TOTAL QUALITY MANAGEMENT IN PUBLIC SCHOOLS AND ATTRITION OF CERTIFIED PERSONNEL

By

MICHAEL FRANCIS MEEHAN

(Under Direction the of WILLIAM W. SWAN)

ABSTRACT

The attrition of certified personnel from schools implementing Total Quality Management (TQM) was studied. The surveyed schools represented a national sample of school districts and schools that had implemented TQM for three years. Tests of Proportionality were conducted to determine if there was any statistical significance between the number of certified personnel leaving schools implementing TQM and the number of certified personnel leaving schools as reported in a national study. Five other variables were tested: age, degrees held, ethnicity, years of experience, and teaching level. Findings revealed that:

It must be concluded that certified personnel attrition for the sample group was significantly less. In the sub-category of elementary schools certified personnel attrition significantly decreased for the three years of the study. It was also found that the certified personnel attrition within the sub-category of secondary schools significantly decreased for the three years of the study.

INDEX WORDS: Total Quality Management, attrition, implementation, certified personnel
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by

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CHAPTER 1

THE INTRODUCTION

Ravitch (2000) commented that early in the twentieth century education activists dreamed of universal education. The U.S. Department of Education (1997) reported that public education, during the 90’s, was universally accessible with graduation rates flat at 86%. While this statistic demonstrates progress toward our national educational goals, it reflected only partial completion of the vision of the earlier turn of the century activists. That vision saw that public schools could transform children’s lives by giving them the opportunity and skills to learn, which are critical elements in self-improvement (Ravitch, 2000). Ravitch observed that public education’s impacts on large-scale social and economic changes were innately limited by the distinctiveness of its mission and its institutional culture.

Ravitch (2000) stated that “the 1980s and 1990s saw a campaign among parents, legislators, governors, business leaders, and even presidents to strengthen curricula, raise graduation requirements and set higher expectations for all children (p. 461).” These topics are fundamental to the distinctive mission and institutional culture of public schools. The major reforms also being debated included school vouchers, back-to-basics, bi-lingual education, teacher empowerment, the market approach to education, and whole language.

Joyce, Bennett, and Rolheiser-Bennett (1990), writing on the empowerment of teachers through research, acknowledged that: “Proposals both for the empowerment of
teachers and for an increase in knowledge base in education depend on the realization of a radically revised workplace with very different relationships among teachers and greater attention to the application of professional knowledge than is the norm in educational settings today” (p. 34). Total Quality Management (TQM) is one approach to teacher empowerment. TQM creates a radically revised workplace that changes the relationships among teachers. TQM acts as a management theory (Deming, 1986,) for the improvement of quality, productivity, and competitive position.

Through the adoption of TQM, school districts and their schools may accomplish three objectives. The first is to focus schools on the quality of education that students receive. The second is to restructure adult roles and each role’s portrayal of successful behaviors. The third is the re-establishment or redefinition of sub-system borders (Schenkat, 1993).

The first objective is achieved when the senior leadership defines the district’s purpose and key stakeholders and outlines successful student outcomes based on meeting or exceeding essential stakeholder expectations. The senior leadership then promotes the district-wide coordination of each school’s mission and culture to reflect the district’s purpose. In a TQM culture, the higher the leadership position, the more the leader must be concerned with quality improvement. Innovation becomes a top and middle leadership function. As the TQM leadership pilots the improvement process, the new results attained lead to new standards (Imai, 1986).

TQM restructures the roles of leader and teacher when it redefines successful teaching as the application of Deming’s 14 Points, Deming’s theory of variation, the use of quality tools, and systems thinking. The foundation to the theory is Deming’s (1986) 14 points of Total Quality Management (see Figure 1).
Deming’s Fourteen Points

1. Create constancy of purpose for the improvement of the product or service. There must be long-term planning and a long-term allocation of resources.
2. Adopt the new philosophy. “We can no longer tolerate commonly accepted levels of mistakes, defects, rework, or material not suited for the job,” Cease dependence on mass inspection to achieve quality, and end the practice of awarding business based on price tag alone.
3. Improve constantly and forever the system of production and service. Quality must be built in at the design phase.
4. Institute training. The greatest waste is a failure to use people’s abilities. Adopt and institute leadership. Management needs to work on the sources of improvement, as well as the intended quality of product or service and translate that intent into the design of the actual product.
5. Drive out fear. No employee can put forth their best effort unless they feel secure.
6. Break down barriers between staff areas. People in research, design, sales, procurement, the reception of incoming materials, and specifications must learn about problems encountered with various materials and specifications in production and assembly. Otherwise, there will be a loss in production from necessity for rework caused by attempts to use materials unsuited to the purpose.
7. Adopt and institute leadership. The job of management is not supervision, but leadership.
8. Drive out fear. No one can do his or her best performance unless he feels secure.
9. Break down barriers between staff areas.
10. Eliminate slogans, exhortations, and targets for the workforce.
11. Eliminate numerical quotas for the workforce and numerical goals for management and the workforce.
12. Remove barriers that rob people of pride of workmanship. Eliminate the annual rating or merit system.
13. Institute a vigorous program of education and self-improvement. What organizations need are not just good people, but people that improve with education.
14. Put everybody in the company to work to accomplish the transformation.

Figure 1: Deming’s 14 points (Out of Crisis, 1986) p.23
The district’s second objective is addressed when the school’s leadership systems promote faculty and staff quality consciousness. Moreover, through quality consciousness faculty and staff members redefine their jobs with the pursuit of quality improvement incorporated as an element of their daily tasks. Quality consciousness focuses on both the quality of the product and the efficiency of process. TQM achieves the assurance of quality with continuous statistical measurement to evaluate process and to control variance.

The faculty and staff take statistical measurements to provide data on variance and brainstorm for solutions for eliminating variance. Attention must be paid to how each persons’ efforts impact other persons efforts and the outcome (Deming points 5 & 9).

The third objective is accomplished through adoption and training of certified personnel in systems thinking. Once people share a common system picture of their work, they can be clear in their purpose. Certified personnel learn to document all systems and to recognize how the systems and subsystems interact to effect quality outcomes. They are empowered by their knowledge of variation and systems theory to control variation. Fields 1993, reported that, “School leaders are familiar with many of Deming’s considerations, but the terminology they have heard may be different” (p.48). An example of this is that employee involvement translates to teacher empowerment, process translates to methodology, reject rate translates to failure rate, customers/stakeholders translates to students, employers, communities, taxpayers, and the next education institution (Neuroth, Plastrik, & Cleveland, 1992).

Deming (1986) represented the TQM transformation as beneficial to the worker who would “feel important to the job if he can take pride in his work and may have a part
in improvement of the system” (p. 82). Deming (1986) addressed attrition when he stated that, “Turnover goes up as the proportion of defective items goes up, and the turnover goes down when it becomes obvious to employees that the management is trying to improve the process” (p. 82). In contrast, Schenkat (1993) lamented that the massive changes brought on through a TQM transformation would be deeply psychologically threatening to rigid hard-wired people.

The attrition of certified personnel is the largest single factor determining the demand for certified personnel in the nation’s schools. Patterns of attrition vary with the ages and the positions of leaving personnel. It is important to study attrition patterns and their implications as the current education work force ages.

Conceptual Framework

TQM advances a theory that runs counter to the common leadership practice in education. TQM transformed schools go through fundamental and interrelated changes. During this process (Deming, 1986), the personnel grow through the recognition and collegial finding of answers. The school’s leadership system and certified personnel are supported and encouraged to find site-based solutions to common cause variation.

The task that most new TQM principals face is to nurture and grow the school’s adult work culture. The starting point for constructing the TQM adult work culture is the analysis of a school’s current adult work culture. An overview of common school cultures was assembled by Germinario and Ogden (1994). They searched the literature and identified three categories of schools. They advanced profiles of the certified personnel in each category.
The lowest, most common, and least effective schools they named the Conventional/Collected Schools. The instructional leadership in these schools firmly believes that good certified personnel make good schools; teaching is an art: therefore, they struggle to hire good certified personnel and eliminate bad teachers. There is a belief that certified personnel are the ones who know instruction and the needs of the students; a good principal leaves the certified personnel alone. The principal ensures the safe and orderly school environment. Effectiveness of the school is the responsibility of the individual teacher; however, effectiveness is limited by outside influences on the student. These schools are characterized as having a distrust of research and a leadership that crisis manages the school.

They named their second class of schools Collegial-teacher centered. Many of the core beliefs of the Conventional or Collected Schools prevail in these schools. Yet, within these schools, decisions are made based on what is best for the adult working culture. The principals of Collegial Schools are very concerned with being popular. The students gain little from being in the Collegial School versus their peers in the Conventional or Collected School. The third class of schools they named the Effective Student Outcome Based/Professional-Collegial Knowledge Based Schools. The adult culture of these schools believes that the purpose of the school is student learning; all students can learn to a very high set of standards. The principal is the instructional leader of the school instructional team. The principal’s role is to express the beliefs of the school, find time to communicate the school’s mission and outcomes beyond the school, foster staff development, and guide planning and analysis. Adult personnel of the school share in the responsibility for the learning of the students. The educators know how to
recognize individual student learning styles and how they should be taught. There is continuous planning and data collection; the adult personnel realize that one needs to wait for something to break down before it is fixed.

Germinario and Ogden’s (1994) third category characteristics agree with TQM concepts and procedures as set out by Fields (1993), Capezio and Morehouse (1993), Bonstingl (1992), and Lau and Shani (1992) and Deming’s 14 points (1986). Under the guidance of the leadership team, a student-focused, learning-oriented climate that is responsive to stakeholder needs develops. A school’s leadership team asserts its’ dynamic leadership through the creation of a clear and visible direction and through the setting of high expectations. The leadership team trains personnel in the principles of TQM and statistical control of variance. At both the district and building leadership levels, system, sub-systems, curricula, policies, and methods for achieving excellence are developed. They set tone, enlist commitment, and spread belief throughout the organization in continuous improvement. This requires providing a learner-centered approach to educating students—a learner-centered design that possesses definite learning objectives and that considers the individual needs of the students. A learner-centered design that has an effective means for gauging student progress and a central quality related theme that adds value to each student’s education. This education adds economic and social value to each student and meets or exceeds the needs that derive from the requirements of the marketplace and the responsibilities of citizenship. District and building leaders strengthen the school learning environment by building and aligning community support, business leaders, and community services to bolster the mission of the school (Capezio & Morehouse, 1993).
The continuous improvement processes possess four identifying characteristics:

1. The TQM school possess a clear set of goals of what to improve;

2. decisions in the TQM school are fact-based and planning outlines what measures/indicators are to be used to measure progress;

3. this planning is systematic and addresses questions of measurement, planning outcomes, and execution;

4. the school focuses upon key processes as avenues to success. The continuous improvement process should be firmly established in the way the school operates (Neuroth, et al., 1992).

TQM work attitudes, thinking, and approaches operate as a regular part of the daily work of all the adult employees. The certified employees are part of the improvement process. They seek to eliminate problems at the source and before problems can grow. The certified personnel and staff possess an attitude that views improvement as driven by opportunities to do better, as well as being driven to solve problems. The personnel view opportunities for improvement as coming from varied sources. The personnel would not be dismissive of ideas generated by: (1) other certified employees and staff members; (2) successful practices of other organizations; and (3) educational research (Capezio & Morehouse, 1993).

Using TQM, certified personnel are given the opportunity to develop and implement the principles, core values, concepts, and skills taught by Deming. The development of certified personnel in quality methodology means not only the building of a knowledge discipline, but also increasing their certified personnel’s knowledge of student learning styles and assessment methods. An active continuous improvement process includes
certified personnel and staff participating in the formation of policy and working in
quality teams to develop and implement programs and curricula. Leadership in the TQM
school works to eliminate disincentives for individuals to sustain these important,
learning-focused professional development activities (Capezio & Morehouse, 1993).

Additionally, there needs to be a firm future orientation among the personnel and a
willingness to make long term commitments to stakeholders both within the building and
outside the building. Stakeholders are defined as the current students, parents, future
students, future employers, alumni, and internal stakeholders—teachers and future
teachers of current students. The TQM transformed school possesses an organizational
focus that views the student’s education as a process outcome that effectively fulfills
student requirements after graduation (Fields, 1993).

The long-term planning to meet the goals and needs of stakeholders must anticipate
changes in requirements, instructional techniques, resource availability, technology, and
demographics. While long term planning is a core value, an increasing important measure
of a school’s effectiveness is the efficient and flexible response to the needs of
stakeholders. Schools by their nature are community based and owe their existence to
that community they serve. TQM schools learn to make improvements in quality,
productivity, and response time that strengthen community stakeholders. To meet the
sometimes conflicting and changing aims that a balancing implies, school strategy needs
to seek out and explicitly address student and stakeholder requirements. Policies, goals,
and plans must be frequently updated. The use of a balanced composite of performance
indicators offers an effective means to communicate requirements, monitor actual

During the TQM establishment phase, school leaders and teachers, find themselves enmeshed in a school-wide cultural change. Initially, senior leaders set internal and external direction for establishment of TQM. They interpret and apply Deming’s Fourteen Points. During the establishment phase, the TQM school’s leaders: Gain internal support through employee empowerment, establish a research based culture, set acceptable student variances, and select appropriate measurement standards. When in the operational phase, the leadership style changes from vertical management to a horizontal systems approach with direct input from an empowered faculty (Fields, 1993). The TQM transformed school uses benchmarking, embraces change, and develops a multiplicity of specific practices and programs (Deming, 1993).

One of Deming’s core beliefs is that workers want to take pride in their work. As Deming stated (1986), “Barriers against realization of pride of workmanship may in fact be one of the most important obstacles to reduction of cost and improvement of quality in the United States” (p. 83). Point 12 of Deming’s 14 Points deals directly with the necessity of eliminating barriers that the system creates to workers having pride in their work. Deming stated that, “Give the workforce a chance to work with pride, and the 3 percent that apparently don’t care will erode itself by peer pressure” (1986, p. 85).

Savings are generated from the reduction of rework. TQM theory advances the idea that common cause variation and special cause variations inhibit the process and create rework. Variations arise from faults within the system that cannot be blamed on human error. It is common cause variations that cross sub-system boundaries. However,
the solution for a particular common cause variation may exist within one of the effected sub-systems. In cases of special cause variations, a particular subsystem is involved. A special cause problem may involve fewer people but effect the whole process (Deming, 1986). Problems in the system are to blame for 90 percent of product rejection and rework (Deming, 1986). Deming does not blame the people who work within the process for process breakdowns and increasing rejection rates. His judgment is that the workers are the keys to solving common cause variations and specific cause variations. By solving variation, there is a reduction in the cost of production. In the TQM School, leader and teacher involvement in solving process variations encourages behaviors that help the individual grow. The school as an adult workplace becomes a teacher to adults. “The result is a chain reaction--lower costs, better competitive position, happier people on the job, jobs, and more jobs” (Deming, 1986, p. 2).

The school’s certified personnel grow in perspective, they propose new solutions, take on new responsibilities, and speak a new language, as they are given responsibility for quality outcome early in the process (Fields, 1993). Hence, the school’s certified personnel learn new behaviors. The certified personnel monitor the processes and contribute to progress in the areas of student performance, educational climate, research, scholarship, service, and the capable use of resources (Fields, 1993). They adopt long term planning to meet goals, emphasizing cross-functional teamwork and involvement with the whole organization. Through participation, the certified personnel are released from the fear of expressing ideas; they expand their vision, clarify their needs and assumptions, and perceive others' needs and assumptions (Fields, 1993).
The Purpose of the Study

The purpose of this study was to document changes in certified personnel attrition that may be related to a TQM culture change. This study expanded on the Brown-Frierson (1994) qualitative study that reported a link with certain demographic variables and acceptance of TQM conditions of excellence. Her study did not attempt to determine if personnel left. The act of leaving creates problems for the senior leadership involving time and costs linked with the recruitment and training of replacement personnel.

