheses in all.

The first four hypotheses examine the Baldrige model’s assertion that Leadership acts as a “driver” of quality management by directly relating to various “system” variables.

Hypothesis 1: Leadership is positively related to Data.

Hypothesis 2: Leadership is positively related to Planning.

Hypothesis 3: Leadership is positively related to Staff Focus.

Hypothesis 4: Leadership is positively related to Work Processes.

The next two hypotheses examine the model’s assertion that Leadership has a direct impact on an organization’s “outcomes.”

Hypothesis 5: Leadership is positively related to Stakeholder Focus.

Hypothesis 6: Leadership is positively related to Results.
Eight hypotheses (H7-H14) will test the strength and direction of the relationships between each of the “system” variables and the two “outcome” variables:

Hypothesis 7: Data is positively related to Stakeholder Focus.
Hypothesis 8: Data is positively related to Results.
Hypothesis 9: Planning is positively related to Stakeholder Focus.
Hypothesis 10: Planning is positively related to Results.
Hypothesis 11: Staff Focus is positively related to Stakeholder Focus.
Hypothesis 12: Staff Focus is positively related to Results.
Hypothesis 13: Work Processes is positively related to Stakeholder Focus.
Hypothesis 14: Work Processes is positively related to Results.

The final hypotheses tests whether the Baldrige model is a good fit for K-12 education support functions based on collected data.

Hypothesis 15: The Baldrige model of quality management adequately describes sample data from K-12 education support functions.

Structural equation modeling (SEM) was used to address the study’s hypotheses. Structural equation modeling can be used to simultaneously study multiple constructs of interest and the relationships among the constructs as identified in structural models with proposed causal relationships (Bollen, 1989; Hair et al., 1995; Joreskog, 1993). Two characteristics distinguish the technique from others: “(1) estimation of multiple and interrelated dependence relationships, and (2) the ability to represent unobserved concepts in these relationships and account for measurement error in the estimation process” (Hair et al., 1995, p. 622). The focus of SEM is not on how well various predictors account for the outcome variables but “how well the entire model fits the data” (Maruyama, 1998, p. 44). The advantages of using SEM include the technique’s ability to simultaneously examine a system of interrelated variables
even when one or more variables act as both predictor and outcome variables within
the system (Byrne, 2001) and the ability to account for measurement error (Maruyama,
1998). SEM is also useful when variables of interest are correlated with one another,
as has shown to be true in several quality management studies (e.g., Flynn & Saladin,
2001; Wilson & Collier, 2000; Winn & Cameron, 1998), because it can help
researchers tease out the effects due to collinearity (Maruyama, 1998).

There are two parts to SEM: assessing the measurement model and assessing
the structural model. The measurement model “(1) specifies the indicators for each
construct, and (2) assesses the reliability of each construct for estimating the causal
relationships” (Hair et al., 1995, p. 620). The assessment of the structural model
includes calculating the strength of the model’s causal relationships and the degree of
overall model fit. Assessing the entire model involves “tests of differences between the
variance/covariance matrix predicted by the model and the sample variance/covariance
matrix from the observed data” (Maruyama, 1998, p. 196). The size of these
differences reflects the extent to which the hypothesized model is similar to the
observed data. Brown (2006) stated that it is important to assess the measurement
model before the structural model since more things can go wrong in the former,
including “problems in the selection of observed measures, misspecified factor
loadings, [and] additional sources of covariation among observed measures that
cannot be accounted for by the latent factors” (p. 5).

“Structural equation modeling has no single statistical test that best describes
the ‘strength’ of the model’s predictions” (Hair, et. al, 1995, p. 682). Instead, several
indices or measures are available to test model fit. These fit indices can be placed in
three categories and it is important for researchers to use and report one or more of
the indices from each type (Hair, et. al, 1995). The first category consists of measures
of absolute fit. These measures “determine the degree to which the overall model (structural and measurement models) predicts the observed covariance or correlation matrix” (Hair, et. al, 1995, p. 683). Measures of incremental fit make up the second type. These measures compare the proposed model to the null or baseline model. “In most cases, the null model is a single-construct model with all indicators perfectly measuring the construct” (Hair, et. al, 1995, p. 685). The third group of measures takes into account the complexity of the model. These indices, called parsimonious fit measures, include a penalty for complex models. These measures are most helpful when making comparisons between models.

Fit statistics from each category were selected for this study. Measures of absolute fit chosen for this study include the Chi-square statistic and the root mean square error of approximation (RMSEA). The likelihood-ratio Chi-square statistic ($\chi^2$) is a fundamental measure of fit and the only one that can be evaluated with levels of statistical significance. A Chi-square value that is large in relation to its degrees of freedom implies that there are considerable differences between the observed and estimated matrices. The accompanying level of statistical significance tells the probability that the differences are due solely to variation in the sample. When using this measure of fit in SEM, researchers want the $\chi^2$ value to be non-significant implying that the predicted and actual matrices are not statistically different from one another. RMSEA accounts for errors made when making approximations in the population. It essentially asks, “How well would the model, with unknown but optimally chosen parameter values, fit the population covariance matrix if it were available?” (Browne & Cudeck, 1993, pp. 137-138 as cited in Byrne, 2001, p. 84). Good fit is indicated by an RMSEA value of less than .05 and values in the range of .05 to .08 are considered acceptable (Byrne, 2001; Hair, et al., 1995). A model has mediocre fit with the data
when the RMSEA value is between .08 and .10; values greater than .10 signify poor fit (MacCallum, Browne, & Sugawara, 1996).

The incremental fit measures selected for use in this study were the comparative fit index (CFI) and the normed fit index (NFI). Both of these measures compared the hypothesized model to the independence or null model and thus “provide a measure of complete covariation in the data” (Byrne, 2001, p. 83). Values for the CFI and NFI range from zero to one and values that exceed .90 represent a well-fitting model (Byrne, 2001; Hair et al., 1995). Of the two indices, the CFI is the preferred one as the NFI has been found to underestimate fit in small samples (Byrne, 2001).

The parsimonious fit measure selected for use was Akaike’s (1987) information criterion (AIC). The AIC is useful for comparing two or more models. AIC values indicate “how well the parameter estimates from the original sample will cross-validate in future samples” (Bandalos, 1993, p. 353). Models with values closer to zero are more desirable (Byrne, 2001).

Goodness-of-fit statistics can “provide a global, descriptive indication of the ability of the model to reproduce the observed relationships among the indicators in the input matrix,” (Brown, 2006, p. 114) but they have limitations. Fit indices can be affected by several things including sample size, the method of estimation used, the type and distribution of data, and model complexity (Brown, 2006). The influence of these factors can, in some instances, lead to “acceptable fit despite the fact that some relationships among indicators in the sample data have not been reproduced adequately; or alternatively, some model-implied relationships may markedly exceed the associations seen in the data” (Brown, 2006, p. 114). Indices also can inform the researcher that a model fits the data poorly but indices don’t give the researcher any
information about why this is so. Additionally, the lack of mutually agreed upon cutoffs for several of the fit indices makes it challenging for researchers to evaluate the plausibility of their models with certainty (Byrne, 2001; Maruyama, 1998). Therefore, the researcher’s “assessment of model adequacy must be based on multiple criteria that take into account theoretical, statistical, and practical considerations” (Byrne, 2001, p. 88).

Structural equation modeling was conducted using Amos 16.0 (Arbuckle, 2007a). An advantage of using Amos over other SEM programs was the way the program approached the handling of missing data. Common approaches to the handling of incomplete data include listwise deletion, pairwise deletion, and imputation (Brown, 2006; Kline, 1998). With listwise deletion, cases with missing data on any observation are excluded from all calculations. If this approach to missing data was adopted in this study, the sample size would have decreased from 196 to 176 subjects. It was important to retain all possible cases in this study since the optimal sample size for SEM is around 200. Pairwise deletion preserves more data than listwise deletion because cases are excluded only in computation involving variables that have missing data. This feature results in a sample size that can vary from analysis to analysis which can present potential drawbacks for SEM and other multivariate procedures (Kline, 1998). Imputation involves replacing missing observations with overall sample or group averages (also called mean substitution) or replacing missing values with those that are generated using regression. These imputation methods have a tendency to underestimate variances, overestimate correlations, and underestimate standard errors (Brown, 2006). Amos uses a full information method to compute maximum likelihood estimates using full cases of data while also taking into account patterns of the data in cases where some values are missing (Arbuckle, 2007b).
CHAPTER FOUR

RESULTS

This chapter, which consists of three parts, reports on the study's results. The assessment of the study's measurement model will be reported in the first part. In the second part, the hypothesized structural model is examined. The strength of the relationships among the hypothesized model's constructs will be identified and fit statistics will be used to examine the extent to which the model reproduced relationships found in the sample data. Each of the study's hypotheses will be addressed in the third part of the chapter.

Measurement Model Assessment

When using SEM, the outcome of testing that examines the structural model is heavily influenced by the specification of the measurement model upon which it is based. Because of this important link between the measurement and structural models, the assessment of this study's measurement model is presented first.

There were seven latent constructs in the study: leadership (Leadership), measurement, analysis, and knowledge management (Data), strategic planning (Planning), workforce focus (Staff Focus), process management (Work Processes), stakeholder focus (Stakeholder Focus), and results (Results). The constructs, components of the quality management model from the Malcolm Baldrige National Quality Award, were measured using items from three sources (Badri et al., 2006; NIST, 2004; Peterson & Cameron, 1994 as cited in Winn, 1996). The items were selected, and in some cases modified, to cover the content of the 2007 Education Criteria for Performance Excellence (NIST, 2007) while being applicable to school district employees providing non-instructional support services. Each construct and the scale of items used to measure it made up a measurement model.
Since the combination of items in the scales for each measurement model had not been previously established, exploratory factor analysis (EFA) using SPSS 16.0 was used to reveal the underlying factor structure for each of the study’s seven latent constructs. Scree plots (see Figure 4.1) were produced for each construct. An eigenvalue of one served as the determination criterion. Five of the latent constructs (Leadership, Data, Planning, Work Processes, and Results) had a single-factor solution based on EFA. When such a solution is obtained, one factor accounts for the highest proportion of the common variance shared by items in the scale.

Two-factor solutions were generated for both Staff Focus and Stakeholder Focus. The two factors underlying Staff Focus had eigenvalues of 5.90 and 1.47, respectively. Together these factors accounted for 61% of the variation in Staff Focus. The eigenvalues for the two factors underlying Stakeholder Focus were 5.85 and 1.02, respectively, and accounted for 68.67% of the total variance of this construct. Due to the two-factor solutions for both Staff Focus and Stakeholder Focus, subsequent analysis was based on the assumption of a quality management model with the following nine latent constructs: Leadership, Data, Planning, Staff Focus 1, Staff Focus 2, Work Processes, Stakeholder Focus 1, Stakeholder Focus 2, and Results.

The nine measurement models were examined in turn. Confirmatory factor analysis in Amos 16.0 was used to reduce the total number of items per scale while still maintaining favorable model fit statistics. Estimated factor loadings and multiple squared correlations for each item in the full scale for a construct were calculated. Scales were reduced, one item at a time, by removing the item with the lowest factor loading. After an item was removed a new measurement model for the latent construct under examination was formed. The fit statistics for this measurement model were calculated and recorded. This process continued until a “favorable” reduced
measurement model was found. “Favorable” meant the model had acceptable fit statistics and contained items that were as reflective of the scope of the Education Criteria for Performance Excellence (NIST, 2007) as possible while still having high factor loadings.

Leadership

There were nine items in the original Leadership measurement scale. This scale had a mean of 38.62 and standard deviation of 10.16. Individual item means ranged from 2.74 (L7GS: We have the opportunity to evaluate the performance of our leaders; S.D. = 1.67) to 4.88 (L8GS: District policies and practices promote legal and ethical behavior among employees; S.D. = 1.16). The factor loadings of items in the original scale (see Figure 4.2) ranged from .59 to .90. The loading values of all nine items were all statistically significant at the .01 level (z = 7.60 to 10.68, p < .01).

The reduced scale for measuring Leadership contained four items which are listed in Table 4.1. Factor loadings for the reduced items ranged from .82 to .92 (z = 15.42 to 19.14, p < .01). Inter-item correlation coefficients ranged from .73 to .83. Both the original and reduced measurement model for Leadership had high scale reliability with a Cronbach’s alpha of .93. The RMSEA was within the acceptable range and the CFI value indicated that the reduced model fit the data quite well. The reduced model also had a non-significant $\chi^2$ and a low value for the AIC.
Figure 4.7. Scree plots from exploratory factor analysis. Pots were generated by SPSS. Extraction method: Maximum Likelihood. Rotation method: Promax with Kaiser Normalization.
Table 4.1

**Retained Items for Leadership**

<table>
<thead>
<tr>
<th>Item Number</th>
<th>Item Wording</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1SL</td>
<td>Leaders make it clear what the district and each work group is trying to accomplish.</td>
</tr>
<tr>
<td>L2SL</td>
<td>Leaders distribute resources in a way that will help achieve that vision.</td>
</tr>
<tr>
<td>L3SL</td>
<td>Leaders lead by example: that is, &quot;they practice what they preach.&quot;</td>
</tr>
<tr>
<td>L4SL</td>
<td>Leaders communicate the importance of continuous improvement and quality.</td>
</tr>
</tbody>
</table>

![Diagram of factor loadings and squared multiple correlations for Leadership.](image)

**Figure 4.2.** Standardized factor loadings and squared multiple correlations for Leadership.
Table 4.2

Model Comparison for Leadership

<table>
<thead>
<tr>
<th>Model</th>
<th>No. of Factors</th>
<th>No. of Items</th>
<th>Chi-square (df), probability level</th>
<th>RMSEA</th>
<th>CFI</th>
<th>NFI</th>
<th>AIC</th>
<th>Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original</td>
<td>1</td>
<td>9</td>
<td>121.55 (27), p = .00</td>
<td>.13</td>
<td>.93</td>
<td>.91</td>
<td>175.55</td>
<td>.93</td>
</tr>
<tr>
<td>Reduced</td>
<td>1</td>
<td>4</td>
<td>4.06 (2), p = .13</td>
<td>.07</td>
<td>1.00</td>
<td>.99</td>
<td>28.06</td>
<td>.93</td>
</tr>
</tbody>
</table>

Measurement, Analysis, and Knowledge Management

The results of confirmatory factor analysis for the study’s second quality management construct are shown in Figure 4.4. Initially there were seven items used to examine Measurement, Analysis, and Knowledge Management, which was referred to as Data in the survey. The original scale had a mean of 27.84 and standard deviation of 9.20. Individual item means ranged from 3.57 (D3MA: We compare our performance data to data from similar work groups (benchmarking); S.D. = 1.61) to 4.28 (D1MA: We know how the quality of our work is measured; S.D. = 1.40). The factor loadings of items in the original scale ranged from .78 to .86. The loading values of the seven items were all statistically significant at the .01 level (z = 11.93 to 13.68, p < .01).

