DISSERTATION

PERCEPTIONS OF COMMUNITY COLLEGE PRESIDENTS: TOTAL QUALITY MANAGEMENT PERFORMANCE MEASURES AT THEIR COLLEGES

Submitted by

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WE HEREBY RECOMMEND THAT THE DISSERTATION PREPARED UNDER OUR SUPERVISION BY MARK RICCARDI ENTITLED PERCEPTIONS OF COMMUNITY COLLEGE PRESIDENTS: TOTAL QUALITY MANAGEMENT PERFORMANCE MEASURES AT THEIR COLLEGES BE ACCEPTED AS FULFILLING IN PART REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY.

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ABSTRACT OF DISSERTATION

PERCEPTIONS OF COMMUNITY COLLEGE PRESIDENTS: TOTAL QUALITY MANAGEMENT PERFORMANCE MEASURES AT THEIR COLLEGES

Continuous Quality Improvement (CQI) measures such as Total Quality Management (TQM), Strategic Planning, Six Sigma, and the Balanced Scorecard are often met with skepticism among leaders of higher education. This study attempts to fill a gap in the literature regarding the study of relationships among specific variables, or building blocks, associated with TQM and their use within community colleges.

Presidents at public, private, and tribal community colleges from every state and U.S. territory were surveyed to determine their perceptions regarding the presence of TQM performance measures at their college. These performance measures were building blocks of the variables under study. These independent variables were: (a) leadership, (b) continuous improvement, (c) employee fulfillment, (d) learning, (e) process management, (f) cooperation, and (g) customer focus. The dependent variables were: (a) product/service quality, (b) financial effectiveness, (c) operational efficiency, (d) public responsibility, (e) customer satisfaction, and (f) employee satisfaction.

A total of 179 responses were received from the pilot and main studies and statistical analysis evaluated six hypotheses under study. The findings indicated that the presidents perceived at their colleges relationships existed between product/service quality and customer focus (H1), financial effectiveness and the other variables (H2), operational efficiency and continuous improvement (H3), public responsibility and the other variables (H4), customer satisfaction and employee fulfillment, cooperation,

customer focus, and public responsibility (H5), and between employee satisfaction and the other variables (H6).

This study adds to the field of research by allowing CQI practitioners to focus on those TQM variables that support each other. Implications for future study include the evaluation of leadership during a CQI process, how accepting or resistant individuals are to change, and an exploration of how integral TQM may be within institutions, whether identified or labeled as such.

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CHAPTER 1: INTRODUCTION

Background and Overview

In his discussion about the Balanced Scorecard, Niven (2003) tells an interesting story about the British navy that lost four warships and 2,000 lives one night in October of 1707. As the story goes, Admiral Clowdisley Shovell was leading his fleet in the Atlantic on a foggy and dark night when he lost almost all of his ships. There was not a battle, and other then the fog, the sea conditions were calm. The Admiral "…simply miscalculated his position in the Atlantic and his flagship smashed into the rocks of the Scilly Isles…The rest of the fleet, following blindly behind, went aground as well, piling into the rocks, one after another" (Niven, 2003, p. 3).

While any loss of life is heartbreaking, this unfortunate and tragic event was not altogether uncommon. As Niven (2003) continues:

> …the concept of latitude and longitude had been around since the first century B.C., still in 1700 no one had devised an accurate way to measure longitude…professional seamen like Clowdisley Shovell had to estimate their progress either by guessing their average speed or by dropping a log over the side of the boat and timing how long it took to float from bow to stern…What caused the disaster was not the admiral's ignorance, but his inability to measure something that he already knew to be critically important – in this case longitude. (p. 4)

The important lesson from Admiral Shovell's tragedy that relates to this study is while the Admiral, and most likely the officers on his crew, knew what latitude and longitude were, they were unable to measure it in a way that prevented disaster.

In a similar vein, most people understand airplanes fly due to the lift provided by the wings, but far fewer could probably explain the exact physics behind flight. The

average passenger who is traveling does not need to understand the principles involved in flight, but the pilots and the individuals who design aircraft must understand these concepts, or they will generate flaws in the design that will lead to tragedies like the one experienced by Admiral Shovell. Like many Continuous Quality Improvement (CQI) theories, Total Quality Management (TQM) offers its users a method to understand what is happening within an organization and ways to improve quality and efficiency.

A large body of literature exists on the success or failure of TQM within the corporate world, and regardless of how an individual views TQM, it is difficult to deny that TQM has made a significant impact on the business world over the past 50 years. While much is written about TQM in the corporate world, far fewer articles are devoted to the success or failure of TQM within higher education even though many colleges and universities attempted to implement TQM or some other form of CQI within their institutions (Burkhalter, 1996). Speaking specifically about higher education, McCulloch (1993) writes that TQM:

> …returns to institutions' control over values, autonomy and professionalism which continues to appear endangered. It embraces change and innovation yet offers strategies by which these can become opportunities rather than threats. It seeks to democratize institutions by devolution of decision making yet retains a powerful concept of leadership through which the momentum of morally-based education management can be maintained. (p. 10)

Put another way, TQM offers higher education a way to identify the customer, improve the product supplied to the customer through the use of measurement and assessment, and empowers faculty members to improve the product in an organization whose hierarchy is flatter than that found in the corporate world (McCulloch, 1993).

It is likely most people in higher education have heard of TQM, Strategic Planning, or Six Sigma. Many of these people are probably even using some of these

concepts in their day-to-day dealings, either by choice or by directive. But do they understand the concepts behind these management systems, the way they should fit into their organization, and the results they should expect from them? Do they understand how to implement TQM and measure its' effect upon an organization, or are they following others to a rocky shore? Boaden (1997) appears to believe most people do not understand TQM. Heady and Smith's study (as cited in Boaden, 1997) states that while TQM is widely practiced, there is significantly less understanding of what TQM means, even though the authors state that "…clear definitions" of TQM "are important" (Boaden, 1997, p. 153).

It is important to take a critical look at TQM as it has become a large part of the corporate world and the success or failure of TQM is almost as difficult to measure as it is to agree upon a universally accepted definition. In their review of the literature, Grandzol and Gershon (1997) found that among surveyed hospitals, 94 percent had a formal TQM program in place. They further found 66 percent of surveyed primary and secondary schools had a formal TQM program.

While the above-mentioned figures constitute a large percentage of organizations that implement TQM, Grandzol and Gershon (1997) also found "…in the electronics industry, 63 percent of the companies having TQM programs failed to reduce internal defects by 10 percent or more" (p. 44). What is more disturbing is the fact that "A survey of 500 American executives showed only about one-third believed their TQM programs made a competitive difference" (Grandzol & Gershon, 1997, p. 44). These reported failures of TQM are in dramatic contrast to past Baldrige Quality Award winners who have reported on-time delivery increased from 75 to 98 percent; a 100 percent increase in

employee productivity; and a 63 percent increase in sales per individual (Grandzol & Gershon, 1997). If TQM is ultimately a success or failure, it is important to be able to properly identify the components of TQM and study the relationship of these components to the overall concept of TQM.

TQM is a method used to help industry leaders improve the quality of their products by reducing errors in manufacturing. Tribus (1981) credits the creation of TQM to Dr. W. Edwards Deming and developed from the continuous quality improvement theories of Dr. Deming, Dr. Walter A. Shewhart, and Joseph M. Juran. These individuals originally developed a program that would increase the United States ability to produce large quantities of quality weapons and ammunition using an unskilled labor force during World War II (Tribus, 1981). While the theories taught by Deming, Shewhart, and Juran helped improve the manufacturing process, Tribus (1981) writes that after the war, most of the lessons learned were lost as many of the managers who applied these lessons moved to other jobs or retired and did not pass on the knowledge they learned. It was not until 1950 when Dr. Deming traveled to Japan to teach his quality improvement techniques with resulting productivity gains of up to 30 percent without the cost of purchasing new equipment that TQM began to gain acceptance in the U.S. (Tribus, 1981).

Since its inception over 50 years ago, TQM has had many supporters and detractors. Perhaps one of the major reasons it meets with skepticism is the difficulty involved in defining TQM. While researching TQM usage in higher education, Bryan (1996) found it difficult to discover a universally accepted definition of TQM. This difficulty is acknowledged by Dr. Deming, long considered the father of TQM, when he

writes “The trouble with Total Quality Management – failure of TQM, you call it – is that there is no such thing. It is a buzzword. I have never used the term, as it carries no meaning” (Romano, 1994, p. 22).

Although Dr. Deming does not like to apply the TQM label to his management methods, making it more difficult to define his teachings, there is agreement in the literature that TQM is based upon what is labeled Deming’s 14 points. As interpreted by Chambers (1998), they are:

> 1. Create constancy of purpose toward improvement of product and service, with the aim to become competitive and to stay in business, and to provide jobs.
> 2. Adopt the new philosophy. We are in a new economic age. Western management must awaken to the challenge, must learn the responsibilities, and take on leadership for change.
> 3. Cease dependence on inspection to achieve quality. Eliminate the need for inspection on a mass basis by building quality into the product in the first place.
> 4. End the practice of awarding business on the basis of a price tag. Instead, minimize total cost. Move toward a single supplier for any one item, on a long-term relationship of loyalty and trust.
> 5. Improve constantly and forever the system of production and service, to improve quality and [productivity, and] thus constantly decrease costs.
> 6. Institute training on the job.
> 7. Institute leadership. The aim of supervision should be to help people and machines and gadgets to do a better job. Supervision of management is in need of overhaul, as well as supervision of production workers.
> 8. Drive out fear, so that everyone may work effectively for the company.
> 9. Break down barriers between departments. People in research, design, sales, and production must work as a team, to foresee problems of production and in use that may be encountered with the product or service.
> 10. Eliminate slogans, exhortations, and targets for the work force asking for zero defects and new levels of productivity. Such exhortations only create adversarial relationships, as the bulk of the causes of low quality and low productivity belong to the system and thus lie beyond the power of the work force.
> 11a. Eliminate work standards (quotas) on the factory floor. Substitute leadership.
> 11b. Eliminate management by objective. Eliminate management by numbers, numerical goals. Substitute leadership.
> 12a. Remove barriers that rob the hourly worker of his right to pride of workmanship. The responsibility of supervisors must be changed from sheer numbers to quality.

> 12b. Remove barriers that rob people in management and in engineering of their right to pride of workmanship. The [sic] means, *inter alia,* abolishment of the annual or merit rating and of management by objective.
> 13. Institute a vigorous program of education and self-improvement.
> 14. Put everybody in the company to work to accomplish the transformation. The transformation is everybody's job. (p. 9)

These 14 points were originally published by Deming in 1981 and were the result of approximately 40 years of work with industry leaders in Japan and the U.S. following World War II (Anderson, Rungtusanatham, & Schroeder, 1994). While Deming wanted everyone within an organization to understand his 14 points, they were clearly directed to the leadership and Deming (as cited in Anderson, 1994) wrote that the 14 points are "…principles of transformation to be embraced by top management it its efforts to continually change and enhance an organization's ability to survive" (p. 474).

While there is no accepted universal definition of TQM, Boaden (1997) offers an analysis of a study conducted by The Conference Board, an organization that reviewed 20 studies on TQM in an attempt to identify the most often used terms associated with TQM. What is most interesting regarding this review is that of the studies analyzed, there was not a single term that emerged as foremost among all studies. In fact, the most common occurrence, Training/Learning, appeared only seven times. Customer focus appeared five times, and leadership appeared four times. Boaden's (1997) research helps point out the widespread confusion regarding a specific definition of TQM.

Problem

CQI measures such as TQM, Strategic Planning, Six Sigma, and the Balanced Scorecard are often met with skepticism among leaders of higher education. Barnard's study (as cited in Helms, 2001) writes that many higher education leaders feel their organizations are very different from the factory model TQM was originally designed to

improve and TQM does not support concepts such as tenure and academic freedom. Educators may feel uncomfortable accepting a system they believe will generate charts and graphs detailing the number and quality of journal articles they have published. Many educators also are concerned about how TQM focuses on the customer and quality improvement following a business model while in higher education many college leaders find it difficult to specifically define the meaning of quality and agree upon exactly who the customer is (Helms, Williams, & Nixon, 2001). This doubt is summarized by Birnbaum (2000) when he writes:

> The first academic management revolution took place near the turn of the twentieth century and lasted for about sixty years. It emphasized means rather then ends. Its goal was to make higher education more efficient and accountable – that is, more businesslike. (p. xii)

While Birnbaum (2000) feels the management theories used during the first revolution benefited higher education and were a positive move forward, he is less supportive of the results of what he termed the second academic management revolution, which took place between 1960 and 2000. The focus of higher education leaders "…was on ends rather than means, and its goal was to produce at the lowest cost goods desired by customers – that is, to make higher education more like a business" (p. xii).

The previous quote is an example of the problem that exists when evaluating the effectiveness of TQM in Higher Education Institutions (HEIs); broad generalizations tend to be made with little quantitative data to support either the success or failure of TQM. In an extensive review of the literature, many articles were found that studied the ways in which HEIs implemented TQM (supporting strategic planning, curriculum improvements, budget and accounting, etc.), but little research was found that attempted to measure the influence or impact TQM had on specific elements found within HEIs.

In contrast to the criticism of TQM and the confusion over its definition, Bryan (1996) offers this explanation while writing about TQM and CQI:

> I view TQM in the college setting as being a comprehensive philosophy of operation in which community members (1) are committed to CQI and to a common campus vision, set of values, attitudes, and principles; (2) understand that campus processes need constant review to improve services to customers; (3) believe the work of each community member is vital to customer satisfaction, and (4) value input from customers. For TQM to exist in the campus culture, there must be a commitment to CQI and the training and development of faculty, administration, and staff as a team dedicated to customer service. (p. 5)

On the subject of support to customers, Bryan (1996) states that one of the concepts of TQM is the customer is paramount. He advocates defining the student as the customer; however, the challenge in implementing this concept is deciding how much empowerment to give to students. He believes striking a balance between the educational function of teachers and administrators and the concerns and desires of students is required to meet this function of TQM. While this is not often an easy task, Bryan (1996) states that it is a requirement of educators to know as much as possible about the customers they serve to meet or exceed their expectations.

Need and Significance of Study

This study is significant as it attempts to fill a gap in the literature regarding the study of relationships among specific variables, or building blocks, associated with TQM and their use within community colleges. Since current research exploring the effectiveness of TQM in community colleges is rather sparse, it is important to undertake a quantitative study that attempts to explore these relationships. This study can serve as a bridge between existing research measures where TQM is used within HEIs, but does not address the relationships that may exist among the components associated with TQM and the HEI's use of TQM. This study can also be generalized beyond the academic world

into public and private business, as it is a study of how leaders evaluate TQM concepts within their organizations.

This study does not attempt to offer a definition of TQM, but perhaps more important, it offers insight for TQM practitioners into what components of TQM are related to each other. Thus, if an organization identified a need to improve their employee or customer satisfaction, the results from this study could be used to identify what specific components of TQM have positive relationships with the desired outcome. This would prevent a TQM practitioner from potentially selecting the wrong components to implement and thus leading to failure in the area they wish to improve.

Purpose

The purpose of this study is to explore the relationship among 13 variables, also identified as constructs or components, associated with the use of TQM within community colleges. This study is an exploratory investigation into the perceptions community college presidents have about these constructs and their existence at their community colleges.

Using a survey instrument originally administered in a study by Grandzol and Gershon (1998), this study will analyze data from presidents at public, independent, and tribal community colleges. For this study, the attribute independent variables are (a) leadership, (b) continuous improvement, (c) internal/external cooperation, (d) customer focus, (e) learning, (f) employee fulfillment, and (g) process management. The dependent variables are (a) product/service quality, (b) operational efficiency, (c) financial effectiveness, (d) public responsibility, (e) employee satisfaction, and (f) customer satisfaction.

These 13 variables are derived from a survey instrument by Grandzol and Gershon (1998), an instrument created based partially upon the research of Anderson, Rungtusanatham, and Schroeder, (1994). In this research, the authors determined that Deming's 14 points are not a theory, but instead a roadmap for leaders to follow in developing an organization that focuses on learning and cooperation to attain continuous improvement. This is supported by the writings of Deming who states his 14 points are "…principles of transformation for improving the practice of management" (Anderson et al., 1994, p. 476). With this in mind, Anderson et al. (1994) set out to determine the components of what they called the Deming management method, an in-depth understanding of the 14 points, and how these components were related and would lead an organization to achieve their strategic goals and long term survival.

To understand the 14 points, Anderson et al. (1994) used the Delphi method for analysis. Helmer and Rescher (as cited in Anderson, 1994) wrote:

> The Delphi method is a technique, developed at the RAND Corporation in the early 1950s, intended for systematically soliciting, organizing, and structuring judgments and opinions on a particularly complex subject matter from a panel of experts until a consensus on the topic is reached or until it becomes evident that further convergence is not possible. Any application of the Delphi method is typified by anonymity, feedback, and summary of responses. (p. 478)

Using this method, Anderson et al. (1994) gathered seven experts from both the academic and industry fields, all of whom either worked with or studied Deming's work. The seven individuals formed a panel that was first asked to individually identify what they believed were the definitions of each of the 14 points. This process was repeated three times, and upon the conclusion, the panel had consistently agreed upon 37 concepts which they believed were underlying concepts of Deming's 14 points (Anderson et al., 1994).

Since 37 concepts were too many to reasonably study, Anderson et al. (1994) asked the panel to evaluate all 37 concepts and identify clusters of concepts. When compared, the cluster results of each panel member showed a high degree of similarity and resulted in seven concepts which Anderson et al. (1994) identified as the building blocks of Deming's quality management method. The seven concepts were (a) visionary leadership, (b) internal and external cooperation, (c) learning, (d) process management, (e) continuous improvement, (f) employee fulfillment, and (g) customer satisfaction.

Even though Anderson et al. (1994) provided a well researched analysis of the meaning of Deming's 14 points, a gap existed in the literature concerning the specific relationships among the 13 variables previously identified by Grandzol and Gershon (1998) in HE. This research attempts to narrow that gap by surveying presidents of community colleges to discover their perceptions of the relationship between these 13 variables, which I believe are the building blocks of TQM. The research will seek relationships among these building blocks and explore the potential relationships through the use of hypotheses testing.

Creswell (2003) writes that research questions and hypotheses are used to shape and focus the study. Rudestam and Newton (2001) state that it is acceptable to combine research questions and hypotheses by having the research question state "…more general investigatory themes, which are then followed by specific hypotheses that make predictions in a testable form" (p. 67).

The research questions and hypotheses are based upon a review of the literature by Grandzol and Gershon (1997, 1998). The hypotheses will explore the relationships of the constructs identified by Grandzol and Gershon (1997) as found in the community

college setting and are derived from their suggestion for further research to explore these relationships. Based upon these goals, the following research questions and hypotheses are used to focus this study.

Research Questions and Hypotheses

Product/Service Quality: Research Question 1. Is customer focus a statistically significant predictor of product/service quality?

H_0) There is no relationship between product/service quality and customer focus.

Financial Effectiveness: Research Question 2. Are the following independent variables statistically significant predictors of financial effectiveness: leadership, continuous improvement, employee fulfillment, learning, process management, internal/external cooperation, customer focus, product/service quality, operational efficiency, public responsibility, customer satisfaction and employee satisfaction?

H_0: Leadership, continuous improvement, employee fulfillment, learning, process management, internal/external cooperation, customer focus, product/service quality, operational efficiency, public responsibility, customer satisfaction and employee satisfaction will not be significant predictors of financial effectiveness.

Operational Efficiency: Research Question 3. Is continuous improvement a statistically significant predictor of operational efficiency?

H_0: Continuous improvement is not a statistically significant predictor of operational efficiency.

Public Responsibility: Research Question 4. Are the following independent variables statistically significant predictors of public responsibility: leadership, continuous improvement, employee fulfillment, learning, process management, internal/external

cooperation, customer focus, product/service quality, operational efficiency, financial effectiveness, customer satisfaction and employee satisfaction?

H_0: Leadership, continuous improvement, employee fulfillment, learning, process management, internal/external cooperation, customer focus, product/service quality, operational efficiency, financial effectiveness, customer satisfaction and employee satisfaction will not be significant predictors of public responsibility.

Customer Satisfaction: Research Question 5. Are the following independent variables statistically significant predictors of customer satisfaction: leadership, continuous improvement, employee fulfillment, learning, process management, internal/external cooperation, customer focus, product/service quality, operational efficiency, financial effectiveness, public responsibility and employee satisfaction?

H_0: Leadership, continuous improvement, employee fulfillment, learning, process management, internal/external cooperation, customer focus, product/service quality, operational efficiency, financial effectiveness, public responsibility and employee satisfaction will not be significant predictors of customer satisfaction.

Employee Satisfaction: Research Question 6. Are the following independent variables statistically significant predictors of employee satisfaction: leadership, continuous improvement, employee fulfillment, learning, process management, internal/external cooperation, customer focus, product/service quality, operational efficiency, financial effectiveness, public responsibility and customer satisfaction?

H_0: Leadership, continuous improvement, employee fulfillment, learning, process management, internal/external cooperation, customer focus, product/service

quality, operational efficiency, financial effectiveness, public responsibility and customer satisfaction will not be significant predictors of employee satisfaction.

While the data from the survey instrument will test these hypotheses, I was also interested in obtaining a profile of the selected community colleges. This was accomplished by asking respondents if they used TQM in their college, and if so, where did they use it? Respondents were asked to identify if their college formed any quality improvement councils and, if so, are the members formally trained? They were also asked how long the respondent has been president. Finally, asking the respondents to identify the size of the student population finished the profile.

The purpose of the college profile is to help better understand how TQM is used within community colleges and to discover any patterns that might exist. Specifically, do community college leaders use TQM in the academic or administrative departments of their school? Also, if the college formed any type of quality improvement council I would like to know if the members are formally trained, as I believe this is related to the success or failure of TQM within an organization.

Theoretical Perspective

While reviewing the literature for TQM, large amounts of research were found that attempt to define, differently, the meaning of TQM or describe the success or failure of TQM within an institution. Binney and Kearney (as cited in Boaden, 1997) suggest enough empirical evidence exists to show TQM has failed within 60% to 70% of the organizations using it. The cautionary note offered by Boaden is that little of this literature addresses exactly what failed within the TQM processes.