This study answered the question of whether the implementation of TQM lowers certified personnel attrition rates or increased certified personnel attrition rates addition. This study provided a basis for planning strategies to deal with the certified personnel attrition during a TQM transformation.

Research Questions

This study addressed three research questions as follows:

1. What are the demographic descriptors of certified personnel leaving schools transforming to TQM in the following areas: elementary or secondary schools, highest degree held, ethnicity, chronological age, years of experience?

2. Does the transformation to a TQM school over a three-year period result in a decrease or increase in attrition of certified personnel as compared to national attrition data?

3. Are there differences between the number of certified personnel leaving schools transforming to TQM as compared to national attrition data for the following demographic descriptors: Type of school (elementary or secondary), highest degree held, ethnicity, chronological age, years of experience?
Null Hypotheses

To answer these three questions the following six null hypotheses were developed:

Ho1: There is no statistically significant difference in the proportion of attritions from the sample study of certified personnel from schools transforming to TQM as compared to the proportion of attritions of certified personnel from the national study by the U.S. Department of Education for year 1, year 2, or year 3.

Ho2a: There is no statistically significant difference in the proportion of the number of attritions from the sample study of certified personnel from schools transforming to TQM as compared to the proportion of attritions from the national study by the U.S. Department of Education for year 1, year 2, or year 3 for elementary or secondary schools.

Ho2b: There is no statistically significant difference in the proportion of the number of attritions from the sample study of certified personnel in schools transforming to TQM as compared to the proportion of attritions from the national study by the U.S. Department of Education for Year 1, Year 2, or Year 3 for the category highest degree held.

Ho2c: There is no statistically significant difference in the proportion of the number of attritions from the sample study of certified personnel in schools transforming to TQM as compared to the proportion of attritions from the national study by the U.S. Department of Education for Year 1, Year 2, or Year 3 for the category of ethnicity.

Ho2d: There is no statistically significant difference in the proportion of the number of attritions from the sample study of certified personnel in schools
transforming to TQM as compared to the proportion of attritions from the national study by the U.S. Department of Education for Year 1, Year 2, or Year 3 for the category of chronological age.

Ho2e There is no statistically significant difference in the proportion of the number of attritions from the sample of certified personnel in schools transforming to TQM as compared to the proportion of attritions from the national study by the U.S. Department of Education for Year 1, Year 2, or Year 3 for years of experience.

Research Hypothesis

HR1: There is a statistically significant increase in the proportion of the number of attritions from the sample study of certified personnel as compared to the proportion of attritions from the U.S. Department of Education Study for Year 1, Year 2, or Year 3.

HR2a: There is a statistically significant difference in the number of attritions from the sample study of certified personnel in schools transforming to TQM as compared to the proportion of attritions from the national study by the U.S. Department of Education for year 1, year 2, or year 3 for elementary or secondary schools.

HR2b: There is a statistically significant difference in the number of attritions from the sample study of certified personnel in schools transforming to TQM as compared to the proportion of attritions from the national study by the U.S. Department of Education for year 1, year 2, or year 3 the category of highest degree held.
HR2c: There is a statistically significant difference in the number of attritions from the sample study of certified personnel in schools transforming to TQM as compared to the proportion of attritions from the national study by the U.S. Department of Education for Year 1, Year 2, or Year 3 for the category ethnicity.

HR2d: There is a statistically significant difference in the number of attritions from the sample study of certified personnel in schools transforming to TQM as compared to the proportion of attritions from the national study by the U.S. Department of Education for Year 1, Year 2, or Year 3 for the category of chronological age.

HR2e There is a statistically significant difference in the number of attritions from the sample of certified personnel in schools transforming to TQM as compared to the proportion of attritions from the national study by the U.S. Department of Education for Year 1, Year 2, or Year 3 for the category of number years of experience.

An effect of the TQM transformation in a school district or in a school is to cognitively challenge the school system employees to recognize critical success factors and key performance requirements that promote student achievement. TQM requires a focus shift to service to the student as the initial customer along with other key stakeholders both internal and external. TQM becomes a theoretical base for instructional leadership, experimental inquiry, and response to public responsibilities (Neuroth, et al., 1992). The importance of TQM to the education field and its practical effect upon the certified personnel remains relatively unknown.

Germinario and Ogden (1994) observed that the environment that the school certified personnel work in frames their perceptions and influences their behaviors. A
school leadership system and certified personnel adopt thinking and behaviors that they perceive as successful within the culture of the school. Senge (1994) identified two central beliefs in systems thinking, which related to people's beliefs: "structure influences behavior" and "policy resistance" (p. 374). Senge (1994) stated that policy resistance is the tendency of complex human systems to resist efforts to change. From a systems approach, the entropy that exacerbates efforts to change schools proceeds from policy resistance to the internal and external demands for system change (p. 374).

As Schenkat (1993) stated: “Such massive change has deep psychological roots. It is difficult for rigid, hard wired folks to get excited and more importantly act congruently with the reality that change is constant” (p.21). Therefore, Schenkat’s rigid hard-wired folks should show up as an increase in the attrition rates for transformed schools.

Limitations

Specific certified personnel attitudes toward their experiences with TQM are not assessed in this study. Similar attitudes could be held by other certified personnel, but with different results. Since this is a quantitative study, the investigator is examining quantitative variables--ethnicity, age, academic degrees possessed, and years of experience. Limitations to the study include: The lack of participation of principals; a small number of schools that responded (10), uncertainty that the national survey and TQM survey groups are equivalent, and uncertainty as to the degree of commitment demonstrated by senior staff members to applying all the principles of TQM, This study relied on responses from principals and they are under no obligation to respond.
Justification for this Study

This study will contribute to existing knowledge through the identification of the characteristics of certified personnel who leave the school during the establishment of TQM. The study will contribute data to school boards and superintendents considering incorporating TQM in their education planning models. The results of the study will allow planners to adopt policies and design responses that address employee training needs and employee problems.

Detert and Mauriel (1997) pointed out that TQM “is somewhat silent” regarding the topic of dealing with resisters (p.35). They recognized that TQM brings about changes in cultural norms that are forced through its school-wide or district-wide adoption. They considered the question of how resistance is motivated by a fear of power loss and loss of competence. Detert and Mauriel (1997), writing about education reforms, contended that “it may be inevitable that some lose power and others gain power in a true systemic change, but we are unsure why anyone who stands to lose power will necessarily be any more excited about TQM than other power-reducing change”(p. 36).

A search of the literature on teacher attitudes, beliefs, and behaviors revealed relationships between Germinario and Ogden's descriptive school categories with Glickman's (1985) and Schenkat’s (1993) descriptions of administrator and teacher cognitive levels. During the establishment phase of the TQM transformation, successful leader and teacher modes of thinking and work habits should change to be successful in a new environment. Accomplishment within the adult TQM school shifts from the presentation of a perfect lesson plan to a new measure of performance-instructional leadership. Instructional leadership promotes clear goals regarding what to improve.
Instructional leadership creates an environment where decisions are fact-based. Within TQM, the action of teaching calls for a profound knowledge of students and of subject matter, together with knowledge of all possible approaches to communicating of the material (Deming, 1993). This shift in the adult work culture effects some teachers with a fear of power loss and a loss of confidence.

Detert and Mauriel (1997) viewed the issue of a loss of competence as typically addressed by TQM through an emphasis on training and retraining. As they pointed out, this brings up the issue of costs involved in establishment, especially the costs of training and retraining. There are costs involved in the training of new people and the hidden costs involved in maintaining the processes that strain resources. Detert and Mauriel (1997) disputed the conclusion that quality pays for itself through increased revenues generated by increased sales and decreased scrap. They maintained that education costs are relatively fixed. They did point out that the gains in student learning, process efficiency, faculty morale, and customer satisfaction produced by a TQM transformation may well be worth the money spent but it probably will not be free.

Definition of Terms

The following terms are defined for this study:

**Benchmarking**- processes and products that represent best practice and performance, within and/or outside of education.

**Common cause variation**-variation in a process produced by interactions of process variables.

**Critical success factors**-conditions of performance most critical to the school's success.
**Human Capital**- workers skills that can be rented out to employers.

**Instructional leadership** - behaviors directed toward a school's mission goals, its instructional goals, its workplace collegiality, and growth through service.

**Kaizen** - incremental improvement involving everyone in the organization.

**Key performance requirements** - includes student learning styles, assessment of student progress, use of school and external resources, effective design, and the use of feedback from students and peers, faculty teamwork, and teaching styles and methods.

**Key stakeholders** - parents, communities, past graduates, employers, social service organizations, governing boards, legislatures, and other schools.

**Quality** - the extent to which the customers or users of a product or service believe it surpasses their needs and expectations.

**Quality of design** - the setting of goals and objectives, preparation of syllabus, course materials, lecture notes, and examinations. All require a long-range view with much thought and research.

**Special Cause variation** - causes of process variance directly related to a failure in material, equipment, of the human operator, or operating method.

**System thinking** - the capacity to see the parts in relation to the whole, to see why variations arise.

**Valued added performance** - two manifestations, (a) year-to-year improvement in key measures and/or indicators of performance, and (b) demonstrated value-added leadership in overall performance relative to comparable schools and/or to appropriate benchmarks.
Organization of the Remainder of the Study

In Chapter two, books and articles that refer to TQM and its application and implementation in education as well as schools as workplace cultures are examined.

Chapter 3 reviews the methodology including national attrition data reported by the U.S. Department of Education. The chapter sets the criteria for selecting the sample population.

In Chapter 4 the descriptive and inferential analysis of the data and the findings are presented.

Chapter 5 concludes this study with a discussion of conclusions drawn from the proportional comparisons and presents recommendations for future research.
CHAPTER 2

REVIEW OF LITERATURE

A search of the computer databases (ERIC, Galin, and Dissertation Abstracts International) yielded 119 articles and books concerned with TQM and education. A search of the bibliographies in articles and books produced 27 additional related articles and books. Of the 146 articles and books reviewed, 88 sources addressed the application of TQM in K-12 public education. These sources were clustered into three categories. The largest category incorporated opinion articles; the next category consisted of theory articles; and the smallest category was case histories. The second category included works concerned with the protocols for the Malcolm Baldrige Education Award. The third and smallest category consisted of two multiple school studies.

Deming commented on education in a 1993 seminar entitled Dr. Deming Talks to Educators sponsored by the American Association of School Administrators (AASA). At that seminar he outlined TQM and made comments concerned with the application of TQM to education. He commented again on the application of TQM to education in his book The New Economics. In The New Economics, he criticized the Secretary of Education, Lamar Alexander, for the April 1991 education bulletin America 2000: An Education Study. Deming (1999) commented that it was a “horrible example of numerical goals, tests, rewards, but no method” (p. 45). Deming cited examples from the report under the heading, “Horrible examples of numerical goals in public places” (p.
The possible effects of a TQM transformation on personnel attrition rates. Patterson, Purkey, and Parker (1986) stated that “culture can be defined as the way we do business around here; who you are and what you stand for; the assumptions about the organization (p. 47). Refining the definition further, they stated that: “culture embraces the norms, values, history--the sum total of the shared understandings held by members of the organization”(Patterson, et al., 1986, p.48). Davis (1984) contributed a caution that beliefs and behavior are only manifestations of the culture and not the culture itself. However, he stated "artifacts are tangible, and it is possible to get your arms around them” (Davis 1984,p.12). There is a difference between the culture of the organization and the climate within the organization. Patterson, et al., (1986) pointed out that…“climate is a measure of whether people’s expectations are being met regarding what it should be like to work in the school district” (p. 48). Davis (1984) put the idea this way: “Climate, then, becomes the fit between the prevailing culture and individual values of employees” (p. 12). Changes in the existing organization’s culture must also bring changes in the organization’s climate.

The Application of TQM Theory to Education

Bonstingl (1992) observed that Shewhart and Deming defined quality by linking the product with the customer's expectations. Deming (1986) credited Shewhart with pioneering the idea that productivity improved when variation is reduced in 1931. Deming (1986) promoted a culture of continued process improvement guided by Shewhart’s Plan-Do-Study-Act cycle (PDSA). The product would be uniform, predictable and dependable, of low cost, and meet or exceed the customer’s expectations.
Education commentaries by Bonstingl (1992), Capezio and Morehouse (1993), Fields (1993), and Lau and Shani (1992) are used to explicate Deming’s 14 points follow:

1. **Create constancy of purpose for improvement of product and service.** There must be long term planning and allocation of resources. “Place resources into: Research and Education. Constantly improve the design of product and service” (Deming, 1986, p. 26). Fields (1993) stated that: “Schools are in the business of personal contribution to the customers as measured by personalized service to their graduates. Schools must think in terms of futures, always 10 to 20 years ahead of today. Schools are constant in their purpose and must change to meet customer requirements” (p. 48).

2. **Adopt the new philosophy.** Management makes a mistake when it does not view quality as an integral part of everyone's work. A management that insists that it is only necessary to meet specifications advances an attitude which does not permit growth or product improvement, and is ineffective (Capezio & Morehouse, 1993; Deming, 1986). In the TQM transformed schools, the leadership system accepts the responsibility for change. TQM school leaders foster and direct changes that build a community of certified personnel characterized by cooperation, not competition. In a TQM school, certified personnel open a dialogue based on cooperation between areas and formal and informal systems to create horizontally and vertically integrated teams. The TQM leadership focuses the adult work culture upon meeting the needs of stakeholders. This is done through the labor of continued process improvement, the promotion of quality methods, a
structured interdependence that supports the system, and a respect for the school’s human capital.

3. **Cease dependence on mass inspection to achieve quality.** Eliminate mass inspection by building quality into the instructional process. Deming (1986) made the following points about inspection:
   - “Inspection is to late; it neither guarantees quality nor improves quality”;
   - “Mass inspection almost always is unreliable, costly, and ineffective”
   - “Divided responsibility means that nobody is responsible” (p. 30).

Student achievement should focus upon student mastery of skills. Over-reliance on mass testing has a detrimental effect. Student achievement must not be used to classify good and bad; such a use of testing drives down quality (Deming, 1993). Bonstingl, (1992) clarified this by stating that: "Early academic failures tend to be self-fulfilling prophesies for later years" (p. 5).

4. **End the practice of awarding business based on price tag alone.** Fields (1993) remarked that, “Cheat on the quality of the input and you cheat on the quality of education for our children” (p. 53). Deming (1986) added that, “A long term relationship between the purchaser and the supplier is necessary for the best economy” (p. 35). To the TQM school, this also implies an understanding on the part of the vendor parent of what is needed before the child enters school and the long term home support of the school’s efforts at quality (Fields, 1993).

5. **Improve constantly and forever the system of production and service.** The certified personnel in a TQM school understand its baseline and the need for control of process variance in the role of continuous improvement. Gains are
made when people in the system eliminate the need and cost of rework. Deming called for the implementation of the "Process of Continuous Improvement" centered on the "Plan Do Study Act" cycle (Deming, 1993) as the answer to rework. The Japanese have a word for this concept kaisen (continuous improvement). Kaisen in the production as well as the service sectors refers to continuous improvement in job function and process function. In an individual’s life, the practice of kaisen assumes that each portion of a person’s life deserves constant attention to improvement (Fields, 1993). The management of process and results is seen as a top and middle administrative function of both workers and supervisors. It is through the realization of quality consciousness and the practice of continuous improvement that the TQM school’s culture encourages each adult member to put aside private aspirations and to strive for improvement of both student and school performance. The transformation to quality consciousness and continuous improvement in educational practice stresses advances in cross-disciplinary cooperation, employee training in multiple roles, the encouragement of internal and external dialogue, and consensus building. A system culture is built where individuals and individual subsystems labor toward the optimization of the whole (Deming, 1993).