The reduced scale for Data contained the five items listed in Table 4.3. Factor loadings for the reduced items ranged from .81 to .83 (z = 12.23 to 12.66, p< .01). Inter-item correlation coefficients ranged from .65 to .69. The measures of fit displayed in Table 4.4 indicate that the reduced measurement model was an improvement over the original model. This reduced model had a non-significant $\chi^2$, a CFI value of 1.00 and a small AIC value. An exception to the improvements was the scale reliability which dropped from .93 to .89. The value for the reduced scale is still considered to be highly reliable.
Figure 4.3. Standardized factor loadings and squared multiple correlations for Data.

Table 4.3

Retained Items for Data

<table>
<thead>
<tr>
<th>Item Number</th>
<th>Item Wording</th>
</tr>
</thead>
<tbody>
<tr>
<td>D1MA</td>
<td>We know how the quality of our work is measured.</td>
</tr>
<tr>
<td>D5MA</td>
<td>We use data to decide when changes need to be made in what is done or how work is accomplished.</td>
</tr>
<tr>
<td>D6KM</td>
<td>We get all the important information we need to do our work.</td>
</tr>
<tr>
<td>D7KM</td>
<td>We identify what's working well and share that with others in the district.</td>
</tr>
</tbody>
</table>
Table 4.4

Model Comparisons for Data

<table>
<thead>
<tr>
<th>Model</th>
<th>No. of Factors</th>
<th>No. of Items</th>
<th>Chi-square (df), probability level</th>
<th>RMSEA</th>
<th>CFI</th>
<th>NFI</th>
<th>AIC</th>
<th>Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original</td>
<td>1</td>
<td>7</td>
<td>97.70 (14), p = .00</td>
<td>.18</td>
<td>.92</td>
<td>.90</td>
<td>139.70</td>
<td>.93</td>
</tr>
<tr>
<td>Reduced</td>
<td>1</td>
<td>4</td>
<td>1.82 (2), p = .40</td>
<td>.00</td>
<td>1.00</td>
<td>1.00</td>
<td>25.82</td>
<td>.89</td>
</tr>
</tbody>
</table>

Strategic Planning

In the original measurement model for Strategic Planning, there were eight items used to measure the construct. This scale, referred to as Planning in the participant surveys, had a mean of 31.43 and standard deviation of 11.07. Individual item means ranged from 3.62 (PL1DV: As it plans for the future, the district asks us what we think; S.D. = 1.69) to 4.31 (PL2DV: District plans address both short- and long-term challenges and opportunities; S.D. = 1.35). The factor loadings of items in the original scale (see Figure 4.5) ranged from .76 to .92. These values were all statistically significant at the .01 level (z = 11.22 to 13.82, p < .01).

The reduced scale for Planning contained the five items listed in Table 4.5. Factor loadings for these items ranged from .72 to .94 (z = 11.48 to 12.15, p < .01). Inter-item correlation coefficients ranged from .63 to .88. Reducing the number of items in the scale improved the measures of fit to desirable levels as shown in Table 4.6. Both the CFI and NFI were above the .90 threshold in the reduced model. The AIC value dropped considerably based on the reduction of items, as was expected. A non-significant $\chi^2$ was obtained for the reduced model. The reduction in the number of items led to a reduction in the scale’s reliability, although it remained in the high range (alpha = .94).
Figure 4.4. Standardized factor loadings and squared multiple correlations for Planning.
Table 4.5

<table>
<thead>
<tr>
<th>Item Number</th>
<th>Item Wording</th>
</tr>
</thead>
<tbody>
<tr>
<td>PL1DV</td>
<td>As it plans for the future, the district asks us what we think.</td>
</tr>
<tr>
<td>PL5DP</td>
<td>Improvement planning occurs regularly within my work group.</td>
</tr>
<tr>
<td>PL6DP</td>
<td>We are encouraged to be involved in our work group's improvement planning process.</td>
</tr>
<tr>
<td>PL7DP</td>
<td>Our ideas and suggestions for improvements are explored and implemented.</td>
</tr>
<tr>
<td>PL8DP</td>
<td>Our improvement plans are regularly updated based on the expectations of those we serve and our work performance.</td>
</tr>
</tbody>
</table>

Table 4.6

<table>
<thead>
<tr>
<th>Model</th>
<th>No. of Factors</th>
<th>No. of Items</th>
<th>Chi-square (df), probability level</th>
<th>RMSEA</th>
<th>CFI</th>
<th>NFI</th>
<th>AIC</th>
<th>Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original</td>
<td>1</td>
<td>8</td>
<td>191.32 (21), p = .00</td>
<td>.20</td>
<td>.87</td>
<td>.86</td>
<td>237.32</td>
<td>.95</td>
</tr>
<tr>
<td>Reduced</td>
<td>1</td>
<td>5</td>
<td>8.92 (5), p = .11</td>
<td>.06</td>
<td>1.00</td>
<td>.99</td>
<td>38.92</td>
<td>.94</td>
</tr>
</tbody>
</table>

Workforce Focus

There were twelve items in the original scale measuring Workforce Focus, or Staff Focus as it was called in this study. The full scale had a mean of 54.80 and standard deviation of 11.87. Individual item means ranged from 3.75 (SF5ENG: The district seeks and uses our input on training and development needs; S.D. = 1.58) to 5.24 (SF7ENG: We have the knowledge and skills needed to do our work effectively; S.D. = .89). Exploratory factor analysis revealed two factor structures underlying the Staff Focus construct and these factors and their corresponding items are displayed in Figure 4.6. The items’ factor loadings ranged from .55 to .86 and were all found to be statistically significant (z = 7.61 to 13.58, p < .01).
The reduced scale for measuring Staff Focus contained a total of five items (see Table 4.7), two items measuring Factor 1 and three items measuring Factor 2. For these five items, factor loadings ranged from .71 to .91 ($z = 8.82$ to $9.38$, $p < .01$). Inter-item correlation coefficients ranged from .36 to .67. Table 4.8 shows that scale reliability was diminished when going from the original 2-factor measurement model suggested by EFA with a 12-item scale to a 2-factor measurement model with a total of five items. Despite this reduction, the scale reliabilities for Factor 1 (alpha = .80), Factor 2 (alpha = .81), and the combined scale (alpha = .82) are all above the recommended level for new scales. The reduced model with two factors was more suitable for additional analysis than the original measurement model as indicated by the non-significant $\chi^2$, a RMSEA value indicating exact fit, a CFI value indicating perfect fit, and a low AIC.

Table 4.7

<table>
<thead>
<tr>
<th>Factor Number</th>
<th>Item Number</th>
<th>Item Wording</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SF9ENV</td>
<td>We are sensitive to one another’s needs.</td>
</tr>
<tr>
<td>1</td>
<td>SF10ENV</td>
<td>We continuously work to improve workplace health, safety, and security.</td>
</tr>
<tr>
<td>2</td>
<td>SF4ENG</td>
<td>We have opportunities to participate in training on quality improvement concepts or tools.</td>
</tr>
<tr>
<td>2</td>
<td>SF5ENG</td>
<td>The district seeks and uses our input on training and development needs.</td>
</tr>
<tr>
<td>2</td>
<td>SF6ENG</td>
<td>We take advantage of opportunities for personal and professional training and development.</td>
</tr>
</tbody>
</table>
Figure 4.5. Standardized factor loadings and squared multiple correlations for Staff Focus.
Table 4.8

*Model Comparisons for Staff Focus*

<table>
<thead>
<tr>
<th>Model</th>
<th>No. of Factors</th>
<th>No. of Items</th>
<th>Chi-square (df), probability level</th>
<th>RMSEA</th>
<th>CFI</th>
<th>NFI</th>
<th>AIC</th>
<th>Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original</td>
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<td>12</td>
<td>277.24 (53), p = .00</td>
<td>.15</td>
<td>.83</td>
<td>.80</td>
<td>351.24</td>
<td>.85 (#1)</td>
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<td></td>
<td></td>
<td>.87 (#2)</td>
</tr>
<tr>
<td>Reduced</td>
<td>2</td>
<td>5</td>
<td>3.98 (4), p = .41</td>
<td>.00</td>
<td>1.00</td>
<td>.99</td>
<td>35.98</td>
<td>.80 (#1)</td>
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<td></td>
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<td>.81 (#2)</td>
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</tbody>
</table>

The reduced measurement model for Staff Focus had two factors. Items measuring the first factor focus on aspects of the work environment for school support personnel. This factor will be referred to as Work Environment throughout the remainder of this study. The second factor of Staff Focus is measured by items relating to the training and development of school support personnel. This factor will be referred to as Training and Development throughout the rest of this study.

*Process Management*

The Process Management construct, or Work Processes as it is called in the survey, was part of a measurement model that originally included 10 items. This original scale had a mean of 46.88 and standard deviation of 10.32. Individual item means ranged from 4.52 (WP6PM: We review our work processes so we can decide what changes or improvements are needed; S.D. = 1.38) to 4.91 (WP3WD: We regularly consider the expectations of those we serve when designing how work gets done; S.D. = 1.18). The factor loadings of items in the original scale (see Figure 4.7) ranged from .70 to .85. The loading values for all items were statistically significant ($z = 9.314$ to 11.28, $p < .01$).
The reduced scale for Work Processes contained four items as listed in Table 4.9. Factor loadings for the reduced items ranged from .79 to .92 (z = 14.30 to 16.07, p < .01). Inter-item correlation coefficients ranged from .64 to .76. Several measures of fit displayed in Table 4.10 indicate that the reduced measurement model fit the data quite well. A non-significant χ² was obtained and the RMSEA and CFI values suggested a perfect fit. Again, Cronbach’s alpha indicated high reliability for the scale.

Figure 4.6. Standardized factor loadings and squared multiple correlations for Work Processes.
Table 4.9

**Retained Items for Work Processes**

<table>
<thead>
<tr>
<th>Item Number</th>
<th>Item Wording</th>
</tr>
</thead>
<tbody>
<tr>
<td>WP2WD</td>
<td>We use worker knowledge and technology when designing how work gets done.</td>
</tr>
<tr>
<td>WP3WD</td>
<td>We regularly consider the expectations of those we serve when designing how work gets done.</td>
</tr>
<tr>
<td>WP4PM</td>
<td>When mistakes occur, we determine why they happened.</td>
</tr>
<tr>
<td>WP9PM</td>
<td>We constantly look for ways to improve how we do our work, even when things are running well.</td>
</tr>
</tbody>
</table>

Table 4.10

**Model Comparisons for Work Processes**

<table>
<thead>
<tr>
<th>Model</th>
<th>No. of Factors</th>
<th>No. of Items</th>
<th>Chi-square (df), probability level</th>
<th>RMSEA</th>
<th>CFI</th>
<th>NFI</th>
<th>AIC</th>
<th>Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original</td>
<td>1</td>
<td>10</td>
<td>138.31 (35), p = .00</td>
<td>.12</td>
<td>.93</td>
<td>.91</td>
<td>198.31</td>
<td>.94</td>
</tr>
<tr>
<td>Reduced</td>
<td>1</td>
<td>4</td>
<td>.37 (2), p = .83</td>
<td>.00</td>
<td>1.00</td>
<td>1.00</td>
<td>24.37</td>
<td>.91</td>
</tr>
</tbody>
</table>

**Stakeholder Focus**

In the original measurement model, Stakeholder Focus was measured by 10 items. The full scale had a mean of 48.06 and standard deviation of 8.62. Individual item means ranged from 3.95 (SHF10RS: We compare our satisfaction data over time and to similar data from other work groups or organizations to see if changes are needed; S.D. = 1.58) to 5.59 (SHF1KN: In my work group, we each can answer the question: “Who do we serve?” S.D. = .71). Using EFA, the Stakeholder Focus construct was found to have two underlying factors as depicted in Figure 4.8. The factor loadings of the 10 items ranged from .54 to .89. The loading values of all 10 items were statistically significant at the .01 level (z = 7.08 to 13.64, p< .01).
The reduced scales for measuring Stakeholder Focus contained a total of four items which are listed in Table 4.11. Each factor was measured by two items. Factor loadings among all four items ranged from .79 to .91 ($z = 11.88$ to $12.03$, $p < .01$). Inter-item correlation coefficients ranged from .72 to .73. A comparison of the original and reduced measurement model is found in Table 4.12. The Chi-square value obtained was non-significant ($0.01$, $df = 1$, $p = .93$) for the reduced model. The RMSEA, CFI and NFI indicated that the reduced measurement model fit the sample data perfectly ($0.00$, $1.00$, and $1.00$, respectively).