In an attempt to synthesize the various articles written about TQM, Grandzol and Gershon (1997) began to develop a theory about the relationship that exists among Deming's 14 points. Through an extensive literature review, they identified specific operational practices that could be measured to determine how they influence concepts associated with TQM. These variables are identified as operational concepts or constructs by the researchers. Having identified these constructs, Grandzol and Gershon (1997) developed a survey instrument to test the theory that there exists "…causal relationships between the constructs and the measures" (p. 46). The constructs are listed in bold with the performance measures following:

> **Leadership**: Clarity of vision, long-range orientation, coaching management style, participative change, employee empowerment, planning/implementing change.
> **Continuous Improvement**: Refinement cycles, improvements.
> **Internal/External Cooperation**: Firm-supplier partnership, single-supplier orientation, collaborative organization, teamwork, organization-wide involvement, systems view, trust, elimination of fear.
> **Customer Focus**: Customer driven focus.
> **Learning**: Company-wide training, foundational knowledge, process knowledge, educational development, continuous self-improvement, managerial learning.
> **Employee Fulfillment**: Job satisfaction, job commitment, pride of workmanship.
> **Process Management**: Prevention orientation, reduction of mass inspection, design quality, statistical process control, understanding variation, elimination of numerical quotas, elimination of merit ratings, understanding motivation, total cost accounting, stable employment.
> **Product/Service Quality**: Accuracy, completeness, conformance, innovation.
> **Operational Efficiency**: Productivity, cycle time, scrap/waste, energy/efficiency, material usage.
> **Financial Effectiveness:** Return on investment, market share, capital investment ratio.
> **Public Responsibility**: Environmental complaints, community involvement.
> **Employee Satisfaction**: Turnover, requests for transfer, grievances/complaints, absenteeism, surveys.
> **Customer Satisfaction**: Surveys, complaints, inquiries. (pp. 82-83)

Based upon these constructs and measurements, the researchers determined 98 possible relationships could exist "one between each exogenous construct, and one

between each of the endogenous constructs. Additionally, correlations may exist among the exogenous constructs" (pp. 49-50). When developing testable hypotheses, this number of potential relationships is too high to reasonably evaluate. In an effort to identify the relationships to study, Grandzol and Gershon (1997) used the Delphi technique and sent out a matrix listing all of the possible relationships to faculty members who had extensive experience in TQM and to "…Baldrige Award examiners from large organizations or consulting firms" (p. 50). The feedback received from these individuals helped identify the most important and most probable relationships, which resulted in the development of the seven hypotheses the researchers tested.

For the purpose of this study, a theory was used by Grandzol and Gershon (1997), which they developed in their study of TQM at government, public, and private organizations. This theory indicated that relationships did exist among the variables under study and these relationships exerted influence on one another. As applied to this study, the theory holds that at the community colleges under examination, the expected independent variables would be: (a) leadership, (b) continuous improvement, (c) internal/external cooperation, (d) customer focus, (e) learning, (f) employee fulfillment, and (g) process management, to influence the dependent variables: (h) product/service quality, (i) operational efficiency, (j) financial effectiveness, (k) public responsibility, (l) employee satisfaction, and (m) customer satisfaction. This expectation was based largely upon the research of Grandzol and Gershon (1997, 1998) who attempted to identify existing relationships between TQM concepts, Chambers (1998) who offered an interpretation of Deming's 14 points, and Boaden (1997) who offered an initial definition

of TQM. This study will attempt to validate the data presented by Grandzol and Gershon (1997) and determine these relationships at community colleges within the United States.

Participants

The overall population for this study was all of the public, independent and tribal community colleges within the 50 United States and included those community colleges within the 50 States, Guam, Puerto Rico, American Samoa, Northern Mariana Islands, Palau, Micronesia, and the Marshall Islands. As of Aug 2007, the American Association of Community Colleges (n.d.) reported this population as 1,163 of which 992 were public, 140 were independent, and 31 were tribal.

I selected the president of each college as the target audience for my survey. One of the key tenets of TQM is that it must have the active support of the leadership. The leader sets the tone for the organization and without their buy in, any quality improvement plan is most likely to fail. Whatever the feelings the president may have about TQM, they are the individuals best suited to evaluate the college's experience with TQM. While the survey lends itself to administration to subordinates in the organization, doing so in a community college setting where job descriptions and actual duties vary among schools could pose a threat to the validity and reliability of the findings. It would be impossible for me to say the Human Services Chair or Business Office Manager at college A has the same responsibilities as his or her counterpart in college B, if the position even existed at college B.

Leaders such as community college presidents have been described as "heroic" individuals rather than participants in shared leadership. Yukl (2002) defines a heroic leader as the individual who influences followers to perform to their fullest capacity.

This influence is one way as it flows from the leader to the subordinates, and when an increase in performance is noticed, the assumption is made that the leader influenced workers to perform better (Yukl, 2002).

A heroic leader is someone who can "…articulate noble values and goals, to solve the most complex problems, to energize and motivate people, and to direct an efficient and effective organization" (Birnbaum, 1988, p. 124). A heroic leader is an individual who is expected to know everything going on in the organization and exerts great influence on those working in the organization (Yukl, 2002). While this may seem like an unrealistic expectation to put on a leader, Yukl (2002) cites Bradford and Cohen (1984) when he states this expectation is not likely to change as long as society expects an "…individual leader to take full responsibility for the fate of the organization" (Yukl, 2002, p. 432). Thus it is the community college president who should be able to best identify what performance measures, if any, of TQM are being used in their college.

To determine my sample size, I used a formula provided by Dillman (2007)

$$Ns = \frac{(Np)\,(p)\,(1-p)}{(Np-1)\,(B/C)^2 + (p)\,(1-p)}$$

Where: Ns = completed sample size needed for desired level of precision
Np = size of population
p = chance that any respondent will answer a question the same as any other respondent
B = acceptable amount of sampling error
C = Z statistic associated with the confidence level

Using this formula, I used the population size (Np) of 1,163 and selected a p level of .05, which assumed maximum variation in respondents selecting responses are the same as other respondents. I accepted a sampling error (B) of $\pm$ 5% as this offered an acceptable balance of sampling error and cost involved in administering the survey. Finally, I chose

Z score = 1.96 which translates to a confidence level of 95%. When I inputted the values into the formula, I obtained a completed sample size of 289.

$$Ns = \frac{(1163)\,(.50)\,(1-.50)}{(1163-1)\,(.05/1.96)^2 + (.50)\,(1-.50)}$$

$$Ns = \frac{290.75}{1.006}$$

$$Ns = 289$$

To ensure surveying community colleges from each state, I took a proportional sample of public, independent, and tribal community colleges by state as obtained from the American Association of Community Colleges available in 2007 (n.d.). I calculated the total percentage of community colleges found in each state and territory based upon the population of 1,163. As an example, California has 111 public, 12 independent, and 1 tribal community college for a total of 124 or 11% (0.106) of the community college population, while Colorado has 15 public, 0 independent, and 0 tribal community colleges for 15 or 1% (0.013).

These percentages were used to calculate how many colleges from each state would form the sample of 289. Assuming a response rate of 50% through the use of an Internet based survey and e-mail correspondence, I would need to survey 580 presidents to obtain my desired sample of 289. For ease of calculation and to increase the probability of surveying colleges that use TQM, 580 was rounded to 600. Using this number, California provided 11% of the sample (66 colleges), while Colorado provided 1% (8 colleges.) Due to rounding, this method of calculation generated a sample size of 617.

The next step in identifying the sample was to list all the colleges in each state and assign them a number. I used a random number generator to sample the colleges. To ensure my sample included at least one independent, public, and tribal college from each state that had at least one of the three, I grouped each state into three columns and randomly chose a proportion from each column. Returning to my example, California has 124 community colleges of which 111 are public (90%), 12 are independent (10%), and one is tribal (<1%). This gave a sample of 59 public colleges, six independent, and one tribal (see Appendix A for complete distribution of the sample by state).

Definition of Terms

Army Performance Improvement Criteria – Based on the 2006 Malcolm Baldrige Criteria for performance excellence it is the strategic framework for leading change and assessing performance (*Army Performance Improvement Criteria*, 2006, p. i).

Balanced Scorecard – Developed by Robert Kaplan and David Norton. It is a method to measure, in quantifiable ways, specific operational aspects of an organization. With strategic planning, it is "…a tool for leaders to use in communicating to employees and external stakeholders the outcomes and performance drivers by which the organization will achieve its mission and strategic objectives" (Niven, 2003, p. 15).

Baldrige Award – A standard for organizations to achieve when improving the quality of their performance, named after former Secretary of Commerce Malcolm Baldrige (Arif & Smiley, 2003).

Community College – For the purpose of this study, community colleges are defined as those two-year schools identified by the American Association of Community Colleges

and grouped into public, independent, and tribal. Data current as of August 2007. (American Association of Community Colleges, n.d.).

Continuous Improvement – An ongoing process in which every individual in the organization focuses on accomplishing the organizations goals through small changes (Caffyn, 1999).

Lean Manufacturing – Management system founded by Toyota of Japan and focuses on the elimination of waste (Arnheiter & Maleyeff, 2005).

Learning Organization – A company that learns powerfully and collectively and is continually transforming itself to better manage and use knowledge for corporate success; it empowers people within and outside the organization to learn as they work, and it utilizes technology to maximize learning and production (Marquardt, 1996, p. 229).

Six Sigma – Management system founded by Motorola Corporation to improve quality in manufacturing processes that have a large number of components subject to defects (Arnheiter & Maleyeff, 2005).

Strategic Planning – A disciplined effort to produce fundamental decisions and actions that shape and guide what an organization is, what it does, and why it does it (Bryson & Alston, 2005, p. 170).

Total Quality Management (TQM) – A form of quality improvement whose creation is credited to William Edwards Deming and revolves around 14 points of management. Stresses quality at a low cost that satisfies market demand (Boaden, 1997).

Assumptions

Several assumptions were made for this research, the first of which was that I would receive a greater response rate through the use of a web-based survey than a

traditional postal delivered survey. This assumption was based upon the research conducted in 1998 by Nesbary (2000) in which he obtained a response rate of 73% when surveying political science department professors at four-year universities. This is a significant difference in web based response rates when compared to other surveys conducted by Nesbary (2000) and it was his belief the higher response rate was due to educators' comfort level with and preference for electronic media. It was my assumption that in the nine years since that study was conducted, the comfort level of educators had increased and since my sample was composed of presidents of community colleges, I should obtain a larger response rate for a web based survey. This assumption was supported by research conducted by Lusk, Delclos, Burau, Drawhorn, and Aday (2007) whose literature review found a study involving individuals in academic public health had a response rate of over 80% to web based surveys.

A second assumption was the recipients of the survey were in a position that allowed them to evaluate TQM within their organization. All of the respondents were assumed to be community college presidents, so it was assumed they were in a position to evaluate the use of TQM within their college. Deming continuously stressed the importance of leadership in the TQM process, so the president of each college should be the individual to complete the survey. As discussed earlier in this chapter, the idea of community college presidents as "heroes" makes them the best qualified individual to complete the survey.

To ensure it was the president who completed the survey and not another individual in the college, the survey contained language clearly stating that the purpose of the instrument was to explore the perceptions of community college presidents. The

cover letter also clearly explained the importance of the perceptions of the president and it was assumed this would help ensure that it was the president who completed the survey.

A third assumption was the variables and performance measures the survey asked community college presidents to give their perceptions of were accurate components of TQM. I believe this was a valid assumption as these variables and measures are based upon extensive evaluation by Anderson et al (1994) and also Grandzol and Gershon (1997, 1998). Using the Delphi technique to solicit responses from experts in the field of TQM, this previous research established valid variables and measures of the components of TQM.

A fourth assumption was the community college presidents would answer the surveys in an open and candid manner. While some presidents may not feel their college implements TQM, this was not the point of the survey. The instrument was designed to specifically ask community college presidents about their perceptions regarding the existence of TQM constructs or building blocks within their colleges. It did not ask the presidents to evaluate the success or failure of TQM at their college or their personal feelings about TQM. Without taking a stance on TQM, the survey encouraged presidents to be open regarding their perceptions of the TQM constructs that may exist at their colleges.

A final assumption tied into the previous assumptions. While this study was of an exploratory nature regarding the perceptions community college presidents have about the presence of TQM building blocks/constructs at their colleges, it was assumed this study can be used to begin the formulation of a formal definition of TQM. If specific

relationships exist between the variables that research has shown are the building blocks of TQM, then it is possible to use these variables in the development of an agreed upon definition of TQM.

Study Limitations and Delimitations

As with any study, there are several potential limitations. With each limitation discussed, I will describe my methods for mitigating these limitations. Perhaps the greatest potential limitation was ensuring the sample contained enough institutions that use TQM. Since it would be almost impossible to screen each of the 1,163 community colleges to determine which implement TQM, I increased the size of my sample in an effort to obtain adequate representation of TQM practicing institutions.

Tied closely to the limitation just listed, the possibility existed that only a very small number of surveyed institutions practice TQM, in which case I would not have enough evidence to generalize findings. TQM is one of the management systems that came on strong and then decreased in popularity in favor of other systems. While it was possible a surveyed institution may not formally implement TQM, it was far more likely it incorporated some TQM methods in daily operations.

Another potential limitation was the response rate. Using the survey they created and the one used for this research, Grandzol and Gershon (1998) obtained an initial response rate of 31%. Follow up letters resulted in a response rate of 47%. It was my hope that with the use of a web-based survey and follow-up communication, letters, or e-mails, I could raise the response rate to 40 – 50%.

Due to the size of the population of HEIs, this study was delimited to the 1,163 public, independent, and tribal community colleges within the 50 United States and

territories as identified by the American Association of Community Colleges as of August, 2007 (n.d.). Thus two-year colleges that are part of a state four-year university system were excluded from my population. Even with the delimitations noted, the sample size allowed generalizability to the population of presidents of community colleges within the United States.

Researcher Perspective

I have been a U.S. Army officer for the past 19 years and during this time I have come to believe that the U.S. military is one of the leading organizations in quality improvement. The stereotypical environment in which leaders dictate inflexible orders to subordinates who blindly execute them is a culture that rarely exists in today's United States military. In a community that is open to public scrutiny and routinely advertises its mistakes to the public, the military is forced to continuously push the envelope of quality improvement.

Like several of my colleagues, I was originally opposed to the idea of TQM. I thought it was nothing more than a buzzword that people threw around in staff meetings. I had never heard of Deming, Shewhart, or Juran, and would have been very surprised to learn that one of Deming's 14 points included the elimination of slogans and buzzwords. I was much like an individual I work with today who recently described TQM as "That touchy-feely stuff where everyone calls each other by their first name." It took me more than 15 years of service to realize philosophies I lived by as a leader - - empowerment, leadership, training, and teamwork were hallmarks of Deming's 14 points. I had been practicing TQM without realizing it.

As I made my way through my doctoral program at Colorado State University, I began to realize that similarities between my career in the military and higher education existed. My review of the literature and discussion with professionals in higher education convinced me that these two fields shared a common distrust of management systems such as TQM and many of the reasons for distrust were similar, such as resistance to change; fear of becoming too much like a business; and the general belief that TQM was just another fad and that if we waited long enough, it would go away like every other fad. Although no specific measurement of time exists for defining a fad, Birnbaum (2000) tells us that they quickly fall out of favor and are soon replaced by another fad. After more than 50 years of practice, it is difficult to label TQM as a fad.

As I did more research on TQM, I realized just how disappointing it was that the concept was met with such distrust. Looking at Deming's 14 points I can't help but wonder why most organizations would not welcome principles that would help them improve their product, save costs, and result in happier and more loyal customers and workers. I wondered if it was possible that TQM was a victim of its own success and exposure that led people to believe that it was the silver bullet that would solve all their problems and immediately turn around a failing business. When this turned out not to be the case, did people condemn TQM as another fad full of false promises rather than look at it as tools they could use in the daily operation of their organization; tools that would lead to sustainable quality improvement?

I am not a believer in pigeonholing individuals in what are often inflexible definitions; it is like labeling an individual a Republican or Democrat, liberal or conservative, and then expecting that person to behave in a way or hold ideas that are

perceived only attributed to the label they have been given. I like to believe that for most people, life is not so black and white and that free choice and the way they were raised allows them to hold a predominant viewpoint or opinion, yet also share opposing viewpoints. As individuals mature in life, they continue to expand their knowledge base. It is this learning that changes people's beliefs and perceptions and makes it difficult to put broad labels on them.

This belief of mine was originally quite distressing as much of the literature seems to focus on individuals who claim a single stance (positivism, feminism, critical theory, etc.) and tend to remain very rigid within the expected parameters of that stance. I am not that rigid and questioned how my views would affect my research and if it would show itself as a potential bias. Many of my concerns were put to rest after I revisited some textbooks and discovered that while my ideology most closely follows that of constructivist, I also have beliefs that could be classified under post-positivist and in some cases, positivist.

In their discussion of research paradigms, Morgan, Gliner, and Harmon (2006) stated that the positivist perspective is most often associated with quantitative research, even though it is not the most appropriate or accurate description. For me the most important statement in their discussion regarding paradigms is that there is so much confusion, especially between positivists and constructivists, because there is not an agreed upon definition of what reality is. I very much agree with them when they write that quantitative researchers often accept the fact that while there is one reality, different people have different perceptions of what this reality is, and when under study, a researcher reports these perceptions as variability (Morgan et al., 2006).

This definition is very important to me while examining the literature for this study. I do believe that the people I survey will have very different perceptions regarding TQM. Some of them may not believe that they are implementing TQM when in fact they are using some of the concepts of TQM and others may proclaim themselves as trendsetters in TQM and quality improvement while they have no formal program in place. I am sure I will also find individuals who fall somewhere in between. This is one of the reasons that I chose the survey instrument as I believe it asks the right questions to determine what is being implemented and what factors may be impacting the implementation and usage of TQM.

My further appreciation for the discussion in the Morgan et al. (2006) text is what I consider to be a critical definition of positivism. They write "…positivists believe that under the proper experimental conditions, one can conclude that the independent variable 'caused' the change" (p. 16). This differs from the constructivist view that change is linked to multiple causes. The authors then define the separation between positivist and constructivist when they state that most positivist studies have used proper sampling techniques sufficient enough to generalize their findings to other populations. Constructivists believe that the study is sufficient only to generalize within a similar population. While this study is non-experimental, it does have variables that seek to explore the relationship that exists among these variables.

Summary

TQM has been around for over 50 years and started as a way for production managers to increase the quality of their products and efficiency on the assembly line. Since its origination, TQM has been accepted and rejected by businesses worldwide. My

initial reason for exploring the use of TQM was based upon my experience with quality management programs and the apprehension often associated with them. Like many other individuals, my initial knowledge of TQM was very small and I did not recognize that I was using elements of TQM.

Measuring the effects of TQM in an organization is a challenging task to undertake, made more difficult by the lack of a universally accepted definition for TQM. Since Deming created his 14 points, TQM has been met with anticipation, excitement, fear, confusion, and several other conflicting emotions. Yet for a concept that has been so largely scrutinized, very little quantitative research has sought to examine specifically how TQM has affected an organization. It is the intent of this research to explore the relationships that exist among 13 variables associated with TQM within community colleges, specifically how the presidents perceive these relationships.

Using my background as an army officer who continuously attempts to incorporate quality improvement methods in my work, I am very interested in evaluating TQM's influence on higher education. The purpose of this study is to explore the relationships that exist among the 13 variables under study within community colleges. This research is different than many of the current articles on the subject that are vague in nature and either condemn or exalt the teachings of TQM, yet fail to provide any specific findings on how TQM impacted an organization.

This research is important to the field as very little quantifiable data exists to show whether TQM has helped or hindered organizations in which it was implemented. Boaden (1997) offered this summary:

> Unless it is clear exactly 'what' has failed, there is always the danger that similar initiatives or activities will be undertaken under a new name, with the same

> results. Alternatively, 'better' results may be obtained because of different approaches and circumstances rather than because the concepts implemented are actually fundamentally any different. (p. 156)

Ross and Greene (as cited in Boaden, 1997) suggested it is possible TQM has become so accepted and integrated into organizations that its existence is almost transparent, making measurement even more difficult. This research should help identify those components of TQM that are related to each other, thus allowing TQM practitioners the ability to easily identify which components they should implement in an attempt to improve certain areas of their ongoing actions.

CHAPTER 2: REVIEW OF LITERATURE.

Introduction

Management systems such as TQM, Six Sigma, and Strategic Planning are popular methods that organizations use to improve performance. While these techniques are popular in business and manufacturing firms, higher education has not extensively adopted these systems into their daily activities (Taylor & Karr, 1999). What makes acceptance and integration of these systems difficult is the viewpoint held by many campus leaders that they would rather shape the future of their campus based on their individual experiences and the experiences of those close to them (Petrides, 2003). As a result, leaders can become hesitant to embrace a system regarded as rigid, fearing that their individual creativity can be blocked.

Comparisons have been made between business organizations and institutions of higher education. Birnbaum (2000) suggested that while there were many similarities between the two such as the use of "… mission statements, employees, management systems" (p. xiii), they were quite different. While many critics asked the question, "Why can't a college be more like a business?" Birnbaum (2000) thought the better question was " 'Why can't a firm be more like a college?' when the American higher education system is considered one of the best in the world" (p. xiii).

While asking these questions, Birnbaum (2000) offered cautionary advice regarding management systems, which he considered to be mostly fads. Though he did not completely reject them, he believed that most fads fail, though through failure they can often make contributions to higher education (Birnbaum, 2000). One of his concerns

with management systems was that they were often promoted as a "silver bullet", requiring people to make significant changes in the way they do business, but then do not perform as advertised. Eventually another system comes along which promises to fix the problem and the cycle begins again (Birnbaum, 2000). Expressing a similar belief, Chambers (1998) wrote that most management fads last only a few years "…just long enough for all who are interested to read the books" (p. 6). However, Chambers (1998) made a distinction between management fads and the quality movement, which has lasted for almost 70 years. He further wrote that the quality movement continued to evolve, and every few years another system came along and inserted itself into the movement, adding its own special ideas. These included Total Quality Management, Six Sigma, Strategic Planning, the Learning Organization, as well as several others no longer in common practice.