6. Institute training. Fields (1993) summed up this point when he wrote, “Shewhart’s thoughts and applications and Deming’s 14 points and their applications must be learned by everyone in the educational community” (p. 55). Deming promoted three important ideas regarding this point. The first was that, “Management must understand and act on the problems that rob the production
worker of the possibility of carrying out his work with satisfaction” (Deming, 1986, p. 52). The second was the idea that, “People learn in different ways” (Deming, 1986, p. 53). The third was that, “A big problem in training and leadership in the United States arises from a flexible standard of what is acceptable work and what is not” (Deming, 1986, p. 53). The development of criteria and awareness of the quality criteria are part of the TQM transformation. The training in and development of quality criteria are part of the responsibility of the leadership and quality teams. Quality teams are responsible in guiding other certified personnel in developing measurements that realistically illustrate the process.

7. **Adopt and institute leadership.** Deming (1986) stated that, “The job of management is not supervision, but leadership” (p. 54). TQM leaders eliminate barriers to pride in workmanship. The TQM senior leadership must create a quality consciousness through training in statistical control, process variation, common cause, special cause, and profound knowledge. The TQM leadership adopts the role of certified personnel and staff supporter, coach, mentor, and cheerleader. The TQM leaders help people do a better job. TQM leaders understand the difference between common cause and special cause and respond appropriately.

   Deming's leadership model incorporated a theory of profound knowledge. He taught that profound knowledge results from the interaction of four parts: (a) An appreciation for a system, (b) a theory of variation, (c) a theory of knowledge, and (d) a knowledge of psychology. The various segments of the system cannot
be dissociated (Deming, 1986). Profound knowledge in the education sector includes the understanding that students learn in different ways, at different rates, and individually possess different strengths. The ways students learn, their strengths, their learning rates differ over time and with subject matter (Deming, 1993).

8. Drive out fear. “No one can put out his best performance unless he feels secure” (Deming, 1986, p.59). The school leadership system must establish a sense of security and community. People must be secure enough to point out problems and suggest improvement or corrective action. The real purpose of corrective action is to eliminate problems forever. Corrective action systems have to be data driven, show what the nature of the problem is, and then perform an analysis that points out the source causes of the problems. Once the source cause is identified, it can be rectified. Rewards are based on everyone winning through the optimization of the instructional process. TQM transformed schools institute assessment strategies that shift evaluation away from people to evaluation of the instructional process (Deming, 1993). The TQM transformed school’s leadership system and certified personnel need to create an atmosphere that encourages certified personnel and student pride in accomplishing tasks and reinforces students for actively participating in the instructional process. TQM transformed schools remove barriers that keep pride of workmanship from the professional staff (Deming, 1993).

9. Break down barriers between areas. The TQM transformed certified personnel break down barriers between administrative departments and subject matter
disciplines. Competition between departments is counterproductive, time wasting, and confusion creating; it diverts focus from the students. The TQM school leadership system organizes interdisciplinary quality improvement teams. The purpose of the quality improvement team is to advance strategies that deal with common problems and to optimize the quality of the system. Quality improvement teams, representing all departments guide the quality process. The quality improvement team possesses an essential role of building quality awareness throughout the school (Deming, 1986). The quality improvement team functions in the education of other certified personnel in quality methods, they represent the school with external stakeholders. They can commit functions without having to double check with senior administrators or school level leadership, and they can clear paths of improvement for faculty and students.

10. **Eliminate slogans, exhortations, and targets for the workforce.** Eliminate goals and slogans that pressure quality work without the means to do so from a commitment to quality. Deming expressed the belief that slogans, exhortations, and targets set by administrators had a negative effect on performance (Deming, 1986).

11. **Eliminate numerical quotas for the workforce and numerical goals for management.** Instructional outcomes and specific instructional strategies possess meaning only (to certified personnel) when both originate among the faculty and are supported statistically. The senior administration needs to eliminate quotas and implement assessment strategies for students to affirm learning and predict readiness for future instruction and for future advancement. Deming advocated
basing advancement of professional staff on criteria such as the demonstration of cooperative skills, understanding statistical analysis, pursuing new knowledge, and using skills consistent with system objectives (Deming, 1986).

12. **Remove barriers that rob people of pride of workmanship** Deming endorsed eliminating the annual rating or merit system. He looked to the elimination of barriers created by management. Management’s barriers are: (a) demanding instant success, (b) placing too much accentuation on the next technological innovation, (c) insistence that external consultants detail the transformation of the company's culture, and (d) insistence that other external solutions and successes can not be duplicated here (Capezio & Morehouse, 1993; Deming, 1986).

Deming explained that leadership’s poor judgment creates barriers to success. Deming insisted that annual rating systems and merit systems focus on individual efforts and not group cooperation. By singling out a worker for special treatment, management diminishes the efforts of everyone else. Such actions work against efforts at cooperation between workers and departments. In the long term these actions hinder quality efforts and harm the organization.

13. **Institute a vigorous program of education and self-improvement.** The overall process design must include clear learning objectives, and consider the individual needs of the students. Such a design must contain an effective means for measuring data. That is, TQM faculties adopt and foster successful behaviors that encompass skills needed to negotiate, think in the long term, take a global view, and plan abstractly. TQM leaders invest in the system’s human capital through a vigorous program of education and life long learning. When the teaching staff
improves their profound knowledge, the quality of instruction improves. Through staff development, the TQM faculty introduces new ideas into the school culture.

14. **Put everybody in the company to work to accomplish the transformation.**

Reaching the TQM school’s performance requirements depends upon the focused capabilities of the faculty, a commonly held faculty belief in continuous improvement, and the skills and the motivation of certified personnel. Part of answering the need to satisfy stakeholders and public responsibilities is to find local solutions to the demands for safe quality schools--coupled with steady improvements in technological systems (Fields, 1993). TQM forces system-wide choices to be made about which technology to adapt, transfer, or develop. TQM schools must find solutions that answer an increasing demand for service quality. Part of the solution fosters the need to reexamine work dynamics (e.g. work design, communication networks, motivation, leadership, and teamwork). System cooperation draws certified personnel out of their comfortable modes of thought and familiar paradigms to form new adult school cultures. Lau and Shani (1992) noted a link between the way employees think about themselves and the way people behave; the reverse can also be true. They stated that, "This interrelationship can be extended to three areas: (a) cognitive, (b) communicative, and (c) the behavioral" (p. 430).

The application of TQM to the field of education has produced a set of core values designed for education. These are expressed in the Malcolm Baldrige National Quality Award in education. The criteria for this TQM award were developed under the National Institute of Standards and Technology (NIST) and funded through the Malcolm Baldrige
National Quality Improvement Act of 1987-Public Law 100-107. The Malcolm Baldrige Education Pilot Criteria were introduced in 1995. These core values are emphasized in this education award:

- **Learner-Centered Education**--Effective teaching and curriculum that place the focus on learning and the real needs of the learners.
- **Leadership**--A school’s senior administrators and leadership teams that take seriously their crucial role in the development of a student-focused, learning-orientated climate.
- **Faculty and Staff Participation and Development**--Success depends upon having meaningful opportunities to develop and practice new knowledge and skills.
- **Partnership Development**--Schools seek to build internal and external partnerships to better accomplish their overall goals.
- **Design Quality and Prevention**--School improvement places powerful emphasis on effective design of educational programs, curricula, and learning objectives. The TQM faculty implements continuous quality improvements within the system. Students learn within the limits of the system. Everyone in a TQM school forms a learning community that collectively and cooperatively transforms the system.
- **Management by Fact**--Any effective improvement needs to be based upon cause-effect thinking utilizing measurement, information, data, and analysis.
- **Long Range View of the Future**--Long term education improvement based on a belief that our efforts do influence the future and a willingness to make long term commitment to the students and to all stakeholders-parents, communities, employers, faculty, and staff.
• **Public Responsibility and Citizenship**—School’s leadership stresses that the school has an important role as a model in its operation as a community institution.

• **Fast Response**—An increasingly important measurement of institutional effectiveness is fast and flexible response to the needs of its students and stakeholders.

• **Result Orientation**—A school’s performance should focus on results reflecting and balancing the needs and interests of students and all stakeholders.

(Malcolm Baldrige Award Education Pilot, 1995)

TQM school leaders direct change in the system. Everyone is needed to act to accomplish the transformation. The school’s certified personnel and staff must believe that the senior district leadership and the principals are serious about school-wide quality. This emphasis on quality and the application of the core values of TQM adds to the principal’s responsibilities. The principal’s behaviors directly influence the institutional climate, instructional organization, and the resulting student outcomes. Figure 2 places adult work culture shapes the learning environment—particularly attitudes core values of TQM theory into areas of the principal’s responsibilities.

**School Cultures and Climate**

Since personnel attrition is a possible outcome of a change in a school’s culture and climate, a review of the literature that focuses on certified personnel, and the influence of the circumstances under which they work was necessary. Germinario and Ogden (1994) stated that" the conceptual environment in which certified personnel's work can distinguish successful from unsuccessful schools" (p. 33). Thus, certified personnel performance is not a separate issue from the building’s working environment. The adult
### THE PRINCIPAL WITHIN A TOTAL QUALITY FRAMEWORK

<table>
<thead>
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<th>PROCESS/THOUGHTPUT</th>
<th>RESULTS/OUTPUT</th>
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<tr>
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<td><strong>PRINCIPAL’S ROUTINE BEHAVIORS</strong></td>
<td><strong>STUDENT OUTCOMES</strong></td>
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<td>employment</td>
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<td>lower retention rates</td>
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<td>building true consensus</td>
<td>student performance</td>
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<td>building faculty and staff quality consciousness</td>
<td>citizenship</td>
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<td>communicating the role of the school in the community</td>
<td>individual needs met</td>
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<td>communicating the mission statement and quality goals to stakeholders</td>
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<td>determining stakeholder needs</td>
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<td>“talk the talk and walk the walk”</td>
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<td><strong>BELIEFS AND EXPERIENCES</strong></td>
<td><strong>INSTRUCTIONAL ORGANIZATION</strong></td>
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<td>TQM quality theory</td>
<td>quality curriculum</td>
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<td>belief in relevance of answering-stakeholder needs</td>
<td>quality teams</td>
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<td>The Fourteen Points</td>
<td>using quality tools</td>
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<td>PDCA cycle</td>
<td>school as quality example</td>
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<td>school as good citizen model</td>
<td>instruction plans to answer</td>
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<td>philosophy of individual differences</td>
<td>individual student needs</td>
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<td><strong>Kaisen belief</strong></td>
<td>instructional assignment</td>
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<tr>
<td><strong>INSTITUTIONAL CONTEXT</strong></td>
<td><strong>INSTRUCTIONAL CLIMATE</strong></td>
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<tr>
<td>alignment of quality objectives</td>
<td>using the tools of quality planning</td>
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<td>mission statement</td>
<td>student focus</td>
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<td>building programs and services</td>
<td>focus on achievement</td>
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<td>state programs</td>
<td>management by fact</td>
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<td>federal programs</td>
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<td>faculty involvement in mission statement</td>
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Figure 2: The Principal within a Total Quality Framework (Meehan, 1997)
<table>
<thead>
<tr>
<th>Instructional Leadership</th>
<th>Management</th>
<th>Instructional Accountability</th>
<th>Education Research</th>
<th>School Improvement and Planning</th>
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</thead>
<tbody>
<tr>
<td><strong>Conventional Schools</strong></td>
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<td>Conventional Schools</td>
<td>Conventional Schools</td>
<td>Conventional Schools</td>
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<tr>
<td>Teaching viewed as an art. Classroom considered separate mini-schools Teachers work as isolated units. Most staff believe that other teachers share same beliefs about teaching</td>
<td>A major concern of the Principal is for a safe and orderly school. Good schools have good teachers eliminate bad teachers Procedures must be followed, and standardize everything</td>
<td>Each teacher bears the responsibility for learning and school effectiveness. School effectiveness is largely a matter of perception.</td>
<td>Research is not trusted. Outside ideas cannot apply here our situations are unique Better schools are that way because they have better kids and more resources.</td>
<td>Schools improvement is linked to increased fiscal resources. Lack of a drive to improve learning unless in crisis.</td>
</tr>
<tr>
<td><strong>Congenial Schools</strong></td>
<td>Congenial Schools</td>
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<tr>
<td>Principal wants to be liked. There are frequent staff meetings and efforts made to promote adult communication and shared information.</td>
<td>The school is run primarily for the benefit of the adult workers there is a strong sense of adult ownership of the school.</td>
<td>The effectiveness of the school is a function of how the adults perceive their own satisfaction with the accomplishment of their own goals.</td>
<td>Adult attitudes on research are similar to the conventional schools; there remains a distrust of outside research.</td>
<td>Adult attitudes are similar to the conventional schools; they are open to ideas that make their task easier</td>
</tr>
<tr>
<td><strong>Effective Student Outcome-Based Schools</strong></td>
<td>Effective Student Outcome-Based Schools</td>
<td>Effective Student Outcome-Based Schools</td>
<td>Effective Student Outcome-Based Schools</td>
<td>Effective Student Outcome-Based Schools</td>
</tr>
<tr>
<td>The adult culture believes that purpose of school is student learning. Principal is the instructional leader and head team leader</td>
<td>Principal concerned with safe and orderly school with common procedures. Open to sharing information with parents.</td>
<td>The whole staff and school are accountable for the learning of the students. If teachers work smart and hard, enough they can reach every student.</td>
<td>The teachers as a group know more about student learning then any individual. Research is useful Teachers and principals are continuously improving their skills</td>
<td>Data concerning outcomes and process are continually gathered and shared with the community. Change takes time and study. The staff needs a common vocabulary and set of common definitions. Outside agencies can help.</td>
</tr>
</tbody>
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Figure 3: Organizational Vitality-School Culture: Measured by Adult Work Attitudes
## Organizational Vitality

### School Culture and Climate; Measured by Adult Work Attitudes

<table>
<thead>
<tr>
<th>Instructional Leadership</th>
<th>Management</th>
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<td><strong>Conventional Schools</strong></td>
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<td>Textbooks and persons in authority, including themselves are correct</td>
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<td>Depend on authority to make changes</td>
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<td>Knowledge is absolute</td>
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<td><strong>Conventional Schools</strong></td>
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<td>Principal as authority figure always correct Authority and correctness flows downwards</td>
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<td>Very procedure conscious, and everything standardized</td>
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<td><strong>Conventional Schools</strong></td>
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<td>Teachers have difficulty generating alternatives to problems</td>
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<td>Instruction consists of questions with only one right answer</td>
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<td><strong>Conventional Schools</strong></td>
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<td>There is little useful knowledge outside the school district.</td>
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<td>Leadership approved research Might be tried as long as it did not threaten teachers authority</td>
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<td><strong>Congenial Schools</strong></td>
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<td>Principal interested in being liked.</td>
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<td>A people person, so tasks usually slip</td>
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<td>All opinions are equally valid</td>
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<td><strong>Congenial Schools</strong></td>
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<td>Some adults negative against rules, resistant against authority</td>
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<td>Other adults see how points of view relate</td>
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<td><strong>Congenial Schools</strong></td>
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<td>Some adults struggling with other points of view</td>
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<td>Identify Instructional problems by concentrating on one dimension of the problem</td>
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<td><strong>Congenial Schools</strong></td>
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<td>Attitudes toward research mixed, some teachers can other points of view and one to three ideas are generated. Still distrustful of research.</td>
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<td><strong>Congenial Schools</strong></td>
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<td>Some adults can see validity in other points of view and generate a few ideas for improvement. Still look for guidance of authority</td>
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Figure 4: Summary of Germinario, Ogden and Glickman, Schenkat Organizational Vitality
work culture reflects the actions/non-actions, attitudes, and interactions of certified personnel. The towards difficult assignments, patterns of privilege or power, and daily work attitudes (Germinario & Ogden, 1994). According to Germinario and Ogden (1994), the interaction of the school's adult culture with students' perceptions of their environment has significant impact on student achievement.