Table 4.11

*Retained Items for Stakeholder Focus*

<table>
<thead>
<tr>
<th>Factor</th>
<th>Item</th>
<th>Item Wording</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SHF2KN</td>
<td>We have effective ways of determining the needs and expectations of those we serve.</td>
</tr>
<tr>
<td>1</td>
<td>SHF3KN</td>
<td>We constantly try to identify and solve problems that have not yet been recognized by those we serve.</td>
</tr>
<tr>
<td>2</td>
<td>SHF8RS</td>
<td>We often discuss how well we are meeting the needs and expectations of those we serve.</td>
</tr>
<tr>
<td>2</td>
<td>SHF10RS</td>
<td>We compare our satisfaction data over time and to similar data from other work groups or organizations to see if changes are needed.</td>
</tr>
</tbody>
</table>

Table 4.12

*Model Comparisons for Stakeholder Focus*

<table>
<thead>
<tr>
<th>Model</th>
<th>No. of Factors</th>
<th>No. of Items</th>
<th>Chi-square (df), probability level</th>
<th>RMSEA</th>
<th>CFI</th>
<th>NFI</th>
<th>AIC</th>
<th>Alpha</th>
</tr>
</thead>
</table>
| Original| 2              | 10           | 99.61 (34), $p = .00$              | .10   | .94  | .92  | 161.61 | .90 (#1)
|         |                |              |                                    |       |      |      |        | .89 (#2)
|         |                |              |                                    |       |      |      |        | .92 (all) |
| Reduced | 2              | 4            | .01 (1), $p = .93$                 | .00   | 1.00 | 1.00 | 26.01  | .83 (#1) |
|         |                |              |                                    |       |      |      |        | .84 (#2) |
|         |                |              |                                    |       |      |      |        | .86 (all) |
Figure 4.7. Standardized factor loadings and squared multiple correlations for Stakeholder Focus.
The reduced measurement model for Stakeholder Focus had two factors. The first factor pertains to having knowledge of those you serve. It will be referred to as Understanding Stakeholders throughout the remainder of this study. The second Stakeholder Focus factor relates to examining the extent to which school support personnel are satisfying stakeholders by meeting their needs and expectations. This factor will be referred to as Responding to Stakeholders throughout the rest of this study.

Results

There were nine items in the original Results measurement scale. This scale had a mean of 42.86 and standard deviation of 7.92. Individual item means ranged from 4.10 (R7LD: The district removes things that get in the way of progress; S.D. = 1.38) to 5.17 (R3PR: Our work consistently meets all requirements; S.D. = .91). The factor loadings of items in the original scale (see Figure 4.9) ranged from .62 to .82. The loading values of all nine items were statistically significant (z = 8.04 to 11.71, p < .01).

The reduced scale for Results contained the five items listed in Table 4.13. Factor loadings for the reduced items ranged from .70 to .81 (z = 9.25 to 10.68, p < .01). Inter-item correlation coefficients ranged from .46 to .61. The original and reduced models are compared in Table 4.14. The scale reliability for the reduced model (alpha = .86) was lower than in the original, but still considered high. A non-significant χ² was obtained along with favorable values for RMSEA, CFI, NFI, and AIC.
Figure 4.8. Standardized factor loadings and squared multiple correlations for Results.

The reduced scale for Results contained the five items listed in Table 4.13. Factor loadings for the reduced items ranged from .70 to .81 ($z = 9.25$ to $10.68$, $p < .01$). Inter-item correlation coefficients ranged from .46 to .61. The original and reduced models are compared in Table 4.14. The scale reliability for the reduced model (alpha = .86) was lower than in the original, but still considered high. A non-significant $\chi^2$ was obtained along with favorable values for RMSEA, CFI, NFI, and AIC.
Table 4.13

Retained Items for Results

<table>
<thead>
<tr>
<th>Item Number</th>
<th>Item Wording</th>
</tr>
</thead>
<tbody>
<tr>
<td>R1F</td>
<td>The value of our services is improving.</td>
</tr>
<tr>
<td>R3PR</td>
<td>Our work consistently meets all requirements.</td>
</tr>
<tr>
<td>R5STF</td>
<td>In general, we are satisfied with our jobs.</td>
</tr>
<tr>
<td>R6STK</td>
<td>Those we serve are consistently satisfied with our work.</td>
</tr>
<tr>
<td>R7LD</td>
<td>The district removes things that get in the way of progress.</td>
</tr>
</tbody>
</table>

Table 4.14

Model Comparisons for Results

<table>
<thead>
<tr>
<th>Model</th>
<th>No. of Factors</th>
<th>No. of Items</th>
<th>Chi-square (df), probability level</th>
<th>RMSEA</th>
<th>CFI</th>
<th>NFI</th>
<th>AIC</th>
<th>Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original</td>
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<td>9</td>
<td>87.48 (27), p = .00</td>
<td>.11</td>
<td>.93</td>
<td>.90</td>
<td>141.48</td>
<td>.90</td>
</tr>
<tr>
<td>Reduced</td>
<td>1</td>
<td>5</td>
<td>9.07 (5), p = .11</td>
<td>.07</td>
<td>.99</td>
<td>.98</td>
<td>39.07</td>
<td>.86</td>
</tr>
</tbody>
</table>

To summarize, each of the latent constructs and the items that measured them were examined in turn with the goal of obtaining a favorable measurement model for each construct. Exploratory factor analysis revealed that Staff Focus and Stakeholder Focus had two underlying factors each while the remaining constructs had a single factor. The 2-factor constructs were divided yielding a total of nine quality management constructs for the subsequent analysis. Systematic analysis led to the reduction of items in each of the scales. The total number of items was reduced from 65 to 31. Each of the reduced measurement models was an improvement over the original. The reduced models had non-significant Chi-square
values and other fit statistics that were considered to be satisfactory or better. Additionally, scale reliabilities were high ranging from .80 to .94.

Exploratory factor analysis, conducted in SPSS, was then used to examine the discriminant validity of the study’s constructs once the optimal indicators for measuring each one had been established. A nine-factor solution was specified. Maximum likelihood extraction with oblique rotation was used. The pattern matrix is displayed in Table 4.15. The criteria for interpreting factor loadings was .30, therefore loadings below this level were suppressed. Retained items that were designed to measure Leadership, Data, Work Environment, Training and Development, Work Processes, and Responding to Stakeholders loaded cleanly onto their respective factors. Four out of the five indicators measuring Planning loaded cleanly on a factor as did four out of the five items measuring Results. The two items measuring Understanding Stakeholders, having knowledge of those you serve, had loadings of .32 on a single factor, but each of the items also had a higher loading on a different factor making the discriminant validity of this construct marginal. Overall, the scales demonstrated adequate to better discriminant validity of the constructs.

Correlations between the individual items, as displayed in Table 4.16, were also examined to further evaluate the discriminant validity among the constructs. Correlations between items were all statistically significant at the .01 level. Constructs display discriminant validity when the correlations between the items measuring them are higher than the correlations these same items have with items measuring other constructs (Campbell & Fiske, 1959). For example, the correlations between the first item in the Leadership scale (L1SL) and the other items in the Leadership scale (L2SL, L3SL, and L4SL) ranged from .73 to .83. The correlations between this same item and items designed to measure other constructs ranged from .40 to .68. Examination of the
Table 4.15

*Pattern Matrix for Retained Items Measuring Nine Latent Constructs*

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<tr>
<th>Item</th>
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</table>

*Note.* Extraction method: Maximum Likelihood; Rotation method: Oblimin with Kaiser Normalization
Table 4.16

<table>
<thead>
<tr>
<th>Item</th>
<th>Mean</th>
<th>S. D.</th>
<th>N</th>
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<td>1 L1SL</td>
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<td>0.42</td>
<td>0.35</td>
<td>0.54</td>
<td>0.59</td>
</tr>
<tr>
<td>31</td>
<td>R7LD</td>
<td>0.50</td>
<td>0.67</td>
<td>0.48</td>
<td>0.50</td>
<td>0.47</td>
<td>0.48</td>
<td>0.54</td>
<td>0.48</td>
<td>0.51</td>
<td>0.47</td>
<td>0.45</td>
<td>0.52</td>
<td>0.57</td>
<td>0.54</td>
<td>0.46</td>
</tr>
</tbody>
</table>
Structural Model Assessment

The analysis above outlined the assessment of the measurement model which included determining the optimum indicators for each of the study’s latent constructs. An assessment of the structural model followed. Confirmatory factory analysis was conducted in Amos to calculate the correlations among the latent constructs. These correlations (see Table 4.17) were moderate to high ranging from .60 to .87.

Table 4.17

<table>
<thead>
<tr>
<th>Correlation Coefficients between Constructs</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Leadership</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Data</td>
<td>.83**</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Planning</td>
<td>.77**</td>
<td>.86**</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Work Environment</td>
<td>.68**</td>
<td>.72**</td>
<td>.75**</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 Planning</td>
<td>.69**</td>
<td>.75**</td>
<td>.80**</td>
<td>.72**</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 Work Processes</td>
<td>.69**</td>
<td>.74**</td>
<td>.61**</td>
<td>.78**</td>
<td>.65**</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 Understanding Stakeholders</td>
<td>.68**</td>
<td>.71**</td>
<td>.60**</td>
<td>.74**</td>
<td>.66**</td>
<td>.79**</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 Responding to Stakeholders</td>
<td>.65**</td>
<td>.77**</td>
<td>.77**</td>
<td>.76**</td>
<td>.78**</td>
<td>.70**</td>
<td>.87**</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>9 Results</td>
<td>.73**</td>
<td>.75**</td>
<td>.73**</td>
<td>.81**</td>
<td>.75**</td>
<td>.85**</td>
<td>.77**</td>
<td>.74**</td>
<td>1.00</td>
</tr>
</tbody>
</table>

** p < .01 (two-tailed)

Relationships between the latent constructs as hypothesized by the Baldrige model were then simultaneously analyzed by Amos using a covariance matrix. The standardized path coefficients for the structural model are shown in Figure 4.9. According to the figure, Leadership had a positive and significant effect on each of the five system variables (Data, Planning, Work Environment, Training and Development, and Work Processes). Surprisingly, the relationship between Leadership and each of the outcome variables (Understanding Stakeholders, Responding to Stakeholders, and Results) was found to be negative. The relationship between Leadership and both
Understanding Stakeholders and Responding to Stakeholders was significant, while the relationship between Leadership and Results was not. In terms of the system variables, Work Environment, Training and Development, and Work Processes had positive and statistically significant effects on each of the outcome variables. The relationship between Planning and each of the three outcome variables was not statistically significant. The relationship between Data and both Understanding Stakeholders and Responding to Stakeholders was positive and statistically significant while its relationship with Results was negative and non-significant.

Figure 4.9 also displays the squared multiple correlations for each of the endogenous variables in the Baldrige quality management model. A squared multiple correlation represents the amount of variation in the variable that is explained by its predictors. The amount of variance explained in the system variables ranged from 55% (Work Processes) to 81% (Data). Since Leadership was the only predictor for the system variables, the value of the squared multiple correlations reinforce the fact that organizational leaders play an important role in data collection and management, strategic planning, the environment for and training of the workforce, and how work tasks are designed and carried out. The model’s ability to account for the variation in the outcome variables was also high. Through the combined effect of Leadership and the five system variables, 72% of the variation in Understanding Stakeholders was accounted for, 81% of the variation in Responding to Stakeholders was accounted for, and 81% of the variation in Results was accounted for.

As when evaluating various measurement models in search for optimal ones for use in this study, several fit statistics were used to assess the extent to which the Baldrige model as a whole (structural model) was consistent with the study’s sample data. Table 4.18 displays the values obtained for the structural model when using the
same measures of fit that were used for assessing each of the measurement models. The $\chi^2$ value of 968.96 (df = 411) was statistically significant, meaning that the actual and predicted covariance matrices differed from one another beyond what differences could be expected due to natural variation in the sample. The root mean square error of approximation value of .08 fell within the acceptable range. Additionally, the CFI and NFI approached .90, the lower threshold of values that indicate a well-fitting model. The AIC value was quite high, but is more informative when compared to values obtained from other models. Considered together, the fit statistics suggest that the initial structural model does not satisfactorily fit the sample data.

Table 4.18

<table>
<thead>
<tr>
<th>Fit Statistics for Initial Baldrige Structural Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chi-square (df), probability level</td>
</tr>
<tr>
<td>-----------------------------------</td>
</tr>
<tr>
<td>968.96 (411), p = .00</td>
</tr>
</tbody>
</table>
Figure 4.9. Standardized regression coefficients for initial model and squared multiple correlations for its endogenous variables

Note: * = p < .05, ** = p < .01
Hypothesis Testing

Several hypotheses were proposed to address the study’s research questions. There were 15 hypotheses in all and they are reviewed below. Evidence presented after each hypothesis determined whether it was accepted or rejected.

The first four hypotheses examined the Baldrige model’s assertion that Leadership acts as a “driver” of quality management by relating directly to multiple “system” variables.

*Hypothesis 1:* Leadership is positively related to Data.

In the SEM analysis, the standardized regression coefficient from Leadership to Data was .90. It was statistically significant at the .01 level. The relationship between Leadership and Data was the strongest among the relationships between Leadership and the “system” variables. Hypothesis 1 was supported.

*Hypothesis 2:* Leadership is positively related to Planning.

Using SEM, the standardized regression coefficient from Leadership to Planning was .85. It was statistically significant at the .01 level. Hypothesis 2 was supported.

*Hypothesis 3:* Leadership is positively related to Staff Focus.

Exploratory factor analysis revealed the presence of two factors underlying Staff Focus. Separate measurement models were established for the two areas that comprised Staff Focus, Work Environment and Training and Development. The standardized regression coefficient from Leadership to Work Environment was found to be .77. This value was statistically significant at the .01 level. The standardized regression coefficient from Leadership to Training and Development was .78, which was also statistically significant at the .01 level. Based on the above analysis, Hypothesis 3 was supported.
Hypothesis 4: Leadership is positively related to Work Processes.

SEM yielded a standardized regression coefficient of .74 for the relationship from Leadership to Work Processes. This value was statistically significant at the .01 level. Hypothesis 4 was supported.

The next two hypotheses examined the model’s assertion that Leadership has a direct impact on an organization’s “outcomes.”

Hypothesis 5: Leadership is positively related to Stakeholder Focus.

Exploratory factor analysis revealed two factors underlying Stakeholder Focus. Measurement models, Understanding Stakeholders and Responding to Stakeholders, were created and used for subsequent analysis. The standardized regression coefficient for the path from Leadership to Understanding Stakeholders was -.28. This value was not statistically significant. In its relationship with Responding to Stakeholders, Leadership had a statistically significant (p < .05) negative relationship. SEM produced a standardized regression coefficient of -.75. Based on the above analysis, Hypothesis 5 was rejected.