While acknowledging that no system is perfect, many higher education leaders believe that a systematic approach to problem solving is beneficial for their organizations. Challenges such as decreasing funding, maintaining a diverse campus population, declining maintenance, and several other issues facing higher education institutions are all areas where Taylor and Karr (1999) suggested the use of strategic planning to help construct solutions. The incorporation of strategic planning into the planning sessions can bring standardization to the process that aids in identifying areas requiring improvement and helps identify problems and find solutions.

This section of the dissertation will review the current literature and present a brief history of quality improvement, competing theories to TQM, and a brief discussion on the pioneers of the quality movement. This review of literature will show the

difficulties encountered by industry and HEIs as they attempted to implement TQM methods within their organizations. It will also take a critical look at some of the successes and failures of TQM.

The section on the history of TQM sets the stage for many of the difficulties encountered in the implementation of TQM. The history shows how the recognized founder of TQM, Dr. W. Edwards Deming, would not offer a definition of TQM as he believed that the word TQM was a buzzword without meaning (Romano, 1994). As the review of TQM shows, assigning a universally accepted definition to TQM has been very difficult.

Finally, this review will examine the literature published on the implementation of TQM within HEIs. It will focus on how TQM is used within HEIs and review the published success stories of TQM within these organizations. Of course TQM is not a "silver bullet" concept that works for every organization all the time and thus the final part of this review will examine the perceived failures of TQM, opposition to TQM within HEIs, and the ways that TQM has been assessed to determine its success or failure (Schoengrund, 1996).

Continuous Improvement Systems and Competing Theories

History

Over time there have been many different styles of management and leadership, different terminology used to describe their methods, and a changing focus as civilization moved forward. During these changes, Allen (1998) suggested that his study of Miles (1975) led him to believe that only three models of management exist: (a) classical, (b) human relations, and (c) human resources management.

The classical school was the first model and Allen (1998) wrote that it began around 1900 and lasted until approximately 1920. This model, also referred to as classical management, had three sub-components: (a) bureaucratic, (b) scientific, and (c) administrative (Allen, 1998). The focus was on efficiency and signaled the start of continuous improvement systems.

The human relations model was next and began in the 1920s with the Hawthorne Studies in 1924. It focused on the human element in organizations. The studies measured worker's performance at the Hawthorne Plant of the Western Electric Company in Cicero, Illinois, between 1924 and 1933. Employee reactions to working in an area that had better lighting than a control area and the effect on employee performance when workers were given breaks and had the freedom to talk were studied. The researchers found a relationship between increased employee performance and group dynamics as well as workers' attitude (Allen, 1998). This study is important to my research as I am going to evaluate relationships that affect employee satisfaction and employee fulfillment as perceived by community college presidents.

The most recent model was the human resources school, begun in the 1950s and highlighted by an increased interest in employee motivation and organizational leadership. This theory stated that most employees wanted to see their organization become successful and wanted to contribute to its success using their talents. Unfortunately, leadership often failed to properly recognize and use employee talent (Allen, 1998). A quick review of Deming's 14 points showed that he was interested in developing employee potential, making workers proud of their part in the organization,

and developing leaders within the organization, suggesting a close relationship between TQM and the human resources school.

Organizations that encouraged their employees to develop programs to improve quality were considered the founders of continuous improvement, a movement that began in the late 1800s (Bhuiyan & Baghel, 2005). Since early days, management systems evolved and worked their way into the private and public sectors and were no longer limited to for profit organizations. Incentives were developed as a way to promote the quality/performance improvement movement such as the Malcolm Baldrige National Quality Award, named after Malcolm Baldrige, Secretary of Commerce from 1981 to 1987. This program was initiated by the U.S. Congress in 1987 and was a way to reward organizations that took the lead in quality improvement and to share their success stories with others. The award evaluated "…customer-driven quality, leadership, continuous improvement, employee participation and development, and fast response" (Arif & Smiley, 2003, p. 741).

The United States Army had a similar program called Army Performance Improvement Criteria (APIC), which was heavily based upon the Baldrige criteria (*Army Performance Improvement Criteria*, 2006). This program attempted to annually evaluate military units in several quality improvement areas. The Army felt so strongly about getting organizations to participate that they awarded $30,000 each year to any organization that submitted a packet of improvement measures they implemented for evaluation. Those organizations selected as winners for fiscal year 2007 received award money ranging from $750 thousand to $2 million dependent on the size of the winning organization (*Army Performance Improvement Criteria*, 2006).

The origins of Continuous Improvement (CI) can be traced to the 1800s when organizations such as National Cash Register (NCR) implemented employee reward programs, opportunities for self development, and techniques to enhance the employee-manager relationship (Bhuiyan & Baghel, 2005). Today, CI is a broad term that encompasses programs as Six Sigma, Lean Manufacturing, Balanced Scorecard, and TQM.

Dr. W. Edwards Deming is often referred to as the creator of TQM, though when confronted, he would passionately argue that TQM was a buzzword with no definition, and therefore did not exist. Deming believed that through better relationships between managers and employees, workers could be instrumental in the reduction of manufacturing errors. Working with Japanese leaders of industry following World War II, Deming began to put his theory for performance improvement into action and for the next 30 years was highly regarded in Japan, but little known in the U.S. (Petersen, 1999).

Deming's obscurity in the U.S. changed in June of 1980 when, at the age of 79, he appeared on an NBC documentary that studied the Japanese industrial recovery after World War II and how they were currently dominating some industries (Petersen, 1999). Since Deming played such an important role in the Japanese recovery he was interviewed for the documentary, and soon after came to be looked on as the leader in quality improvement.

Six Sigma

Six Sigma is currently one of the more popular CI programs in use. A careful review of its main ideas revealed that Six Sigma had its roots clearly in TQM, including its birth in the manufacturing field. Six Sigma was a program created by the Motorola

Corporation as a way to improve quality in products that had a large number of components and, subsequently, had a potentially higher than acceptable rate of defects in these components (Arnheiter & Maleyeff, 2006).

Although Motorola coined the term Six Sigma, its origins could be traced to Deming and Shewhart. Working with statisticians in his effort to improve quality, Deming identified what Chambers (1998) labeled as "…normal variation inherent in each process. Superimposed on the natural variation are the "special" factors that produce excessive numbers of defects" (p. 9). To illustrate this example, Chambers (1998) used airplane landings that "…normally range from the smooth to the bumpy; pilot or equipment error, often combined with unusual weather circumstances, cause the extreme variations which lead to severely uncomfortable and dangerous landings or worse" (p. 9). The TQM link to Six Sigma was evident when Chambers wrote:

> Deming and others arbitrarily defined three standard deviations above and three standard deviations below the standard as the boundaries of "normal variation". This is the origin of the Six Sigma standard that has become a motto for several quality improvement programs. (p. 9)

Motorola was in the business of developing electronics that could have thousands of parts, any one that could fail. They discovered that as their products became more technological, the number of components increased, with a subsequent increase in the possible number of failures to any of the components. The possible failures were called Opportunities for Defects (OFD). The development of Six Sigma was a way to reduce possible failures and evolved as a statistical analysis of a "…component's tolerance were consistent with a spread of six standard deviation units of process variation, about 99.7 percent of the components would be expected to meet tolerances…which translates to about 3,000 non-conforming parts per million (NCPPM)" (Arnheiter & Maleyeff, 2005,

p. 7). A graphic representation of the increases in quality for each sigma level is shown in Figure 1.

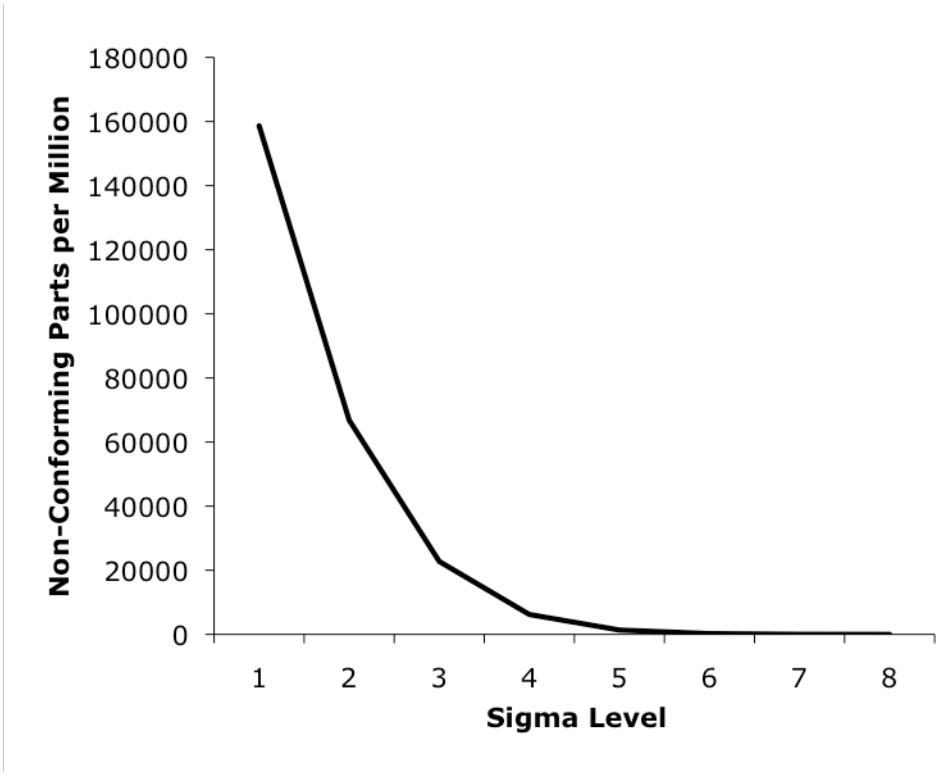

Figure 1. Reduction in Defects per Standard Deviation

As the figure shows, for every increase in the standard deviation (sigma), a significant increase in quality occurs. This was explained by using Arnheiter and Maleyeff's, (2005) example that in 1999, Ford Motor Company averaged 20,000 OFDs per car. If Ford obtained Six Sigma quality (six standard deviations above the norm), one car in every 15 would contain a defect, while a standard deviation of 5.5 would result in at least one defect in approximately half of all cars produced (Arnheiter & Maleyeff., 2005).

To reduce the number of defects in a product, Six Sigma calls for a structured model for organizations to follow. Abbreviated as DMAIC, the model asked managers to Define opportunities, Measure performance, Analyze opportunities, Improve

performance, and Control performance. When this model was first used at Motorola, the company achieved a savings of $14 billion from 1987 to 1997 (Bhuiyan, 2005).

Lean Manufacturing

Like many of the other concepts discussed in this review, Lean Manufacturing was interested in the elimination of waste with an increase in productivity through the use of less space and effort. It also required organizations to support the current consumer demand for a high quality product at a low cost. Lean Manufacturing allowed a company to learn as it eliminated waste and avoided the mistakes that led to the generation of waste (Bhuiyan, 2005).

Though lean manufacturing was often believed to have originated at Toyota, Strouse (2008) suggested that it was actually developed by Henry Ford in 1913 when he "…developed flow production to streamline the automotive assembly process" (p. 58). The process was revised by others until it eventually was adapted in the 1950s at Toyota where it was originally referred to in Japan as the Toyota production system and subsequently became known as Lean Manufacturing by Womack (Dahlgaard & Dahlgaard-Park, 2006). It was built on three basic principles: (a) improve flow of material and information across business function, (b) focus on pull by the customer, and (c) commitment of organizations to continuous improvement (Bhuiyan, 2005).

Taiichi Ohno was an individual working in the production department of Toyota who was credited with creating Toyota's production system of reducing *muda* (waste), which became the foundation for lean manufacturing (Dahlgaard & Dahlgaard-Park, 2006). He often traveled to the U.S. to study mass production techniques at Ford Motor Company and returned to Japan with ideas to reduce waste and increase performance at

Toyota. His first step was the creation of groups of workers who were encouraged to work together. These groups were considered to be the original quality circles (Dahlgaard et al., 2006).

While Dahlgaard and Dahlgaard-Park (2006) presented a thorough history of continuous improvement programs, the authors also provided a very good description of how Lean Manufacturing and other continuous improvement programs "…should not be seen as alternatives to TQM but rather as a collection of concepts and tools, which support the overall principles and aims of TQM" (p. 271). Even more interesting, they wrote that while all of the continuous improvement methods they discussed could be considered roadmaps to world-class quality, none would work unless the company culture utilized the core principles of TQM (Dahlgaard & Dahlgaard-Park, 2006).

While it can be argued that TQM was the genesis of all other continuous improvement programs, the literature clearly demonstrated that the proverbial "silver bullet" did not exist (Schoengrund, 1996). New programs emerged or evolved from other ones, but a single program that prevented all problems had yet to be found. This search for a better solution resulted in the combination of management theories. One such combination was the relatively new Lean Six Sigma, which, as the title suggests, combined Lean Manufacturing and Six Sigma. Bhuiyan (2005) suggested that the strength of this combination was that lean manufacturing sought to eliminate waste while Six Sigma attempted to reduce defects in the production process. In combining the two processes, waste was first removed, which then made it easier to spot defects in the production process.

Kaizen

Kaizen was a system closely related to lean manufacturing and the Toyota production system developed by Taiichi Ohno. Kaizen was a Japanese word that translated to improvement or continuous improvement. Kaizen asked assembly line workers at Toyota to be a part of the development and improvement process and empowered them to reduce waste through their individual creativity (Alukal, 2007). Manos (2007) defined kaizen as a system of small incremental steps that lead to improvement. He used the baseball analogy of "…hitting singles all game long to score runs" (Manos, 2007, p. 47) to describe how these small steps were made over time.

Kaizen developed into a system that used teams of individuals focused on the improvement process and as noted by Manos (2007) started using kaizen events, or blitzes, that asked the team to develop quick solutions to larger problems. Liu, Pylipow, and Plsek (2008) suggested that the event lasted no longer than three to five days. Going back to the baseball analogy, kaizen events were akin to hitting homeruns (Manos, 2007). Lest there be confusions, kaizen events supplemented, rather than replaced, traditional kaizen. The baseball game was still won by the batters hitting the singles, but a home run was hit when the game was getting too close and it looked like the competition might take the lead.

Like other improvement programs, kaizen was related to TQM and had been successfully used outside of the manufacturing field. Alukal (2007) discussed how kaizen implemented the plan-do-check-act cycle developed by Deming. He wrote:

> The approach that the *kaizen* team came up with was the plan step. Implementing the plan was the do step. Monitoring performance versus plan was the check step. Taking midcourse correction if the performance does not meet the plan, or standardizing at the improve level if the targets are met was the act step. (p. 69)

It should come as no surprise that kaizen implemented TQM concepts as Toyota was a Japanese company and the Japanese were very strong supporters of Deming and his methods.

Kaizen has been successfully used outside of manufacturing and a startling success story was found at the Arche Wellness center that treats alcohol and drug dependency. The center had been operating in the United States for over 25 years and had a success rate between 74% and 85% for a 60 day program (Brandt, 2007). The director wanted to improve the success rate and stumbled upon kaizen during her search for improvement methods.

Using kaizen, the center implemented a plan-act-verify-analyze cycle that lasted one week. During this week counselors met with clients to evaluate the treatment plan they were under and make adjustments based upon the plan-act-verify-analyze cycle (Brandt, 2007). Since implementing kaizen into the treatment program, the center reduced the 60 day program to two to three weeks and has enjoyed a 100% success rate (Brandt, 2007).

The current Toyota production system evolved into a tri-level program that started with a focus on the assembly line worker. Alukal (2007) wrote that at the first level, called Gemba Kaizen, employees are encouraged to stop the line if they detect any possibility of a problem. Gemba Kaizen was followed by Jishuken which asked individuals from other areas of the organization to evaluate the process. This allowed for a fresh perspective to evaluate the methods and look for ways of improvement (Hallum, 2007). The final level was called the kaikaku approach and attempted to bring about rapid change to a program, similar to the kaizen events discussed by Manos (2007).

Hallum (2007) stated that kaikaku was primarily used when "Old methods are discarded and a fundamentally new concept is introduced" (p. 40). It is the home run mentioned by Manos (2007).

Strategic Planning

Strategic planning was a system that provided leaders with a detailed roadmap to follow as they set the course of their organizations. Fogg (1994) wrote that most strategic plans included "…situation analysis (external assessment, internal assessment), priority issues, mission, objectives, strategies, program development, delegation, and accountability and review" (pp. 4-5). What made strategic planning a continuous improvement methodology was some of the stated goals of strategic planning: (a) reaction to a greater demand in quality from consumers, (b) requirement for organizations to improve themselves and their product through efficiency, and (c) a demand for greater accountability (Bryson & Alston, 2005).

With respect to higher education, Dooris, Kelley, and Trainer (2002) suggested that colleges could improve themselves and their product through measures such as "…hiring better faculty, recruiting stronger students, upgrading facilities, strengthening academic programs and student services, and acquiring the resources needed to accomplish these things" (pp. 5-6). This research presented an important distinction regarding strategic planning in the collegiate setting when they wrote that the focus was on creativity, learning, and challenging long held assumptions.

As with TQM, strategic planning often suffered from an identity crisis as some organizations improperly used strategic planning which led to frustration with the process. Mintzberg (1994) attributed part of this problem to confusion between what he

called strategic planning, which he claimed was really strategic programming as practiced today, and strategic thinking. What made this distinction important was the difference between strategic planning and strategic thinking. Where strategic planning was a more formal and detailed process, strategic thinking was much more creative and intuitive and could occur at any time and in any setting (Mintzberg, 1994). This was much different than the nine step process identified by Fogg (1994), and confusing the two was what Mintzberg (1994) believed caused so many organizations to be unsuccessful in their strategic planning.

Balanced Scorecard

Robert Kaplan and David Norton created the balanced scorecard in the 1990s based upon their belief that corporations did not have an effective method to quantify their level of performance and were unable to determine if they were meeting the organization's goals and objectives (Niven, 2003). They set out to create a tool that could provide managers with performance measures from inside their organizations centered on three elements: (a) measurement system, (b) strategic management system, and (c) communication tool.

Where the balanced scorecard differed from other improvement programs was the measurement system. Put into context, Niven (2003) wrote that many organizations tended to measure performance using financial measurements. However, these measures provided lag indicators, meaning they measured events that had already occurred. Balanced scorecard attempted to measure lead indicators that were future economic performance measures taken from an organization's strategy, or strategic plan, which tied into the second element of the scorecard.

Kaplan and Norton discovered that after several years of use, the balanced scorecard was being used as a strategic management system (Niven, 2003) and that organizations were using the scorecard as a tool to "…align short-term actions with their strategy" (Niven, 2003, p. 19). Using the scorecard, organizations were able to overcome hurdles that Niven (2003) described as vision barriers, people barriers, resource barriers, and management barriers.

The final element of the balanced scorecard was its use as a communication tool. This is where the strength of Niven's (2003) research was demonstrated, as the communication element was perhaps the most important element of the balanced scorecard. This was due to its ability to translate an often confusing or vague vision and goals statement into a simple to understand format that every member of the organization could comprehend and strive toward.

Deming and Total Quality Management

The history of what becomes TQM is an interesting one that began during World War II. Dr. Deming, along with Dr. Walter A. Shewhart, a statistician with Bell Laboratories and Joseph M. Juran, an engineer with Western Electric, were key individuals in increasing the U.S. ability to produce large quantities of quality weaponry and ammunition using an unskilled labor force (Chambers, 1998). The concepts they used to increase productivity offered new ways to look at how to manage and run a factory (Tribus, 1981).

At the conclusion of the war, most of the lessons taught by Deming, Shewhart, and Juran were lost to American businesses as new managers who did not receive training in quality improvement began to take over the factories and businesses (Tribus,

1981). At the same time, American consumers accepted lower quality products as "…the best that could possibly be done" (p. 3). The belief was that any increase in quality would have a resultant increase in cost, and for a society that just exited from a costly war, and whose costs continued through restoration programs, this was not an acceptable consequence for the average consumer. Additionally, many Americans felt that because we had won the war, the quality of American products was superior to those of other countries (Tribus, 1981).

The viewpoint on the western side of the Pacific Ocean was very different. Having lost the war, with an economy in ruins, and a proud society defeated, the Japanese were very willing to learn new ways of management and production that would help restore their economy. In 1950, the U.S. assisted the Japanese Union of Science and Engineering by sending Dr. Deming to Japan to teach his concepts of quality improvement (Tribus, 1981).

Upon his arrival, Deming observed operations in Japanese industry and felt that his quality improvement methods could solve several problems. He invited 45 Japanese industrial leaders to an initial meeting where he discussed his methods and promised them that if used, Japan would become a leader in international trade within five years (Tribus, 1981). It is interesting to read that Tribus (1981) reviewed the writings made years later by some of the attendees and discovered that most of them did not believe what Deming said. The best that most of them hoped for was a return to the level Japan was at prior to entering World War II. While not initially excited about the teachings of Deming, they felt honor bound to make an attempt to implement Deming's methods, even though they felt they would do no good. Within six weeks of the meeting, several

attendees reported performance improvements of 30% within their industry without purchasing any new equipment (Tribus, 1981). The gains were directly attributed to Deming's methods and he was quickly embraced by Japanese industry as a leader who had important lessons to teach.

The concepts Deming taught the Japanese were basically a different way to look at business priorities and how to achieve them. Instead of asking managers to set goals and priorities for their employees that led to greater profits, Deming instructed leaders to "…provide a consistency and continuity of purpose for his organization and to seek ever more efficient ways to meet its purpose" (Tribus, 1981, p. 5). In short, Deming taught industry leaders that seeking profit was not the ultimate goal of organizations; it was necessary for the organization to endure, but it was far from the main reason for existence. Deming believed that managers could create an environment in which best quality and least cost could exist and at the same time be concerned with the continued employment of their workers. This final concept was very important to practitioners of Deming's teaching, as it was understood that the continued improvement of an organization was largely dependent upon the employees (Tribus, 1981). It is important to note that Tribus (1981) believed a leader trained under Deming was not interested in motivational posters or slogans, but on efforts to develop a team that worked together to find innovative ways to improve performance.

The concepts taught by Deming have become known as Deming's 14 Points. As interpreted by Chambers (1998), they are:

> 1. Create constancy of purpose toward improvement of product and service, with the aim to become competitive and to stay in business, and to provide jobs.