Based on their review of the literature, Germinario and Ogden (1994) constructed a range of school environments based on school achievement, faculty attitudes, and student focus. From their studies of the literature, they identified a continuum with three levels of adult-formed school cultures: (a) Conventional or Collected School, (b) the Congenial School, and (c) the Effective Student Outcome-Based/Professional/Collegial Knowledge-Based School. Figure 3 illustrates the continuum of climate and attitudes discerned from the literature by Germinario and Ogden.

Glickman (1986) postulated the existence of three levels of certified personnel and certified personnel thought--Low Abstract, Moderate Abstract, and High Abstract. Schenkat (1993) agreed with Glickman on two of the levels, but divided the Moderate Abstract level into: System 2 and System 3 thus added a fourth level. Both Glickman and Schenkat found that the working environment in which adults find themselves relates to thinking characteristics, and outcomes. Figure 4 illustrates Schenkat’s cognitive paradigms within Germinario and Ogden’s (1994) range of school environments.

Germinario and Ogden (1994), Glickman (1985), Goodlad (1984), and Joyce and Murphy (1990) identified a widespread school culture that Germinario and Ogden referred to as the Conventional or Collected School. In this culture, certified personnel
are considered as the ones who know instruction and the needs of the students; an effective principal leaves the certified personnel alone. The principal ensures the safe and orderly school environment. Effectiveness of the school is the responsibility of the individual certified person: however, effectiveness is limited by outside influences on the student. The school leadership finds itself crisis managing the school. An omnipresent trait is that each certified person is an autonomous unit. Problems and low achievement are viewed in this culture as: (a) The products of the external factors of social position and genetic fitness, and/or (b) rising from problems unique to the school. The certified personnel reject education research as too external to be trustworthy (Germinario & Ogden, 1994; Joyce & Murphy, 1990). Figure 3 illustrates the beliefs that are held within this category.

The educators in conventional schools fit into the description of System 1/Low Abstract thinkers, identified by both Glickman (1986) and Schenkat (1993). Notably, these educators raise as a solution to the problems of poor academic achievement the linkage of academic progress to better buildings or to new superior textbooks. Their goals and beliefs are obscure and virtually unknown to other certified personnel or are not taken seriously enough for daily application. Certified personnel consider evaluation a bureaucratic requirement and unrealistic. They have no doubt that the principal's primary utility is to provide a safe and orderly school environment. An idiosyncrasy demonstrated by these certified persons is the dependence on authority or outside experts to make changes. A related belief is that texts and experts are the final authorities.

In the Conventional/Collected School certified personnel, ask questions to students in such a way that there is one correct answer. There is an over-dependence on multiple-
choice tests or single answer questions. These certified personnel reward students for recitation of approved answers and penalize them for divergent answers. The certified person is the specialist. Certified personnel regard issues and answers as right or wrong and are intolerant of concession or different answers. Knowledge is certain. These certified persons lack ideas about what is feasible. They depend on habitual and single answers to varying situations (Glickman, 1986, Schenkat, 1993).

Germinario and Ogden's (1994) second category is the Congenial School. In contrast to the Conventional/Collected School, this school projects the impression of a cohesive unit with common goals. Adult group activity is a characterized by significant amounts of communication, frequent meetings, and shared information. The adults possess a strong sense of ownership of the school. However, Glickman (1986) commented that an appraisal of the school's objectives discloses an adult centering rather than a student orientation. The result is that the students profit little in terms of learning over their fellows in the Conventional/Collected School (Germinario & Ogden, 1994). Figure 3 illustrates the beliefs that are held within this category.

Schenkat’s (1993) System 2 and System 3 certified personnel compare in cognitive profile to Glickman's (1986) Moderate Abstract cognitive style. In the Congenial School schools, there is a range of attitudes. Some adults fall within the System 2 description in that they are adverse to rules, resistant to control, and find it hard to see another point of view. Within the same school may well be adults at the opposite end of the range or System 3 adults who can see how points of view connect. System 3 adults are certified personnel that see all opinions as equally valid and view themselves as people persons. They show a lack of interest in following through on tasks. Glickman combined both
groups in his Moderate Abstract Group. Schenkat and Glickman stated that these adults identify instructional problems by focusing on a single aspect of the problem and by ignoring multiple sources of information. They generate from one to three ideas about change, yet they need the facilitation of authorities weighing the consequences of actions and planning (Glickman, 1986, Schenkat, 1993).

Germinario’s and Ogden’s (1994) third and final school culture, The Effective Student Outcome-Based/Professional/Professional/Collegial Knowledge-Based School, represents the culture that encompasses TQM criteria. Adults in these schools share the belief that the purpose of the school is student learning. They also believe that all students can learn to a very high set of standards. The principal acts as the instructional leader of the school’s instruction team. The principal’s role is to express the beliefs of the school, find time to communicate the school’s mission and outcomes beyond the school, foster staff development, and guide planning and analysis. The educators know how to recognize individual student learning styles and how they should be taught. There is continuous planning and data collection, the faculty realizes that one doesn’t need to wait for something to break down before it is fixed. There is a strong sense of common mission and a conscientious set of learning outcome goals. The certified personnel derive satisfaction from professional work accomplished together and from the achievement of children. It is a central canon of the school culture that certified personnel are accountable for the learning of the students. They add value to the students’ human capital. These certified personnel consider research on instruction and learning as a means of improving practice. They share a viewpoint that schools can improve, that they accomplish their mission by long term planning, and that effective education practices
will advance student learning. Figure 3 illustrates the beliefs that are held within this category.

Schools in this category have a large number of System 4/High Abstract Thinkers. The faculty is characterized by an ability to accommodate change, to negotiate with others, to work out abstract problems, and to possess sufficient vision to see the big picture. The formation of cross-functional quality teams breaks down artificial divisions that isolate adults within the school culture. These faculties and their schools develop into a highly integrated information processing systems—a social ecology. Glickman (1986) described them as able to identify instructional problems from multiple sources of information and generate multiple solutions. This group of certified personnel are able to visualize and verbalize the consequences of their actions and follow through by making changes (Schenkat, 1993).

TQM Schools fit into the Effective Student Outcome-Based/Professional/Collegial Knowledge-Based School category. They possess certain core values expressed within the Malcolm Baldrige Education Criteria (1995) that form from the employment in education of TQM principles. There is a core value that schools exist primarily to develop the fullest student potential, affording students opportunities to pursue a variety of avenues to success. TQM schools also hold a core value that the real needs of the learners derive from the requirements of the marketplace and the responsibilities of citizenship. These schools realistically respond to changes in local and world economies that are placing new demands for knowledgeable workers to meet the requirements of the marketplace. There is an emphasis for school employees to be knowledge workers and problem solvers. There is a belief that the delivery of education needs to be built around
gathered data concerning learning effectiveness and student outcomes. Teaching effectiveness is to be defined in terms of learning effectiveness.

A school district and its principals are using cultural change to build organizational vitality. The changes within the culture affect adult work attitudes and certified personnel thinking. Certified personnel are being asked to abandon their old perceptions and grow more complex in their thinking and actions.

**Motivation**

When examining changing the adult work culture of a school, motivation is an important factor in that cultural change. Schools are unlikely to change from a Conventional or Collected School culture to an Effective Student Outcome-Based/Professional/Collegial Knowledge Based School culture without significant effort. Effort is linked with motivation.

Kondo (1990) explained that motivation is a common problem in manufacturing. He remarked that Maslow linked motivation to a hierarchy of human needs. He outlined Maslow’s five classes of human needs: (a) Physiological needs, (b) safety needs, (c) social needs, (d) ego and esteem needs workers setting their own goals, and (e) leadership's recognition of their work.

Motivated workers produce creative ideas. Within the workplace, needs are met at lower levels by removal of dissatisfiers and alleviated at higher levels by satisfiers; this effect confirms the thesis of Maslow and Hertzberg (Kondo, 1990). In order to encourage creative ideas from certified personnel the leadership must adopt policies and systems that provide certified personnel, and students with needed satisfiers in their daily work.
Kondo (1990) theorized that there is..."an optimum to the quest for quality of conformance with regard to manufacturing cost" (p. 7). Kondo stated that the optimum would always fall short of perfection because of the increased costs involved. The optimum is advanced through the worker’s creative ideas. It is the worker’s breakthrough ideas that promote product or service conformance and reduce cost. What is needed is to search for ideas that reduce defects with a minimum cost (Kondo, 1990). Kondo pointed out that breakthrough thinking occurs before considerable progress in optimization.

Breakthrough thinking is defined as an original approach based on the creative ideas and strong will of concerned individuals. Breakthrough thinking is a quantum leap in judgment which is not predictable, nor does it follow clearly evolved paths of logical development (Kondo, 1990). This type of thinking is motivated by the need to solve a dilemma. The solution may come from any employee. Kondo stated that: "Quality is achieved only by the quality consciousness and the keen sense of responsibility in the mind of the workers" (Kondo, 1990, p. 9).

Education presents a motivation dilemma. How can the leadership provide satisfiers to both the students and the adult faculty? When a TQM School’s culture is in the establishment phase this question becomes complex. There are at least two viewpoints concerned with the development and administration of satisfiers. The first viewpoint envisions senior leadership controlling the outside satisfiers as a means of achieving production levels. Trenta (1992) outlined the second viewpoint, that administrators can overcome resistance to the TQM paradigm by leading dissenters into experiencing satisfaction in their new work paradigm.
Within Education: The Bell Curve Meets Kaizen

When considering moving a school from the culture and climate of a Conventional or Congenial School to that of an Effective Student Outcome/Professional/Collegial Knowledge Based School, student success and failure needs to be defined. How schools determine student success and failure and the effect of either of these on student motivation is addressed by Deming (1993) and Glasser (1992). Both of them point out that a problem arises from using a bell-curve to determine student success. The bell curve has an acceptable zone of failure built into it. Glasser (1992) pointed out that certified personnel are trained to use the bell (normal) curve as the basis for educational evaluation. Deming (1993) pointed out that through the acceptance of the bell curve, schools tacitly build in a rejection rate. Some students are expected to achieve below group expectations. This acceptance of a rejection rate is counter to key points in TQM: continuous improvement, control of variance, and meeting the needs of stakeholders. In TQM transformed schools, certified personnel troubleshoot the process. Their emphasis is upon correcting flaws in a process. The certified personnel must find the flaws that hold back the acquisition of knowledge and skills by students and eliminate their influence. In TQM Schools, students are given remedial and preventive help early in the process, and the focus is on returning them to the standard.

In manufacturing, gains are made in cost benefits through the control of all factors leading to unacceptable variances in the product. Manufacturing refers to production savings as cutting down on rework costs. In education, a measure and visual example of unacceptable variance of product is the presence of remedial programs. Remedial and rework costs are incurred to bring students/products into conformance with requirements.
Therefore, there is a cost in both the manufacturing and education experience that increases the closer each gets to total-zero defects.

In the TQM School, there is a fundamental belief that student achievement increases through faculty effort and control of the costs of variance. The support of certified personnel is an essential element in the stimulation of curriculum improvements, instructional improvements, and improvements to the social climate. According to Steverson, Lee, and Stigler (1986) and Halloway (1988), the belief in effort is one of the essential reasons for the outstanding record of the Japanese schools. Under TQM, the quality of education and the responsibility for what the student understands of the material is placed upon the certified personnel and the whole school's culture. The end objective is for all students to understand the material well enough to receive an A or A+ or least a B (Glasser, 1992).

**Educational Implementation in Practice**

Trenta (1992) detailed the first year experiences of employees implementing TQM in the Akron Public schools. Trenta was the chief personnel officer for the school system with supervisory responsibility for the Department of Research and Education. He did not address problems of faculty retention directly. He commented on the resistance to implementation of TQM that "much of what existed as negative feelings is due to people acting out to protect themselves or preserve the status quo, then reaction to the redefined (TQM) and revitalized mission of the system" (p. 4).

Trenta (1992) Reported that under TQM, certified personnel develop through three levels of experience on their way toward becoming, "ethical Professionals" (Trenta, 1992, p.4). He termed the levels as follows: (a) state of being, (b) process level, and (c)
level of action. During the state of being level, employees defined themselves through their prior experiences. At this level, they had no understanding of the nature of the proposed changes. Employees moved to the process level by learning to make decisions using separate knowledge bases. The certified personnel’s knowledge bases were their individual classroom situation, the school building, the community, and knowledge about pedagogues, student learning styles, and current education research. In the level of action, the professional reflected upon his/her professionalism, the unique situation in which an action must occur, and the current knowledge in the field; only then does he/she decide and act (Trenta, 1992).

Trenta (1992) stated that to effectively deal with negativism, senior administrators must provide the faculty with assignments that they can be successful doing. He pointed out that motivation became a critical issue during the adoption process. "Since stopping is not possible, we must find ways and time to make people be and feel successful" (p. 4). Success can be earned only within the context of using the new ways of operating. Success motivated adults to try new methods and to practice new skills. Adult motivation must be addressed effectively or the whole TQM process stops.

Brown-Frierson’s Demographic Linkages

One study linked demographics with the attitudes of adapters and resistors concerning TQM implementation. This study entitled, A Study in Organizational Change: The Attitudes of Personnel Toward Total Quality Management in a State Department of Education (Brown-Frierson, 1994), described the impact of TQM on workers at the headquarters of the Maryland State Department of Education. Her research hypothesis was as follows:
"That there is a significant difference in the means of the twelve categories and the total score based on (independent variable) as measured by a survey instrument on Total Quality Management" (Brown-Frierson, 1994, p. 119).

She found significant mean differences when distinguishing dissenters from adapters with the demographic variables of education, age, department affiliation, and ethnicity. Her data allowed her to develop a profile of dissenters.

Brown-Frierson’s (1994) dissertation survey was an analysis of employee attitudes toward TQM. She surveyed personnel in each division asking their perceptions on twelve conditions of quality. She matched dissenters with the demographic variables and division affiliation. She used a correlation matrix to identify differences in attitudes of employees with her defined twelve conditions of quality excellence that were significant at p< 01.

Brown-Frierson’s (1994) survey was concerned with the identification of the following twelve conditions of excellence: (a) Total Quality Requirements, (b) Customer Orientation, (c) Participation, (d) Development, (e) Motivation, (f) Product and Services, (g) Processes and Procedures, (h) Information, (i) Suppliers, (j) Culture, (l) Planning, and (m) Communications and Accountabilities' (Brown-Frierson, 1994). She found that adapters answering her questions either agreed or strongly agreed with the twelve conditions of excellence. Dissenters did not strongly disagree as frequently as adapters strongly agreed.