Hypothesis 6: Leadership is positively related to Results.

The standardized regression coefficient from Leadership to Results was -.02. This value was not statistically significant. Hypothesis 6 was rejected.

Eight hypotheses (H7-H14) tested the strength and direction of the relationships between each of the “system” variables and the “outcome” variables:

Hypothesis 7: Data is positively related to Stakeholder Focus.

SEM produced a standardized regression coefficient of .43 for the relationship between Data and Understanding Stakeholders. This value was statistically significant at the .05 level. The relationship between Data and Responding to Stakeholders was
positive and statistically significant at the .01 level. The standardized regression coefficient for this path was .54. Hypothesis 7 was supported.

_Hypothesis 8:_ Data is positively related to Results.

When examining the relationship between Data and Results, SEM produced a standardized regression coefficient of -.07. This value was not statistically significant. Hypothesis 8 was rejected.

_Hypothesis 9:_ Planning is positively related to Stakeholder Focus.

SEM analysis produced a standardized regression coefficient of -.22, suggesting a negative, but non-significant, relationship between Planning and Understanding Stakeholders. When examining the relationship between Planning and Responding to Stakeholders, a standardized regression coefficient of .23 was obtained. This value was not statistically significant. Hypothesis 9, the belief that Planning is positively related to Stakeholder Focus, was rejected.

_Hypothesis 10:_ Planning is positively related to Results.

A standardized regression coefficient of .18 was produced for the relationship between Planning and Results using SEM. This value was not statistically significant. Hypothesis 10 was rejected.

_Hypothesis 11:_ Staff Focus is positively related to Stakeholder Focus.

To test this hypothesis, four relationships, instead of one as initially anticipated, had to be examined. The original Staff Focus construct became two separate constructs, Work Environment and Training and Development, when the measurement model was assessed. Furthermore, the Stakeholder Focus construct as initially envisioned became two distinct constructs: Understanding Stakeholders and Responding to Stakeholders.
SEM was used to examine the relationship between Work Environment and Understanding Stakeholders. A standardized regression coefficient of .39 was produced. This value was statistically significant at the .01 level.

The relationship between Work Environment and Responding to Stakeholders was also examined. A standardized regression coefficient of .40 (p < .01) was produced when using SEM.

The relationship between Training and Development and the stakeholder-related outcomes were also examined. SEM produced a standardized regression coefficient of .26 for the relationship between Training and Development and Understanding Stakeholders. This value was statistically significant at the .05 level.

Training and Development had a positive relationship with Responding to Stakeholders in the SEM analysis which produced a standardized regression coefficient of .45. This value was statistically significant at the .01 level.

Based on the above analysis, Hypothesis 11 was supported. Both aspects of Staff Focus, Work Environment and Training and Development, were positively related to having knowledge of those you serve and as well as responding to the stated and anticipated needs and desires of those you serve. These ideas form the basis of Stakeholder Focus which became Understanding Stakeholders and Responding to Stakeholders in the analysis of the structural model.

*Hypothesis 12: Staff Focus is positively related to Results.*

Two relationships were examined when testing this hypothesis. SEM produced a standardized regression coefficient of .22 for the relationship between Work Environment and Results. This value was statistically significant at the .05 level. Work Environment represented one aspect of the Staff Focus construct as initially conceptualized.
The relationship between Training and Development and Results was also examined. Based on a standardized regression coefficient of .20, the relationship was found to be statistically significant at the .05 level. Training and Development represented the other aspect of the Staff Focus construct as initially conceptualized.

Based on the analysis, Hypothesis 12 was supported. Work Environment and Training and Development, both important aspects of Staff Focus, were positively related to Results.

*Hypothesis 13: Work Processes is positively related to Stakeholder Focus.*

This hypothesis was examined by testing two separate relationships. Using SEM, a positive and statistically significant relationship ($p < .01$) was found between Work Processes and Understanding Stakeholders, the first aspect of Stakeholder Focus. The standardized regression coefficient was .42.

The relationship between Work Processes and Responding to Stakeholders, another aspect of Stakeholder Focus, was also examined. Using SEM, the standardized regression coefficient was .22. This value was statistically significant at the .05 level.

Hypothesis 13 was fully supported. Work Processes had a positive and statistically significant relationship with both Understanding Stakeholders and Responding to Stakeholders.

*Hypothesis 14: Work Processes is positively related to Results.*

For the last hypothesis testing the relationship between a “system” and “outcome” variable, the relationship between Work Processes and Results was examined. A standardized regression coefficient of .54 was produced using SEM. This value was statistically significant at the .01 level. Hypothesis 14 was fully supported.
This study’s final hypothesis tested whether the Baldrige model is a good fit for K-12 education support functions based on collected data.

*Hypothesis 15:* The Baldrige model of quality management adequately describes sample data from K-12 education support functions.

Again, SEM was the analytic technique used to test this hypothesis. When examining the study’s structural model, a variety of fit statistics were produced. These statistics helped determine the extent to which relationships in the model were reproduced in the sample data. The initial model had a $\chi^2$ value of 968.96 (df = 411). This value was statistically significant ($p < .01$) which indicated that the actual and predicted covariance matrices differed from one another beyond what differences could be expected due to natural variation in the sample. When testing structural models a non-significant $\chi^2$ value is desired, meaning that the predicted and actual covariance matrices are not significantly different from one another. The RMSEA value of .08 was in the upper end of the acceptable range. The CFI and NFI values of .89 and .82, respectively, are below the recommended level of .90 or greater which is indicative of a well-fitting model. The AIC value was also high. Based on this evidence, Hypothesis 15 was rejected.
CHAPTER FIVE
SUMMARY, DISCUSSION, AND IMPLICATIONS

This chapter is organized into three parts. It begins with a summary of the study including a review of the need for the study, the study’s purposes, its method, and hypotheses. In the second part, the results of the study are discussed. Implications are presented in the third part of the chapter.

Summary

Quality management, an approach to achieving and sustaining high quality products or services by focusing on the continuous improvement of processes throughout all levels and functions of an organization in order to meet or exceed customer requirements (Flynn, Schroeder, & Sakakibara, 1994), has been of interest to scholars and practitioners for decades. Japan’s recovery following WWII and its global competitiveness in the manufacturing of automobiles and high-tech products has largely been credited to quality management (Gehani, 1993) as shaped by the work of W. Edwards Deming, Joseph M. Juran, and Kauro Ishikawa. Japan’s success spurred the quality movement in the United States, beginning in the manufacturing sector and later extending to the service sector.

The quality movement has also influenced the education sector in the United States. In elementary and secondary education, reforms during the 1990s laid the groundwork for nationwide monitoring and improvement of selected outcomes, including student achievement and graduation rates, under the No Child Left Behind Act of 2002. This legislation, and the reforms that preceded it, helped to engage teachers and school administrators throughout the country in quality management practices including the collection and use of data for making decisions, the establishment of performance measures, learning in teams, and the systematic
examination and refinement of instructional processes. Teachers and administrators have been “impelled to change the status quo of professional practice with the expectation that they will be accountable for improving student performance” (Heck, 2000, p. 513). While this impetus for continuous improvement has impacted nearly 4 million instructional staff and administrators, support service personnel, who make up 30-32% of the elementary and secondary education workforce (NCES, 2006a), have been largely unaffected. Quality management literature contends that systematic continuous improvement should involve employees from top executives to front-line workers whether they are engaged in the organization’s core or support functions. This study examined customer-focused continuous improvement efforts among employees in food service, operations and maintenance, transportation, human resources, business services, and administrative support functions of public school districts.

The purpose of the study was to identify the impact of leadership, measurement, analysis, and knowledge management, strategic planning, workforce focus and process management on stakeholder focus and other organizational results. The study utilized a quality management model from the Malcolm Baldrige National Quality Award. Survey research methods were used to gather perceptual data from 196 support service personnel serving in public school districts in Minnesota. Structural equation modeling techniques were used to examine the relationships among the quality management constructs as defined in the Malcolm Baldrige National Quality Award’s Education Criteria for Performance Excellence (NIST, 2007).

The fifteen hypotheses that follow were tested in this study:

_Hypothesis 1:_ Leadership is positively related to Data.

_Hypothesis 2:_ Leadership is positively related to Planning.

_Hypothesis 3:_ Leadership is positively related to Staff Focus.
**Hypothesis 4:** Leadership is positively related to Work Processes.

**Hypothesis 5:** Leadership is positively related to Stakeholder Focus.

**Hypothesis 6:** Leadership is positively related to Results.

**Hypothesis 7:** Data is positively related to Stakeholder Focus.

**Hypothesis 8:** Data is positively related to Results.

**Hypothesis 9:** Planning is positively related to Stakeholder Focus.

**Hypothesis 10:** Planning is positively related to Results.

**Hypothesis 11:** Staff Focus is positively related to Stakeholder Focus.

**Hypothesis 12:** Staff Focus is positively related to Results.

**Hypothesis 13:** Work Processes is positively related to Stakeholder Focus.

**Hypothesis 14:** Work Processes is positively related to Results.

**Hypothesis 15:** The Baldrige model of quality management adequately describes sample data from K-12 education support functions.

**Discussion**

The quality management model utilized in this study is one that suggests top organizational leaders play a critical role in shaping the inner workings of the organization and ultimately its results. In this recursive model, utilized by the Malcolm Baldrige National Quality Award from 1992-1996, Leadership acts as a “driver” of the organization and directly impacts organizational “system” variables including measurement, analysis, and knowledge management, strategic planning, the workforce, and process management. These “system” variables, in turn, have a direct impact on organizational “outcomes” including customer or stakeholder relationships and satisfaction and other organizational results. The model claims that Leadership also has a direct impact on these organizational “outcomes.”
Before discussing ways in which the results from this study are consistent with results from other quality management studies that use multivariate techniques to examine the Baldrige model, it is important to note a few of the differences. This study used data from employees working in public elementary and secondary education settings. Similar studies have been conducted in the education sector (Badri, et al., 2006; Winn & Cameron, 1998) however those studies’ participants were affiliated with higher education institutions. To this researcher’s knowledge, the relationships between the quality management constructs in the Baldrige model have not been empirically examined using data solely from elementary and secondary education in previously published research.

Another difference between this study and similar others was the type of position held by participants. This study’s sample was comprised predominantly of front-line workers. Of the 180 subjects answering the item about their job responsibilities, 132 (73%) did not manage or supervise other employees in their work group. This emphasis on participation from front-line workers can be contrasted with other quality management studies in which senior leaders, middle managers, or individuals responsible for the organization’s quality programs were sought as participants. Wilson and Collier (2000) utilized plant-level quality managers for their study and Meyer and Collier (2001) collected data from those serving as directors, vice presidents, or managers of quality. Badri et al.’s (2006) participants held leadership or administrative positions like chancellor, dean, or department chair within the university setting. Nearly half of the participants in Flynn and Saladin’s (2001) study in the manufacturing sector were direct laborers, although the extent of the influence of their data on the findings was unclear since survey content varied by the job title held by the
participants. About half of the participants in the study reported by Winn and Cameron (1998) were not among the ranks of the university’s professional staff or administration.

York and Miree (2004) cautioned against relying heavily on data from managers and others in top levels of the organization when conducting quality management research. “Managers are not necessarily objective observers, and a survey asking about the use of TQM management methods has a strong demand characteristic influencing managers to say that their company is TQM-managed” (York & Miree, 2004, p. 297). This study heeded that caution. Data collected from front-line workers may more accurately reflect the extent to which quality management practices are embedded in the day-to-day workings of the organization.

Another substantial difference between this study and previously described MBNQA model validation studies was the number of quality management constructs assessed in the model. In this study, exploratory factor analysis revealed that both Staff Focus and Stakeholder Focus were comprised of two factors. This led to the creation of a measurement model for Staff Focus 1 (subsequently named Work Environment) and Staff Focus 2 (subsequently named Training and Development). The same was true of the Stakeholder Focus construct which became Stakeholder Focus 1 (subsequently named Understanding Stakeholders) and Stakeholder Focus 2 (subsequently named Responding to Stakeholders). The structural model that was analyzed in this study therefore had a total of nine quality management constructs, instead of the expected seven.

*Leadership and Measurement, Analysis, and Knowledge Management*

The impact of organizational leadership on the development and use of performance measures, the use of data to guide work processes and make decisions, and the sharing of knowledge within the organization was evident in this study. Using
SEM, Leadership accounted for 81% of the variance in Data. Leadership's strong and significant relationship with Data was consistent with findings in prior studies (see Table 5.1). Of the system variables in this study, Leadership had the strongest relationship with Data. The same was true in studies conducted within manufacturing (Flynn & Saladin, 2001; Wilson & Collier, 2000) and healthcare (Meyer & Collier, 2001) settings, but not in higher education (Badri et al., 2006; Winn & Cameron, 1998).

**Leadership and Strategic Planning**

Like in previous studies (Badri et al., 2006; Flynn & Saladin, 2001; Meyer & Collier, 2001; Wilson & Collier, 2000; Winn & Cameron, 1998), this study found a strong and significant relationship between organizational leadership and the development and execution of its improvement planning. Of the systems variables, Leadership had the second largest impact on Planning in this study. This finding was also shared in a few studies (Flynn & Saladin, 2001; Meyer & Collier, 2001; Winn & Cameron, 1998). This study’s data showed that Leadership accounted for up to 72% of the variation in Planning.

**Leadership and Workforce Focus**

The internal environment in which organizational members carry out their work and how they interact with co-workers and work processes is significantly influenced by senior leaders (Badri et al., 2006; Flynn & Saladin, 2001; Meyer & Collier, 2001; Wilson & Collier, 2000; Winn & Cameron, 1998). In this study, the work environment (Work Environment) and workplace learning (Training and Development) for support service staff working in public schools were considered separately. Leadership’s relationship with these two workforce areas was similar, both in terms of the strength of the relationship and the amount of variance explained.
Table 5.1

Comparison of Findings between Present and Previous Baldrige Model Studies

<table>
<thead>
<tr>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Setting</td>
<td>K-12 Education</td>
<td>Higher Education</td>
<td>Higher Education</td>
<td>Health Care</td>
<td>Manufacturing</td>
<td>Manufacturing</td>
</tr>
</tbody>
</table>

Is the relationship between the pairs of constructs positive and statistically significant at the .05 level or less?