> 2. Adopt the new philosophy. We are in a new economic age. Western management must awaken to the challenge, must learn the responsibilities, and take on leadership for change.
> 3. Cease dependence on inspection to achieve quality. Eliminate the need for inspection on a mass basis by building quality into the product in the first place.
> 4. End the practice of awarding business on the basis of a price tag. Instead, minimize total cost. Move toward a single supplier for any one item, on a long-term relationship of loyalty and trust.
> 5. Improve constantly and forever the system of production and service, to improve quality and [productivity, and] thus constantly decrease costs.
> 6. Institute training on the job.
> 7. Institute leadership. The aim of supervision should be to help people and machines and gadgets to do a better job. Supervision of management is in need of overhaul, as well as supervision of production workers.
> 8. Drive out fear, so that everyone may work effectively for the company.
> 9. Break down barriers between departments. People in research, design, sales, and production must work as a team, to foresee problems of production and in use that may be encountered with the product or service.
> 10. Eliminate slogans, exhortations, and targets for the work force asking for zero defects and new levels of productivity. Such exhortations only create adversarial relationships, as the bulk of the causes of low quality and low productivity belong to the system and thus lie beyond the power of the work force.
> 11a. Eliminate work standards (quotas) on the factory floor. Substitute leadership.
> 11b. Eliminate management by objective. Eliminate management by numbers, numerical goals. Substitute leadership.
> 12a. Remove barriers that rob the hourly worker of his right to pride of workmanship. The responsibility of supervisors must be changed from sheer numbers to quality.
> 12b. Remove barriers that rob people in management and in engineering of their right to pride of workmanship. The [sic] means, *inter alia,* abolishment of the annual or merit rating and of management by objective.
> 13. Institute a vigorous program of education and self-improvement.
> 14. Put everybody in the company to work to accomplish the transformation. The transformation is everybody's job. (p. 9)

Tribus (1981) believed that the 14 points would result in an environment in which leaders identified the difference between problems caused by employees and problems caused by organizations' systems. Leaders could then work with the employees to identify and solve the problems.

TQM Components

While Deming's 14 points were widely recognized as the framework for a successful continuous improvement program, the points did not lend themselves to easily measured concepts. More simply put, how were traits such as leadership, teamwork, or employee satisfaction measured in such a way as to evaluate the effectiveness of the program?

The reviewed literature clearly suggested that a universal definition of TQM did not exist. However, several researchers attempted to identify the components of what they believed made up a successful TQM program. The literature contained several studies in which researchers developed survey instruments designed to quantifiably measure these components.

A study conducted in 2002 by Detert, Schroeder, and Cudeck (2003) attempted to validate *The School Quality Management Culture Survey* (SQMCS), which was a survey designed to measure quality management concepts in K-12 schools. The researchers began their study with a literature review to identify common themes found in descriptions of quality management program. This review resulted in nine components of quality management: (a) shared vision, (b) customer focus, (c) long-term focus, (d) continuous improvement, (e) teacher involvement, (f) collaboration, (g) data-based decision-making, (h) process focus, and (i) quality at the same cost.

The researchers sent an initial survey to teachers from a sample of schools whose sample size was not identified. From this, they received 207 responses from eight school districts in seven states (Detert, Schroeder, & Cudeck, 2003). The analysis from these responses were not what the researchers expected based upon their belief that many of the

questions were confusing and items believed to be related by the researchers were not supported by the answers provided by the respondents. With this in mind, the researchers modified the survey and sent it to teachers from 16 schools. Though the researchers did not identify the sample size, they did receive responses from 725 individuals (Detert et al., 2003). Based upon the analysis from the responses, the survey was once again modified and sent to 36 schools with responses received from 1,743 individuals.

Each version of the instrument asked respondents to "…indicate their level of agreement with each question twice – first indicating how things in their school actually ARE as regards to the question, and second indicating how they think things SHOULD BE…" (Detert et al., p. 311). The researchers determined that of the nine constructs evaluated, they could not consistently find related items that suggested a definition of quality. However, the constructs had consistent loading across the ARE and SHOULD BE columns, indicating that these constructs were present at institutions that considered themselves practitioners of quality management.

This research was a valuable contribution to the identification of components making up a quality management program. The researchers conducted an extensive literature review that resulted in the identification of suspected quality management components and then tested them through the development of a survey. The instrument was administered to separate samples and changes were made to improve reliability based upon analysis of the first two administrations. The statistical analysis conducted was very thorough and was appropriate for the conclusions reached by the researchers. Other authors supported the components identified by the researchers and several of them were used in the formulation of the survey instrument used for this dissertation.

As stated earlier in this document, TQM has been in existence since just after the conclusion of World War II and the last six decades have seen many attempts to clarify the concept. Reviews of research in identifying these concepts were conducted by Eshennawy, Maytubby, and Aly (1991). Through in-depth reviews of the literature, the researchers discovered common components that appeared in successful TQM programs. The first component was continuous improvement, which Eshennawy et al. (1991) cited as the critical component for increasing customer satisfaction and reducing waste.

The other attributes identified as components of TQM included the formation of teams, a reduction in variability, education and training, and supplier integration (Eshennawy et al., 1991). When compared to the study by Detert et al. (2003) similar findings emerged about continuous improvement, collaboration, and customer satisfaction. However, the Eshennawy et al. (1991) article differed from the Detert et al. (2003) study in that it was a review of existing literature and did not put forth a theory or hypothesis that could be tested.

One of the first studies that attempted to explore relationships between TQM components was conducted by Kaynak (2003). The researchers sampled 1,884 respondents from manufacturing firms and service industries, targeting presidents, vice presidents, directors, and managers. Responses were received from 382 administrators for a response rate of 20.3%. Overall, the study determined a positive relationship existed between increased performance in a firm in relation to the level of TQM implementation.

Where this study differed from earlier ones was the investigation into the relationship among the components of TQM. Kaynak's (2003) statistical analysis

discovered that management leadership is directly related to training, employee relations, supplier quality management, and product design. It was indirectly related to quality data and reporting and to process management. Kaynak (2003) further found that training and employee relations were directly related to quality data and reporting and indirectly related to supplier quality management, product/service design, and process management. The results of further analysis by Kaynak (2003) discovered that:

> …the three TQM practices which have direct effects on operating performance (inventory management and quality performance) are supplier quality management, product/service design, and process management. Management leadership, training, employee relations, and quality data and reporting affect operating performance through supplier quality management, product/service design, and process management…This finding is consistent with the results in the study by Grandzol and Gershon (1997). (Kaynak, 2003, p. 429)

This study was important not only because it validated the research conducted by the authors of the survey used in this dissertation, but also because Kaynak (2003) keenly pointed out that the relationships among TQM components suggested that TQM practitioners cannot randomly select components to implement. If a TQM program is to be successful or practitioners are looking to improve certain areas, then implementers must ensure that the techniques they choose are ones that positively relate to the goal they are seeking. Kaynak (2003) conducted an extensive literature review and sampled a large enough group to conduct his analysis. The statistical methods chosen for analysis were appropriate and thoroughly explained allowing for subsequent testing of his findings.

Refinement of TQM

Although Deming is perhaps the individual most associated with TQM, there are others who had significant impact upon the TQM and CQI process. Three very influential individuals were Walter A. Shewhart, Philip B. Crosby, and Joseph M. Juran.

Each made important contributions to the field of TQM and CQI. Shewhart, served as Deming's mentor and is credited as being responsible for much of Deming's theories (Petersen, 1999). While being a CQI practitioner himself, Crosby eventually became one of the more outspoken critics of TQM.

Walter A. Shewhart

Like Deming, Shewhart was a statistician interested in quality improvement. Though Deming was often referred to as the father of TQM, Shewhart was considered to be one of Deming's mentors and greatly influenced his early entry into the world of quality improvement (Petersen, 1999). Deming met Shewhart in the 1920s when introduced by one of Deming's co-workers at the Department of Agriculture. The introduction led to a mentorship from Shewhart and included several collaborative efforts between the two (Petersen, 1999). Shewhart was indirectly responsible for Deming travelling to Japan in 1950. Because of an illness, Shewhart was unable to travel to Japan and suggested that Deming go in his stead (Schultz, 1994).

Shewhart is credited with the creation of rational subgrouping, a method of statistical thinking that asks statisticians to identify the source of variation within a process and eliminate it (Hare, Hoerl, Hromi, & Snee, 1995). It was in 1924 that Shewhart created the "first known example of a process control chart…which allowed an inspector to document the percentage of defective product" (Folaron, 2003, p. 39). In the early part of the 20th century, this was considered a relatively new idea. Writing about this concept in 1939, Shewhart and Deming (as cited in Petersen, 1999) stated, "Most of us have thought of the statistician's work as that of measuring and predicting and planning, but few of us have thought it the statistician's duty to try to bring about changes

in the things that he measures" (p. 479). Shewhart and Deming felt that statistics were an important part of the improvement process and that statisticians played a key role in implementing it.

Shewhart's control chart had three lines, the central line which was the mean and upper and lower lines, which were the control limits representing "…the limits of common-cause variation" (Mohammed, Cheng, Rouse, & Marshall, 2001, p. 463). Any data point, or manufacturing process, that fell outside of these control limits was a cause for concern. Using his skills as a statistician, Shewhart stated that quality processes should lie within three sigma limits of the mean (Mohammed, et al., 2001). Unlike Crosby, Shewhart felt that variation in the manufacturing process could be reduced to an acceptable limit, but not eliminated. One can clearly see how his process control chart influenced the Motorola Corporation in their development of Six Sigma. Folaron (2003) wrote that the components of Six Sigma were more than 50 years old when "discovered" by Motorola, and Shewhart was an obvious inspiration for Six Sigma developers. Best and Neuhauser (2006) supported this statement in their review of Shewhart's contributions to TQM and quality improvement.

From the process control chart, Shewhart created a cycle for reducing variation, which he labeled: plan, do, inspect, and act (PDCA's Beginnings, 2006). This is a cyclic system that continuously evaluates manufacturing as it occurs. The "plan" step asks managers to learn from successes and failures in order to design a product with reduced variability. This plan is put into action during the "do" stage during which the product is manufactured to new standards. Variation is looked for, and removed, in the "inspection" stage, and "act" flows into the "plan" stage where changes are made to the process based

upon results gathered from the "inspection" stage (Hare et al., 1995). The central theme to this process was that learning and improvements occurred throughout the entire cycle (Best et al., 2006). Deming later modified the cycle into the plan-do-check-act (PDCA) and after years of study refined it once more into the plan-do-study-act (PDSA) cycle (Folaron, 2003).

Deming was a great admirer of Shewhart as a statistician, friend, and mentor. Upon Shewhart's passing in 1967, Deming wrote a brief history of the work of Shewhart and discussed the three sigma limits and how this process supported quality improvement:

> He saw further that statistical control is not a matter of estimation nor of testing a hypothesis, but rather a rule of behavior that will strike a balance for the net economic loss from two sources of mistake: (1) looking for special causes (he called them assignable causes) too often, or overadjusting; (2) not looking often enough. (Deming, 1967, p. 40)

Joseph M. Juran

Joseph M. Juran, was an engineer with Western Electric during the 1930s. He was born in Romania in 1904 and immigrated to the United States in 1909 (Petersen, 1999). He grew up very poor and during an interview in 1999, related his upbringing to society's current dependence upon technology. Juran stated that growing up he never worried about power failures because his village didn't have power and appliances didn't fail because his family didn't have any (Stewart, 1999).

After graduating from the University of Minnesota in 1924 with a BS in electrical engineering, Juran followed a path very similar to that of Deming. Both men worked at Western Electric's Hawthorne Plant in Chicago and at the start of World War II, both left Western Electric to work with the federal government (Landesberg, 1999). Upon the

conclusion of the war, both were invited to work closely with the Japanese government in their rebuilding efforts (Petersen, 1999). Juran and Deming's similar paths continued on the road to quality improvement after World War II when they were eventually recognized in the United States, if not much of the world, as experts in continuous quality improvement.

Juran's contributions included the creation of the Juran trilogy, the triprol concept, and his central theory called continuous quality improvement (Petersen, 1999). The Juran trilogy was a concept that would reduce waste by explaining the "…interrelationship of three processes used to manage quality: (a) quality planning, (b) quality control, and (c) quality improvement" (Petersen, 1999, p. 473). Juran's triprol was a concept that workers in an organization had three main roles: (a) customer, (b) processor, and (c) supplier (Petersen, 1999). While Deming had his 14 points, Juran created the Ten Steps of the Quality Improvement Process, which asked managers to:

1. Build awareness of the need and opportunity for improvement.
2. Set goals for improvement.
3. Organize to reach the goals.
4. Provide training throughout the organization.
5. Carry out projects to solve problems.
6. Report progress.
7. Give recognition.
8. Communicate results.
9. Keep score.
10. Maintain momentum by making annual improvement part of the regular systems and processes of the company. (Landesberg, 1999, p. 60)

Juran placed importance on the definition of the customer and disagreed with those who defined the customer as someone who purchased a product from a supplier. During an interview given to *IIE Solutions*, he stated that he would like to change the dictionary to define a customer as "…all the people who are impacted by what we do"

(Gaboury, 1999, p. 33). He further elaborated on the idea of students within HE and stated that the customers of HE are more than just the students and included the employers who would eventually hire students as they were also impacted by what the college or university did. In the direct manner he was known for, Juran summarized his thoughts on customers by saying "…we've assumed that there is only one category of people that are what we call customers and I think that assumption is defective" (Gaboury, 1999, p. 33).

While Deming and Juran followed similar paths and were both early innovators in quality improvement programs, Landesberg (1999) believed that a fundamental difference between the two was Deming's focus on theory and philosophy while Juran focused more on practical application of his ideas. This led him to state that individuals who favor theory would be drawn to Deming and those who were more practical would appreciate the works of Juran (Landesberg, 1999).

An example of Juran's practical views was found in his discussions of technology. Juran was 103 years old when he died in 2008 and in his later life he studied our dependence upon technology, which he labeled "…life behind the quality dikes" (Stewart, 1999, p. 169). He explained that society had greatly benefitted economically from dikes and levee systems that kept the sea at bay, but the cost of this benefit was a requirement to maintain these systems in perfect order for the rest of our lives or suffer great loss. While he was clearly drawing an analogy to managerial concepts, his words were prophetic of Hurricane Katrina in 2005, which demonstrated the results of neglect.

In the same interview, Juran told Stewart (1999) that the 21st century would have to be the century of quality. He stated that we were too dependent upon technology for

our society not to do everything we could to maintain the quality of our innovations. He described how a few weeks prior to the interview a satellite stopped functioning, which resulted in his credit card no longer working, which in turn prevented him from buying gas for his car (Stewart, 1999). This was a short-lived minor inconvenience, but it was a good illustration of the chain of events that could occur from a breakdown in the quality of technology.

Regardless of whether an individual was drawn to the theory of Deming or the practicality of Juran, it was important to educate future practitioners in fundamentals of quality improvement and that was where Juran believed HE was failing (Gaboury, 1999). Demonstrating his different perceptions from Deming, Juran stated that HEIs focused too much on mathematical models and not enough on reality. Students were entering the work force lacking the abilities to apply theory learned in school to real life applications in the business world, and Juran challenged faculty to correct this (Gaboury, 1999).

Philip B. Crosby

Philip Crosby was initially a major supporter of TQM during the 1980s. He worked at Martin Marietta where he created the concept of zero defects and was the first vice-president of quality for ITT Corporation (Petersen, 1999). He established four absolutes of quality, which were "(a) quality is conformance to requirements, not goodness, (b) quality is achieved through prevention, not appraisal, (c) zero defects is the quality performance standard, not some acceptable level of defects, (d) quality is measured by the price of nonconformance, not indexes" (Stevens, 1995, p. 14).

From his absolutes of quality, Crosby developed his 14 steps of quality management (as cited in Petersen, 1999):

1. Management commitment.
2. Quality improvement team.
3. Measurement.
4. Cost of quality.
5. Quality awareness.
6. Corrective action.
7. ZD (zero defects) planning.
8. Employee education.
9. ZD day.
10. Goal setting.
11. Error-cause removal.
12. Recognition.
13. Quality councils.
14. Do it over again. (pp. 474-475)

Crosby mentions quality several times in absolutes and his 14 steps. During an interview, Crosby was asked to define quality and he described it as a concept that was measurable, referred to goodness, and resulted in a product that was delivered to the customer exactly as promised. It was a concept that resulted in happy customers, which in turn led to a profitable business (A prophet of quality, 1990).

It was Crosby's belief (1980) that corporations did not embrace his 14 steps of quality management or his absolutes of quality management because people were slow to change and rejected newness. For his philosophy to receive acceptance, businesses would have to change their cultures and asking them to accept a culture of zero defects was very difficult (Crosby, 1980). As Crosby became a critic of TQM, further discussion of his zero defect philosophy is covered in the ensuing paragraphs of this document.

Perceived Failures of TQM

TQM was not a silver bullet for improving performance and it had its share of failures and a large group of critics (Schoengrund, 1996), among the most vocal was Crosby. His biggest complaint with TQM was reliance on procedures and statistics,

when it was his belief that quality improvement came from concepts; a concept he named zero defects and discussed in an interview with Cabanis (1997).

Zero defects was exactly what the name implied, all products must be completely free of defects when delivered to the customer. Crosby illustrated the simplicity of his concept when he was quoted saying, "I walk up to the automatic teller machine and stick my card in and ask for $200 and they give me $200 and it shows up in my checking account. No problem" (Cabanis, 1997, p. 19). This was where Crosby drew the line between CI and what he preached -- quality management. According to Crosby, CI was a lifetime achievement goal, but if an organization based their operations on CI, then:

> They would think it means that if we dropped eight babies this week, we'll only drop seven babies next week and six the week after that and then we'll apply for the Baldrige because our percentages will look good. It's a way of getting around zero defects. (Cabanis, 1997, p. 21)

Crosby felt that zero defects could be easily obtained by every organization but it was blocked by managerial failure to believe it was obtainable due to anticipated high costs (Cabanis, 1997).

In an interview given to Stevens (1995) Crosby stated that corporations that implement zero defects as the performance standard could expect to see a revenue gain of 20% to 25%. This resulted from doing things right the first time and not having to spend money on repeating a process to correct a flaw in manufacturing. Crosby further stated that a corporation could expect to cut in half their cost of nonconformance within a year to a year and a half. Shortly after that expenses for nonconformance should be "…just a trace – what you spend is primarily on education and evaluation" (Stevens, 1995, p. 14).

While offering no specific observations of companies that failed to improve when they used TQM, Crosby did offer valid criticism of TQM and other CI methods. As an

example, Six Sigma strives for 99.7% of products without defect. Citing an article by Marino (1997), Cabanis (1997) wrote that if organizations operated at 99.9% defect free, then banks would deduct 22,000 checks from the wrong bank accounts each hour; surgeons would perform 500 incorrect operations daily; and hospitals would be responsible for giving 12 babies to the wrong parents every day. The message Marino (1997) was sending was clear; any CI program that doesn't strive for 100% accuracy in their product was a failure.

Although the Cabanis' (1997) and Marino' (1997) articles did not specifically address why CI programs failed, Yang (2006) conducted a study in which it was concluded that Human Resource Management (HRM) significantly impacted the effectiveness of TQM programs within high-tech firms in Taiwan. Using a questionnaire, Yang (2006) surveyed 300 companies and received 62 responses for a response rate of 20.7%. The questionnaire attempted to study the relationship between "…HRM practices on the implementation of TQM and quality performances…" (Yang, 2006, p. 166). Subsequent interviews with HR and quality managers as well as CEOs of several high-tech firms were conducted to further explore the relationship between HRM and TQM (Yang, 2006).

What Yang (2006) found was that "…the implementation of HRM has a positive and significant effect on the performance of TQM…" (p. 166). What is important for this study is that Yang (2006) found that the HRM practices that had the greatest effect on the implementation of TQM included training and education, followed by incentive compensation, employee development, and recruiting and selection. Further, Yang (2006) found that the HRM practices that had the greatest effect on individual practices

of TQM were customer satisfaction managing, statistical quality control, and leadership. These findings are important for this study as several of the relationships under study include leadership, learning, and employee fulfillment.

TQM and Higher Education

TQM became one of the more familiar management systems based upon the goal of continuous organizational improvement by following a road that was determined by the leader of the organization (Taylor & Hill, 1992). One of the key requirements in the TQM model was the identification of a process for performance measuring and benchmarking, and an evaluation of how effectively the organization was supporting the customer with their business practices (Groccia, 1997). What appeared to be a very simple step could be very difficult to articulate when applied to higher education.

For higher education to effectively use TQM, Groccia (1997) argued that the college or university must first identify students as the customers as they were the ones who have entered into a contract for a service with the school. Students should be allowed to voice their concerns on what they felt they needed, and they were entitled to a product that was safe, open, and valuable. Groccia (1997) suggested that through the application of TQM, HEIs could evaluate how well they were supplying their product and look for ways to improve performance.

In developing her argument for the use of TQM in higher education, Burkhalter (1996) cited Deming when she stated that "…94% of an organization's quality problems lie within the management system, not with the individual, emphasis should always focus on analyzing and improving the system rather than focusing on the individual" (p. 155). TQM was a tool that offered a step-by-step process of improving business methods to

satisfy stakeholders' demands, and Burkhalter (1996) identified the stakeholders as both students and parents of students who were increasingly asking what type of return was being earned based upon the cost of tuition.

Recognition of this pressure from stakeholders resulted in university leaders looking for ways to improve the quality of their product. Taking a cue from their counterparts in the corporate world, over 160 universities in the U.S. adopted some form of quality improvement program during the 1990s, with over half of them creating some form of quality improvement center based upon the broad belief that stakeholders have a right to expect a measurable return on their investment (Burkhalter, 1996).

Narasimhan (1997) credited Fox Valley Technical College (FVTC), a two-year technical college in Wisconsin, as being one of the first institutions to implement TQM into their planning process. Since 1985, the college used TQM to help administrators find ways to improve quality of life in the office. FVTC was so well regarded, that colleges in the United Kingdom used their assessment tools, the SOO-2000 questionnaire, in devising their own TQM programs. The questionnaire was a 120-item employee survey that categorized findings under four areas: organizational climate, supervisory leadership, peer relationships, and end results. These categories were developed based upon the survey creators' belief that problems in an organization could be traced to three main areas: (a) organizational climate, (b) supervisory leadership, and (c) peer relationships (Narasimhan, 1997).