She defined dissenters as strongly disagreeing or disagreeing with one or more segments or all the twelve conditions of excellence. The mean response on each of the 33
questions was lower for dissenters than for the adapters. The demographic variables tested were (a) level of education, (b) gender, (c) age, (d) ethnic background, (e) length of employment or service, and (f) department of employment. She reported no significant difference in response based on the variables of gender or length of service. Her gathered data revealed that within the variable of education, the subgroup identified as Some College Group scored the lowest; therefore, they were dissenters. The subgroup identified as High School Graduates Group scored the highest mean; they agreed with the twelve principles of TQM examined. When she analyzed by age, the data suggested that the subgroup aged 46-52 proved more adaptable then the other age groups; they agreed or strongly agreed. Brown-Frierson attributed this support to the nearness to retirement. She stated that the subgroup directly before it, aged 39-45, registered the lowest mean in two of the twelve conditions of excellence (Brown-Frierson, 1994). She discovered that ethnicity had significance in the categories of Participation, Development, Motivation, Information, Culture, and Communication. African-Americans had not adopted six of the conditions of excellence. Brown-Frierson interpreted this response to be associated with an African-American viewpoint of not being part of the system (1994).

Different units within the Maryland State Department of Education presented significant attitudinal preferences. The Division of Certification and Accreditation registered the highest means in most of the conditions of excellence; they were adapters. The dissenting divisions were the Divisions of Planning, Division of Results, and the Division of Information Management which consistently registered the lowest means in the conditions of excellence; they were dissenters (Brown-Frierson, 1994). In her implications, she stated that the difference in the division means reflected a difference in
the leadership styles between the divisions. Brown-Frierson made three recommendations based on her research. First, the Maryland State Department of Education should study its system climate for reasons why dissenters feel as they do. Second, she proposed that her research results suggested a need for stronger leadership. Third, the Maryland State Department of Education should benchmark with other state agencies and implement comprehensive system wide staff development (Brown-Frierson, 1994).

**Standardization of the TQM in Education**

Since 1991, the American Society for Quality Control (ASQC) annually surveyed school districts that were members of the American Association of School Administrator's Total Quality Management Network. Additionally, the ASQC sent state superintendents of education the survey and past ASQC survey respondents a letter requesting forwarding of the survey to districts involved in TQM. At the K-12 level the responses grew from 42 in 1991 to 156 in 1996, but dropped to 107 in 1997, and 102 in 1998. Colleges, universities, and community colleges represented a separate survey category. These institutions responded that they either offered courses and degree opportunities or applied TQM principles in running their administrations. By combining the post-secondary responses and the K-12 survey responses, the total number of responses were charted (Horine, 1992). Horine, et al., (1993) reported that several states had taken the initiative to form quality partnerships with school districts. All of these partnerships were aimed at the use and promotion of quality principles in school improvement efforts. Two partnerships were singled out by the ASQC for attention were New Mexico's Strengthening Quality in Schools Project and Minnesota's Partners for Quality Education Initiative. Horine, Hailey, and Rubach (1993) reported that in 1992 the
governor of New York issued the Excelsior Award (a quality in education award modeled after the Malcolm Baldrige National Quality Award). The state of Massachusetts adopted elements of TQM under the 1993 Massachusetts Education Reform Act.

Brown (1993) related that the National Institute of Standards and Technology (NIST) (1987) sponsored the development of the Malcolm Baldrige National Quality Award (P.L.100-107). The award was created with a three-fold intent:

- to promote awareness of the importance of quality improvement in the national economy;
- to recognize systems which have substantial improvement in products, services, and overall competitive performance; and
- to foster sharing of the best practice information among U.S. systems.

(Malcolm Baldrige National Quality Award-Education Pilot Criteria, 1995, p.1)

In 1993, the Malcolm Baldrige Award was extended to education. The criteria and the terminology of the Malcolm Baldrige Award were standardized to facilitate the application of TQM in the education sector of the economy. The ASQC oversaw the Malcolm Baldrige Education Pilot Award Criteria under contract to NIST. The criteria for the award focused around several TQM core values: demonstrated value-added performance, clear ties between what is assessed and the mission statement of the school, a single set of criteria to cover all requirements of specific organization missions, research on customers’ needs, a primary focus on teaching and learning, efficient business operations, statistical sampling, control of variation, long term planning, and relations with suppliers. Each candidate school must demonstrate these TQM core values in the seven following categories:
1. Leadership

2. Information and Analysis

3. Strategic and Operational Planning

4. Human Resource Development and Management

5. Educational and Business Process Management

6. School Performance Results

7. Student Focus and Student and Stakeholder Satisfaction

(Malcolm Baldrige National Quality Award-Education Pilot Criteria, 1995)

Attrition Studies—National Statistics

In the U.S. Department of Education study Characteristics of Stayers, Movers, and Leavers: Results from the Teacher Follow-up Survey, 1988-89, Bobbit, Faupel, and Burns, (1991) found that the mean certified personnel attrition rate was 5.6 % in public schools. They (1991) reported that the rate at which public school certified personnel leave the profession varied little by field. Science and math teachers, in particular, were no more likely to leave the teaching profession than certified personnel of general education subjects such as English, reading, and social studies. They found certified personnel attrition varied by age. The attrition rate for public school certified personnel ages 50 or more was 9.8 %; for ages 40 to 49 was 2.9%; for ages 30-39 was 5%, and the rate for certified personnel below age 30 was 9 %. The total response rate for former certified personnel was 93.5% and for current certified personnel was 97.4%.

Bobbit, et al. (1991) reported that the percent of public school certified personnel that left one public school for another during FY '87-'88 and '88-'89 was 92.6% of leavers. They reported that only 48% of the private school certified personnel in FY '87-
'88 transferred to other private schools while 52% from that group transferred to public schools. About two-thirds of certified personnel who stayed in the same school during the school years' 1987-88 and 1988-89 stated that providing higher salaries or better fringe benefits was the most effective step that schools might take to encourage certified personnel to remain in teaching (Bobbit, et al., 1991). However, the former public school certified personnel cited "dissatisfaction with the career" as one of their main reasons for leaving the profession and 7.3% cited poor salary as their main area of dissatisfaction, while 26% cited "inadequate support from the administration" (Bobbit, et al., 1991, p. iii).

Fondelier et al., (1997), for the U.S. Department of Education, National Center for Education Statistics, published SASS Data for 1994-1995 as the Characteristics of Stayers, Movers, and Leavers: Results from the Teacher Follow-up Survey: 1994-95. This report was particularly important to the survey in this study since it covers the period of time when many of the reported ASQC TQM school districts were being established. This survey provided a national norm (comparison group) compiled during the period when school districts were reporting their progress at implementation of TQM to the ASQC 1995.

The report stated that six percent of full-time public school certified personnel during 1993-94 left teaching before the 1994-95 school year. This rate was higher then the reported rates between 1987-88 and 1988-89 school years. For most of the public school leavers during 1993-94 and 1994-95, the reason was retirement. During this period thirty percent of the leavers retired. The attrition rate was higher among older certified personnel (those aged 60 and older) and among those aged 25-29 it was ten

Summary

The ideas that comprise TQM have entered the American lexicon. The term quality has become a fixture of advertising, education, and business names. The Deming phrase to “walk the talk” has made it into the American business lexicon. Ideas including quality, customer driven design, quality of design, benchmarking, Just In Time (JIT), abstraction, systems thinking, experimental inquiry, and collaboration, while not exclusive to TQM, are parts of the umbrella of ideas that comprise TQM. In our high-volume, high-value production, and global economy, TQM stands out as the paradigm that brought about the Japanese miracle of 1970’s-1980’s market dominance. TQM has not become the dominant management practice in America.

Germinario and Ogden (1994) projected the existence of a continuum of three dominant school cultures: the Conventional/Collegial, the Congenial, and the Effective. These three cultures are distinct because of dominant certified personnel and certified personnel work paradigms. Each adult culture influences student outcomes. Glickman (1986) and Schenkat (1993) found the same adult work paradigms when they described and ranked certified personnel according to their cognitive levels. The findings of Ogden and Germinario together with Glickman and Schenkat support the systems idea that a culture of a school influences the perceptions of involved individuals.

When a school redefines itself and establishes a new culture, adults need to redefine themselves and their concepts or leave. TQM represents this circumstance of redefining
system behaviors and employee behaviors. Employees seeking internal consistency with the past are likely to leave.

The literature suggests two areas that directly effect the faculty involved within the TQM paradigm. The first is that the consumer drives product design; and the second is that a quality instructional leadership paradigm vigorously promotes a commitment to the continuing improvement of educational quality. The result is that from the certified personnel to the custodian there is greater worker empowerment and responsibility for the quality of the product. The empowerment of the teacher or production worker over the process represents one function of the paradigm. There is also a strong emphasis in TQM toward research, design, development, sourcing, and marketing of the product.

It is clear from the literature that certain themes are repeated and are well supported. The quality instructional leadership paradigm is enhanced with modern business theory and technologies. Lau and Shani (1992) stated that managers could use social technology, learning approaches, methods, and techniques to enhance their effectiveness. They divided social technology by the subheadings of individual and teams (small group, inter-group, and system wide groupings). Their list of examples agreed with points emphasized in TQM. They agreed that leadership must possess communication skills, engage in coaching, encourage private growth, set goals, and recognize creativity. Both groups emphasize team building, inter-team communications, and job swapping to learn job roles, group empowerment, group problem solving, group decision-making, and group goal setting. TQM emphasizes team quality control with each member of a team understanding statistical processes. Lau and Shani (1992) stated that not everyone in business agrees on the same limits to worker empowerment. In TQM, workers possess a
high level of control over the work they are responsible for along with a voice in design and internal production requirements. TQM and modern business research advocate the use of subordinate goal setting, inter-group comments, benchmarking, and inter-group contacts. Both groups emphasize continuing system improvement, socio-technical systems, internal instruction, surveys, data comments, and goal setting throughout the system.
CHAPTER 3
METHODOLOGY

Overview

The researcher gathered data on attrition rates following the initial institution of TQM and correlated the reported rates with known attrition rates during the period under study. Data was also gathered on the demographic characteristics of the leavers and correlated with known data on attrition. The attrition data was recorded at the site or available in the district personnel office.

The researcher constructed a survey instrument designed to probe changes in the attrition rate of certified personnel within six descriptive categories. Items on the survey instrument correspond to categories and questions used in a series of U.S. Department of Education studies on teacher attrition conducted during the period of initial institution of TQM in the surveyed schools.

Research Design

This study is a quantitative, descriptive study, which compared data gathered nationally on teacher attrition as a baseline for comparison to attrition in schools implementing TQM. This study was designed to follow up on similar research done by Brown-Frierson. The survey was designed to be consistent with the U.S. Department of Education, National Center for Education Statistics studies and their follow-up surveys.

Campbell and Stanley (1963) reported that a time-series design might be employed to measure the effects of a major change in administrative policy. Policy decisions infrequently reveal the direct effects, indirect effects, nor the cumulative effects to the observer until the element of effect over time is studied. The time series design considers this. Moreover, “the design is especially suited to institutional settings in which records are continually kept and thus compose an accustomed part of the environment” (p.41). Such a design possesses a relatively high degree of reliability since there exists a set of conditions that makes this certain.

The Survey Development

Clearly, the more certain the nature of the data being sought and the better the respondent knows that information, the more reliable the reported information should be. The information that was sought for this survey is fixed. It will not change nor is it subject to observer errors.

A researcher looking at teacher attrition would be interested in the demographic variables of age, sex, number of years experience, highest degree held, ethnicity, and teaching level taught. Sex was rejected for use as a variable because the only other study in this area and type, the Brown-Frierson (1994) study found sex to be of no consequence.

The data variables for the leaving teachers were the same as those reported by the U.S. Department of Education survey: the year of leaving, the teacher’s age, the highest
degree held, the teacher’s ethnic group, the teacher’s grade level, and the teacher’s years of experience (Appendix B, p. 102).

The U.S. Department of Education tracks attrition among the national teaching force through six-year surveys. The period on which this study is focused was from the late 1980s through 1990s. The rational for presenting the decade span was to check the results of the surveys for wide variances.

The survey also collected data as to when personnel left, in the first, second or third year of TQM implementation. The first question that the survey addresses is that of teaching level taught. Each principal’s survey was numbered so that the school and its level could be identified. This along with the figure of how many teachers and administrators taught at the school allowed the researcher to calculate percentages of stayers versus leavers.

Reliability and Validity

The basis for evaluating the reliability of an instrument comes from the identification and control of the factors that diminish the reliability of the instrument. According to Fox (1969) there are five factors, if not present negatively effect the reliability of a study. Factor 1 is the certainty of the information being sought. Factor 2 is the stability of the dynamic over time. Factor 3 is the researchers understanding of the dynamic being studied. Factor 4 is the current ability of the investigator to translate that dynamic into instrument form. Factor 5 are chance factors (Fox, 1969).

Fox’s first condition is that the investigator is seeking relatively defined objective material that respondents possess in files. The second is that the information is stable
over time. The survey accomplished these two factors needed in reliability. In the survey, the information is fixed and unchanging and the respondent is in a position to know.

The third and fourth of Fox’s (1969) factors for reliability deal with understanding the dynamic being measured. The use of TQM in education is not a regional or localized occurrence. It has been used in business for 70 years; it is an internationally and nationally recognized management technique. When TQM crossed over into education, it became an agent of change on a national education level. The schools and school districts surveyed were in all regions of the country. The data used to compare attrition rated must be national. The period on which this study was focused was from the late 1980s through the 1990s.

Fox’s fifth factor (1969) is the recognition and control of chance factors. A design problem springs from the external history variable that might have skewed results. This study controls the external history variable through the means of geographic distribution and group size. The researcher sampled public schools and public school districts in United States. The survey validly measures select quantitative indices. Campbell and Stanley’s conditions agree with Fox’s factors. Therefore, this survey’s reliability and validity regarding public school attrition rates is high.

The Sample

A difficulty in measuring the impact of TQM on the attrition of certified personnel is locating TQM schools. The researcher selected and surveyed principals in public school districts that the American Society for Quality Control (ASQC) reported as using TQM in their K-12 Quality Education Listings (1992 through 1998). The list's sponsor was the National Aeronautics and Space Administration (NASA). The American Society for Quality Control (ASQC) listed qualified schools in its monthly magazine
Quality. Progress. The total responses to the ASQC K-12 Quality Education Listing rose from 132 in 1991 to peak at 451 in 1996. The responses drop to 343 in 1997 and 312 in 1998 (Figure 5).

To further refine the selection criteria, schools were included in the sample only after their district appeared on the ASQC list for at least three years. This procedure assured that: (a) each school could provide data for the three years being investigated, and (b) the schools were seriously implementing TQM. Schools that were exploring or recently implemented TQM were not selected for this study sample. A site needed to have had at least three years commitment to the TQM program to assure implementation of TQM. Each school district in this study had more than three years experience with TQM. It takes three years of TQM implementation for schools to demonstrate a conceptual mastery of TQM values, to set high standards, to focus on key requirements of organizational excellence, and to develop assessment tools that measure progress relative to their process requirements (Trenta, 1992). The sample consisted of 947 principals in 69 school districts, whose schools qualified for the ASQC list of TQM schools for at least five years between 1992 through 1998 for the Quality Progress’-Quality in Education Listings. These school districts, through their continuance of the program, demonstrated institutional involvement and internal communication. An additional determination as to the extent to which schools in the sample had adopted the principles of TQM was how much these schools employed TQM in their critical processes. In 1991, the ASQC first published lists of K-12 school districts, independent schools, community colleges, and colleges and universities that responded to their annual Quality in Education survey. In the following years there were changes in form of reporting data from the initial surveys of 1991-1992. Reports from 1991-1992, concentrated on the areas of who was receiving training, the application of TQM to critical processes, the presence and degree of district application, the presence of implementation plans, and the application of TQM concepts and/tools. From 1993
through 1998, the ASQC reported data on focus areas important to the functioning of a
school or a school district. Figures 7 through Figure 11. Graphs reports on application
and development in the TQM focus areas: business support, administration,
communication, curriculum, student achievement, and teaching methods by ASQC
reporting school districts. The vertical axis on the graph measures the number of K-12
responses in the particular category.