- Leadership → Measurement, Analysis & Knowledge Management
  - Present Study: Yes
  - Badri, et al., 2006: Yes
  - Winn & Cameron, 1998: Yes
  - Meyer & Collier, 2001: Yes
  - Flynn & Saladin, 2001: Yes
  - Wilson & Collier, 2000: Yes

- Leadership → Strategic Planning
  - Present Study: Yes
  - Badri, et al., 2006: Yes
  - Winn & Cameron, 1998: Yes
  - Meyer & Collier, 2001: Yes
  - Flynn & Saladin, 2001: Yes
  - Wilson & Collier, 2000: Yes

- Leadership → Workforce Focus
  - Present Study: Yes
  - Badri, et al., 2006: Yes
  - Winn & Cameron, 1998: Yes
  - Meyer & Collier, 2001: Yes
  - Flynn & Saladin, 2001: Yes
  - Wilson & Collier, 2000: Yes

- Leadership → Process Management
  - Present Study: Yes
  - Badri, et al., 2006: Yes
  - Winn & Cameron, 1998: Yes
  - Meyer & Collier, 2001: Yes
  - Flynn & Saladin, 2001: Yes
  - Wilson & Collier, 2000: Yes

- Leadership → Customer Focus
  - Present Study: No
  - Badri, et al., 2006: Yes
  - Winn & Cameron, 1998: Yes
  - Meyer & Collier, 2001: No
  - Flynn & Saladin, 2001: No
  - Wilson & Collier, 2000: No

- Leadership → Results
  - Present Study: No
  - Badri, et al., 2006: Yes
  - Winn & Cameron, 1998: Yes
  - Meyer & Collier, 2001: Yes
  - Flynn & Saladin, 2001: Yes
  - Wilson & Collier, 2000: Yes

- Measurement, Analysis & Knowledge Management → Customer Focus
  - Present Study: Yes
  - Badri, et al., 2006: Yes
  - Winn & Cameron, 1998: Yes
  - Meyer & Collier, 2001: No
  - Flynn & Saladin, 2001: Not tested
  - Wilson & Collier, 2000: No

- Strategic Planning → Customer Focus
  - Present Study: No
  - Badri, et al., 2006: Yes
  - Winn & Cameron, 1998: Yes
  - Meyer & Collier, 2001: No
  - Flynn & Saladin, 2001: No
  - Wilson & Collier, 2000: No

- Workforce Focus → Customer Focus
  - Present Study: Yes
  - Badri, et al., 2006: Yes
  - Winn & Cameron, 1998: Yes
  - Meyer & Collier, 2001: Yes
  - Flynn & Saladin, 2001: Yes
  - Wilson & Collier, 2000: Yes

- Process Management → Customer Focus
  - Present Study: Yes
  - Badri, et al., 2006: Yes
  - Winn & Cameron, 1998: Yes
  - Meyer & Collier, 2001: Yes
  - Flynn & Saladin, 2001: No
  - Wilson & Collier, 2000: Yes

- Measurement, Analysis & Knowledge Management → Results
  - Present Study: No
  - Badri, et al., 2006: Yes
  - Winn & Cameron, 1998: Yes
  - Meyer & Collier, 2001: Yes
  - Flynn & Saladin, 2001: Not tested
  - Wilson & Collier, 2000: Yes

- Strategic Planning → Results
  - Present Study: No
  - Badri, et al., 2006: Yes
  - Winn & Cameron, 1998: Yes
  - Meyer & Collier, 2001: No
  - Flynn & Saladin, 2001: Yes
  - Wilson & Collier, 2000: No

- Workforce Focus → Results
  - Present Study: Yes
  - Badri, et al., 2006: Yes
  - Winn & Cameron, 1998: Yes
  - Meyer & Collier, 2001: No
  - Flynn & Saladin, 2001: No
  - Wilson & Collier, 2000: No

- Process Management → Results
  - Present Study: Yes
  - Badri, et al., 2006: Yes
  - Winn & Cameron, 1998: Yes
  - Meyer & Collier, 2001: No
  - Flynn & Saladin, 2001: Yes
  - Wilson & Collier, 2000: Yes
Leadership and Process Management

Incorporating customer expectations, employee knowledge, and technology in the design of work processes and refining those processes to enhance performance is heavily influenced by organizational leaders. The significant relationship between Leadership and Work Processes in this study is consistent with similar relationships in other Baldrige model studies (Badri et al., 2006; Flynn & Saladin, 2001; Meyer & Collier, 2001; Wilson & Collier, 2000; Winn & Cameron, 1998). Of Leadership’s relationships with the system variables, its one with Work Processes tends not to be the strongest; Badri et al.’s (2006) study is an exception.

Measurement, Analysis, and Knowledge Management and Stakeholder Focus

Intuitively, possessing and sharing information about those served by the organization is necessary for organizational members to understand their customers’ needs and expectations and to develop satisfying relationships with them. The relationships between Data and knowledge of customers (Understanding Stakeholders) and relating to and satisfying them (Responding to Stakeholders) were moderate yet significant in this study. Statistically significant relationships between these variables were also found in higher education settings (Badri et al., 2006; Winn & Cameron, 1998) but not in manufacturing (Wilson & Collier, 2000) or healthcare (Meyer & Collier, 2001) environments. This direct relationship was not examined by Flynn and Saladin (2001).

Strategic Planning and Stakeholder Focus

The causal influence of planning on knowledge of customers and their satisfaction has not been firmly established. In this study, the standardized regression coefficients for paths between Planning and the Stakeholder Focus variables (Understanding Stakeholders and Responding to Stakeholders) were not statistically
significant. In higher education (Badri et al., 2006; Winn & Cameron, 1998), the relationship between strategic planning and customer relations has been found to be significant, but not so in other settings (Flynn & Saladin, 2001; Meyer & Collier, 2001; Wilson & Collier, 2000).

**Workforce Focus and Stakeholder Focus**

Evidence from this study supported the link between environments that foster competency and commitment among organizational members and informed and responsive relations between these members and their customers. Small to moderate, but statistically significant, relationships between the Staff Focus and Stakeholder Focus variables were found using SEM. The work environment (Work Environment) for support service personnel impacted their knowledge of customers (Understanding Stakeholders) and customer relations (Responding to Stakeholders) similarly. Workplace learning (Training and Development) had a stronger impact on relating to and satisfying customers (Responding to Stakeholders) than it did on gaining knowledge about these customers (Understanding Stakeholders). The direct link between workforce and customer focus has also been affirmed in service (Badri et al., 2006; Meyer & Collier, 2001; Winn & Cameron, 1998) and manufacturing (Flynn & Saladin, 2001) settings.

**Process Management and Stakeholder Focus**

Process improvement is a defining characteristic of quality management. Prior studies examining the relationships among constructs in the Baldrige model have found strong support for the influence of process management on customer focus (Badri, et al., 2006; Flynn & Saladin, 2001; Meyer & Collier, 2001; Wilson & Collier, 2000; Winn & Cameron, 1998). Evidence for the positive direct relationship between these two areas was also found in this study.
Measurement, Analysis, and Knowledge Management and Results

A direct relationship between the establishment and monitoring of performance, using data to inform decisions, and cultivating and sharing knowledge among organizational members is hypothesized by the study’s model. This relationship has been previously supported when tested by researchers (Badri, et al., 2006; Meyer & Collier, 2001; Wilson & Collier, 2000; Winn & Cameron, 1998). The standardized regression coefficient obtained in this study did not support a direct relationship between Data and Results.

Strategic Planning and Results

The development and deployment of strategic plans has been hypothesized as having a direct impact on organizational performance. The association between Planning and Results in this study was not statistically significant. Small but statistically significant standardized regression coefficients, ranging from .07 to .20, have been obtained for this relationship in three previously published studies (Badri, et al., 2006; Flynn & Saladin, 2001; Winn & Cameron, 1998).

Workforce Focus and Results

The link between the environment for and engagement of the workforce and organizational results has not been firmly established. Evidence to support this link in educational environments has been reported (Badri et al., 2006; Winn & Cameron, 1998). SEM analysis in this study revealed small but statistically significant relationships between the work environment (Work Environment) and organizational results and between workplace learning (Training and Development) and organizational results.

Process Management and Results
Deming (1986) argued that processes, far more than people, were responsible for poor performance in organizations. The statistically significant relationship between Work Processes and Results in this study was among the strongest of the relationships between the system and outcome variables examined. With the exception of one study (Meyer & Collier, 2001) the relationship between the design and improvement of processes and organizational results was statistically significant in all those examined.

**Leadership and Stakeholder Focus**

Leadership’s direct impact on customer relations and satisfaction was suggested by the model, but not generally supported by empirical evidence (Flynn & Saladin, 2001; Meyer & Collier, 2001; Wilson & Collier, 2000). In higher education settings, this relationship has been found to be both positive and statistically significant with standardized regression coefficients ranging from .06 (Winn & Cameron, 1998) to .93 (Badri et al., 2006). Path coefficients from SEM for the relationship between Leadership and Understanding Stakeholders and Responding to Stakeholders in this study were negative.

**Leadership and Results**

Other Baldrige model validation studies have found mixed support for the direct relationship between senior leadership and organizational performance on key measures. A significant direct relationship has been confirmed in sample data from healthcare (Meyer & Collier, 2001), higher education (Badri et al., 2006), and manufacturing (Flynn & Saladin, 2001) settings. In this study, the relationship between Leadership and Results was found to be neither positive nor statistically significant.

**Implications**

Research on effective schools (e.g., Hallinger & Heck, 1996; Hanushek & Raymond, 2005) highlights many factors that impact student outcomes. Leadership is
one of those factors. This study demonstrated the strong and significant impact that elementary and secondary educational leaders have on non-instructional areas as well. These effects were shown in the areas of measurement, analysis, and knowledge management, improvement planning, the work environment, workplace learning, and process management.

Among this study’s sample, the relationship between leadership and the use of data to measure the quality of work and refine how it gets accomplished by support service personnel was particularly strong. Based on personal experience as a senior examiner for the MBNQA and a state-level quality award, Evans (2005) observed that measurement, analysis, and knowledge management efforts are often the least advanced of the quality management areas within organizations, often because “the discipline required to establish and maintain an effective performance measurement system is viewed as an arduous task” (p. 519). The mean score for Data’s retained items, 4.08, was the second lowest mean score of the constructs in the study, ahead of Planning at 3.55.

School district leaders can look to existing resources for guidance on collecting data for establishing performance measures that provide a holistic view of support functions. The applications submitted by school districts receiving the MBNQA (e.g., Community Consolidated School District 15, 2003; Jenks Public Schools, 2005; Pearl River School District, 2001) represent one kind of available resource. Accessible online, the applications contain many examples of the type of data collected and monitored to aid in the continuous improvement of support service functions. In the area of transportation, for example, the award-winning districts have tracked the number of accidents and reported injuries, on-time delivery percentage, cost of service per eligible student, the number of behavior infraction reports filed, number of
complaints to the transportation director, the number of complaints made on the seventh day of school, and the time it takes to place students into routes. Payroll accuracy percentage, purchase order cycle time, and program expenditures as a percentage of the total budget time are measures reported for business services. Food service performance measures included staff time spent for department ordering, student satisfaction rates, and the average amount of time students spent in the lunch line. Performance measures for the human resource department, and the workforce in general, included hours of training/development per year, retention rate by employee group, daily attendance rate by employee group, number of labor grievances, number of workman’s compensation claims, and percentage of employees meeting performance expectations as determined by annual reviews.

Organizations and associations designed to serve particular segments of elementary and secondary education or their personnel also provide resources for leaders in the area of measurement, analysis, and knowledge management. Through its publication titled School *Business Affairs*, the Association for School Business Officials International publishes occasional articles on establishing and monitoring performance measures for education’s support service functions (e.g., Forsyth, 2001). The National Food Service Management Institute, which is funded through grants from the United States Department of Agriculture, developed the financial management information system model (Cater et al., 2005) to standardize financial information for school food service programs so the data could be used in decision-making and to improve the quality and efficiency of school meal programs. Its use has been facilitated by the availability of software based on the model (Cater, 2007). The Institute has also developed surveys to assess student, parent, and staff member satisfaction with school foodservice programs.
A national organization focused on the needs of urban public school districts, called the Council of Great City Schools, has developed performance measures for the areas of transportation, food service, operations and maintenance, and procurement and supply chain. Once the measures were established, data was collected in the organization’s 66-member school districts. The subsequent report (Eugene, Carlson & Hrowal, 2007) addressed each performance measure, explaining “why the measure is important, how it is defined and calculated, what the range of responses were across the city school districts, and how the indicators’ values were affected by other school district practices” (p. vi). Similar work in the areas of safety and security, business operations, finance, human resources, and information technology is planned along with case study research of top performers to facilitate understanding of management practices leading to favorable results (Gerwertz, 2007).

Benchmarking efforts, like the one sponsored by the Council of the Great City Schools, demonstrate the recognition of the value of performance measures for self-assessment, monitoring progress on goals, and facilitating communication with the public. Efforts also point to the scarcity of comparative data available for judging the non-instructional work done in school districts (Gerwertz, 2007). The adoption of statewide reporting systems may be necessary in order for educational leaders to have easy access to data about support service functions in other districts. This approach has been taken in states like Florida, Mississippi, and Texas for school food service programs which enable districts to compare their data to other districts with similar enrollments, geography, per pupil expenditures, and student characteristics (Cater, 2007). Educational leaders concerned about the availability of data about support service areas should lobby their state education department to study the initiation, use,
and impact of existing reporting systems in other states to determine the extent to which similar systems would be feasible and beneficial.