In a study of how three large universities implemented TQM into their decision making process, Seymour (1993) visited the campuses of Georgia Tech, Pennsylvania State University, and the University of Maryland. The three universities were similar in

that each had won a $4 million cash and equipment grant from the IBM Total Quality Management University Competition, and at each institution, the leadership was totally committed to using quality improvement methods (Seymour, 1993).

Seymour (1993) found that at Georgia Tech, TQM was used in conjunction with Strategic Planning to identify a problem with their undergraduate program. The university had a very strong research program, which was the foundation for a high quality graduate program. However, the university discovered that their undergraduate program was stagnant and the freshman year attrition rate was 20%. Quoting the Vice President for planning, Tom Gilmour, Seymour (1993) wrote that the undergraduate program at Tech was more "…boot camp – survival of the fittest. People got out of Georgia Tech; they didn't graduate. And mostly they got out with a lot of anger" (p. 16).

To respond to these challenges, Georgia Tech created a quality council. Acknowledging the importance of leadership in this process, the council was chaired by the university president. They established an office for continuous improvement and assessment and a continuous improvement curriculum committee. These new committees shared the common goal of integrating TQM principles into the curriculum in an effortless manner that reached every student (Seymour, 1993).

One of the core principles of continuous improvement programs, as stated by Dahlgaard (2006), was partnerships. In his article, Seymour (1993) found partnerships existed in an interesting way. A professor of Information Technology at the University of Maryland was a proponent of TQM and was looking for ways to increase student participation and collaboration in the classroom. She used technology by equipping the classroom with individual student monitors. When the professor paused to ask if

everyone understood the concept she was discussing, students entered a keystroke that illuminated a sign that said "Got it" or "Don't get it". This way, the embarrassment students may have felt about saying they did not understand a particular concept was alleviated, as the input from student terminals was completely anonymous. Additionally, upon the completion of the lesson, the professor asked students to list the three major points they learned. The information the student typed into the terminal was sent to every other student in the class so that students could see and compare their ideas with their fellow students (Seymour, 1993).

While not an evaluation of TQM within HE, the SouthEastern Regional Vision (SERV) conducted an in-depth longitudinal study of TQM implementation within secondary schools. They published their results in 1995 and were able to specifically identify areas in which TQM was implemented within schools and how these changes either improved operations or negatively impacted them. Four schools and two school systems were selected to participate in the study and received intensive training on TQM and its implementation. Results were monitored over a three-year period and then published.

The researchers in SERV (1995) presented a very comprehensive study, but what set this apart from similar studies is the detailed manner in which they addressed how the selected schools implemented new techniques to address specific TQM components. When they evaluated customer focus, SERV (1995) found through the use of TQM, one of the selected schools formed a site council composed of four staff members. The purpose of this council was to evaluate comments submitted by parents, students, or teachers, who had a concern or suggestion they would like addressed. The site council

read all of these comments and decided if the issue was an individual concern or a school-wide issue. If it turned out to be a school-wide issue, the item would go on the council agenda for discussion. The results of this discussion were then published in a school newsletter so that the customers could see the results of the issues brought forward (SouthEastern Regional Vision for Education, 1995). One of the other selected schools in the study formed a committee that went into the local community and asked groups of people what skills they thought a high school student should possess upon graduation. They evaluated all the comments received and incorporated several of them into the standard curriculum.

Addressing the TQM component of continuous improvement, a school under study implemented a program that focused on transition between schools (elementary to middle and middle to high school). The SERV (1995) researchers observed this school conduct an assessment of the current transition program and identified several areas for improvement that included teacher exchanges, student tours of the new school led by students, and solicitation of feedback from parents and students on how to improve student orientation programs. As a result of the implemented changes, the school observed increased positive feedback on student surveys and an improvement of grades, specifically in the 9th grade (SouthEastern Regional Vision for Education, 1995).

Finally, the article concluded with what was the most important data of the study: Lessons learned. After talking to participants from all of the selected schools, SERV (1995) determined that the keys to a successful total quality program were:

> A committed and supportive leader who is willing to share decision making authority; a faculty that is willing and open to change and/or can be convinced of the need for improvement; TQM training for school administrators, faculty and staff that is clearly applicable to public education and appropriate to the individual

> school or system setting and climate; time for training and participation in the TQM process which does not result in participants being pushed beyond their effective capacity; inclusion of all faculty in an orientation or introduction to or otherwise informing them about TQM; and recognition that TQM is not a quick-fix solution and requires the continuing commitment of all stakeholders. (p. 29)

Equally important were the potential barriers to TQM the research uncovered:

> Unsupportive, autocratic leadership; a faculty which is largely content with the status quo; a lack of adequate or appropriate training; insufficient time or resources for training and participation in TQM; and a lack of continuing commitment to the TQM process. (p. 30)

This research presented an excellent longitudinal study of the ways in which TQM could be incorporated into the education system. The researchers were able to assess the methods used for implementation and how they affected the specific components of TQM, such as continuous improvement and customer focus.

While the SERV (1995) study highlighted the importance of customer focus and satisfaction, a cautionary note was put forward by Groccia (1997) alerting educators that they should not take the TQM ideal of the "customer is always right" too far when dealing with students. Reminding us that learning is not always easy, and in fact is often challenging and sometimes uncomfortable, Groccia (1997) stated that the "customer is always right" concept applied to the student as the customer should not apply to the student as the learner. Instead, Groccia (1997) stated that higher education should apply the methods of TQM to improve the "…policies of instruction and the quality of campus life" (p. 32). A way to accomplish this was through the use of TQM methods during the strategic planning process.

Assessing TQM within HE

It is easy to measure performance in a college registrar's office if a manager decides to evaluate data such as how long students have to stand in line before seeing a

representative, or how many student questions are successfully answered in a one hour period. Using a community college as an example, many different areas can be evaluated with TQM techniques such as transfer rate, graduation rate, or diversity across the campus. This, however, becomes more difficult when applied to the classroom. The challenge arises in defining quantifiable measurements to these areas so that improvement strategies can be assessed (Taylor & Hill, 1992). Is success defined as the number of students with a G.P.A. of 2.0 and above and if so, who defines this measure of success?

Returning to Burkhalter (1996), one possible solution to the aforementioned question was offered in the form of a quality improvement model used at Auburn University. The model was used university wide and was rather simple in its construct. The president of Auburn felt it was a functional tool in a process that linked budget, planning, and assessment, and answered the following six basic questions that addressed accountability within the university:

1. How well are we doing our jobs?
2. How can we do them better in the future?
3. Do students achieve their goals?
4. Are they improved as community and academic leaders?
5. How can we determine if our institution is focusing on its mission and achieving its other institutional goals?
6. Does Auburn University's access, price, and quality of education meet expectations of our students and parents? (Brukhalter, 1996, p. 157)

A key to the success of the Auburn Model was assessment. As stated earlier in this review, one of the tenets of TQM was an evaluation of how the organization was supporting its customers (Groccia, 1997). The six questions in the Auburn Model were the basis for gathering data, which became part of a detailed assessment cycle to provide

a status reading of customer support and fed into a cycle of continuous performance improvement (Burkhalter, 1996).

In concluding her discussion of TQM, Burkhalter (1996) pointed out that TQM was a management process that led to an increase in the quality of work. Specifically, she cited Hill and Taylor (1991) when she listed the potential benefits of TQM in higher education:

> 1. continuous and sustained organizational improvement,
> 2. increased levels of external satisfaction,
> 3. tangible and significant cost savings of approximately 5-10% of operating costs,
> 4. focus on the importance of interdisciplinary teams with faculty and administration,
> 5. new way of managing the organization which promotes organization-wide congruence, accountability, and involvement,
> 6. improvements in employee morale, commitment, and motivation (Burkhalter, 1996, p. 159).

Overseas Implementation of TQM

Total Quality Management was not a concept limited to the U.S. Countries such as Malaysia and the United Kingdom (U.K.) experimented with TQM with varying degrees of success. An exploratory study conducted by Kanji and Tambi (1999) examined the way TQM was used in HEIs in the U.K. The population used for the study included 163 institutions listed in the Quality Assurance and Network Directory for 1997-98. Of this number, 51 HEIs participated in the study, a response rate of 31.3%

The data from the study showed that of the 51 respondents, four HEIs (8%) implemented TQM. Of these four institutions, their ages ranged from 5 to 161 years, and showed that TQM concepts were not limited to younger organizations, but included HEIs that have long established procedures. The data showed that "the largest proportion of HEI's (72.5%) defined quality as 'fitness for purpose'…The proportion that defined

quality as 'meeting customers' expectations' was 25.5%. This group included a TQM institution" (Kanji & Tambi, 1999, p. 140). This low percentage of HEIs that focused on satisfying customers was attributed to the low number of HEIs identified as using TQM (Kanji & Tambi, 1999).

One of the basic tenets of TQM is leadership involvement in establishing the program and supporting it throughout the process. However, the U.K. study found that TQM was introduced by campus leadership at 53.8% of HEIs, while Quality Directors introduced it at 11.1% and at the remainder (35.1%) it was introduced by individuals or other groups (Kanji & Tambi, 1999). Part of the survey asked respondents to describe the reasons for implementing TQM processes into HEIs, and the researchers identified 32 common elements. The top five reasons are shown in Figure 2. It is interesting to note that government influence was identified more than twice as many times as customer/student satisfaction.

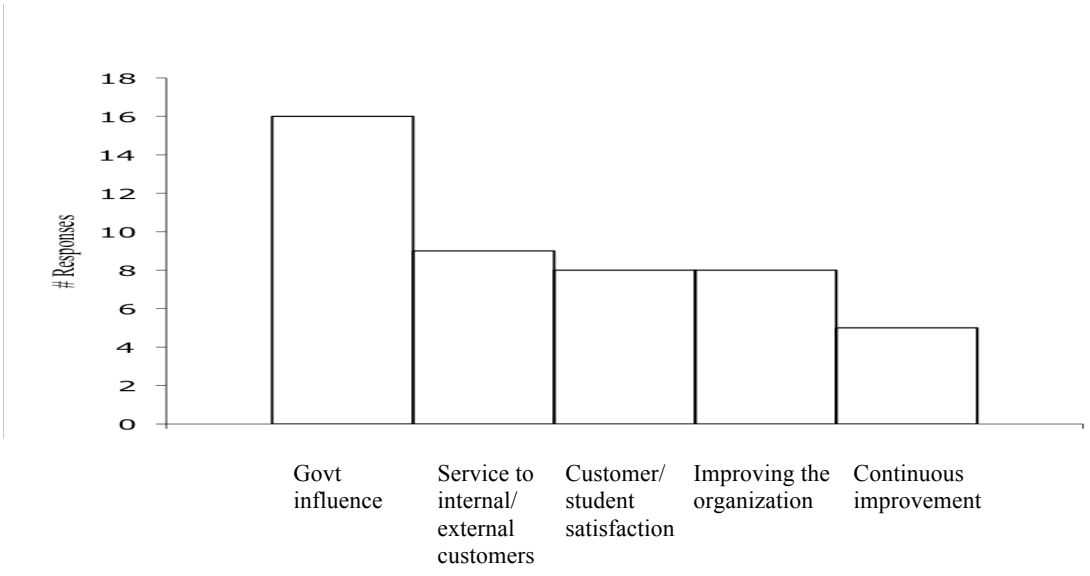

Figure 2. Top 5 Reasons for Quality Management in U.K. Higher Education Institutions

Kanji and Tambi (1999) concluded that TQM was not a concept that had been widely accepted within the U.K. The researchers believed that the HEIs studied were more interested in traditional measures of success such as "…degrees, professional experience, authorship, and research activities" (p. 147). The researchers suggested that problems such as employer and parent dissatisfaction, increased tuition, and competition for high quality faculty and students could be solved with the use of TQM. However, without the widespread acceptance of TQM and the support of leadership, the program would not be able to establish a foothold within the U.K. higher education institutions (Kanji & Tambi, 1999).

In a similar study, Kanji, Tambi, and Wallace (1999) compared the implementation of TQM measures between selected HEIs in the United States and Malaysia. From a sample of 216 HEIs in Malaysia and 294 HEIs in the United States, the researchers mailed surveys to both public and independent institutions. Overall, 60 Malaysian HEIs participated for a response rate of 27.8% while 72 U.S. HEIs participated for a response rate of 24.5% (Kanji, et al., 1999).

As would be expected in a country that first developed and implemented TQM, the United States had a higher percentage of HEIs that implemented the methods of TQM, 70.9%, compared to Malaysia at 50.0%. Although both countries started implementing TQM in HEIs in the late 1980s, Malaysia lagged behind the United States in implementation (Kanji, et al., 1999).

Concurrently, the percentage of HEIs in the United States that did not consider themselves TQM institutions, but still implemented some methods of TQM, was greater than that in Malaysia. The researchers found that 54.2% of U.S. HEIs did not consider

themselves TQM institutions, but had some TQM processes in place. In Malaysia, the percentage was 23.7% (Kanji, et al., 1999). This could lead to the conclusion that even if it was not widely accepted and implemented, some of the methods of TQM found their way into HEIs both in the United States and Malaysia.

What is interesting is the relatively high number of Malaysian HEIs, 86.2% that applied the lessons of TQM in the academic areas as well as the administrative departments. This was one of the areas in which Malaysia had a larger percentage than the United States (74.1%) (Kanji, et al., 1999). Further research is warranted in this area to determine (a) why HEIs within the United States are not using TQM within the academic areas and (b) if this is related to lack of acceptance or due to the implementation of other performance improvement systems.

Most of the management systems and quality programs require the support of the organizational leadership. Vazzana, Winter, and Warner (1997) wrote that to successfully implement TQM "…a leader must be willing to initiate change and provide the resources needed for team efforts. A very important factor is the university president's active support of the TQM process" (p. 316). However, Kanji et al. (1999) found that leadership in about 77.4% of U.S. institutions and 75.9% of Malaysian institutions introduced TQM.

One final interesting result of the Kanji et al. (1999) research was the types of incentives offered to higher education employees in both countries. Malaysian HEIs rewarded employee performance with job promotion in 46.4% of the HEIs, while the United States offered promotions in 5.7% of HEIs. Similar results were found in bonuses (42.9% in Malaysia, 3.8% in U.S.), and vacations (17.9% in Malaysia, 0% in the United

States). Kanji et al. (1999) found a definitive cultural difference between the two countries as the U.S. HEIs reward system focused on recognition (77.4%), organizational support (52.8%), and quality awards (32.1%) as opposed to the vacation and monetary awards offered in Malaysia.

The University of Santo Tomas in the Philippines will be 400 years old in 2011, making it the oldest university in Asia. With a student population of 33,322 as of 2002-2003, it was identified as one of the four best universities in the Philippines according to *Asia Week*. This was quite an honor as the Philippine higher education system consisted of 1,383 colleges and universities in 1998 (de Guzman, 2004).

In 2003, the university began a program to transform itself into what the university called "Total Quality Education" (de Guzman, 2004) through the institution wide implementation of total quality management. University administrators focused on eight constructs of TQM identified with the acronym VICTORY-C; vision, involvement, continuous improvement, training and education, ownership, recognition and rewards, yearning for success, and customer focus.

A study of the TQM implementation at Santo Tomas by de Guzman (2004) found that vision was implemented the most within the university followed by training and education. Continuous improvement, yearning for success, involvement, and ownership had the least implementation. de Guzman (2004) reiterated the importance of leadership driving a successful TQM program and added this insightful comment about the importance of learning:

> …a) it requires administrators and faculty to know what are actually being done in their study programs, and to gather data on how these practices affect the quality of students' learning; and b) it helps develop in the administrators and faculty depth of understanding of the meaning of quality education, which

> requires provision of learning experiences which are functional and relevant to the students' field of study, and more importantly, relevant to their life and life in this country today. (p. 97).

He finished his article by stating his opinion that universities were systems that "…operate through a network of human interrelationships…" (de Guzman, 2004, p. 97). He pointed out the difficulties identified by others in properly defining quality management, but did state that it requires planning, evaluation, and an openness to risk taking and change.

Opposition to TQM within Higher Education

Not all of the literature supported instituting TQM within HEIs. Birnbaum (2000) referred to these systems as management fads, which when applied to higher education were short-term initiatives that ultimately resulted in disappointment and failure. He asserted that TQM was a hastily implemented solution to the challenges of higher education, whose acceptance was championed by the business community. Citing Nicklin to help illustrate this business view, Birnbaum (2000) wrote, "…educating people is a process, just like making a car is a process" (p. 99).

It is interesting to note that Birnbaum (2000) cited several sources in what appeared to be a suggestion that American corporations, if not directly responsible for higher education's acceptance of TQM, have certainly fanned the fires that kept it going. One of the articles he uses for his support is research by Seymour (1993), who quoted former IBM Chairman John F. Akers, as saying:

> I believe that working together, the academic and business communities can speed up the use of total quality management in education and industry. That will mean that graduates, particularly in business and engineering, will be ready to apply the principles of quality management from the first day they are on the job. (p. 14)

Schargel (as cited in Birnbaum, 2000) stated "American businesses should not have to spend money…to retrofit American workers with TQM skills that should be acquired in American schools" (p. 100). While Birnbaum (2000) used the Seymour (1993) article in support of his argument for listing TQM as a fad, Seymour actually portrays TQM in a very positive manner as he studied its implementation in three universities. The successes enjoyed at Georgia Tech, Penn State, and the University of Maryland (Seymour, 1993), as described earlier, tend to lend support to the use of TQM within higher education. The fact that the improvements made at these three flagship universities occurred approximately 40 years after the development of TQM called into question Birnbaum's (2000) idea that TQM was a passing fad.

In line with what Birnbaum (2000) was saying about American corporations providing support for TQM within HEIs, Houston (2007) wrote about his personal observations of TQM implementation within HEIs. He stated that TQM started to appear at HEIs within the United States during the late 1980s as a direct result of partnerships between colleges and corporations (Houston, 2007). This came about due to corporations' influence with HEIs as they were viewed as customers of the HEIs, receiving the product, which were students capable of entering the work force. The problem with this metaphor was that products in industry and products in HEIs were very different; students are people and not mechanical parts (Houston, 2007). How then do you define students under TQM and what is the relationship between the student and the HE?

Houston (2007) attempted to answer this question by evaluating several possibilities. The student as the customer had been addressed by Groccia (1997) and

Scott (1999), to which Houston (2007) stated that the student as customer and the HE as service provider "…carries entailments of downgraded status of academic work from profession to presentation and processing, and of academics in their teaching role from educator to entertainer" (p. 9).

While suggesting that TQM turned educators into entertainers is a bit of a stretch, Houston (2007) made a later point in his research that was very valid regarding variability. One of the key components of TQM was an improvement in product quality through a reduction in variability. Returning to his concerns of labeling students as customers, Houston (2007) made the excellent point that all students are different and variation should be encouraged for each student, not reduced as TQM attempts to do. Houston (2007) concluded his argument by stating that "The purpose of higher education, rather than conformity, should be to promote diversity: to extend each student towards realising [*sic*] their own individual potential" (p. 11).

While the article by Houston (2007) was not a study using survey instruments or interviews with individuals involved in TQM or educators within HEIs, he claimed to base his assumptions upon 20 years of personal experience working in HE, which included years of work developing training, teaching, and consulting in the field of quality management. While empirical results were not presented in this article, Houston (2007) made several good points about the challenges involved in implementing TQM into HEIs and asked readers to question if TQM was a good fit for HEIs.

Another outspoken critic of TQM and its use in higher education was Koch, whose biggest complaint with TQM in higher education was that it was mostly implemented in non-academic areas such as administrative and logistical functions (Koch

& Fisher, 1998). While improvement in these areas was beneficial, Koch and Fisher (1998) felt that TQM was not living up to the claims made by the supporters of improving performance within the classroom.

Citing a lack of empirical data to show that TQM had improved performance within the classroom, Koch and Fisher (1998) proposed this was due to issues such as:

> …the nature of the curriculum and the allocation of faculty time have been extremely resistant to TQM campaigns, not the least because faculties usually cast a jaundiced eye on any development that threatens to loosen their grip over course and degree requirements, or their ability to allocate their own time. (p. 663)

They further wrote many faculty were not interested in the potential improvements TQM could bring to the classroom, but were more interested in the possibility of moving power away from the administrators and into their hands (Koch & Fisher, 1998).

Writing five years later, Koch (2003) agreed with Birnbaum (2000) in calling TQM a fad whose time had come and gone. Though Koch (2003) admitted it was possible that TQM originally had value, it was his belief that the concept had become so "…dissected, mutated, and deconstructed so many times that it is nearly always misinterpreted and misused…" (p. 325). This led Koch (2003) to state that TQM "…had its moments, but failed to deliver, and now gradually will fade into the background, albeit slowly because of the tremendous inertia that afflicts higher education" (p. 332).

While presenting some convincing arguments regarding the limited use of TQM, Koch and Fisher (1998) and Koch (2003) were victim to their greatest criticism of the research surrounding TQM in higher education, a lack of empirical evidence. Both articles were critical of the lack of statistical evidence supporting the perceived improvements made by TQM, yet they quickly reached the conclusion that TQM had failed higher education based upon conversations they had with campus leaders who

complained about the number of meetings and amount of paperwork generated by TQM and the perceived lack of accountability and competition found in TQM organizations. They were unable to support their arguments with statistical data.

Running counter to the comments by Koch and Fisher (1998) and Koch (2003) are several of Deming's 14 points. Point number one asked leaders to work toward improvement of product and service, with the aim to become competitive, to stay in business, and to provide jobs (Chambers, 1998). Several of Deming's 14 points stressed the critical importance of leadership involvement in the improvement process, which strongly suggested that if an organization was being consumed by too many meetings or too much paperwork, then the leaders were setting that precedence and disregarding Deming's teachings.