Missing in the ASQC data was reference to the size or types of schools, the
principals' names, or school addresses. These references were needed for the survey. A
search of state and district web sites revealed information on six school districts. The
final step was to research the school districts in Peterson's School Directories for
Elementary and Middle Schools and Secondary Schools from 1996 to 2000.

Several public school district service agencies were not surveyed since their role in the
development of TQM would be advocacy and district level training.

Demographic Linkages

Brown-Frierson (1994) identified a relationship between demographic variables,
and the acceptance or rejection of the TQM paradigm within the Maryland Department of
Education. As part of her study, she developed a questionnaire based on twelve
conditions of quality that she identified.
Figure 5 The ASQC survey response reports published in (Quality Progress from 1991-1998)
Figure 6. The focus area of business support

Figure 7. The focus area administrative practice
Figure 8. The focus area communication

Figure 9. The focus area of curriculum
Figure 10. The focus area student achievement

Figure 11. The focus area improvement of teaching methods
Brown-Frierson (1994) reported no significant difference in response based on the variables of gender or length of service. She did find levels of difference in variables identified with level of education, age, ethnic group, and department of employment. She concluded her study by reporting statistically significant correlation between her demographic variables and quality consciousness (Brown-Frierson, 1994). She found that diverse departments within the Maryland State Department of Education presented significant attitudinal preferences. The Department of Certification and Accreditation registered the highest means in most of the conditions of excellence; they were adapters. The Division of Planning, Results and Information Management, consistently registered the lowest means in the conditions of excellence; it was the strongest dissenting division (Brown-Frierson, 1994).

**Hypotheses and Variables**

The treatment for this study was the implementation of TQM management paradigm. This study’s control was the national norms reported by the U.S. Department of Education, National Center for Education Statistics report Teacher Follow-up Survey 1994-1995.

The dependent variable was the rate of certified personnel attrition during each of the first three years of TQM implementation.

**Null Hypotheses**

Ho1: There is a statistically significant difference in the proportion of the attritions from the sample of certified personnel in the schools transforming to TQM compared to the proportion of attritions from the national study by the U.S. Department of Education Study for Year 1, Year 2, or Year 3.
To respond to the research hypothesis the following seven null hypotheses were developed: The hypotheses concerned characteristics of the leaving certified personnel and the rates of attrition for each of the independent demographic variables—level taught, chronological age, highest degrees held, race/ethnicity, and full-time teaching experience are as follows.

Ho2a: There is no statistically significant difference in the proportion of the number of attritions from the sample of certified personnel in schools transforming to TQM compared to the proportion of attritions from the national study by the U.S. Department of Education for year 1, year 2, or year 3 for elementary schools.

Ho2ab: There is no statistically significant difference in the proportion of the number of attritions from the sample of certified personnel in schools transforming to TQM compared to the proportion of attritions from the national study by the U.S. Department of Education for year 1, year 2, or year 3 for secondary schools.

Ho2b: There is no statistically significant difference in the proportion of the number of attritions from the sample of certified personnel in schools transforming to TQM compared to the proportion of attritions from the national study by the U.S. Department of Education for year 1, year 2, or year 3 for the category chronological age.

Ho2c: There is no statistically significant difference in the proportion of the number of attritions from the sample of certified personnel in schools transforming to TQM compared to the proportion of attritions from the national study by the U.S. Department of Education for year 1, year 2, or year 3 for the category highest degree held.

Ho2d: There is no statistically significant difference in the proportion of attritions from the sample of certified personnel in schools transforming to TQM compared
to the proportion of attritions projected from the national study by the U.S. Department of Education for Year 1, Year 2, or Year 3 for the category ethnicity.

Ho2e: There is no statistically significant difference in the proportion of attritions from the sample of certified personnel in schools transforming to TQM compared to the proportion of attritions projected from the national study by the U.S. Department of Education for Year 1, Year 2, or Year 3 for the category years of experience.

Procedures

Over the eight years of the lists, there were 291 different United States public schools and public school districts mentioned--each state was represented. The researcher paired down the lists to 69 public school districts and public schools based on their consistent appearance on the list for four or more years that demonstrated vitality in those programs. These 69 public school districts and public schools were scattered among 16 states. There were four states from the North East; four from the South East; four from the North Central States; three from the South Central States; one from the South West; and two from the West Coast; therefore, national representation was possible.

Of the 69 school districts in the ASQC’s list of Quality School Districts over half were either state capitals or cities clearly identifiable with corporate home offices: for example Sacramento, California; Albany, New York; Oskosh, Wisconsin; Battle Creek, Michigan; and Yamouth, Maine. This distribution strongly suggests a link existed between business sponsorship and the implementation of TQM.

The study group consisted of a group of 941 principals belonging to 69 public school districts and one public school. These school districts varied in size from the
Sacramento District with 116 schools to two or three schools in a district. To prevent large schools from skewing the results these practices were adopted:

The study group was arranged into a list without regard to geographic region.

1. In districts of more than 99 schools, every tenth principal was surveyed.
2. In districts of more than 45 schools, but less than 99, every fifth principal was surveyed.
3. In districts of more than 18 schools, but less than 45, every third principal was surveyed.
4. In districts of more than 2 schools, but less than 18, every second principal was surveyed.
5. When a single school was involved, the principal was surveyed.

The investigator continued the count from district to district, adjusting only to the size of the district as summarized above. This technique randomized the order of selection and assured the first principal in Peterson’s school district lists was not always surveyed.

Ninety-five principals were randomly selected from a list of ASQC identified TQM schools. The first survey, a letter of explanation, and a stamped return envelope were mailed on April 20, 2000 to each chosen principal; along with a request to return the completed survey before June 1, 2000. Each envelope was numbered and each number represented a particular principal and school. Survey instruments were mailed with a return stamped addressed envelope and a cover letter that explained the purpose of the study and gave instructions for completion and return of the survey.
Survey Returns

The first survey yielded 6 usable responses and the second survey yielded 1 usable survey. There were six returned surveys in response to the third survey, but again only 1 was usable. The fourth survey returned 11 responses. One was by E-mail. The 11 responses yielded only 3 that contained survey data. Eight did not respond with data. The eight responses break down three groups. The first group consisted of two principals who were about to start implementing TQM. The second group consisted of three that were new principals and did not have data. The third group consisted of three principals who were not using TQM. This leaves the 3 respondents which the investigator bases the fourth survey comparison of data upon.

Statistical Analysis

The researcher applied the test of proportionality (Ferguson 1966, p.178-180) to test the hypotheses and to create tables concerning the demographic distributions of leavers. The Test of Proportionality was used to determine if the distribution of reported leaving personnel was the same or different from the known national distribution. The significance level was set at p<.05.

Analysis

The researcher’s methodology involved asking the principal about events at a school building level; the principal in his role of senior building leader would be in the position to have access to the attrition data necessary for this study. The investigator developed a cover letter that requested the cooperation of principals (see appendix A). The survey instrument asked principals to supply a count for specific demographic information certified personnel leaving during the first three years of implementation (see
appendix B). Comparisons to national statistics on stayers, leavers, and movers were to be made using inferential statistics parametric models. Percentages in the different categories were developed by referencing the Common Core of Data (CCD) reported by Fondelier, et al., in the 1993-1994 schools and Staffing Survey: Data File User’s Manual, Vol.1: Survey Documentation.
CHAPTER 4
DATA ANALYSIS AND INTERPRETATION

Data generated from this study are presented, analyzed, and interpreted in this chapter. This study was taken to answer two questions. The first was whether the implementation of TQM was related an increase in personnel attrition (Ho 1). The second was whether certain demographic variables correlated with those who left (Ho 2). Answers to these questions could guide the development of appropriate interventions that might reduce future attrition.

Sampling Procedures

Since there were only six usable responses to the first survey, the investigator selected another 95 principals. Where the 10th was selected, the 11th was now selected. Where the fifth was selected, the sixth was now selected. Where the third had been selected, the fourth was now selected. Where the second had been selected, the next school on the list was selected. The new mailing list was checked for names of superintendents still leading their districts and the principals still leading their schools against 1998 ASQC listing and Peterson’s Spring 2000 lists of Elementary and Secondary Lists. The new list was checked against the old mailing. If a site was discovered that had already been surveyed, the next school on the list was sent a survey.

The selection process was therefore advanced by one. On August 15, 2000, the second survey was sent to 95 principals. The return deadline date for this survey was
September 10, 2000. Seven responses were received none were usable, most responses remarked that they were new principals who were unfamiliar with TQM. These results were followed by a third attempt that employed the same selection procedure that was used in the second survey that resulted in one usable response. The list for the fourth attempt was selected differently. The previous lists were based on schools and school districts that appeared on the ASQC list from four to eight years. The investigator went back to the ASQC K-12 District listings and selected school districts that had been rejected for the original lists because they had only appeared on the list for one or two years. At the time of the fourth mailing, these schools would be in their third or fourth year of implementation. This search produced four more school districts. These schools and their principals were added to the list. All the schools were checked against Peterson’s Fall 2000 Elementary and Secondary School Listings. This resulted in a fourth list of 95 principals that was checked against past lists to assure not re-surveying principals. The fourth survey went out to principals on November 19, 2000. The return date was December 15, 2000. This survey mailing yielded eleven responses; only three were usable surveys. After four survey distributions, the total usable surveys were 10.

Problems in Received Responses

There were 19 unusable responses. There were 10 usable survey responses.

The returned unusable surveys fall into four categories of explanations,

- Five principals stated that TQM was no longer a priority.
- Five principals responded that the principal who initiated TQM had left.
- Four other principals stated that they were new principals and had not been involved in the implementation phase of TQM and had no data.
• Three more responses indicated that TQM had not been implemented.

• Two principals reported that TQM had been dropped by the school district and both principals were from the same district.

Four of the five principals reported that TQM was no longer a priority were from the Sacramento District. Since the Sacramento District was comprised of 130 different schools, over a quarter of the sample and nine other surveys sent to the Sacramento district were not returned a further inquiry needed to be made.

The researcher wrote to Mr. Meaney the Sacramento School District’s Assistant Superintendent of Quality Control. He responded that the Sacramento School District and the surrounding school districts were no longer using TQM. He remarked that Sacramento was still using three key principles of TQM: 1) customer focus, 2) improvement, and 3) involvement of everyone. He explained that, ‘TQM had become invisible and is now just the way we do business”. He also stated that, ”We feel that we have been highly successful by a number of measures ex: income doubled from $30 million to $70 million, employee turnover was down, moral was up, customers (e.g. school districts) more then satisfied that TQM works” (D. Meaney (personal communication), Oct.30 1998). The investigator eliminated the Sacramento School District from the list of TQM districts.

Two principals from the Haddonfield (NJ) Public Schools, stated that TQM was not implemented in a formal way and it was dropped after one year by order of the district. The Haddonfield superintendent had not left his position during the period covered by this study.
A problem that emerged from the responses was principal attrition. The first list of superintendents their school districts and the list of principals and their schools were compiled by cross-referencing the ASQC lists and Patterson's 1998 Spring list of school districts and schools. When a recheck (Fall, 2000) of the same districts and their principals was done by the investigator it was discovered that 11.5% of the superintendents and that 13.6% of the principals had been replaced. This is important since it is a variable that effects the survey outcomes as already noted from some of the unusable responses. Principals and superintendents are in positions that can either advance or retard TQM in their schools the replacement of committed TQM principals and superintendents can negatively effect the implementation of TQM.

Data Analysis

The investigator combined all the usable responses from all four distributions of the surveys-a total of 447 certified personnel were contained in the usable responses. The Test for Significance of Difference Between two Independent Proportions (Ferguson, 1966) was used to determine the significance of the difference between two independent proportions to analyze the attrition data for all hypothesis. There was no report of any certified personnel leaving who were not white. The survey did have a place on the report form for different racial and ethnic groups to be represented and accounted for in the survey. The variable of ethnicity was could not be reported.

National descriptive statistics/responses of usable surveys

The Teacher Follow-up Survey (TFS) 1994-95 was a survey of elementary and secondary certified personnel who participated in the Schools and Staffing Survey
(SASS) and is conducted in the school year following the SASS data collection. The sample consisted of all certified personnel who left teaching within the year after the SASS was administrated and a sub-sample of those that continued teaching Teacher Follow-up Survey (TFS) 1994-95.

The U.S. Department of Education survey team interviewed 4,528 public and former public school teacher. There were 2,798 current certified personnel and 1,730 former certified personnel interviewed Teacher Follow-up Survey 1994-95 (TFS 1994-1995).

The TFS 1994-1995 corresponds to the period with which this study was concerned. The surveyed principals were implementing TQM during this period. Some schools and their districts were still in the initial implementation stage as late as 1995. These schools were targeted during the fourth survey. The Teacher Follow-up Survey (TFS) 1994-1995 attrition results were valid for fourth survey.

In the first column of Table 1 defines the categories, these match the categories in the Teacher Follow-up Survey (TFS) 1994-1995. The second column reports the percents of within the Teacher Follow-up Survey (TFS) 1994-1995 population for the category. The third column presents the expected number of leavers per year based on the sample size of 447. This was obtained by multiplying that size by the distribution of the particular category (from the second column) and multiplying the answer by the percent of leavers in that category from the Teacher Follow-up Survey, 1994-1995 study. The fourth column reports the yearly average of Leavers from the survey. Finally, leavers were defined as certified personnel that left education.
Table 1


<table>
<thead>
<tr>
<th>% Distribution</th>
<th>% TFS Leavers</th>
<th>Sample (Reported over 3 years)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>N=4,528 Age N=447</td>
</tr>
<tr>
<td>&gt; 25</td>
<td>1.5</td>
<td>3.8</td>
</tr>
<tr>
<td>25-29</td>
<td>9.9</td>
<td>10</td>
</tr>
<tr>
<td>30-39</td>
<td>23.7</td>
<td>6.7</td>
</tr>
<tr>
<td>40-49</td>
<td>39.9</td>
<td>3.9</td>
</tr>
<tr>
<td>50-59</td>
<td>21.6</td>
<td>6.3</td>
</tr>
<tr>
<td>60-64</td>
<td>2.6</td>
<td>30.5</td>
</tr>
<tr>
<td>65+</td>
<td>.7</td>
<td>34.1</td>
</tr>
</tbody>
</table>

|                           | N=447         |
|                           | Reported data|
| 1 to 3                    | 7             |
| 4 to 9                    | 5             |
| 10 to 20                  | 5             |
| 20+                       | 8             |
| Not reported              | 0             |

|                           | N=4,528       |
| Highest degree earned     |               |
| Bachelors                 | 51.9          |
| Masters                   | 47.5          |
| Masters +                 | 6.3           |

Inferential statistics

Two sets of attrition data were used in the analyses. The first set of attrition data were from a national the Teacher Follow-up Survey, 1994-1995 survey reported by the U.S. Department of Education (1997). In order to provide comparable comparisons, the data from the national study were used to project the numbers of attrition that would have been expected in the survey. For example, a mean of 6.6% of the certified personnel was reported in the national study as leaving their schools each year. By using the 6.6% as the attrition rate for the 447 certified personnel in the sample it is estimated that 30 certified persons would leave their positions each year. A similar procedure was used to estimate the number of leavers for each of the demographic hypotheses (level taught, age, teaching experience, and degrees earned). The estimations for each demographic hypothesis were arrived at by applying the percent distribution in each category of the Teacher Follow-up Survey, 1994-1995 reported in Table 1. The estimates were then rounded before they were set into the tables. The last set of data was the distribution of the collected data concerning the 447 certified personnel gathered from reporting schools. Tables 2 through Table 17 contain the actual demographic distributions by year and type for the 447 personnel and the expected distributions.