Even when performance measures have been established and systematic data collection on them occurs, challenges exist in using data for decision-making in elementary and secondary education environments. A study by Ingram, Seashore Louis, and Schroeder (2004) found that high school teachers in schools highly regarded for their continuous improvement efforts had a strong tendency to rely on anecdotal data, intuition, and experience instead of systematically collected data when making decisions about teacher effectiveness. Teachers perceived that data was withheld or distorted to justify decisions that were already made by administrators. There was lack of agreement among teachers and other stakeholders about the kinds of data that were meaningful which led teachers to disregard systematically collected data, including test scores, when making their own decisions. Teachers were more likely to use data collected in a systematic fashion when a particular process was being studied and when they were in a group charged with making a decision. The lack of time to collect and analyze data was an additional barrier to its use.

Findings from the Ingram et al. (2004) study have implications for leaders using data within support service functions. It is important to involve personnel, including front-line workers, in the development of performance measures that will be used to judge the quality of their work. Support service personnel should also participate in discussions about the meaningfulness of different types of data in guiding their work, the methods and frequency of data collection within their work group, and in identifying how collected data will be used in making decisions. This type of involvement will enhance the meaningfulness of the data collected which may counteract the tendency to rely more heavily on intuition and experience rather than systematically collected
data. Having multiple workers involved in analyzing the collected data and putting small groups, rather than individuals, in charge of making decisions will help to increase the use of data and increase transparency in the decision making process.

Improvement planning within support service functions of elementary and secondary education was heavily influenced by leadership in this study. At the district level, superintendents, business managers, food service directors, human resource directors, transportation directors, and other leaders play significant roles in shaping the future direction and goals of the school district through the strategic planning process. Support service functions are often most affected by goals and objectives within the strategic plan that are aimed at the efficient and effective use of resources. Through the establishment of such goals, district leaders communicate the importance of quality and continuous improvement of the district’s support service functions to employees and to the public. Goals and action plans to meet them should be developed with input from front-line workers and middle managers. Nearly 40% of the support service personnel participating in the study had served in their current position for 11 years or more. While the extent to which this statistic is reflective of the length of tenure among other support service personnel in Minnesota school districts is unknown, it does suggest that a large percentage of support service employees would have gained valuable knowledge and experience from longevity in their position that can inform the creation and implementation of improvement plans. Employee involvement would also foster commitment to the implementation and future refinement of the action plans.

The Malcolm Baldrige National Quality Award has influenced quality management in the United States over the past 20 years. Numerous state-level quality awards and national awards in other countries have been modeled after the Baldrige,
further extending its influence. To date, its *Criteria for Performance Excellence* has been utilized as the basis for recognizing the continuous improvement efforts of 75 for-profit and non-profit organizations in a variety of sectors (NIST, 2008a) and has served as a guide for countless other organizations in assessing their own continuous improvement efforts on a less-formal basis. Through its *Criteria*, the MBNQA has codified the principles of quality management (Garvin, 1991) and researchers have used its constructs in shaping their research agendas.

This study adds to the growing evidence that statistically significant relationships do exist between the constructs that make up the Baldrige model of quality management and that these relationships exist within organizations varying in size, location, and mission. One difficulty for researchers has been the fact that the model itself has undergone large changes over time. As the model has evolved, it has become more complex and has changed from a recursive model with the relationships between the constructs being specified in a particular direction to a non-recursive model that includes numerous bi-directional relationships. Non-recursive models, such as the current Baldrige model are quite difficult for researchers to test. Several researchers have turned a non-recursive Baldrige models into recursive ones so they could be tested, but their interpretations aren’t always the same (e.g., Flynn & Saladin, 2001; Jayamaha, Grigg, & Mann, 2008; Lee, Rho, & Lee, 2003). This leads to the testing of certain relationships between quality management constructs in some studies but not others. Sila and Ebrahimpour (2002) noted the growing trend in quality management research focused on testing of causal relationships. If the trend continues, meta-analysis of Baldrige model validation studies may be useful in reaching consensus on a recursive model (Jayamaha et al., 2008). Such a model is needed in order for a sound theory of quality management to emerge.
The stability of the factors underlying the constructs in the Baldrige model was called into question in this study. Distinctions were made between the workplace environment and workplace learning as opposed to the construct of workforce focus which encompasses both. Knowledge of customers and relating to and satisfying them were found to be distinct factors rather than a single one representing customer focus. Additional research with instruments suitable for organizational members ranging from front-line workers to those leading quality efforts should be conducted to determine whether or not one’s role within the organization impacts the factor structure of the quality management constructs in the Baldrige model.

Additional research is also needed in the area of instrumentation. Saraph et al.'s (1989) development of an instrument measuring critical factors of quality management helped spur quality management research, primarily in manufacturing settings, during the 1990s. As the quality movement extended beyond the manufacturing sector into service sectors, the suitability of this instrument for widespread use among researchers lessened. The Baldrige *Criteria for Performance Excellence* was designed to be applicable to a wide variety of organizations and so it is often used by researchers to operationalize the quality management constructs they wish to study. Since the *Criteria* is revised annually by NIST, with more significant changes made bi-annually (Vokurka, 2001), the content validity of instruments based on the *Criteria* can be diminished in a matter of a few years. This fact limits the use of such instruments in replication studies, which, when successful, increase confidence in the reliability of the results and help determine the extent to which outcomes can be generalized to different populations. Examination of the *Criteria* over time as well as the instruments developed to reflect its different iterations can lead to the development of an instrument which measures aspects of leadership, measurement, analysis, and
knowledge management, strategic planning, workforce focus, process management, customer focus, and results that have persisted in the literature and are applicable to organizations of many types, including those in public elementary and secondary education.
REFERENCES


*Education Week, 26*(35), 9.


Lessons for education from other sectors (pp. 11-33). Santa Monica, CA: Rand Corporation.


Recruitment Letter (MN Quality Award Recipient)

Lela Olson
contact information

Date

Name, title
District name
Street address
City, State Zip Code

Dear [name],

My name is Lela Olson and I have taught in Minnesota’s public schools for ten years, serving in both regular and special education capacities. I am also licensed as a K-12 principal and am currently a full-time doctoral student at the University of Minnesota.

For my dissertation I’d like to examine quality management in the non-instructional functions of K-12 education. My study will provide quantitative evidence of quality management practices in food service, pupil transportation, operations and maintenance, and other support services. By utilizing the Malcolm Baldrige National Quality Award framework and developing an instrument based on its Education Criteria for Performance Excellence, I hope to be able to empirically validate the Baldrige framework, including its causal relationships, in the K-12 setting. Similar research has been conducted in manufacturing, health care, and higher education settings.

Based on the recognition [district name] received from the Minnesota Council for Quality in [year], I know that your district values continuous improvement and is familiar with the Baldrige Criteria for Performance Excellence. I’d like to learn more about how your district approaches quality management in its support service functions. I would also like to share more information with you about my research study and how your district’s participation would be mutually beneficial.

I look forward to hearing from you or another member of your leadership team. I can be reached by phone or e-mail using the contact information above.

Thank you for your consideration.