While acknowledging the fact that many researchers and academic leaders did not support the use of TQM in higher education, Helms (2001) suggested that TQM had a fit and use as a tool when reviewing tenure. She asked leaders to consider that the tenure process, in which the goal was an increase in the quality of teaching and research, was not that different from the TQM goals used in business. The methods used to track and improve quality on the factory floor were not substantially different than those used to track and improve instructor performance in the classroom or the quantity of journal articles published by an individual (Helms, 2001).

Summary and Synthesis

Though difficult to define, the literature clearly suggested that TQM was structured around Deming's 14 points. As suggested by Crosby during the Cabanis (1999) interview, TQM relied on procedures and statistics. This belief regarding

procedures was supported by some of Deming's 14 points such as creating constancy of purpose toward improvement of products and services, instituting training on the job, instituting leadership, and breaking down barriers among departments that prevent them from working as a team (Chambers, 1998).

Thus, widespread confusion regarding the definition of what TQM truly involves could have resulted in the difficulties implementing TQM as discovered in the literature. Grandzol and Gershon (1997) whose survey instrument will be used for this study discovered "…over 900 different TQM programs…" (p. 44), yet they were unable to find a single, universally accepted definition of TQM. Instead they offered their own definition of TQM as "…a holistic approach to running an organization such that every facet earns the description *quality*" (p. 44).

TQM has met with mixed success in HEIs, however, very little quantitative research exists that attempts to discover why TQM succeeded or failed within an institution. This could be due partly to the difficulty in agreeing upon a universally accepted definition of TQM; without a definition it is difficult to measure success or failure. The purpose of this research is not to suggest a definition for TQM, but instead to explore the relationships among specific operational concepts that the reviewed literature strongly suggests are components of TQM.

Research does exist that explores these relationships within the corporate world. Grandzol and Gershon (1998) conducted research to explore the relationships between certain operational concepts associated with TQM, which they believed comprised the "…requisite management programs or activities…" (p. 81) suggested by Deming (1986), Juran (1988), Crosby (1980), Anderson et al. (1994) and the Baldrige Award criteria

(1995). While the research by Grandzol and Gershon (1998) did not apply to HEIs, the variables used in that research are the same ones used in this current study.

While research existed which demonstrated successful implementation of TQM within HEIs, the majority of this research told the reader that the program was successful, but did not offer detailed quantifiable findings as to why it was successful. The research conducted by Seymour (1993) presented a very good profile of successful implementation of TQM at three flagship HEIs but failed to explore the background leading to implementation of TQM. It is important to explore community college presidents' perceptions on the relationships that might exist among the suggested constructs of TQM.

Finally, the survey used for the Grandzol and Gershon (1998) study generated quantitative results on the relationship of variables associated with TQM in the corporate and government sectors. This current study will use the same survey used by Grandzol and Gershon (1998) to see how community college presidents view these same variables. It will be interesting to see if these relationships are viewed differently among sampled populations and, if so, how differently they are viewed.

CHAPTER 3: METHOD

Research Design and Rationale

The purpose of this study was to explore the relationships among 13 variables associated with TQM within community colleges. Specifically, what were the perceptions of community college presidents regarding the presence of these relationships at their colleges? These relationships were best explored using an approach that included the views of a constructivist and that of a positivist and post-positivist.

When attempting to properly understand the differences among paradigms, Morgan, Gliner, and Harmon (2006) identified positivism as an ideology often associated with quantitative research. The positivist believes that when conducted under proper experimental protocols, a researcher can determine if an independent variable is the cause of change in the dependent variable. This view differs from that of the constructivist, who believes that change is the result of multiple causes. For this research, I must consider the paradigm of post-positivism defined by Creswell (2003) as a view that it is impossible to be positive about completely understanding human behaviors and actions. With that limitation acknowledged, post-positivists study a problem through an examination of a suspected cause, or intervention, which is injected into the situation.

Post-positivism also seeks to reduce research problems"…into a small, discrete set of ideas to test, such as the variables that constitute hypotheses and research questions" (Creswell, 2003, p. 7). A post-positivist researcher likes to measure events occurring in the real world, and one of the ways to do this is through a survey. Based upon the hypotheses and the number of participants required for this study, I believe that

a cross-sectional survey of selected HEIs is the best data collection strategy to answer the hypotheses.

This study was undertaken to respond to a lack of literature that attempted to explore the relationship of TQM and management components of community college presidents. During the literature review, I discovered a large amount of literature addressing TQM and why it was introduced into higher education. Some of this literature discussed the relative success and failure of TQM at HEIs in specific nations, but little literature was found that specifically addressed why or how TQM succeeded or failed at community colleges. It was my intent to explore the relationship between TQM and 13 variables perceived by community college leaders.

The general approach was non-experimental with the specific approach being associational. As defined by Morgan, Gliner, and Harmon (2006) an associational approach measures all the sample participants against the attribute independent variables to discover relationships. For this study, the attribute independent variables were (a) leadership, (b) continuous improvement, (c) internal/external cooperation, (d) customer focus, (e) learning, (f) employee fulfillment, and (g) process management. Morgan et al. (2006) wrote "Such research where an apparent intervention is studied after the fact is sometimes called *ex post facto*. We consider such variables to be attributes" (p. 33). Gliner and Morgan (2000) further state that generally, attributes cannot be introduced or manipulated during a study, leaving a researcher no choice but to conduct a comparative study.

The dependent variables were (a) product/service quality, (b) financial effectiveness, (c) operational efficiency, (d) public responsibility, (e) customer

satisfaction, and (f) employee satisfaction. Through the use of inferential statistics, I used the associational approach to explore the relationships between the dependent and independent variables and see what variables were significant predictors of the variables under study.

Participants and Sampling

The population for this study would be all of the public, independent, and tribal community colleges within the United States and territories, which included those in Guam, Puerto Rico, American Samoa, Northern Mariana Islands, Palau, Micronesia and the Marshall Islands, from here on referred to as outlying areas. According to the American Association of Community Colleges (n.d.) this population was 1,163 of which 992 are public, 140 are independent and 31 are tribal. This population data was current as of August 2007.

To determine the sample size, a formula provided by Dillman (2007) was used

$$Ns = \frac{(Np)\,(p)\,(1-p)}{(Np-1)\,(B/C)^2 + (p)\,(1-p)}$$

Where: Ns = completed sample size needed for desired level of precision
Np = size of population
p = chance that any respondent will answer a question the same as any other respondent
B = acceptable amount of sampling error
C = Z statistic associated with the confidence level

This formula calculated a population size (Np) of 1,163. A p level of .05 was selected, which assumed maximum variation in respondents selecting responses that are the same as other respondents. A sampling error (B) of $\pm$ 5% offered an acceptable balance of sampling error and cost involved in administering the survey. Finally, a Z score = 1.96

was chosen which translated to a confidence level of 95%. When these values were input into the formula, completed sample size of 289 was obtained.

$$Ns = \frac{(1163)\,(.50)\,(1-.50)}{(1163-1)\,(.05/1.96)^2 + (.50)\,(1-.50)}$$

$$Ns = \frac{290.75}{1.006}$$

$$Ns = 289$$

With an anticipated response rate of 50%, 600 community college presidents would be contacted to ensure that at least 289 responses were received.

The presidents of these colleges were the target audience for the survey. These individuals were selected based upon their position of overall leadership and responsibility. One of the key tenets of TQM is that it must have the active support of the leadership. The leader sets the tone for the organization and without his or her buy in, any quality improvement plan is most likely to fail. Whatever the feelings the presidents may have about TQM, they are best suited to evaluate and understand their experiences with TQM within their colleges.

As stated earlier in this document, TQM had met with various levels of enthusiasm and implementation within community colleges and a current and accurate lists of community colleges that implement TQM could not be found. As the sample needed to include colleges that use TQM, the sample had to include a highly varied sample that still used an acceptable method of random generation. To accomplish this a proportional sample of community colleges from each of the 50 states and outlying areas was selected.

This proportional sample was obtained by listing the number of public, independent, and tribal community colleges by state as obtained from the American Association of Community Colleges available in 2007 (n.d.). A calculation of the total percentage of U.S. community colleges found in each state based upon the population of 1,163 was conducted. As an example, California had 111 public, 12 independent, and 1 tribal community college for a total of 124 or 11% (0.107) of the population, while Colorado had 15 public, 0 independent, and 0 tribal community colleges for a total of 15 or 1% (0.013). These percentages were used to calculate how many colleges from each state to randomly sample. Continuing with the example, California would include 11% of the sample, while Colorado would include 1%.

The next step was to list all the colleges in each state and assign them a number and then use a random number generator to select the colleges for the sample. To ensure that the sample included at least one independent, public, and tribal college from each state that had at least one of the three, each state was grouped into three columns and a random proportion from each column was chosen. Returning to the earlier example, California had 124 community colleges of which 111 were public (90%), 12 independent (10%), and one tribal (<1%). This provided a sample of 59 public colleges, six independent, and one tribal. This stratified random sampling method was chosen to ensure that the sample is representative of the population and since the sample is geographically distributed, this method ensures that "…appropriate proportions come from the different regions" (Morgan, Gliner, & Harmon, 2006. p. 125). The calculations for this are in Appendix A.

Data Collection

With an expected mail survey response rate of between 25% and 40% (Newton & Rudestam, 1999) between 700 and the entire population of 1,163 would have to be surveyed to generate a complete sample of 289. A survey this large can quickly consume available time and money. A realistic and affordable option was to survey 600 community colleges, using a web-based survey. In the original research in which the survey was used, Grandzol and Gershon (1998) achieved an initial response rate of 31% using a mail survey. Using follow up letters, they raised the response rate to 47%.

The choice of a web-based survey was based upon research conducted by Nesbary (2000). In examining results of several projects that used both mail and web based surveys, he found that when surveys were sent to Law Enforcement agencies, he received a response rate of 29% for web administration and 39% for traditional mail administration. This is very close to the results reported by Grandzol and Gershon (1998) and also Newton and Rudestam (1999). However, when Nesbary (2000) conducted a similar project with university professors in political science, he obtained a response rate of 73% from web administration and 20% from mail administration. He followed up with the respondents through a telephone interview and discovered that the professors had a strong preference for the use of electronic administration as opposed to mail administration. This higher response rate for web administration was further supported by Lusk, Delclos, Burau, Drawhorn, and Aday (2007) who reviewed a study involving individuals in academic public health with a response rate of over 80%.

Another reason for using a web survey was that it could significantly reduce the costs involved in administration by approximately one-third. Additionally, Nesbary

(2000) found that he received the majority of responses within 10 days, where the majority of responses using the mail survey were returned at or by the 40-day mark. Since the sample included community colleges that were in outlying areas, the time involved with mail surveys increases. Time can be greatly reduced through the use of web administration.

A concern existed as to whether web-based surveys produced the same data as paper-based surveys. In reviewing studies that attempted to address this concern over validity, Danscombe (2006) cited a study by McCabe (2004) in which 7,000 university students in the United States were surveyed regarding illicit drug use. The participants were randomly assigned to either a web-based or postal-based survey group and identical instruments were administered using the two delivery modes. McCabe (2004) found that the two modes produced similar results. Danscombe (2006) also reviewed a study by Lozar and Vehovar (2002) in which 400 primary and secondary school students in Slovenia were randomly placed into two groups, one group received a web survey and the other received a printed questionnaire through the mail. The researchers found "…no major differences in substantive responses" (p. 149).

Finally, Danscombe (2006) conducted a study in which high school students in England were administered identical web-based and paper-based instruments. Students were randomly assigned to either the web or paper-based group with 269 (79.6%) taking the paper-based instrument and 69 (20.4%) taking the web-based instrument. The questions on each instrument were identical and formatted to look as similar as possible to each other. Danscombe (2006) discovered that of the 23 items on the instrument, only

one item produced data that was statistically significantly different between the paper-based and web-based instruments, which led to the statement:

> the indications from this study and others are that the benefits of web-based questionnaires do not appear to come at the expense of consistency. Web-based questionnaires appear to provide a reliable data collection method as measured against equivalent paper-based versions. (p. 253)

Additionally, it was found that the completion rate for a web-based instrument (97.1%) was greater than the paper-based instrument (81.8%), providing further evidence of the greater completion rates for web-based instruments (Denscombe, 2006). With the benefits associated with a web survey targeted to a sample, a web based survey offered the greatest potential for a high response rate. Using this method, I believed it was reasonable to expect at least a 50% response rate, which would exceed the calculated sample size of 289.

Instrument

A survey instrument created by Grandzol and Gershon (1998) was used to collect data for the hypotheses under evaluation. In the analysis of a study conducted by The Conference Board, Boaden (1997) identified several common themes within 20 studies of TQM. These were very important, as several of the themes that arose in this study were included in the survey instrument chosen (leadership, learning, customer focus/satisfaction, continuous improvement, process management, public responsibility/corporate citizenship). The fact that these areas were incorporated in the chosen survey helped demonstrate that the survey was relevant for the research and the concepts explored are ones that have been researched in other studies.

Regarding the concept of employee fulfillment, Bryan (1996) felt that team building, employee empowerment, shared leadership, continuous improvement, and

professional development support were concepts that improved employee fulfillment, with shared leadership being the most important. The survey used for my research asked questions specifically designed to examine the concepts of employee fulfillment and leadership within the president's organization and added to the relevance of the instrument.

Grandzol and Gershon (1998) reviewed the literature on current definitions of TQM and created a survey based upon the seven variables outlined by Anderson et al. (1994); leadership, process management, employee fulfillment, customer focus, learning, continuous improvement, and cooperation. The authors felt it important to study the performance outcomes from a TQM organization and that these measures should cross over from the private into the public and nonprofit sectors. They chose to measure product/service quality, financial effectiveness, operational efficiency, public responsibility, customer satisfaction, and employee satisfaction (Grandzol & Gershon, 1998). These six variables combined with the seven variables from the Anderson et al. (1994) research resulted in the 13 variables under study.

Anderson et al. (1994) determined that Deming's 14 points are not a theory, but instead a roadmap for leaders to follow in developing an organization that focuses on learning and cooperation as methods to attain continuous improvement. This is supported by the writings of Deming himself who stated that his 14 points were "…principles of transformation for improving the practice of management" (Anderson et al., p. 476). With this in mind, Anderson et al. set out to determine the components of what they called the Deming management method, an in-depth understanding of the 14

points, and how these components would lead an organization to achieve their strategic goals and long term survival.

To understand the 14 points, Anderson et al. (1994) used the Delphi method for data collection and analysis. Citing Helmer and Rescher (1959), Anderson et al. wrote:

> The Delphi method is a technique, developed at the RAND Corporation in the early 1950s, intended for systematically soliciting, organizing, and structuring judgments and opinions on a particularly complex subject matter from a panel of experts until a consensus on the topic is reached or until it becomes evident that further convergence is not possible. Any application of the Delphi method is typified by anonymity, feedback, and summary of responses. (p. 478)

Using this method, Anderson et al. gathered seven experts from both the academy and industry, all of whom either worked with or studied Deming's work. The seven individuals formed a panel that was first asked to individually identify what they believed were the definitions of each of the 14 points. This process was repeated three times, and upon the conclusion, the panel had consistently agreed upon 37 concepts (Anderson et al.).

Since 37 concepts were far too many to reasonably study, Anderson et al. (1994) asked the panel to conduct a cluster analysis in which they attempted to evaluate all 37 concepts and identify clusters of concepts. When compared, the clustering by each panel member showed a high degree of similarity and resulted in seven concepts, which Anderson et al. identified as the building blocks of Deming's quality management method. The seven concepts were (a) visionary leadership, (b) continuous improvement, (c) internal and external cooperation, (d) learning, (e) employee fulfillment, (f) process management, and (g) customer satisfaction. Grandzon and Gershon (1998) also chose to measure product/service quality, financial, operational, public responsibility, customer

satisfaction, and employee satisfaction. These six variables and the seven variables from the Anderson et al. research resulted in the 13 variables under study.

The next step in the instrument development process was finding a way to measure the variables. Citing suggestions made by Anderson et al. (1994) and Brown et al. (1994), Grandzol and Gershon (1998) created a survey instrument using the following items:

> **Leadership**: Clarity of vision, long-range orientation, coaching management style, participative change, employee empowerment, planning/implementing change.
> **Continuous Improvement**: Refinement cycles, improvements.
> **Internal/External Cooperation**: Firm-supplier partnership, single-supplier orientation, collaborative organization, teamwork, organization-wide involvement, systems view, trust, elimination of fear.
> **Customer Focus**: Customer driven focus.
> **Learning**: Company-wide training, foundational knowledge, process knowledge, educational development, continuous self-improvement, managerial learning.
> **Employee Fulfillment**: Job satisfaction, job commitment, pride of workmanship.
> **Process Management**: Prevention orientation, reduction of mass inspection, design quality, statistical process control, understanding variation, elimination of numerical quotas, elimination of merit ratings, understanding motivation, total cost accounting, stable employment.
> **Product/Service Quality**: Accuracy, completeness, conformance, innovation.
> **Operational Efficiency**: Productivity, cycle time, scrap/waste, energy/efficiency, material usage.
> **Financial Effectiveness**: Return on investment, market share, capital investment ratio.
> **Public Responsibility**: Environmental complaints, community involvement.
> **Employee Satisfaction**: Turnover, requests for transfer, grievances/complaints, absenteeism, surveys.
> **Customer Satisfaction**: Surveys, complaints, inquiries. (pp. 82-83)

From these, the authors created a 137-item survey they sent to senior Baldrige examiners for review, which resulted in Grandzol and Gershon (1998) paring the survey to 68 items. A pilot test was conducted using this final product and responses were received from 306 individuals (Grandzol & Gershon, 1998). The survey was then used to sample suppliers doing business with the U.S. Department of Navy in 1994. The

population included 1,947 organizations from which 582 were sampled. The survey was mailed to the senior executive in charge of each organization, and responses were received from 275, a response rate of 47%.

The survey used a six point Likert-type scale that allowed a respondent to chose from strongly disagree (1), disagree (2), somewhat disagree (3), somewhat agree (4), agree (5), strongly agree (6). This scale forced respondents to make a definitive choice for each item rather than a more indecisive choice of either agreeing or disagreeing. To prevent respondents from responding in patterns, patterned response bias, the authors recoded several of the items in the survey by reversing the meaning of the response (Grandzol & Gershon, 1998).

Instruments Considered and Rejected

There was no shortage of survey instruments designed to measure and interpret an individual's leadership style, however, few instruments were found which adequately measured the building blocks of TQM. Several instruments were carefully considered for this study and ultimately rejected. The reasons for rejection were many, with the main one being a lack of instruments specifically targeting TQM. This could be due to the fact that TQM had lost its appeal or more likely as cited by Boaden (1997), TQM had become so integrated into organizations that its very existence was transparent and often forgotten about.

An instrument titled Styles of Leadership Survey created by Hall, Harvey, and Williams (1995) included questions that involved TQM concepts, however the purpose of the survey was to categorize a respondent into one of five leadership beliefs: (a) directive, (b) supportive, (c) bureaucratic, (d) strategic, (e) collaborative. This survey was rejected

due to the limited number of TQM measures and the heavy preferential bias the authors had toward the collaborative style.

Bass and Avolio (n.d.) created an instrument called the Multifactor Leadership Questionnaire (3rd ed.). This survey, while high quality, focused more on transformational leadership and an exploration of leadership behaviors. As with the Styles of Leadership Survey (1995), this survey was rejected for its lack of focus on TQM.

Finally, a survey that focused on leadership styles was also considered and ultimately rejected. The Managerial Style Questionnaire (n.d.) created by the Hay Group was similar to the Styles of Leadership Survey (1995) in that it attempted to assign respondents into one of six leadership categories and then help the individual decide which category best suited them.

Measures

Reliability

Measurement reliability is defined as the confidence a researcher has in the instrument returning consistent scores from the sample. When evaluating a survey instrument for measurement reliability, the correlation coefficient, expressed as *r*, is often used. A range between -1.00 and +1.00 is used to express the strength of a relationship among variables, with 0 indicating no relation between variables and -1.00 or +1.00 indicating either a strong negative or strong positive relationship among variables (Morgan et al., 2006).

The survey used in this study measured internal consistency using Cronbach's alpha (α), which Morgan et al. (2006) describe as a measure of inter-item reliability and

tends to be the most common measure of reliability. The benefit of using alpha is that it can be obtained from one administration, often times the primary data collection. Morgan et al. (2006) state that the measured alpha value should be 0.70 or greater.

Grandzol and Gershon (1998) determined reliability for each of the 13 variables they were investigating with the alpha values for exogenous leadership as (0.7305), continuous improvement (0.7524), employee fulfillment (0.7391), learning (0.8132), process management (0.8185), cooperation (0.8358), customer focus (0.8651), endogenous product/service quality (0.6495), financial (0.6786), operational (0.7275), public responsibility (0.2454), customer satisfaction (0.7523), and employee satisfaction (0.7355).

Validity

Validity is defined as ensuring that the instrument is measuring what it is supposed to measure (Morgan et al., 2006). Within the broad statement of validity, there are several sub-categories, the first is content validity, which "…asks if the content that comprises the instrument is representative of the concept that one is attempting to measure" (Gliner & Morgan, 2000, p. 320). One way to measure content validity is an examination using literature to determine if the instrument is gaining information to answer the questions explored or hypotheses tested as there is no statistical measure of content validity. Content validity is not measured numerically and Grandzol and Gershon (1998) established the content validity of the survey through a thorough review of the instrument "…by business school faculty, senior Baldrige examiners, and TQM practitioners in industry. Items were deleted, added, or modified based on these reviews prior to the pilot test" (p. 94).

Criterion validity "…refers to validating the instrument against some form of external criterion. This validation procedure usually involves establishing a correlation coefficient between the instrument and the external or outside criterion" (Gliner & Morgan, 2000, p. 321). Grandzol and Gershon (1998) further define criterion validity as an examination of "…the degree to which items in each construct scale are correlated with external referents, in this case, total quality measures" (p. 94). A bivariate analysis by Grandzol and Gershon (1998) showed legitimate criterion validity for the variables under study and are shown in Table 1.