Seven hypotheses were tested using the Test of Significance of the Difference between Two Independent Proportions with a significance level of \( p<.05 \) and \( p<.01 \). Each hypothesis is presented along with the data and analyses.

Ho1: There is no statistically significant difference in the proportion of the number of attritions of certified personnel from the sample study of schools transforming to TQM compared to the proportion of certified personnel from the U.S. Department of Education Study for year 1, year 2, or year 3.
A total of 447 certified personnel were represented in the usable responses. Table 2 illustrates the actual attrition distributions by the year for the 447 personnel. A rate of 6.6% of the certified personnel in the national study left their schools each year. By using the 6.6% figure as the expected attrition rate applied against the 447 certified personnel from the survey sample, it is estimated that 30 certified persons would leave each year. The Test of the Difference between Two Independent Proportions was used to determine whether there were any statistically significant differences between TFS 1994-1995 reported data and the TQM attritions. The data is comprised of two samples drawn independently. The TFS (1994-1995) sample consisted of 4528 individuals while the TQM survey group consisted of 447 individuals. In Table 2, the calculated Z values for each year are presented. Using \( p < 0.05 \) the critical value of \( Z = 1.96 \) and at a \( p < 0.01 \) value the \( Z = 2.57 \). The calculated value of the TQM sample attrition of certified personnel was statistically significant from the national survey.

Ho2a: There is no statistically significant difference in the proportion of the number of attritions from the TQM sample of elementary personnel as compared to the proportion from the U.S. Department of Education Study for year 1, Year 2, or year 3.

182 certified personnel in elementary schools were represented in the usable responses. Table 3 contains the actual and expected attritions for each year for the 182 personnel. Using the results of the TFS (1994-1995), it was anticipated that 6.6% of these personnel would leave their positions each year. The Test of significance of the difference between Two Independent Proportions was used to determine statistically the difference between expected proportion and the reported attritions. Using \( p < 0.05 \), the critical value for \( Z = 1.96 \) and at the \( p < 0.01 \) critical value \( Z = 2.57 \). As indicated in Table 3, the calculated Z value exceeded the critical value of \( p < 0.01 \) for the three years of the study, therefore the null hypothesis is rejected for all three years of the study. The TQM sample's attrition was significantly lower for all three years of the study then that of the certified personnel in the national study.

Ho2a: There is no statistically significant difference in the proportion of the number of certified personnel attritions from the sample study of TQM secondary schools compared
to the proportion of certified personnel from the U.S. Department of Education Study for
year 1, year 2, or year 3.

There were 265 certified personnel in secondary schools represented in the usable
responses. Table 4 illustrates the actual and the expected attritions by year for TQM
secondary teachers. By using the results of the TFS (1994-1995) report, it was anticipated
that 6.6% of the personnel would leave their positions each year. The Test of significance
of the Difference between Two Independent Proportions was used to determine
difference between the expected and the reported number of leavers. Table 4 contains the
actual and expected attritions by year. The sample attrition of certified personnel
participating in schools implementing TQM was significantly statistically different from
the attrition of certified personnel from the TFS (1994-1995) The null hypothesis was
rejected for all three years.

Tables 5 through 17 contain the expected and reported attritions by year for the
TQM sample (n=447) each table represents a different category that match the TFS
(1994-1995) reported categories. Tables 5 through Table 8 illustrate the category years of
teaching experience broken into chronological segments. Using p<.05 the critical value
of Z =1.96 and at p.01 the critical value of Z= 2.57.

Using the results reported in the TFS (1994-1995) report that was illustrated and
expanded in Table 1 the expected number of personnel was projected. To assure accuracy
in the determining the expected number of leavers the same percentage of population
distribution was used in the TFS (1994-1995) study was applied against the sample size
(447) for each category and then multiplied by the percent of leavers reported in the
national sample. The Test of Significance of the Difference between Two Independent
Proportions was again used to determine difference between the expected and the
reported attrition. Tables 5 through 8 report the results of these comparisons. Using p<.05 the critical value of Z =1.96 and at p. 01 the critical value of Z= 2.57. The result was
that the calculated values of Z in Table 5 did not exceed the critical value, thus the null
hypothesis is accepted for certified personnel with under 4 years of teaching experience.
Table 2
Analysis of Ho1:

<table>
<thead>
<tr>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reported</td>
<td>2</td>
<td>14</td>
</tr>
<tr>
<td>Expected*</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Z Scores (p values)</td>
<td>Z=5.3 (p=.997)</td>
<td>Z=2.94 (p=.9982)</td>
</tr>
</tbody>
</table>


Table 3
Analysis of Ho2a: elementary

<table>
<thead>
<tr>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reported</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Expected *</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Z Scores (p values)</td>
<td>Z=3.62 (p=.997)</td>
<td>Z=2.47 (p=.9918)</td>
</tr>
</tbody>
</table>

Table 4
Analysis of Ho2a: secondary

<table>
<thead>
<tr>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reported</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>Expected *</td>
<td>17</td>
<td>17</td>
</tr>
<tr>
<td>Z scores (p values)</td>
<td>Z=12.44 (p=.9997)</td>
<td>Z=5.89 (p=.9997)</td>
</tr>
</tbody>
</table>
The calculated Z values in Table 6 did not exceed the critical value. The null hypothesis is accepted for the category 4 to 9 years of teaching experience. The attrition of certified personnel from TQM schools was not statistically different then the attrition from the TFS (1994-1995) report. The TQM sample's attrition of certified personnel was not statistically different then the attrition from the TFS (1994-1995) report. The calculated Z values in Table 7 (10 to 20 years experience) did exceed the critical values for year 1 and 3, but did not exceed the critical values for year 2. The null hypothesis is rejected for years 1 and 3 and accepted for year 2. Certified personnel in the TQM sample left their schools in lower numbers during years 1 and 3 then certified personnel reported in the TFS (1994-1995) report. During year two the attrition was not significantly different from the (TFS (1994-1995) sample. The calculated Z values in Table 8 did not exceed the critical value and therefore the null hypothesis is accepted for certified personnel with 20 + years of experience. The TQM sample of attrition for certified personnel was not statistically different from reported attrition in the TFS (1994-1995).

Ho2c: There is no statistically significant difference in the proportion of the number of attritions from the sample study of schools transforming to TQM compared to the proportion from the U.S. Department of Education Study for year 1, year 2, or year 3 under the category of chronological age.

Table 9 illustrates the reported and expected attritions for each year of implementation for the 447 certified personnel from the TQM survey sample. Using the results from TFS (1994-1995), recorded in Table 1 the number of certified personnel that would leave was projected for each age category. To assure accuracy the same percentage of the distribution from the TFS (1994-1995) study was applied against the TQM sample of 447 for each age category and that number was applied against the percent of leavers from the TFS (1994-1995) report for each category. The Test of Significance of the Difference between Two Independent Proportions was applied for each age category. The results are recorded in Table 9 through Table 14.
### Table 5
Analysis of Ho2b: 1 to 3 years of experience.

<table>
<thead>
<tr>
<th></th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reported</td>
<td>1</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Expected*</td>
<td>9</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>Z value (p value)</td>
<td>Z=1.39 (p=.9265)</td>
<td>Z=1.39 (p=.9265)</td>
<td>Z=1.39 (p=.9265)</td>
</tr>
</tbody>
</table>

* Based on Teacher follow up Survey, (1994-1995)

### Table 6
Analysis of Ho2b: 4 to 9 years of experience

<table>
<thead>
<tr>
<th></th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reported</td>
<td>0</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Expected*</td>
<td>9</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>Z value (p value)</td>
<td>Z=1.79 (p=.9599)</td>
<td>Z=.676 (p=.7734)</td>
<td>Z=.676 (p=.7734)</td>
</tr>
</tbody>
</table>

### Table 7
Analysis of Ho2b: 10 to 20 years of experience

<table>
<thead>
<tr>
<th></th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reported</td>
<td>0</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Expected*</td>
<td>9</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>Z value (p value)</td>
<td>Z= 3.53 (p=.9997)</td>
<td>Z=.63 (p=.7088)</td>
<td>Z=3.53 (p=.9997)</td>
</tr>
</tbody>
</table>
Table 8

Analysis of Ho2b: 20+ years of experience

<table>
<thead>
<tr>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reported</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Expected *</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Z value (p value)</td>
<td>Z= 0.7 (p= 0.7734)</td>
<td>Z= 0.55 (p= 0.7088)</td>
</tr>
</tbody>
</table>

Table 9

Analysis for Ho2d: certified personnel <26-29 years of age.

<table>
<thead>
<tr>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reported</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Expected *</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Z value (p value)</td>
<td>Z= 3.62 (p= 0.9997)</td>
<td>Z= 2.7 (p= 0.997)</td>
</tr>
</tbody>
</table>

Table 10

Analysis for Ho2d: certified personnel 30-39 years of age.

<table>
<thead>
<tr>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reported</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Expected *</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Z value (p value)</td>
<td>Z= 2.82 (p= 0.9978)</td>
<td>Z= 2.02 (p= 0.9798)</td>
</tr>
</tbody>
</table>

Using \( p < 0.05 \) the critical value of \( Z = 1.96 \) and at \( p = 0.01 \) the critical value of \( Z = 2.57 \). The calculated Z score did exceed the critical value for chronological ages <25-29 thus the null hypothesis is rejected for all three years. In the age group 30-0=39, the calculated value of Z did exceed the critical value for all three years, for years 1 and 3 the critical value exceeded the \( p = 0.01 \), but only exceeded the \( p = 0.05 \) level during year 2. The null hypothesis is rejected for the category 30-39 years. In the category ages 40-49, the calculated Z value for all three exceeded the \( p = 0.05 \) level and during years 2 and 3 the value exceeded the \( p = 0.01 \) critical value. The null hypothesis is therefore rejected for the age category 40-49 for all three years of the study. The critical Z value exceeded the critical value at the \( p = 0.05 \) level for each of the three years of the study in the age category 50-59. The null hypothesis is rejected for all three years under study. In the age category 60-64, the critical value was exceeded at the critical value of \( p = 0.05 \) for all three years under study and exceeded the \( p = 0.01 \) level during years 1 and 3. The null hypothesis was rejected for ages 60-64. In the age category 65+, the critical value exceeded the critical value during all three years under study at the \( p = 0.01 \) level. The null hypothesis is rejected for rejected for all three years of the study.

\textbf{Ho2d:} There is no statistically significant difference in the proportion of the number of certified personnel attritions from the sample study of schools transforming to TQM as compared to the proportion of certified personnel attritions from the U.S. Department of education Study for year 1, year 2, or year 3, under the category race/ethnicity.
The null hypothesis concerning TQM implementation and the variables of race and ethnicity could not be tested due to a lack of reported data, because of incomplete surveys. Therefore, the hypothesis was not tested.

**Ho2f** There is no statistically significant difference in the proportion of the number of certified personnel leaving from the sample of schools transforming to TQM as compared to the proportion of certified attritions from the U.S. Department of Education Study for year 1, year 2, or year 3 in the category of highest degree earned.

Table 15 through 17 contains the reported and expected attrition by year divided into categories by highest degree attained. To assure accuracy the percentage (Table 1) for each category of degree earned was multiplied times the TQM survey sample size of 447 to determine approximately how many individuals the category represented. The number obtained was then multiplied by the percent of leavers for that category of the TFS (1994-1995) study to yield the expected number of TQM leavers. A comparison was then done using the Test of Significance between Two Independent Proportions. At p=.05 the critical value of Z=1.96 and at the p=.01 level the critical value of Z=2.57.

The calculated value of Z in Table 15 did not exceed the critical Z value. The null hypothesis must be accepted. Certified personnel possessing Bachelor degrees from the TQM study sample leave in the same numbers as certified personnel from the TFS 1994-1995.

The category Masters degrees the critical Z value were exceeded during years 1 and 3 but it was not met or exceeded for the second year. The null hypothesis is rejected during years 1 and 3 and accepted for year 2.
The category Masters degree + did not exceed the critical value for all three years of the study. The attrition from TQM sample schools met or exceeded that of the reported attrition from the TFS 1994-1995 survey. Attrition in the TQM schools sampled was not statistically different within the categories of Bachelors degrees and Masters + degrees. It did differ statistically, during the first and third year under study, within the category of Masters degree. The number of people leaving was statistically significantly lower for years 1 and 3 under study.

Tables 2 through 17 have been summarized in Table 18. In Table 18 each table's Z scores are illustrated. Where a Z score has a single * before it the Z score meet or exceeded the critical value at the p< .05 level. Where the Z score has a double ** before it the critical value was met or exceeded at the p<.01 level.

**Findings**

Several conclusions were generated from this study.

1. That based on a 6.6% attrition rate it was expected that 30 certified personnel would leave for each year of the study, therefore 90 certified personnel would leave during the three years of the study. It was reported by the TQM schools that 23 certified personnel left during the three years of the study. The Test of the Significance of the Difference between Two proportions was applied and the Z scores for each of the three years did fall within the rejection region. The null hypothesis is rejected as implausible in favor of an alternative hypothesis that the attrition in the TQM school

2. (cont.) under study was statistically significantly lower then the reported attrition in the TFS 1994-1995.

3. That based on the level taught elementary schools and the national attrition rate of 6.6% it was expected that 12 certified personnel would leave each
Table 11

Analysis for Ho2d certified personnel 40-49 years of age

<table>
<thead>
<tr>
<th></th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reported</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Expected*</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Z value (p value)</td>
<td>Z=2.38 (p= .9929)</td>
<td>Z=2.78 (p=. 9975)</td>
<td>Z=2.78 (p=. 9975)</td>
</tr>
</tbody>
</table>


Table 12

Analysis for Ho2d: certified personnel age 50-59

<table>
<thead>
<tr>
<th></th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reported</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Expected*</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Z value (p value)</td>
<td>Z=3.62 (p=. 9997)</td>
<td>Z=2.56 (p=. 9955)</td>
<td>Z=3.62 (p=. 9997)</td>
</tr>
</tbody>
</table>

Table 13

Analysis for Ho2d: certified personnel age 60-64.

<table>
<thead>
<tr>
<th></th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reported</td>
<td>2</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Expected*</td>
<td>35</td>
<td>35</td>
<td>35</td>
</tr>
<tr>
<td>Z value (p value)</td>
<td>Z=3.19 (p=. 9993)</td>
<td>Z=2.56 (p=. 9955)</td>
<td>Z=3.82 (p=. 9997)</td>
</tr>
</tbody>
</table>
Table 14
Analysis for Ho2c: certified personnel 65+ years of age.

<table>
<thead>
<tr>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reported</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Expected*</td>
<td>31.8</td>
<td>31.8</td>
</tr>
<tr>
<td>Z value (p value)</td>
<td>Z= 5.16 (p= .9997)</td>
<td>Z=3.95 (p= .9997)</td>
</tr>
</tbody>
</table>

Table 15
Analysis for Ho2e: attrition of certified personnel with Bachelors degree.