Respectfully,

Lela Olson
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<thead>
<tr>
<th>Item no.</th>
<th>Item wording</th>
<th>Construct</th>
<th>Dimension</th>
<th>Item source</th>
<th>Adapted from original?</th>
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</thead>
<tbody>
<tr>
<td>L1SL</td>
<td>Leaders make it clear what the district and each work group is trying to</td>
<td>Leadership</td>
<td>Senior Leadership</td>
<td>C</td>
<td>Yes</td>
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<td></td>
<td>accomplish.</td>
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<tr>
<td>L2SL</td>
<td>Leaders distribute resources in a way that will help achieve that vision.</td>
<td>Leadership</td>
<td>Senior Leadership</td>
<td>D</td>
<td>Yes</td>
</tr>
<tr>
<td>L3SL</td>
<td>Leaders lead by example: that is, &quot;they practice what they preach.&quot;</td>
<td>Leadership</td>
<td>Senior Leadership</td>
<td>D</td>
<td>Yes</td>
</tr>
<tr>
<td>L4SL</td>
<td>Leaders communicate the importance of continuous improvement and quality.</td>
<td>Leadership</td>
<td>Senior Leadership</td>
<td>B</td>
<td>Yes</td>
</tr>
<tr>
<td>L5SL</td>
<td>Leaders base decisions mostly on facts and data rather than on opinions and</td>
<td>Leadership</td>
<td>Senior Leadership</td>
<td>D</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>feelings.</td>
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<tr>
<td>L6SL</td>
<td>Leaders are open to change.</td>
<td>Leadership</td>
<td>Senior Leadership</td>
<td>D</td>
<td>Yes</td>
</tr>
<tr>
<td>L7GS</td>
<td>We have the opportunity to evaluate the performance of our leaders.</td>
<td>Leadership</td>
<td>Governance and</td>
<td>B</td>
<td>Yes</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td>Social</td>
<td></td>
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<td></td>
<td></td>
<td>Responsibilities</td>
<td></td>
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</tr>
<tr>
<td>L8GS</td>
<td>District policies and practices promote legal and ethical behavior among</td>
<td>Leadership</td>
<td>Governance and</td>
<td>A</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td>employees.</td>
<td></td>
<td>Social</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>Responsibilities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L9GS</td>
<td>Leaders encourage efforts strengthening the local community.</td>
<td>Leadership</td>
<td>Governance and</td>
<td>B</td>
<td>Yes</td>
</tr>
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<td></td>
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<td></td>
<td>Social</td>
<td></td>
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<td>Responsibilities</td>
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<tr>
<td>D1MA</td>
<td>We know how the quality of our work is measured.</td>
<td>Measurement, Analysis, and Knowledge Management</td>
<td>Measurement, Analysis, and Improvement of Organizational Performance</td>
<td>C</td>
<td>Yes</td>
</tr>
<tr>
<td>D2MA</td>
<td>We know how our work measures fit into the district’s overall measures of improvement.</td>
<td>Measurement, Analysis, and Knowledge Management</td>
<td>Measurement, Analysis, and Improvement of Organizational Performance</td>
<td>C</td>
<td>Yes</td>
</tr>
<tr>
<td>D3MA</td>
<td>We compare our performance data to data from similar work groups (benchmarking).</td>
<td>Measurement, Analysis, and Knowledge Management</td>
<td>Measurement, Analysis, and Improvement of Organizational Performance</td>
<td>A</td>
<td>NA</td>
</tr>
<tr>
<td>D4MA</td>
<td>We use data to examine trends.</td>
<td>Measurement, Analysis, and Knowledge Management</td>
<td>Measurement, Analysis, and Improvement of Organizational Performance</td>
<td>B</td>
<td>Yes</td>
</tr>
<tr>
<td>D5MA</td>
<td>We use data to decide when changes need to be made in what is done or how work is accomplished.</td>
<td>Measurement, Analysis, and Knowledge Management</td>
<td>Measurement, Analysis, and Improvement of Organizational Performance</td>
<td>A</td>
<td>NA</td>
</tr>
<tr>
<td>D6KM</td>
<td>We get all the important information we need to do our work.</td>
<td>Measurement, Analysis, and Knowledge Management</td>
<td>Management of Information, Information Technology, and Knowledge</td>
<td>C</td>
<td>Yes</td>
</tr>
<tr>
<td>D7KM</td>
<td>We identify what’s working well and share that with others in the district.</td>
<td>Measurement, Analysis, and Knowledge Management</td>
<td>Management of Information, Information Technology, and Knowledge</td>
<td>A</td>
<td>NA</td>
</tr>
<tr>
<td>PL1DV</td>
<td>As it plans for the future, the district asks us what we think.</td>
<td>Strategic Planning</td>
<td>Strategy Development</td>
<td>C</td>
<td>Yes</td>
</tr>
<tr>
<td>PL2DV</td>
<td>District plans address both short- and long-term challenges and opportunities.</td>
<td>Strategic Planning</td>
<td>Strategy Development</td>
<td>B</td>
<td>Yes</td>
</tr>
<tr>
<td>Item no.</td>
<td>Item wording</td>
<td>Construct</td>
<td>Dimension</td>
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<tr>
<td>PL3DP</td>
<td>We know the parts of the district's plans that will affect us and our work.</td>
<td>Strategic Planning</td>
<td>Strategy Deployment</td>
<td>C</td>
<td>Yes</td>
</tr>
<tr>
<td>PL4DP</td>
<td>We know how to tell if we're making progress on these plans.</td>
<td>Strategic Planning</td>
<td>Strategy Deployment</td>
<td>C</td>
<td>No</td>
</tr>
<tr>
<td>PL5DP</td>
<td>Improvement planning occurs regularly within my work group.</td>
<td>Strategic Planning</td>
<td>Strategy Development</td>
<td>A</td>
<td>NA</td>
</tr>
<tr>
<td>PL6DP</td>
<td>We are encouraged to be involved in our work group's improvement planning process.</td>
<td>Strategic Planning</td>
<td>Strategy Development</td>
<td>D</td>
<td>Yes</td>
</tr>
<tr>
<td>PL7DP</td>
<td>Our ideas and suggestions for improvements are explored and implemented.</td>
<td>Strategic Planning</td>
<td>Strategy Deployment</td>
<td>A</td>
<td>NA</td>
</tr>
<tr>
<td>PL8DP</td>
<td>Our improvement plans are regularly updated based on the expectations of those we serve and our work performance.</td>
<td>Strategic Planning</td>
<td>Strategy Deployment</td>
<td>D</td>
<td>Yes</td>
</tr>
<tr>
<td>SF1ENG</td>
<td>We cooperate and work as a team.</td>
<td>Workforce Focus</td>
<td>Workforce Engagement</td>
<td>C</td>
<td>No</td>
</tr>
<tr>
<td>SF2ENG</td>
<td>More and more decisions are made by staff members performing the work.</td>
<td>Workforce Focus</td>
<td>Workforce Engagement</td>
<td>D</td>
<td>Yes</td>
</tr>
<tr>
<td>SF3ENG</td>
<td>We have opportunities for personal and professional training and development.</td>
<td>Workforce Focus</td>
<td>Workforce Engagement</td>
<td>D</td>
<td>Yes</td>
</tr>
<tr>
<td>Item no.</td>
<td>Item wording</td>
<td>Construct</td>
<td>Dimension</td>
<td>Item source</td>
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<tr>
<td>SF4ENG</td>
<td>We have opportunities to participate in education or training on quality improvement concepts or tools.</td>
<td>Workforce Focus</td>
<td>Workforce Engagement</td>
<td>D</td>
<td>Yes</td>
</tr>
<tr>
<td>SF5ENG</td>
<td>The district seeks and uses our input on training and development needs.</td>
<td>Workforce Focus</td>
<td>Workforce Engagement</td>
<td>B</td>
<td>Yes</td>
</tr>
<tr>
<td>SF6ENG</td>
<td>We take advantage of opportunities for personal and professional training and development.</td>
<td>Workforce Focus</td>
<td>Workforce Engagement</td>
<td>D</td>
<td>Yes</td>
</tr>
<tr>
<td>SF7ENV</td>
<td>We have the knowledge and skills needed to do our work effectively.</td>
<td>Workforce Focus</td>
<td>Workforce Environment</td>
<td>A</td>
<td>NA</td>
</tr>
<tr>
<td>SF8ENV</td>
<td>The district effectively recruits, hires, and retains employees in my work group.</td>
<td>Workforce Focus</td>
<td>Workforce Environment</td>
<td>B</td>
<td>Yes</td>
</tr>
<tr>
<td>SF9ENV</td>
<td>We are sensitive to one another’s needs.</td>
<td>Workforce Focus</td>
<td>Workforce Environment</td>
<td>D</td>
<td>Yes</td>
</tr>
<tr>
<td>SF10ENV</td>
<td>We continuously work to improve workplace health, safety, and security.</td>
<td>Workforce Focus</td>
<td>Workforce Environment</td>
<td>B</td>
<td>Yes</td>
</tr>
<tr>
<td>SF11ENG</td>
<td>In my work group, individual work performance is regularly evaluated.</td>
<td>Workforce Focus</td>
<td>Workforce Engagement</td>
<td>A</td>
<td>NA</td>
</tr>
<tr>
<td>SF12ENG</td>
<td>We set and review individual work improvement goals with our supervisor.</td>
<td>Workforce Focus</td>
<td>Workforce Engagement</td>
<td>D</td>
<td>Yes</td>
</tr>
<tr>
<td>WP1WD</td>
<td>We have defined processes for doing our work.</td>
<td>Process Management</td>
<td>Work Systems Design</td>
<td>C</td>
<td>Yes</td>
</tr>
<tr>
<td>Item no.</td>
<td>Item wording</td>
<td>Construct</td>
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</tr>
<tr>
<td>WP2WD</td>
<td>We use worker knowledge and technology when designing how work gets done.</td>
<td>Process Management</td>
<td>Work Systems Design</td>
<td>B</td>
<td>Yes</td>
</tr>
<tr>
<td>WP3WD</td>
<td>We regularly consider the expectations of those we serve when designing how work gets done.</td>
<td>Process Management</td>
<td>Work Systems Design</td>
<td>A</td>
<td>NA</td>
</tr>
<tr>
<td>WP4PM</td>
<td>When mistakes occur, we determine why they happened.</td>
<td>Process Management</td>
<td>Work Process Management and Improvement</td>
<td>D</td>
<td>Yes</td>
</tr>
<tr>
<td>WP5PM</td>
<td>Mechanisms are in place to help prevent mistakes and rework.</td>
<td>Process Management</td>
<td>Work Process Management and Improvement</td>
<td>A</td>
<td>NA</td>
</tr>
<tr>
<td>WP6PM</td>
<td>We review our work processes so we can decide what changes or improvements are needed.</td>
<td>Process Management</td>
<td>Work Process Management and Improvement</td>
<td>D</td>
<td>Yes</td>
</tr>
<tr>
<td>WP7PM</td>
<td>We constantly try to simplify our work.</td>
<td>Process Management</td>
<td>Work Process Management and Improvement</td>
<td>D</td>
<td>No</td>
</tr>
<tr>
<td>WP8PM</td>
<td>To become more efficient, we have reorganized the way we do our work.</td>
<td>Process Management</td>
<td>Work Process Management and Improvement</td>
<td>D</td>
<td>Yes</td>
</tr>
<tr>
<td>WP9PM</td>
<td>We constantly look for ways to improve how we do our work, even when things are running well.</td>
<td>Process Management</td>
<td>Work Process Management and Improvement</td>
<td>D</td>
<td>Yes</td>
</tr>
<tr>
<td>WP10PM</td>
<td>We constantly try to reduce our costs and the resources we need without sacrificing the quality of our work.</td>
<td>Process Management</td>
<td>Work Process Management and Improvement</td>
<td>D</td>
<td>Yes</td>
</tr>
<tr>
<td>Item no.</td>
<td>Item wording</td>
<td>Construct</td>
<td>Dimension</td>
<td>Item source</td>
<td>Adapted from original?</td>
</tr>
<tr>
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<td>------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>----------------------------------</td>
<td>------------------------------------------------</td>
<td>-------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>SHF1KN</td>
<td>In my work group, we each can answer the question: “Who do we serve?”</td>
<td>Student, Stakeholder, and Market Focus</td>
<td>Student, Stakeholder, and Market Knowledge</td>
<td>D</td>
<td>Yes</td>
</tr>
<tr>
<td>SHF2KN</td>
<td>We have effective ways of determining the needs and expectations of those we serve.</td>
<td>Student, Stakeholder, and Market Focus</td>
<td>Student, Stakeholder, and Market Knowledge</td>
<td>B</td>
<td>Yes</td>
</tr>
<tr>
<td>SHF3KN</td>
<td>We constantly try to identify and solve problems that have not yet been recognized by those we serve.</td>
<td>Student, Stakeholder, and Market Focus</td>
<td>Student, Stakeholder, and Market Knowledge</td>
<td>D</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>It is easy for those we serve to give us feedback including compliments, suggestions for improvement, and complaints.</td>
<td>Student, Stakeholder, and Market Focus</td>
<td>Student and Stakeholder Relationships and Satisfaction</td>
<td>A</td>
<td>NA</td>
</tr>
<tr>
<td>SHF4RS</td>
<td>Complaints from those we serve are resolved quickly and effectively.</td>
<td>Student, Stakeholder, and Market Focus</td>
<td>Student and Stakeholder Relationships and Satisfaction</td>
<td>B</td>
<td>Yes</td>
</tr>
<tr>
<td>SHF5RS</td>
<td>We are allowed to make decisions to solve problems for those we serve.</td>
<td>Student, Stakeholder, and Market Focus</td>
<td>Student and Stakeholder Relationships and Satisfaction</td>
<td>C</td>
<td>Yes</td>
</tr>
<tr>
<td>SHF6RS</td>
<td>We use feedback from those we serve to improve our services.</td>
<td>Student, Stakeholder, and Market Focus</td>
<td>Student and Stakeholder Relationships and Satisfaction</td>
<td>B</td>
<td>Yes</td>
</tr>
<tr>
<td>SHF7RS</td>
<td>We often discuss how well we are meeting the needs and expectations of those we serve.</td>
<td>Student, Stakeholder, and Market Focus</td>
<td>Student and Stakeholder Relationships and Satisfaction</td>
<td>D</td>
<td>Yes</td>
</tr>
<tr>
<td>SHF8RS</td>
<td>We have effective ways of collecting satisfaction data from those we serve.</td>
<td>Student, Stakeholder, and Market Focus</td>
<td>Student and Stakeholder Relationships and Satisfaction</td>
<td>A</td>
<td>NA</td>
</tr>
<tr>
<td>Item no.</td>
<td>Item wording</td>
<td>Construct</td>
<td>Dimension</td>
<td>Item source</td>
<td>Adapted from original?</td>
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</tr>
<tr>
<td>SHF10RS</td>
<td>We compare our satisfaction data over time and to similar data from other work groups or organizations to see if changes are needed.</td>
<td>Student, Stakeholder, and Market Focus</td>
<td>Student and Stakeholder Relationships and Satisfaction</td>
<td>A</td>
<td>NA</td>
</tr>
<tr>
<td>R1F</td>
<td>The value of our services is improving.</td>
<td>Results</td>
<td>Budgetary, Financial, and Market Outcomes</td>
<td>D</td>
<td>Yes</td>
</tr>
<tr>
<td>R2PR</td>
<td>The number of indicators of poor quality (complaints, rework, and returns) is going down.</td>
<td>Results</td>
<td>Process Effectiveness Outcomes</td>
<td>D</td>
<td>Yes</td>
</tr>
<tr>
<td>R3PR</td>
<td>Our work consistently meets all requirements.</td>
<td>Results</td>
<td>Process Effectiveness Outcomes</td>
<td>C</td>
<td>Yes</td>
</tr>
<tr>
<td>R4STF</td>
<td>We are seeing improvement in staff member morale, turnover, or absenteeism.</td>
<td>Results</td>
<td>Workforce-Focused Outcomes</td>
<td>D</td>
<td>Yes</td>
</tr>
<tr>
<td>R5STF</td>
<td>In general, we are satisfied with our jobs.</td>
<td>Results</td>
<td>Workforce-Focused Outcomes</td>
<td>C</td>
<td>Yes</td>
</tr>
<tr>
<td>R6STK</td>
<td>Those we serve are consistently satisfied with our work.</td>
<td>Results</td>
<td>Student- and Stakeholder-Focused Outcomes</td>
<td>C</td>
<td>Yes</td>
</tr>
<tr>
<td>R7LD</td>
<td>The district removes things that get in the way of progress.</td>
<td>Results</td>
<td>Leadership Outcomes</td>
<td>C</td>
<td>Yes</td>
</tr>
<tr>
<td>R8VA</td>
<td>We have measurable goals that guide our work.</td>
<td>Results</td>
<td>Varied</td>
<td>A</td>
<td>NA</td>
</tr>
<tr>
<td>R9VA</td>
<td>We consistently meet our goals within specified time periods.</td>
<td>Results</td>
<td>Varied</td>
<td>A</td>
<td>NA</td>
</tr>
</tbody>
</table>
Note. Survey items come from this study’s author and from the following sources as found in the reference list:

A = Author

B = Badri et al., 2006

C = NIST, 2007

D = Peterson & Cameron, 1994 as cited in Winn, 1996

ª = For the pilot study, this item was worded slightly differently and measured with the responses “Yes,” “No,” or “I don’t know.” Contact the author for exact wording of these pilot study items.
APPENDIX C

Letter of Approval from Institutional Review Board

The IRB: Human Subjects Committee determined that the referenced study is exempt from review under federal guidelines 45 CFR Part 46.101(b) category #2 SURVEYS/INTERVIEWS; STANDARDIZED EDUCATIONAL TESTS; OBSERVATION OF PUBLIC BEHAVIOR.

Study Number: 0801E25501

Principal Investigator: Lela Olson

Title(s): An Examination of Quality Management in Support Functions of Elementary and Secondary Education Using the Malcolm Baldrige National Quality Award's Criteria for Performance Excellence

This e-mail confirmation is your official University of Minnesota REPP notification of exemption from full committee review. You will not receive a hard copy or letter. This secure electronic notification between password protected authentications has been deemed by the University of Minnesota to constitute a legal signature.

The study number above is assigned to your research. That number and the title of your study must be used in all communication with the IRB office.

Research that involves observation can be approved under this category without obtaining consent.

SURVEY OR INTERVIEW RESEARCH APPROVED AS EXEMPT UNDER THIS CATEGORY IS LIMITED TO ADMIIT SUBJECTS.

This exemption is valid for three years from the date of this correspondence. You will receive a notification requesting an update after three years, at which time you will have the opportunity to renew your study.

Upon receipt of this email, you may begin your research. If you have questions, please call the IRB office at (612) 624-5634.

You may go to the View Completed section of eResearch Central at http://eresearch.umn.edu/ to view further details on your study.

The IRB wishes you success with this research.
Dear [insert district name] employee,

You are invited to participate in a research study of support services in K-12 education. You were selected as a possible participant because you currently work as a support service employee in a school district. [District name] was invited to participate in the study based on [receiving the MN Quality Award/its affiliation with the [name] Partnership which uses the model examined in this study/its reputation for commitment to continuous improvement]. Superintendent [insert name] was contacted by Lela Olson, a doctoral student from the University of Minnesota’s Department of Work and Human Resource Education, about the study and agreed to the district’s participation. [Insert name] is serving as the study’s liaison for your school district and can be reached at [insert number].

BACKGROUND INFORMATION: The purpose of the study is to examine management practices in support service areas of K-12 education that affect organizational performance. Your responses will help others understand how common these practices are, how they relate to one another, and what impact they have on stakeholder satisfaction and other results.

PROCEDURES: If you agree to participate, you will be asked to complete one [online/paper] survey. It will take you about 15 minutes. After you are done with the survey, please return the colored postcard to the researcher. The researcher will send you reminders about the study if you do not send back the postcard. Those completing the paper survey will mail it to the researcher separately in the envelope provided.

RISKS AND BENEFITS: The risks and benefits of participation are minimal. Items in the survey ask you to reflect on many areas of your job, including work tasks, co-workers, and the organization you work for. Based on your experiences at work, positive, negative, and/or other feelings may surface while taking the survey.

COMPENSATION: If you complete the entire survey, you will be eligible to receive a $50 cash prize. Two prizes will be awarded per district. Your district will receive a summary of the results. You can ask for your own copy of the results on the colored return postcard provided. The researcher will also donate money to your district’s staff development fund or educational foundation to be used for training and education for support service employees. You may directly benefit from this donation in the future.

CONFIDENTIALITY: Records of this study will be kept private. Any sort of report that might be published will not include information that will make it possible to identify you or your responses. Data will be stored in a secure place. Only the researcher and her advisor will have access to the data.

VOLUNTARY STUDY: Participation is voluntary. Your current or future relations with [district name] or the University of Minnesota will not change whether or not you decide to participate. Participants can quit at any time.
CONTACTS AND QUESTIONS: Contact the researcher, Lela Olson at 651-XXX-XXXX or olso1358@umn.edu to ask any questions you may have now. If you have questions later, you can contact the researcher or her advisor, Dr. Ted Lewis. He may be reached at lewis007@umn.edu or 612-XXX-XXXX.