Table 1. Criterion Validity Determined through the Correlations of Mean Scale Scores

Dependent Variables	Independent Variables					
	Product/Service Qualtiy	Financial Effectiveness	Operational Efficiency	Public Responsibility	Customer Satisfaction	Employee Satisfactior
Leadership	0.3345	0.5217	0.5333	0.3229	0.4754	0.4993
Continuous Improvement	0.3943	0.4770	0.5549	0.3729	0.5524	0.4423
Employee Fulfillment	0.3050	0.4521	0.5198	0.3070	0.3786	0.4662
Learning	0.3551	0.5226	0.5984	0.3184	0.5036	0.5372
Process Management	0.4028	0.5055	0.6438	0.3574	0.5708	0.5506
Internal/External Cooperation	0.4522	0.5322	0.6397	0.4340	0.6412	0.5767
Customer Focus	0.4097	0.4849	0.5303	0.2788	0.5990	0.4165

The third type of validity used in this research is construct validity, which Gliner and Morgan (2000) define as examination of "…hypothetical concepts that cannot be observed directly. Intelligence, achievement, and anxiety are all constructs" (p. 322). The survey instrument used for this research measured construct validity using

confirmatory factor analysis which tests the overall fit of the instrument. Grandzol and Gershon's (1998) analysis of construct validity resulted in factor scores greater than 0.30 for each construct, with most in the 0.50 to 0.80 range. The results from this analysis are in Table 2.

Table 2. Validity Results for Latent Variables that are the Framework of each Variable

Variable	Item Name	Factor Score
Leadership		
	Clarity of Vision	0.646
	Long-Range Orientation	0.533
	Participative Change	0.617
	Employee Empowerment	0.567
	Plan and Implement Change	0.730
Continuous improvement		
	Refinement Cycles No. 1	0.747
	Refinement Cycles No. 2	0.656
	Demonstrated Improvements No. 1	0.638
	Demonstrated Improvements No. 2	0.657
Employee fulfillment		
	Job Satisfaction No. 1	0.528
	Job Satisfaction No. 2	0.545
	Job Commitment	0.651
	Pride of Workmanship No. 1	0.609
	Pride of Workmanship No. 2	0.805
Learning		
	Company-Wide Training	0.835
	Foundational Knowledge	0.621
	Process Knowledge	0.553
	Continuous Self-Improvement	0.783
	Managerial Learning	0.700
Process management		
	Prevention Orientation	0.680
	Reduction of Mass Inspection	0.532
	Design Quality	0.717
	Statistical Process Control	0.516
	Understanding Variation	0.590
	Elimination of Quotas	0.573
	Understanding Motivation	0.799
	Total Cost Accounting	0.419

Cooperation		
	Firm-Supplier Partnership	0.622
	Single-Supplier Orientation	0.461
	Collaborative Organization	0.509
	Teamwork	0.682
	Organization-Wide Involvement	0.769
	Systems View	0.758
	Trust and Elimination of Fear No. 1	0.754
	Trust and Elimination of Fear No. 2	0.694
Customer focus		
	Customer-Driven Focus No. 1	0.850
	Customer-Driven Focus No. 2	0.880
	Customer-Driven Focus No. 3	0.741
	Customer-Driven Focus No. 4	0.731
Product/Service quality		
	Accuracy	0.361
	Completeness	0.804
	Conformance	0.754
	Innovation	0.573
Financial effectiveness		
	Return on Investment	0.652
	Market Share	0.625
	Capital Investment	0.665
Operational efficiency		
	Productivity	0.751
	Scrap/Waste	0.627
	Energy/Efficiency	0.536
	Material Usage	0.674
Public responsibility		
	Environmental Complaints	0.385
	Community Involvement	0.439
Customer satisfaction		
	Customer Surveys	0.576
	Customer Satisfaction Results	0.749
	Customer Inquiries	0.718
	Customer Complaints	0.571
Employee satisfaction		
	Employee Turnover	0.551
	Requests for Transfer	0.635
	Absenteeism	0.510
	Grievances/Complaints	0.491
	Employee Satisfaction Surveys	0.580
	Employee Satisfaction Results	0.729

The survey instrument was selected as it was the best available instrument that incorporated many of the 14 points Deming established when he discussed how to incorporate TQM in organizations (O'Neil, 1993). Grandzol and Gershon (1998) used accepted quality measures from Anderson, Rungtusanatham and Schroeder (1994) who evaluated leadership, continuous improvement, internal/external cooperation, customer focus, learning, employee fulfillment, and process management. They then used measures suggested by Brown (1994) to measure product/service quality, operational, financial, public responsibility, employee satisfaction and customer satisfaction.

Data Analysis

Data from the surveys were analyzed using descriptive and inferential statistics. Reliability was tested using Cronbach's alpha (α), while validity was examined using the correlations of mean scale scores to determine criterion validity. Content validity cannot be measured numerically and was established by the original authors of the survey instrument through an extensive literature review and peer review of the instrument.

The instrument was constructed using a Likert-type scale of orderable discreet variables. Upon the completion of analysis using descriptive statistics, inferential statistical analysis was used. Simple linear regression and multiple regression analysis were used to determine if significant relationships could be identified among the variables under study.

Pilot Study

A pilot study was conducted to validate the reliability and validity of the survey instrument, determine an expected response rate, and to validate the statistics used to analyze the collected data. The pilot study started on March 23, 2008 and concluded on

April 13, 2008. A cover letter was sent to recipients (see Appendix B), using the survey creation site Survey Monkey, which automatically delivered the cover letters and tracked responses. The recipients for this pilot study were the first 101 members of the random sample (approximately 17%) generated for this study as described in Chapter 3. This was a number that Dillman (2007) stated as suitable for a pilot study.

The instrument was transferred from the traditional written form to an Internet based survey. The cover letter included a link to the survey as well as a link that allowed the respondent to opt out of the survey and be removed from further correspondence. When the 101 cover letters were sent, it was discovered that four recipients' email addresses were invalid. An intensive search of the Internet could not discover current email addresses for these individuals, thus, 97 cover letters were delivered to the recipients.

Twelve responses were received by March 29th, a response rate of 12%. A follow up email was immediately sent to all recipients who had not completed the survey. This resulted in 7 responses and two opt out responses for a response rate of 20% (19 of 97). A final follow up e-mail was sent on April 13, 2008, which did not generate any more responses.

The collected data were downloaded from Survey Monkey into a Microsoft Excel spreadsheet at which time the Likert-type scale responses were coded. This file was imported into SPSS. The first statistical analysis conducted was a reliability analysis using Cronbach's alpha (α). This method was chosen as it did not require multiple administration of a survey and was the method used by Grandzol and Gershon (1997; 1998) in their original research. Using the same reliability analysis allowed for a

comparison between this study and the original research. Morgan, Gliner, and Harmon (2006) stated that reliability coefficients should be 0.80 or higher, though it is common to find coefficients between 0.60 and 0.70 in journal articles. Fraenkel and Wallen (1995) supported this idea when they stated that reliability should be at least 0.70.

The results for the reliability analysis for this study are in Table C3 (See Appendix C). The item column indicates the statement number on the survey. Statements that measure exogenous variables are identified with an X and those that measure endogenous variables are identified with a Y. This labeling holds true for the rest of this document. All of the coefficients were within the acceptable range as defined by Morgan, Gliner, and Harmon (2006) and Fraenkel and Wallen (1995), with the exception of process management.

It was not possible to measure construct validity of the pilot and main study using factor analysis as Grandzol and Gershon (1998) did in their original research. Factor analysis is used with very large samples as small samples can cause the analysis to be unstable. Stanek (1995) suggests a sample size to number of variables ratio of from 2:1 to 20:1 as acceptable for factor analysis. Comrey and Lee (1992) stated that 100 participants were poor, 200 were fair, 300 were good, 500 were very good, and 1,000 or more were excellent for conducting factor analysis. Field (2005) identifies a minimum of 300 participants as adequate. As both the pilot (n = 19) and main study (n = 160) were below the minimally accepted standards, factor analysis was not used in this research to examine the construct validity measures used by Grandzol and Gershon (1998). However, convergent evidence obtained from the analysis of the hypotheses combined with the factor analysis conducted in the original research suggest that Grandzol and

Gershon (1998) adequately modified the instrument through several administrations of the survey and that construct validity was adequate for this research.

Criterion validity is the measure of an instrument against some form of external criteria and is usually composed of concurrent and predictive evidence (Gliner & Morgan, 2000). Predictive evidence is normally collected over time with multiple applications of the same instrument while concurrent evidence validates instrument measures and external criteria at the same time (Fraenkel & Wallen, 1996). Since the instrument for this project was only administered once, concurrent validity was tested using the correlation coefficient (*r*). The exogenous scores were compared against the endogenous scores and are shown in Table C4 (See Appendix C).

Main Study

The analysis from the pilot study suggested that the survey instrument was both reliable and valid and was not in need of modification prior to administration to the main study group. However, it was discovered that the response rate for the pilot study was unacceptable as a 20% response rate would not be enough to properly conduct the main study. In an effort to increase the response rate, several changes were incorporated prior to administration of the main study.

The first step was to increase the sample by 100 respondents. Following the steps for random selection as outlined in chapter 3, 100 additional community college presidents were added to the sample, bringing the final sample size to 700. This increase helped compensate for respondents who had changed jobs from the time they were originally selected for participation until the instrument was administered.

A method suggested by Dillman (2007) for increasing response rates was the use of a pre-notice letter. For the main study, a pre-notice e-mail was sent to respondents two days before the cover letter with the survey link. Additionally, two follow-up contact e-mails were sent to those who had not responded. These contacts were originally going to be spaced approximately every five days, but this was changed due to the number of out of office responses received during the summer. After the main invitation to the survey was sent, a reminder was sent six days later and a final reminder sent 40 days after the initial invitation.

The e-mail cover letter was personalized. The return address for Colorado State University School of Education appeared on the cover letter. The cover letter for the pilot study had been addressed to "Dear Participant". For the main study, a simple Hypertext Markup Language (HTML) command was created that inserted the last name of each respondent so that the cover letters read "Dear President last name".

A pre-notification e-mail was sent to 600 respondents on May 27, 2008. This short e-mail briefly explained the study and notified each potential respondent that in two days they would receive another e-mail, the cover letter (see Appendix B) which would contain the link to the survey as well as a link to opt out. This e-mail was sent on May 29, 2008.

Of the 600 respondents contacted, 28 opted out. A total of 92 responses were received when the initial reminder e-mail was sent on June 5, 2008. A large number of out-of-office auto reply e-mails were received stating that respondents were out of the office for much of June. Based upon this information, it was decided to keep the survey open longer than originally planned. Responses from 119 presidents were received when

the final reminder was sent on July 7, 2008. The survey was closed on July 14, 2008. At closure, a total of 160 responses were received.

The 160 responses equated to a response rate of 27%, much lower than hoped for during the design of the survey but within the response range seen in most of the literature reviewed for this study (Dillman 2007; Grandzol & Gershon 1997, 1998; Lusk, Delclos, Burau, Drawhorn, & Aday, 2007; Nesbary 2000; Newton & Rudestam, 1999). The 19 responses from the pilot study were incorporated for analysis into the final study, resulting in 179 respondents from a sample of 700 for a response rate of 26%. This response rate did not allow achieving the goal of a sampling error of $\pm$5%, and instead resulted in a potential sampling error of $\pm$6.67%. Of the 179 responses, 15 individuals did not answer every item on the survey, resulting in an N of 164 valid cases. An examination of the raw data strongly indicates that the 15 individuals who did not answer every question self terminated their responses as all 15 answered at least the first five questions and no more after that.

The raw data from Survey Monkey was downloaded into a Microsoft Excel spreadsheet. The syntax responses were coded using a codebook developed during the pilot study. The coded responses were imported into SPSS version 16.0. The same tests for reliability and validity used for the pilot study were used for the main study. Table 5 shows the results of the reliability analysis and Table 6 shows the results of an analysis of concurrent validity using correlation coefficients.

Table 5. Reliability Analysis for Independent and Dependent Variables

Variable	Item	Item Name	Alpha if Deleted
Leadership	X1	Clarity of vision	.548
(α = .658)	X2	Long-range orientation	.584
	X3	Coaching management style	.595
	X4	Employee empowerment	.682
	X5	Plan and implement change	.605
Continuous	X6	Refinement cycles No. 1	.891
improvement	X7	Refinement cycles No. 2	.767
(α = .778)	X8	Demonstrated improvements No. 1	.793
	X9	Demonstrated improvements No. 2	.941
Employee fulfillment	X10	Job satisfaction No. 1	.586
(α = .619)	X11	Job satisfaction No. 2	.587
	X12	Job commitment	.538
	X13	Pride of workmanship No. 1	.599
	X14	Pride of workmanship No 2.	.516
Learning	X15	Company-wide training	.714
(α = .777)	X16	Foundational knowledge	.748
	X17	Process knowledge	.744
	X18	Continuous self-improvement	.739
	X19	Managerial learning	.738
Process management	X20	Prevention orientation	.726
(α = .760)	X21	Reduction of mass inspection	.703
	X22	Design quality	.728
	X23	Statistical process control	.733
	X24	Understanding variation	.736
	X25	Elimination of quotas	.774
	X26	Understanding motivation	.728
	X27	Total cost accounting	.745
Internal/External	X28	Firm-supplier partnerships	.667
cooperation	X29	Single-supplier orientation	.721
(α = .639)	X30	Collaborative organization	.616
	X31	Teamwork	.555
	X32	Organization-wide involvement	.535
	X33	Systems view	.572
	X34	Trust and elimination of fear No. 1	.569
	X35	Trust and elimination of fear No. 2	.596

Customer focus (α = .824)	X36	Customer-driven focus No. 1	.741
	X37	Customer-driven focus No. 2	.720
	X38	Customer-driven focus No. 3	.837
	X39	Customer-driven focus No. 4	.808
Product service quality (α = .737)	Y1	Accuracy	.731
	Y2	Completeness	.590
	Y3	Conformance	.634
	Y4	Innovation	.732
Financial effectiveness (α = .666)	Y5	Return on investment	.429
	Y6	Market share	.621
	Y7	Capital investment	.658
Operational efficiency (α = .688)	Y8	Productivity	.607
	Y9	Scrap/waste	.652
	Y10	Energy/efficiency	.677
	Y11	Material usage	.560
Public responsibility (α = .594)	Y12	Environmental complaints	-
	Y13	Community involvement	-
Customer satisfaction (α = .777)	Y14	Customer surveys	.720
	Y15	Customer satisfaction results	.810
	Y16	Customer inquiries	.646
	Y17	Customer complaints	.679
Employee satisfaction (α = .640)	Y18	Employee turnover	.656
	Y19	Requests for transfer	.563
	Y20	Absenteeism	.537
	Y21	Grievances/complaints	.589
	Y22	Employee satisfaction surveys	.600
	Y23	Employee satisfaction results	.632

The values for public responsibility in Table 5 are blank as SPSS returned a negative average covariance among the items and this violates the reliability model assumptions. A possible cause of this is an error in coding. However, upon receiving this output, all data was checked for any possible coding errors and none were detected. Nichols (1999) states surveys with small sample sizes and a small number of items it is likely that sampling error has caused the negative covariance while it is possible for the population

to have a positive covariance. It is also possible that the items do not have a positive covariance and they may not be measuring the same thing (Nichols, 1999). The same negative values in public responsibility occurred during the pilot study.

Table 6. Correlation of Scores for Independent and Dependent Variables

Dependent Variables	Independent Variables					
	Product Service Quality	Financial Effectiveness	Operational Efficiency	Public Responsibility	Customer Satisfaction	Employee Satisfaction
Leadership	.334	.336	.281	.192	.347	.253
Continuous Improvement	.485	.497	.510	.189	.529	.377
Employee Fulfillment	.538	.475	.500	.261	.335	.575
Learning	.533	.521	.516	.259	.524	.472
Process Management	.593	.500	.548	.224	.578	.393
Internal/External Cooperation	.571	.523	.535	.268	.541	.455
Customer Focus	.656	.538	.600	.279	.618	.427

Summary

The study was a quantitative investigation into the relationship among seven independent variables: (a) leadership, (b) continuous improvement, (c) employee fulfillment, (d) learning, (e) process management, (f) internal/external cooperation, (g) customer focus, and six dependent variables: (a) product/service quality, (b) financial effectiveness, (c) operational efficiency, (d) public responsibility, (e) customer satisfaction, and (f) employee satisfaction.

A pilot study consisting of 101 colleges was conducted prior to the administration of the final study. The participants from the pilot study (n = 19) formed part of the final sample. Data from the pilot study were used to examine the efficiency of the electronic survey administration, the reliability and validity of the survey instrument, and a determination of the data analysis methods used for the final survey, which were simple linear regression and multiple regression analysis. Changes were made to the sample size and cover letter based upon the pilot study in an effort to increase the response rate for the main study.

The original printed survey created by Grandzol and Gershon (1997) was formatted for electronic administration. Using the methods discussed by Dillman (2007), Denscombe (2006), and Duffy (2002), electronic letters of introduction were sent to the community college presidents with a link to the web survey. Follow up communications were sent to presidents who had not completed the survey within the first several days (Duffy, 2002). 179 total responses, a 26% response rate, were received and a total of 164 were determined to be valid.

CHAPTER 4: FINDINGS

As stated in Chapter 1, the purpose of this study was to explore the relationship among 13 variables associated with the use of TQM within community colleges. Specifically, this study asked community college presidents within the United States and outlying areas to indicate their perceptions of how they believe components of these 13 variables are practiced within their colleges. Following are the statistical analyses conducted to test the null hypotheses presented in Chapter 1. This chapter is divided into sections that first briefly profile the colleges and then explore the descriptive and inferential statistics used to test the hypotheses.

College Profile

One hundred seventy-nine institutions participated. The participants' from each institution responded to a number of items pertaining to TQM at their colleges. Descriptive statistics for the participants' responses to these items are listed in Tables 7 and 8. A large majority (126; 97.7%) of the institutions were public colleges. The institutions had existed for an average of 48.70 (SD = 20.99) years. The colleges had an average student population of 7,965.87 (SD = 8,622.86) years. Fifty-five (42.6%) of the institutions practiced TQM, and 74 (57.4%) did not. TQM was used in the classroom (72.7%) and the finance department (74.5%) of a majority of the colleges. Relatively few (30, 23.3%) of the institutions had a TQM council, and the councils had been in existence for 4.92 (SD = 2.50) years on average. The presidents had an average of 5.98 (SD = 6.02) years experience in that position.

Table 7. Descriptive Statistics for Total Quality Management Responses

Variable	N	%
Institution Practices TQM		
Yes	55	42.6
No	74	57.4
TQM Locations		
Classroom	40	72.7
Finance	41	74.5
Other Departments	50	90.9
Institution Has TQM Council		
Yes	30	23.3
No	99	76.7
Type of Community College		
Public	126	97.7
Tribal	2	1.6
Independent	1	0.8

Table 8. Descriptive Statistics for Total Quality Management Data

Variable	N	Min.	Max.	M	SD
Existence TQM Council (Years)	12	2	10	4.92	2.50
Student Population	127	400	45,000	7,965.87	8,622.86
Existence of College (Years)	127	5	139	48.70	20.99
Time as President (Years)	128	0	37	5.98	6.02

Product/Service Quality: Research Question 1

Is customer focus a statistically significant predictor of product/service quality?

H_0: Customer focus is not a significant predictor of product/service quality.

A simple linear regression was conducted to determine if customer focus was a significant predictor of the level of product/service quality. The data were screened for

outliers prior to analysis. Participants with a standardized residual greater than |3| were considered outliers. This process revealed one outlier in the data set. A plot of standardized residuals suggested linearity. The plot did not reveal evidence of heteroscedasticity.

The descriptive statistics and regression coefficients are listed in Tables 9 and 10. The data revealed that customer focus was a significant positive predictor of product/service quality, F (1, 161) = 134.71, β = 0.68, R^2 = .46, p < .01. The effect size, as defined by Cohen (1988), was large (0.85). β showed a positive relationship, meaning that as customer focus increased, product/service quality increased. R^2 indicated that 46% of the variability of product service quality was attributed to customer focus. P < .01 indicated that the relationship between customer focus and product/service quality was statistically significant and was probably not due to chance. A t value of 11.61 indicated a statistically significant measure of the relationship between customer focus and product/service quality. B measured the slope of the line and indicated for every one-unit change in customer focus, product service quality increased by 0.73. This indicated that the predictor accounted for a significant amount of variation in the criterion. This suggests that product/service quality significantly increased with increasing levels of customer focus.

Table 9. Descriptive Statistics for Research Question 1: Product Service Quality

Variable	N	M	SD
Product/Service Quality	163	4.82	0.72
Customer Focus	163	5.04	0.67

Table 10. Regression Coefficients for Research Question 1: Product Service Quality

Predictor	B	SE	β	*t*	*p*
Customer Focus	0.73	0.06	0.68	11.61	.000

Financial Effectiveness: Research Question 2

Are the following independent variables statistically significant predictors of financial effectiveness: leadership, continuous improvement, employee fulfillment, learning, process management, internal/external cooperation, customer focus, product/service quality, operational efficiency, public responsibility, customer satisfaction and employee satisfaction?

H_0: Leadership, continuous improvement, employee fulfillment, learning, process management, internal/external cooperation, customer focus, product/service quality, operational efficiency, public responsibility, customer satisfaction and employee satisfaction will not be significant predictors of financial effectiveness.

A multiple regression was conducted to determine if the 12 independent variables were significant predictors of financial effectiveness. The standardized residuals revealed two outliers in the data. Review of the variance inflation factors and tolerance levels did not reveal evidence of multicollinearity. A plot of standardized residuals did not reveal evidence of heteroscedasticity.

The descriptive statistics and regression coefficients are listed in Tables 11 and 12. The omnibus model was a significant predictor of financial effectiveness, F (12, 147) = 15.93, R^2 = .57, p < .01. The effect size was large (0.75). This indicates that together the predictors accounted for a significant amount of variation in the criterion and that 57% of the variability of financial effectiveness was attributed to the predictors. The

coefficients indicated that several of the predictors were significant within this model. First, product/service quality was a statistically significant positive predictor of financial effectiveness, $\beta = 0.23$, $p < .01$, meaning that product/service quality increased significantly with increasing levels of financial effectiveness within the model and the increase was statistically significant and not likely due to chance. A *t* value of 2.68 indicated a statistically significant measure of the relationship between product/service quality and financial effectiveness. B measured the slope of the line and indicated for every one-unit change in financial effectiveness, product/service quality increased by 0.25.