<table>
<thead>
<tr>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reported</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>Expected*</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>Z value (p value)</td>
<td>Z=1.91 (p= .9744)</td>
<td>Z=1.06 (p=9394)</td>
</tr>
</tbody>
</table>

Table 16
Analysis of Ho2e: attrition certified personnel with masters degree.

<table>
<thead>
<tr>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reported</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Expected</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>Z value (p value)</td>
<td>3.27 (p=. 9997)</td>
<td>Z= 1.47 (p=. 9395)</td>
</tr>
</tbody>
</table>

Table 17

Analysis of Ho2e: attrition certified personnel with masters degree +

<table>
<thead>
<tr>
<th></th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reported</td>
<td>1</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Expected*</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Z value (p value)</td>
<td>Z=1.91 (p=. 9798)</td>
<td>Z=1.07 (p=. 8289)</td>
<td>Z=1.91 (p=. 9798)</td>
</tr>
</tbody>
</table>

Table 18
Summary table of results.

<table>
<thead>
<tr>
<th>Ho1: Table 2</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Z= 5.3</strong></td>
<td><strong>Z= 2.94</strong></td>
<td><strong>Z= 4.31</strong></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ho2a: Table 3 Elem.</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Z= 3.62</strong></td>
<td><em>Z= 2.47</em>*</td>
<td><strong>Z= 3.07</strong></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ho2a: Table 4 Sec.</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Z=12.44</strong></td>
<td><strong>Z= 5.89</strong></td>
<td><strong>Z= 9.04</strong></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ho2b: Tables 5-8 Years of Experience</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-3</td>
<td>Z= 1.39</td>
<td>Z= 1.39</td>
<td>Z= 1.39</td>
</tr>
<tr>
<td>4-9</td>
<td>Z= 1.79</td>
<td>Z=.676</td>
<td>Z=.676</td>
</tr>
<tr>
<td>10-20</td>
<td><strong>Z= 3.53</strong></td>
<td>Z=.63</td>
<td>Z= 3.53</td>
</tr>
<tr>
<td>20+</td>
<td>Z=.7</td>
<td>Z=.55</td>
<td>Z= 1.17</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ho2e: Tables 9-14 Chronological ages</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;25-29</td>
<td><strong>Z= 3.62</strong></td>
<td><strong>Z= 2.7</strong></td>
<td><strong>Z= 2.7</strong></td>
</tr>
<tr>
<td>30-39</td>
<td><strong>Z= 2.82</strong></td>
<td>*Z= 2.02</td>
<td><strong>Z= 2.82</strong></td>
</tr>
<tr>
<td>40-49</td>
<td>*Z= 2.38</td>
<td><strong>Z= 2.78</strong></td>
<td><strong>Z= 2.78</strong></td>
</tr>
<tr>
<td>50-59</td>
<td>*Z= 3.62</td>
<td>*Z= 2.06</td>
<td>*Z= 3.62</td>
</tr>
<tr>
<td>60-64</td>
<td><strong>Z= 3.19</strong></td>
<td>*Z= 2.56</td>
<td><strong>Z= 3.80</strong></td>
</tr>
<tr>
<td>65+</td>
<td><strong>Z= 5.19</strong></td>
<td><strong>Z= 3.95</strong></td>
<td><strong>Z= 3.64</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ho2f: Tables 15-17 highest degree held</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bachelors</td>
<td>Z= 1.91</td>
<td>Z= 1.06</td>
<td>Z= 1.91</td>
</tr>
<tr>
<td>Masters</td>
<td><strong>Z= 3.27</strong></td>
<td>Z= 1.47</td>
<td><strong>Z= 3.77</strong></td>
</tr>
<tr>
<td>Masters +</td>
<td>Z= 1.91</td>
<td>Z= 1.07</td>
<td>Z= 1.91</td>
</tr>
</tbody>
</table>

Note: * exceeds p< .05 value (Z= 1.96) ** exceeds p<.01 value p< .01 (Z= 2.57)
year, making 36 over the three-year period. The total reported number for all three years was 6. Since the Test of Significance of the Difference between Two Independent Variables did result in Z scores that fell within the rejection range at $p < .01$ the null hypothesis was rejected for year 1 and 3. The Z scores for year 2 did fall within the rejection range but at the $p < .05$ level therefore the null hypothesis was also rejected for year 2.

4. That based on an attrition rate of 6.6% at the secondary school level, the number of certified personal leaving was expected to be 51 during the three years of implementation. The reported number of leavers was 18 during the three years. Since the Test of Significance of the Difference between Two Independent Variables resulted in Z scores that fell within the rejection range the null hypothesis is rejected.

5. That based on the variable of years of experience the attrition for the 1-3 years of experience level was expected to be 27 leavers. The reported number of leavers was 7 for the three years. Since the Test of Significance of the Difference between Two Independent Variables did not result in Z scores that fell within the rejection range the null hypothesis is accepted.

6. That based on the variable of years of experience the attrition for the category 4-9 years of experience was expected to be 6 leavers. The reported number of leavers was 5 for the three years. Since the Test of Significance of the Difference between Two Independent Variables did not result in Z scores that fell within the rejection range the null hypothesis is accepted.

7. That based on the variable of years of experience for the category 10-20 years attrition was expected to be 9 leavers during the three years. The reported number of
leavers was 3 for the three years. Since the Test of Significance of the Difference between Two Independent Variables did result in Z scores that fell in the rejection range for years 1 and 3 of the study the null hypothesis is rejected for years 1 and 3 and accepted for year 2 of the study.

8. That based on the variable of years of experience attrition for the category 20+ years of experience was expected to be 18 leavers during the three years. The reported number of leavers from TQM schools was 8 for the three years. Since the Test of Significance of the Difference between Two Independent Variables did not result in Z scores that fell within the rejection range the null hypothesis is accepted for all three years.

9. That based on the variable of chronological age the attrition for the certified personal < 29 years of age was expected to be 15 leavers during the three years. The reported number of leavers was 9 for the three years. Since the Test of Significance of the Difference between Two Independent Variables did result in Z scores that did fall in the rejection range for the three years of the study. The null hypothesis is rejected for the three study years.

10. That based on the variable of chronological age the attrition for the certified personal 30-39 years of age was expected to be 21 leavers during the three years of the study. The reported number of leavers was 2 for the three years. Since the Test of Significance of the Difference between Two Independent Variables did result in Z scores that did fall within the rejection range for the three years being studied. The null hypothesis is rejected for all three years.
11. That based on the variable of chronological age the attrition for the certified personal 40-49 years of age was expected to be 21 leavers during the three years of the study. The reported number of leavers was 1 during the three years under study. Since the Test of Significance of the Difference between Two Independent Variables did result in Z scores that did fall in the rejection range. The null hypothesis is rejected for all three years.

12. That based on the variable of chronological age the attrition for the certified personal 50-59 years of age was expected to be 18 leavers during the three years of the study. The reported number of leavers was 1 for the three years under study. Since the Test of Significance of the Difference between Two Independent Variables did result in Z scores that did fall in the rejection range. The null hypothesis is rejected for all three years of the study.

13. That based on the variable of chronological age the attrition for the certified personal 60-64 years of age was expected to be 8 leavers during the three years of the study. The reported number of leavers was 6 for the three years under study. Since the Test of Significance of the Difference between Two Independent Variables did result in Z scores that did not fall in the rejection range for years 1 and 2, but did fall within the rejection range for year 3. The null hypothesis is rejected for all three years.

14. That based on the variable of chronological age the attrition for the certified personal 65+ years of age was expected to be 3 leavers during the three years of the study. The reported number of leavers was 3 for the three years under study. Since the Test of Significance of the Difference between Two Independent Variables did result in Z
scores that did not fall in the rejection range. The null hypothesis is rejected for all three years of the study.

15. That based on the variable highest degree earned the attrition for the certified personal with Bachelors degrees was expected to be 45 leavers during the three years of the study. The reported number of leavers was 12 for the three years under study. The Test of Significance of the Difference between Two Independent Variables did not result in Z scores that fell in the rejection range. The null hypothesis is accepted for all three years of the study.

16. That based on the variable highest degree earned the attrition for the certified personal with Masters degrees was expected to be 41 leavers during the three years of the study. The reported number of leavers was 6 for the three years under study. Since the Test of Significance of the Difference between Two Independent Variables did result in a Z score that fell in the rejection range for year 1 and 3. The null hypothesis is accepted only for year 2 of the study and rejected for years 1 and 3.

17. That based on the variable highest degree earned the attrition for the certified personal with Masters + degrees were expected to be 9 leavers during the three years of the study. The TQM schools reported 2 leavers for the three years under study. Since the Test of Significance of the Difference between Two Independent Variables did result in a Z scores that did not fall in the rejection range. The null hypothesis is accepted for all three years of the study.
CHAPTER 5
SUMMARY AND DISCUSSION

The purpose of this study was to investigate the relationship between certified personal attrition and changes in the adult workplace brought about through the implementation of Total Quality Management in public schools. Further, the study expected to determine demographic characteristics that would identify personnel most likely to leave. It was hoped that by identifying the likely leavers that attention to their needs could be given and measures could be developed to address their concerns. Through the development of counter-measures, the cost of replacing the certified personal could be saved. A TQM sample of four hundred and forty seven certified teachers and administrators were gathered. This sample group was compared to a TFS 1994-1995 sample group of four thousand five hundred twenty eight. This chapter will provide the reader with a concise summary of the study.

Summary

Six hypotheses were tested at the $p<.05$ and $p<.01$ critical levels. The data was compared using a Test of Significance of Difference between Two Proportions. The data under analysis consisted of two samples drawn independently. The first survey was conducted by the U.S. Department of Education. It was based on interviews with 4528 certified personal and conducted as part of a continuous study of teacher attrition. The second was conducted for this study and involved principals using TQM and returning a
survey on attrition during the implementation period. The difference between the two proportions is being tested, the null hypothesis is assumed. The variables chosen for the study were level being taught (secondary or elementary), the highest degree held, age, number of years teaching, and ethnic background. These variables were analyzed in terms of difference to the proportions that occurred in the two surveys. A yearly projected number of leavers were projected in each category.

Implications

The ramification for a district’s senior education leadership contemplating implementing TQM and concerned about attrition is that it may result in staff remaining. Attrition should not be a factor against the adoption of a TQM program. As noted in chapter 4 in tables 2, 3, and 4 the data rejects the hypothesis that there is no significant difference or an increase of attrition between the TFS 1994-1995 study and TQM schools under study. The reported data supports the hypothesis that there is a statistically significant lowering of the attrition numbers in the TQM schools under study. When the data is broken down into elementary and secondary schools the data continues to support the hypothesis that there is a significant lowering of the attrition at TQM schools during the first three years of implementation. The attrition numbers reported in all three tables were statistically significant, the p< .05 being the criteria of significance. These results are organizationally significant to any school district or school that is in the planning stages of implementing TQM in their school. The attrition of certified personnel can have a disrupting effect on school programs.

As tested and noted in the data age, earned degrees, teaching level and years of experience were variables that could be used to distinguish leaves from stayers. Timing
might be added to the list since during years 1 and 3 the attrition of certified personnel is lower than during year 2 of implementation. The profile of leavers was evident where the variables of degrees, age, years of experience. The most likely leavers would have less then 9 years experience and possess a Bachelors or Masters + degrees, teach at an elementary level, and leave during the year 2 of implementation. Conversely, the most likely certified personnel to remain would be 40-59 with 10-20 years of experience, possess a Masters degree and be in year 1 or year 3 of implementation. It may be that for this group their experiences and intelligence are leading them to address problems that they recognize and they are interested in innovation. They may wish to leave a legacy and improve their last years of teaching before retirement. The data involved in describing these profiles does differ from the profiles of leavers and stayers in the TFS 1994-1995 study. There is a tendency revealed in the TQM sample to remain teaching while in their sixties which is counter to the national TFS 1994-1995 data.

The gathered data on TQM schools does not indicate an increase in attrition. The data when tested leads to the observation that in categories where the data did not fall into the rejection range the attrition characteristics were similar to those reported in TFS 1994-1995.

Recommendations

As a result of this study, the following recommendations for further study were generated:

1. Conduct a study focused on measuring principal’s attitudes before, during, and at the end of the implementation process.
2. Study the leaders during the implementation process and their strategies to implement TQM in their schools. Observe by charting behaviors that the leadership at both the school and district levels holds the belief that TQM is a visible, viable, and effective planned change method, when properly installed.

3. Develop observation and surveys that address if a school is ready for TQM. Some schools described by Germinario and Ogden as Conventional Schools would not be ready to accept the changes brought by TQM. As part of the development of the observation and survey instruments test them in schools and return after implementation or implementation failure to determine perimeters for readiness.

4. A greater examination of the organizational cultures of successful TQM schools and schools that failed in their implementation efforts should be undertaken.

5. Study the evolving quality culture and compare these work culture changes with other school improvement techniques and issues.

6. Research to reveal how certified personnel are using statistical sampling to uncover data and drive the process should be done.

7. Research can reveal if quality circles are successful and if they make a difference in student achievement.

8. Examine the changes that lead to districts dropping TQM to determine if each school’s leadership committed themselves to the idea that the TQM paradigm involves long term, large-scale cultural change.
In summary, remember that changing a school’s culture to TQM is a difficult, comprehensive, and long process. TQM gives principals and their certified personnel an increased ability to synthesize, analyze, and evaluate process. The data gathered while using TQM processes permits the principal and the senior leadership to exercise greater control over the outcomes. Leaders will need to maintain their commitment, keep the focus of their certified personnel on the quality process, leadership must provide the necessary support, and hold personnel responsible for following through on the gathered data. The principal sets the tone, oversees the gathering of the data that guides the school’s continuous improvement cycle.
REFERENCES

Achievement in America GEAR-UP (April, 2000)


Malcolm Baldrige National Quality Award education pilot criteria (1995), Gaithersburg, MD: National Institute of Standards and Technology (NIST)


January 31, 2003

Principal (name)
(School name)
(School Address)

Dear (name)

The attrition of personnel during the implementation of Total Quality Management (TQM) in education settings is a timely and critical research topic. Only limited research has been conducted in this area. I have chosen this topic for my doctoral dissertation in education leadership at the University of Georgia. The purpose of my study is to provide data on personnel attrition that can be used by superintendents and principals in planning during the initial implementation phase of TQM in schools. Please return the survey (in the envelope provided) to me no later than December 15, 2000.

The enclosed survey is designed to gather attrition data on certified personnel from schools that have been applying TQM. I am asking you to take approximately thirty minutes to complete this survey concerning your experiences with TQM. Your participation is appreciated. Each response will be kept in strictest confidence-no principal or school will be identified or identifiable in the reported results. Should you wish to receive a summary of the results, please indicate so on the back of the survey. The reason that I am asking for the numbers of other non-leaving personnel under the categories of highest degree earned and race/ethnicity (Am. Indian, Aleut, Eskimo-Asian or Pacific Islander-Black, non-Hispanic-White, non-Hispanic-Hispanic) is to convert the data into percents that can be compared with National data.

Sincerely,

Michael F. Meehan
Doctoral Candidate
APPENDIX B

DESCRIPTIVE INFORMATION ABOUT PERSONNEL LEAVING DURING THE FIRST THREE YEARS OF TQM IMPLEMENTATION

<table>
<thead>
<tr>
<th>Years of Teaching</th>
<th>Person’s Position</th>
<th>Year of Leaving</th>
<th>Highest Degree</th>
<th>Race/Ethnicity</th>
<th>Age</th>
<th>Last four Digits of Employee Number</th>
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How many administrators are assigned to your school?

How many teachers are assigned to your school?