If you have any questions or concerns about this study and would like to talk to someone other than the researcher, her advisor, or your district's liaison, you are encouraged to contact the Research Subjects’ Advocate Line, D528 Mayo, 420 Delaware St. Southeast, Minneapolis, MN 55455; 612-625-1650.

Please keep this sheet for your records.

Sincerely,

Lela Olson, Researcher
APPENDIX E

Open Ended Responses by Quality Management Construct

PILOT STUDY (N = 59)

Leadership

There has never been any discussion of our work group's vision, mission or goals. We do not discuss our work group in terms of who are customers are and what services we provide. Decisions are made extremely slowly, or sometimes not at all. From what I've seen so far leadership here is only about firefighting and fixing problems. Leaders react - not plan and lead. (HR or Business Services)

Some bosses are very difficult to go to for help. (HR or Business Services)

The one time I was asked to provide feedback relative to district leadership, there were "technical problems" and the survey was never sent. (Admin/Other Support)

The thoughts and ideas of employees are not considered in anything that is done. We are never given any chance to give feedback to anything before decisions are made. The communication is lacking in this department and makes it very difficult to complete the job correctly and effectively. (HR or Business Services)

Currently, our administration is very top down with an abundant amount of micromanagement. (Admin/Other Support)

Top down management style. (HR or Business Services)

Leaders make decisions, but don't think of the total picture. i.e. Busing 3 & 4 yr olds with older children… (Admin/Other Support)

We have a new boss this year and it has been hard. Communication is zero. We should be a team and we are not, yet. (Food Service)

Data

Too many channels through which info. and data come from! Only feedback from district comes when something is done wrong. (Admin/Other Support)

We know what works. Falling enrollment-get the schools involved in 4 year old programs. But how does the district do it? They dismantle the School Readiness program and give it to each school. Is that ethical? (Admin/Other Support)

My boss does have meetings with other managers but has not shared with us. We should have a monthly meeting. It would give us a feeling of being a team. (Food Service)

Planning

I've never seen any written project plans except ones that consultants provide for major computer system upgrades. I could count on one hand the number of people here that
could manage a project - I know because I taught project management in my previous job. (HR or Business Services)

In my position there are too many grey areas. What one does in their building doesn't always pertain to another building. (Operations & Maintenance)

I think maybe my boss has knowledge in this area. I do not. (Food Service)

**Staff Focus**

*We are directed what to do and not solicited for input.* (Admin/Other Support)

There is no management training here at the district, so new managers don't really know how to manage staff. They have technical expertise and can sort of manage the work, but things like performance evaluations, professional development plans and team building just don't happen. (HR or Business Services)

I don't feel the supervisors care about the employees they supervise. (HR or Business Services)

*Used to be done more often (work performance evaluation). Now seldom.* (Food Service)

I have not had an evaluation in 9 years since I was promoted for this position. Evaluation I do occasionally in my building, but they stay in file. (Operations and Maintenance)

At one time I was evaluated. I have not been evaluated in a few years. (Food Service)

*In the past we had a good team and we did discuss things. Our new boss needs training on how to communicate.* (Food Service)

**Work Processes**

*We are so overwhelmed with work there isn't time to think about refining work processes and reducing costs.* (Admin/Other Support)

For four years we've been talking about establishing a standard operating procedure in our group, and it still hasn't happened. It's just not considered a priority, even though we spend huge amounts of time fixing problems that occur because we don't have that in place. (HR or Business Services)

*We always try to simplify and give more to our clients needs, via classes on the web or other resources available to them.* (Admin/Other Support)

**Stakeholder Focus**

*We push a lot of work out to the schools without determining ahead of time whether they have the capacity to take it on.* For example, the district decided to do site-based budgeting and gave the Principal and school secretary a lot of responsibilities for managing their budgets. No one has evaluated how well that is working and whether the Principals and secretaries can really do the job appropriately. I see a lot of money wasted because they are too busy to deal with it. (HR or Business Services)
The boss does what she wants. She is trainable. (Food Service)

Results
Processes currently in place have existed for years. We would be so much happier and productive if the district valued our experience, work, and efforts. (Admin/Other Support)

As far as I know we don't measure anything, so answering these questions was really just a guess. (HR or Business Services)

I don't know much about this but they must have a way to measure labor hours as we were cut back on hours. It is not shared with us as a team. Communication is needed. (Food Service)

Other (Survey Feedback)
For some of the questions the correct response would have been "Don't Know". For example, the section on measures. Since we don't measure anything I had no idea how to answer those questions accurately. (HR or Business Services)

Add Does Not Apply to the options. (Admin/Other Support)

You should be able to not answer a question if it is not applicable to you or something you do. (Operations & Maintenance)

Great Questions! Very revealing! (Admin/Other Support)

MAIN STUDY (N = 137)

Leadership
I am not aware of any opportunities to formerly evaluate our leaders. However, it is a very open door policy in our office and concerns can be easily addressed with one of our superiors. (HR or Business Services)

I often feel that the very top of leadership doesn't acknowledge what is happening in my work group and therefore doesn't make the necessary changes. (Admin/Other Support)

Just obtained a new leader and things are beginning to improve... (Admin/Other Support)

I really only have direct contact w/ my immediate supervisor and have very much respect for the leadership displayed, as well as open communication...a joy to work with and for! (Admin/Other Support)

Leadership figures have become more involved in the past few years. (Admin/Other Support)

[name] is open to change [name] IS NOT (Food Service)
Think our leaders could be better and concentrate more if they weren't so bogged down with paperwork and so far behind in their work. (HR or Business Services)

In my position, I don't have much interaction with leadership. I'm by myself all the time, except when transporting a student(s). (Transportation)

We have good leadership since the new Superintendent was selected. (Operations & Maintenance)

Every information passed along [from leaders] is over the email. Only about 5 people in our kitchen have a computer [but we have] 13 employees in all. (Food Service)

My boss does not seek out opinions from workers in our group. (Admin/Other Support)

Rather than deal with issues and discipline those that need disciplinary action among the staff they are just switched out to different buildings. Also it is not what the action is that determines disciplinary procedure but who you are! The above refers to the Administrative leadership such as school board & Supt. If I was marking this for my principal then I would have to mark strongly agree for all areas. (Admin/Other Support)

I feel our leaders should be evaluated, so they also know where changes are needed. (Food Service)

I have been very fortunate in the years working in the district of having wonderful & supporting administrators as my supervisors. (Admin/Other Support)

Our kitchen supervisor is great. No one above her gives us the time of day! (unless they have a complaint) (Food Service)

I am frustrated by the lack of communication between me and my boss. It is not a personality conflict, since other staff & faculty have mentioned the same frustration. (Admin/Other Support)

Data
We are a very Data driven district. (Admin/Other Support)

I don't think my work group is compared to other district work groups. (Admin/Other Support)

We identify [what’s working well] and attempt to share.... (Admin/Other Support)

Within our district and field, I think we have good communication. Possibly it would be even more helpful to "connect" w/ surrounding district's services. (Admin/Other Support)

Baldrige is getting us closer to these goals. We do comparisons among [city name] Area Schools. (Admin/Other Support)

Need to get procedure manuals completed to help us know how to do certain aspects of our jobs (HR or Business Services)
The district doesn't ask us what we think but they would be open for us to come and ask and tell them. If I ask I'll find out. (Admin/Other Support)

I've never received any data or feedback to check, change or improve performance. Anything I've ever done has been by my own initiative and research. (Transportation)

We have tried different work assignments and have found one that works well for us. (Operations and Maintenance)

We discuss what would work better but our boss won't go to her boss. (Food Service)

More [data] should be used. (Food Service)

I am not aware of performance data being kept and used to make changes/decisions. (Admin/Other Support)

**Planning**
There are several things that need to be changed (staff added) in my work group and I don't think we are encouraged to talk about that and figure out ways to make that happen. (Admin/Other Support)

Many ideas and suggestions for improvements are made but few are explored and less implemented. (Admin/Other Support)

Again, WITHIN our immediate area of service, we have good communication. I think we possibly fall short with communication...within the district...but beyond our area of expertise. (Admin/Other Support)

Do more communicating with teaching staff. Feel support staff is hanging on issues. Expected to do work but very little praise from teaching staff. (HR or Business Services)

Never heard anything to do with improvements or planning. (Transportation)

Our former supervisor used to have many meetings with us -many I thought seemed like a waste of time. Our new supervisor does not meet with us on any kind of regular basis - because of this I many times discover things that I feel are very important in day to day operations that should have been addressed in an informational meeting. (Admin/Other Support)

Overall things work well. (Operations & Maintenance)

We are left in the dark most of the time. (Food Service)

The district leaders never ask our opinions or consult us. We have even found out about decisions affecting our department only when we read it in the newspaper! (Food Service)
The district as a whole does an excellent job of planning both long & short term goals. The breakdown occurs at the building level. (Admin/Other Support)

Staff Focus
[Participant's markings indicated that the district did not effectively retain employees in the administrative/other support work group.] (Admin/Other Support)

Staff is needed in my work group and I don't feel the district is effectively recruiting to fill the positions. (Admin/Other Support)

There aren't many professional training and development opportunities provided for us. (Admin/Other Support)

I do believe that...over the last couple decades...our field has "lost ground" and been stretched too thinly. We need to reinstate staff and/or hire additional specialists to more effectively serve our students and staff. When something/someone is removed, people learn to "do without". In the end, we've forgotten what "used to be" or "could be again"! It's a Catch 22 effect. (Admin/Other Support)

I feel very fortunate to be part of a work group that gets along and cares about each other. (Admin/Other Support)

We take advantage of seminars being offered in our area. In my position I feel I still haven't had proper training. Feel like I know just enough about my job to get by. Way office is set up, hard to have privacy with my job. One person in office feels it should be "social" time all the time. (HR or Business Services)

With better training we could do our jobs more effectively & efficiently. Time is always a factor. Cuts are made & more work gets put on us. (HR or Business Services)

There was computer-based training and development implemented for staff this school year but as a transportation person I fell through some crack and was not allowed to participate! I really wanted to! (Transportation)

It is hard to keep or acquire staff when the pay is so low. (Operations & Maintenance)

In my group we have people that work well together as a team and others that do not. The members that do not work as a team do it by choice and do not offer to help others. If I ask for assistance it is met with resistance so I do not ask anymore. (Admin/Other Support)

Sensitivity to workers in our group is not shown by our boss. This affects all workers-making them edgy & down at work. (Admin/Other Support)

Our head cook doesn't like confrontation so doesn't discuss problems with employees. Doesn't make one person do any of the harder work- because she doesn't want to tell her. (Food Service)
The women that I work with are top notch. We work well together—there is no "back-stabbing," consequently our work environment is pleasant & productive. (Admin/Other Support)

Our Kitchen supervisor listens to our suggestions and is very open and co-operative to our thoughts. No one above her cares what we think. (Food Service)

**Work Processes**

*We are a continuous improvement school and our office doesn’t do things just because “that’s how we’ve always done it.” Continual improvements!* (Admin/Other Support)

I’ve never received any sort of guideline or evaluation to help streamline or improve my work processes. (Transportation)

*This [examining how work gets done] is an ongoing process that never ends.* (Operations & Maintenance)

I wish our principal would sit down with us and review what we all do and make sure each job is being done by the appropriate employee. I think job duties get shifted around sometimes without knowing what that person actually does in the office. I think our input could make the office a lot more effective and efficient. (Admin/Other Support)

I put slightly agree on the "become more efficient, we have reorganized the way we do our work." I put slightly agree because we do not get to put our input on who does what job, and I think we could be A LOT more efficient if we were able to do so. (Admin/Other Support)

**Stakeholder Focus**

*I've never had a work group meeting to sit down & discuss anything pertaining to the satisfaction or performance of what I do.* (Transportation)

...definitely an area we can improve on! :-D (Admin/Other Support)

I have worked in the Service industry for over 25 years. First time in public school system. Strongly feel a lot of employees in our district do not understand that the students & parents are our "customers." (HR or Business Services)

We are not always given an opportunity to help with resolutions [of customers’ problems]. (Operations & Maintenance)

We have evaluations filled out by "customers," however, we never seem to implement their comments- pro or con. (Admin/Other Support)

Hear mostly feedback in negative form. Always what staff doesn’t have or need or what our offices hasn’t done for them. (Admin/Other Support)

I wish we were given more feedback from the community members and our staff to know how well/bad we are doing our job. (Admin/Other Support)
We regularly tell our Food Service supervisor about items on the menu that the kids like and those that they don't but it doesn't seem to make a difference. Food isn't "healthy" unless it is eaten. (Food Service)

Results
I think staff in my work group is over worked and does not get the appropriate amount of time to successfully complete our work as a team. (Admin/Other Support)

Those I serve are satisfied with my work, but I put in a lot of extra time over my contract hours that I don't get pd. for in order to maintain that level of satisfaction. We just are not given enough hours. Also, our budget is way too low to buy new materials to help effectively serve our customers. Some of our materials are so old they should be disposed of rather than continuing to use them, but until we have funds to replace them we keep them. (Admin/Other Support)

To a certain degree, the wording of the questions don't necessarily apply to our field...as I see it! (Admin/Other Support)

My student(s) have been the only people to give me feedback on my performance or "results." Never have gotten "goals" to achieve or improve on. (Transportation)

We are always short of help and time. (Operations & Maintenance)

Many times deadlines are not met by several workers within our group. (Admin/Other Support)

Head cook cut down on portion sizes when she doesn’t make enough- older kids don’t get much to eat. (Food Service)

We have a new Principal this year. School morale has increased a great deal. (Admin/Other Support)

We have no set of measurable goals. (Admin/Other Support)
Please mark all that apply.

_____ Yes, I've completed the online survey about support services in K-12 education. Please include me in the drawing for a $50 cash prize.

_____ Yes, I've completed the paper survey about support services in K-12 education and have mailed it back in the envelope provided. Please include me in the drawing for a $50 cash prize.

_____ I do not wish to participate in the study. Please do not send me additional reminders.

_____ I'd like a summary of my district's data. When the data is available, please send it to me at the email address below.

[Employee address label here]  STAMP

K-12 Support Services Study
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