Public responsibility was a significant positive predictor of financial effectiveness, $\beta = 0.13$, $p < .05$, meaning that public responsibility increased significantly with increasing levels of financial effectiveness and the increase was not likely due to chance. A *t* value of 2.15 did not indicate a significant measure of the relationship between public responsibility and financial effectiveness. B measured the slope of the line and indicated for every one-unit change in financial effectiveness, public responsibility increased by 0.14.

Customer satisfaction was also a significant positive predictor of financial effectiveness, $\beta = 0.19$, $p < .05$, meaning that customer satisfaction increased significantly with increasing levels of financial effectiveness and the increase was not likely due to chance. A *t* value of 2.31 indicated a statistically significant measure of the relationship between customer satisfaction and financial effectiveness. B measured the slope of the line and indicated for every one-unit change in financial effectiveness,

customer satisfaction increased by 0.21. The remaining variables were not significant predictors of financial effectiveness.

Table 11. Descriptive Statistics for Research Question 2: Financial Effectiveness

Variable	N	M	SD
Financial Effectiveness	160	4.89	0.81
Leadership	160	5.17	0.57
Continuous Improvement	160	5.13	0.64
Employee Fulfillment	160	5.24	0.52
Learning	160	4.63	0.72
Process Management	160	4.25	0.62
Internal/External Cooperation	160	4.55	0.52
Customer Focus	160	5.05	0.67
Product/Service Quality	160	4.83	0.73
Operational Efficiency	160	4.51	0.71
Public Responsibility	160	5.47	0.75
Customer Satisfaction	160	5.04	0.72
Employee Satisfaction	160	5.11	0.58

Table 12. Regression Coefficients for Research Question 2: Financial Effectiveness

Predictor	B	SE	β	*t*	*p*
Leadership	-0.01	0.10	-0.01	-0.13	.901
Continuous Improvement	0.19	0.10	0.15	1.96	.052
Employee Fulfillment	0.01	0.14	0.01	0.07	.944
Learning	0.10	0.10	0.09	1.01	.314
Process Management	-0.03	0.11	-0.02	-0.23	.820
Internal/External Cooperation	0.07	0.13	0.04	0.51	.610
Customer Focus	-0.01	0.11	-0.01	-0.08	.937
Product/Service Quality	0.25	0.09	0.23	2.68	.008
Operational Efficiency	0.16	0.09	0.14	1.81	.072
Public Responsibility	0.14	0.07	0.13	2.15	.033
Customer Satisfaction	0.21	0.09	0.19	2.31	.022
Employee Satisfaction	0.12	0.11	0.09	1.12	.265

Operational Efficiency: Research Question 3

Is continuous improvement a statistically significant predictor of operational efficiency?

H_0: Continuous improvement is not a statistically significant predictor of operational efficiency.

A simple linear regression was conducted to determine if continuous improvement was a significant predictor of the level of operational efficiency. The standardized residuals revealed one outlier in the data. A plot of standardized residuals suggested linearity. However, the plot did reveal clear evidence of heteroscedasticity.

This indicates that the size of the average residual was unequal across the values of the criterion. Inconsistency of errors across values of the criterion suggests that this model may be limited in terms of application.

The descriptive statistics and regression coefficients are listed in Tables 13 and 14. The data revealed that continuous improvement was a statistically significant positive predictor of operational efficiency, F (1, 160) = 65.33, β = 0.54, R^2 = .29, p < .01. The effect size was large (0.41). β showed a positive relationship, meaning that as continuous improvement increased, operational efficiency increased. R^2 indicated that 29% of the variability of operational efficiency was attributed to continuous improvement. P < .01 indicated that the relationship between continuous improvement and operational efficiency was statistically significant and was probably not due to chance. A t value of 8.08 did not indicate a statistically significant measure of the relationship between continuous improvement and operational efficiency. B measured the slope of the line and indicated for every one-unit change in continuous improvement, operational efficiency increased by 0.59. This indicates that the predictor accounted for a significant amount of variation in the criterion. Operational efficiency significantly increased with increasing levels of continuous improvement.

Table 13. Descriptive Statistics for Research Question 3: Operational Efficiency

Variable	N	M	SD
Operational Efficiency	162	4.50	0.70
Continuous Improvement	162	5.13	0.64

Table 14. Regression Coefficients for Research Question 3: Operational Efficiency

Predictor	B	SE	β	*t*	*p*
Continuous Improvement	0.59	0.07	0.54	8.08	.000

Public Responsibility: Research Question 4

Are the following independent variables statistically significant predictors of public responsibility: leadership, continuous improvement, employee fulfillment, learning, process management, internal/external cooperation, customer focus, product/service quality, operational efficiency, financial effectiveness, customer satisfaction and employee satisfaction?

H_0: Leadership, continuous improvement, employee fulfillment, learning, process management, internal/external cooperation, customer focus, product/service quality, operational efficiency, financial effectiveness, customer satisfaction and employee satisfaction will not be significant predictors of public responsibility.

A multiple regression was conducted to determine if the 12 independent variables were significant predictors of public responsibility. The standardized residuals revealed two outliers in the data. Review of the variance inflation factors and tolerance levels did not reveal evidence of multicollinearity. The plot of standardized residuals indicated linearity. The plot failed to reveal any evidence of heteroscedasticity.

The descriptive statistics and regression coefficients are listed in Tables 15 and 16. The omnibus model was a significant predictor of public responsibility, F (12, 147) = 3.11, R^2 = .20, p < .01. The effect size was medium (0.25). This indicates that together the predictors accounted for a statistically significant amount of variation in the criterion and that together 20% of the variability of public responsibility could be attributed to the

predictors. However, the coefficients indicated no single predictor was significant within this model.

Table 15. Descriptive Statistics for Research Question 4: Public Responsibility

Variable	N	M	SD
Public Responsibility	160	5.48	0.70
Leadership	160	5.17	0.57
Continuous Improvement	160	5.13	0.65
Employee Fulfillment	160	5.25	0.51
Learning	160	4.63	0.71
Process Management	160	4.25	0.62
Internal/External Cooperation	160	4.56	0.52
Customer Focus	160	5.04	0.67
Product/Service Quality	160	4.83	0.73
Financial Effectiveness	160	4.93	0.82
Operational Efficiency	160	4.52	0.71
Customer Satisfaction	160	5.04	0.72
Employee Satisfaction	160	5.12	0.58

Table 16. Regression Coefficients for Research Question 4: Public Responsibility

Predictor	B	SE	β	*t*	*p*
Leadership	0.18	0.12	0.15	1.51	.133
Continuous Improvement	-0.11	0.12	-0.10	-0.95	.343
Employee Fulfillment	-0.14	0.16	-0.11	-0.90	.372
Learning	-0.13	0.12	-0.13	-1.12	.265
Process Management	0.03	0.13	0.03	0.22	.826
Internal/External Cooperation	0.05	0.16	0.03	0.29	.771
Customer Focus	0.12	0.13	0.12	0.95	.346
Product/Service Quality	0.15	0.11	0.15	1.29	.199
Financial Effectiveness	0.07	0.09	0.08	0.76	.448
Operational Efficiency	0.17	0.10	0.17	1.58	.117
Customer Satisfaction	-0.05	0.11	-0.06	-0.49	.624
Employee Satisfaction	0.24	0.13	0.20	1.88	.062

Customer Satisfaction: Research Question 5

Are the following independent variables statistically significant predictors of customer satisfaction: leadership, continuous improvement, employee fulfillment, learning, process management, internal/external cooperation, customer focus, product/service quality, operational efficiency, financial effectiveness, public responsibility and employee satisfaction?

H_0: Leadership, continuous improvement, employee fulfillment, learning, process management, internal/external cooperation, customer focus, product/service

quality, operational efficiency, financial effectiveness, public responsibility and employee satisfaction will not be significant predictors of customer satisfaction.

A multiple regression was conducted to determine if the 12 independent variables were significant predictors of customer satisfaction. The standardized residuals did not reveal any outliers in the data. Review of the variance inflation factors and tolerance levels did not reveal evidence of multicollinearity. The plot of standardized residuals indicated linearity, and the plot failed to reveal any evidence of heteroscedasticity.

The descriptive statistics and regression coefficients are listed in Tables 17 and 18. The omnibus model was a statistically significant predictor of customer satisfaction, F (12, 149) = 15.66, R^2 = .56, p < .01. The effect size was large (0.75). This indicates that together the predictors accounted for a significant amount of variation in the criterion and that together 56% of the variability of customer satisfaction could be attributed to the predictors. Several of the predictors were significant within this model. Employee fulfillment was a negative predictor of customer satisfaction within this model, β = -0.29, p < .01. This indicates customer satisfaction significantly increased with decreasing levels of employee fulfillment. This was statistically significant and not likely due to chance. A t value of -3.54 indicated a statistically significant negative measure of the relationship between employee fulfillment and customer satisfaction. B measured the slope of the line and indicated for every one-unit change in customer satisfaction, employee fulfillment decreased by 0.41.

Process management was a significant positive predictor of customer satisfaction, β = 0.20, p < .05, meaning process management increased significantly with increasing levels of customer satisfaction within the model and was not likely due to chance. A t

value of 2.43 indicated a statistically significant measure of the relationship between process management and customer satisfaction. B measured the slope of the line and indicated for every one-unit change in customer satisfaction, process management increased 0.24.

Customer focus was a statistically significant positive predictor of customer satisfaction, $\beta = 0.24$, $p < .01$, meaning that customer focus increased significantly with increasing levels of customer satisfaction within the model and was not likely due to chance. A *t* value of 2.74 indicated a statistically significant measure of the relationship between customer focus and customer satisfaction. B measured the slope of the line and indicated for every one-unit change in customer satisfaction, customer focus increased by 0.26.

Financial effectiveness was a significant positive predictor of customer satisfaction, $\beta = 0.20$, $p < .05$, meaning that financial effectiveness increased significantly with increasing levels of customer satisfaction within the model and was not likely due to chance. A *t* value of 2.21 indicated a statistically significant measure of the relationship between financial effectiveness and customer satisfaction. B measured the slope of the line and indicated for every one-unit change in customer satisfaction, financial effectiveness increased by 0.15.

Employee satisfaction was a statistically significant positive predictor of customer satisfaction, $\beta = 0.26$, $p < .01$, meaning that employee satisfaction increased significantly with increasing levels of customer satisfaction within the model and was not likely due to chance. A *t* value of 3.37 indicated a statistically significant measure of the relationship between employee satisfaction and customer satisfaction. B measured the slope of the

line and indicated for every one-unit change in customer satisfaction, employee satisfaction increased by 0.32. This indicates that customer satisfaction increased significantly with increasing levels of these predictor variables. Leadership, continuous improvement, learning, internal/external cooperation, product/service quality, operational efficiency and public responsibility were not significant predictors in this model.

Table 17. Descriptive Statistics for Research Question 5: Customer Satisfaction

Variable	N	M	SD
Customer Satisfaction	162	5.04	0.72
Leadership	162	5.17	0.57
Continuous Improvement	162	5.13	0.64
Employee Fulfillment	162	5.24	0.51
Learning	162	4.63	0.71
Process Management	162	4.25	0.62
Internal/External Cooperation	162	4.55	0.52
Customer Focus	162	5.04	0.67
Product/Service Quality	162	4.83	0.73
Financial Effectiveness	162	4.92	0.83
Operational Efficiency	162	4.51	0.71
Public Responsibility	162	5.46	0.75
Employee Satisfaction	162	5.12	0.58

Table 18. Regression Coefficients for Research Question 5: Customer Satisfaction

Predictor	B	SE	β	*t*	*p*
Leadership	0.13	0.09	0.10	1.40	.165
Continuous Improvement	0.15	0.09	0.13	1.70	.092
Employee Fulfillment	-0.41	0.12	-0.29	-3.54	.001
Learning	0.03	0.09	0.03	0.31	.755
Process Management	0.24	0.10	0.20	2.43	.016
Internal/External Cooperation	0.10	0.12	0.07	0.81	.417
Customer Focus	0.26	0.10	0.24	2.74	.007
Product/Service Quality	0.08	0.09	0.08	0.89	.374
Financial Effectiveness	0.15	0.07	0.17	2.21	.029
Operational Efficiency	-0.04	0.08	-0.04	-0.45	.651
Public Responsibility	-0.06	0.06	-0.06	-1.04	.299
Employee Satisfaction	0.32	0.10	0.26	3.37	.001

Employee Satisfaction: Research Question 6

Are the following independent variables statistically significant predictors of employee satisfaction: leadership, continuous improvement, employee fulfillment, learning, process management, internal/external cooperation, customer focus, product/service quality, operational efficiency, financial effectiveness, public responsibility and customer satisfaction?

H_0: Leadership, continuous improvement, employee fulfillment, learning, process management, internal/external cooperation, customer focus, product/service

quality, operational efficiency, financial effectiveness, public responsibility and customer satisfaction will not be significant predictors of employee satisfaction.

A multiple regression was conducted to determine if the 12 independent variables were significant predictors of employee satisfaction. Standardized residuals revealed two outliers in the data. Review of the variance inflation factors and tolerance levels did not reveal evidence of multicollinearity. The plot of standardized residuals indicated linearity. The plot also failed to reveal any evidence of heteroscedasticity.

Descriptive statistics and regression coefficients are listed in Tables 19 and 20. The omnibus model was a significant predictor of employee satisfaction, F (12, 147) = 13.30, R^2 = .52, p < .01. The effect size was large (0.72). This indicates that together the predictors accounted for a significant amount of variation in the criterion and that together 52% of the variability of employee satisfaction could be attributed to the predictors. Several of the predictors were significant. First, employee fulfillment was a statistically significant positive predictor of employee satisfaction within this model, β = 0.33, p < .01. This indicates that employee satisfaction significantly increased with increasing values of employee fulfillment and was not likely due to chance. A t value of 3.95 indicated a statistically significant measure of the relationship between employee fulfillment and employee satisfaction. B measured the slope of the line and indicated for every one-unit change in employee satisfaction, employee fulfillment increased by 0.35.

Product/service quality was a significant positive predictor of employee satisfaction within this model, β = 0.20, p < .05. This indicates that employee satisfaction significantly increased with increasing levels of product/service quality and was not likely due to chance. A t value of 2.25 indicated a statistically significant

measure of the relationship between employee satisfaction and product/service quality. B measured the slope of the line and indicated for every one-unit change in employee satisfaction, product/service quality increased by 0.14.

Customer satisfaction was also a statistically significant positive predictor within this model, $\beta = 0.28$, $p < .01$. This indicates that employee satisfaction significantly increased with increasing levels of customer satisfaction and was likely not due to chance. A t value of 3.44 indicated a statistically significant measure of the relationship between employee satisfaction and customer satisfaction. B measured the slope of the line and indicated for every one-unit change in employee satisfaction, customer satisfaction increased by 0.20. The remaining predictors were not significant.

Table 19. Descriptive Statistics for Research Question 6: Employee Satisfaction

Variable	N	M	SD
Employee Satisfaction	160	5.14	0.52
Leadership	160	5.16	0.57
Continuous Improvement	160	5.13	0.63
Employee Fulfillment	160	5.25	0.49
Learning	160	4.63	0.71
Process Management	160	4.25	0.61
Internal/External Cooperation	160	4.55	0.52
Customer Focus	160	5.05	0.66
Product/Service Quality	160	4.84	0.72
Financial Effectiveness	160	4.92	0.81
Operational Efficiency	160	4.52	0.67
Public Responsibility	160	5.47	0.73
Customer Satisfaction	160	5.04	0.71

Table 20. Regression Coefficients for Research Question 6: Employee Satisfaction

Predictor	B	SE	β	*t*	*p*
Leadership	-0.08	0.07	-0.08	-1.12	.266
Continuous Improvement	-0.06	0.07	-0.08	-0.96	.338
Employee Fulfillment	0.35	0.09	0.33	3.95	.000
Learning	0.10	0.06	0.14	1.56	.120
Process Management	-0.08	0.08	-0.10	-1.11	.271
Internal/External Cooperation	0.02	0.09	0.02	0.16	.870
Customer Focus	-0.11	0.07	-0.14	-1.54	.126
Product/Service Quality	0.14	0.06	0.20	2.25	.026
Financial Effectiveness	0.07	0.05	0.11	1.42	.158
Operational Efficiency	0.12	0.06	0.15	1.93	.056
Public Responsibility	0.07	0.04	0.10	1.65	.101
Customer Satisfaction	0.20	0.06	0.28	3.44	.001

CHAPTER 5: DISCUSSION

The discussion of this study is outlined in four sections: (a) hypothesis review, (b) interpretation, (c) implications for future study, and (d) summary. The analysis of data from the survey instrument and the testing of the hypotheses indicate that relationships do exist between perceptions of performance measures associated with TQM. Understanding these relationships can assist leaders in an evaluation of their current TQM program, if they have one, and offer those looking to start a CQI program a place to start by showing which performance measures of TQM support each other.

Hypotheses Review

The hypotheses explored in this study are shown in Table 21 while the perceived relationships are shown in Table 22.

Table 21. Analysis Summary of Hypotheses

Hypothesis	Result of Regression Analysis
H1) Customer focus is not a significant predictor of product/service quality	Reject
H2) Leadership, continuous improvement, employee fulfillment, learning, process management, internal/external cooperation, customer focus, product/service quality, operational efficiency, public responsibility, customer satisfaction and employee satisfaction will not be significant predictors of financial effectiveness.	Partial Rejection
H3) Continuous improvement is not a statistically significant predictor of operational efficiency.	Reject

H4) Leadership, continuous improvement, employee fulfillment, learning, process management, internal/external cooperation, customer focus, product/service quality, operational efficiency, financial effectiveness, customer satisfaction and employee satisfaction will not be significant predictors of public responsibility	Partial Rejection
H5) Leadership, continuous improvement, employee fulfillment, learning, process management, internal/external cooperation, customer focus, product/service quality, operational efficiency, financial effectiveness, public responsibility and employee satisfaction will not be significant predictors of customer satisfaction	Partial Rejection
H6) Leadership, continuous improvement, employee fulfillment, learning, process management, internal/external cooperation, customer focus, product/service quality, operational efficiency, financial effectiveness, public responsibility and customer satisfaction will not be significant predictors of employee satisfaction	Partial Rejection

Table 22. Perceived Significant Relationships Among Variables

Variables	Perceived Relationship
Customer Focus and Product/Service Quality	Positive
Public Responsibility and Financial Effectiveness	Positive
Customer Satisfaction and Financial Effectiveness	Positive
Continuous Improvement and Operational Efficiency	Positive
Employee Fulfillment and Customer Satisfaction	Negative
Process Management and Customer Satisfaction	Positive
Customer Focus and Customer Satisfaction	Positive
Financial Effectiveness and Customer Satisfaction	Positive
Employee Satisfaction and Customer Satisfaction	Positive
Employee Fulfillment and Employee Satisfaction	Positive
Product/Service Quality and Employee Satisfaction	Positive
Customer Satisfaction and Employee Satisfaction	Positive

While the tables present a summary of the analytical results, interpretation of the hypotheses are required, particularly the ones that compare multiple variables or performance measures. The hypotheses that indicate partial rejection are due to omnibus

models, which demonstrate overall significance; however, several of the predictors were not significant.

Product/Service Quality

The analysis of Research Question 1 and Hypothesis 1 leads to a rejection of the null hypothesis. This relationship is in line with the research conducted by Detert, Schroeder, and Cudeck (2003), that customer focus was a performance measure found at K-12 institutions which considered themselves practitioners of TQM. de Guzman's (2004) research showed that faculty members and administrators ranked customer focus sixth of eight possible constructs of TQM and was identified with the acronym VICTORY-C (vision, involvement, continuous improvement, training and education, ownership, recognition and rewards, yearning for success, customer focus). Additionally, when the colleges under the University of Santo Tomas were asked to rank order the TQM constructs they implement, customer focus was clustered between fourth and sixth place, with one college ranking it seventh. Vision was identified as the most important construct and every college ranked it as number one.

The strength of the relationship between customer focus and product/service quality suggests that TQM practitioners should place more importance on customer focus if they wish to see a subsequent increase in product/service quality. The responses indicate that the presidents perceive their colleges are proponents of customer focus and product/service quality. What institution that expects to stay in business would claim to have poor customer focus or produce a product full of defects? Yet if the belief that the student is the customer as proposed by Groccia (1997) and Scott (1999) is accepted, then

research by Gumbus (2005) provides valuable insight into how difficult it is to identify the performance measures comprising each construct.

Using the balanced scorecard, Gumbus (2005) evaluated organization management and organization behavior among undergraduate and graduate students at Sacred Heart University as to what they viewed as important customer items. Students identified that customer focus items included:

> Class surveys on instruction. Surveys on housing, internships, extracurricular activities, food, facilities, sports, technology, abroad programs, financial aid available. Surveys postgraduate on percent employed after graduation. Academic surveys on course offerings, majors offered, class size, faculty responsiveness. (p. 628)

When the same exercise was given to administrators at the university, they identified customer focus items as:

> National Survey of Student Engagement (NSSE) results. American Association of Colleges of Schools of Business Undergraduate Business Exit Study (AACSB) results. Student evaluations of academic classes. Ranking of *US News and World Report* on colleges and universities. Student evaluations of nonacademic student services. (p. 629)

The Gumbus (2005) study of community college presidents indicates a strong positive relationship between customer focus and product/service quality. Further research would be valuable in defining who the customer is perceived to be and possibly surveying them to identify what they perceive customer focus to be. Measurements of product/service quality are a bit easier to obtain, as they should come from the leadership of the organization through their vision or strategic plan.

Financial Effectiveness

The analysis of Research Question 2 and Hypothesis 2 leads to a partial rejection of the null hypothesis. This supports the philosophy of Deming in many of his

publications. In an analysis of TQM and Deming, Petersen (1999) wrote that Deming believed "…improvements in quality will result in: increases in productivity; decreases in cycle time; increases in capacity; lower production costs; improved profits; happier customers; greater market share; more jobs; fewer customer complaints; less litigation". (pp. 481-482)

The performance measures for financial effectiveness include an evaluation of the colleges' return on investment, resistance to losses to other colleges providing the same service, and reinvestment in the processes used to provide services. It is reasonable to conclude that if an organization is successful in this area then their market share will increase. Reaching this conclusion, we can then see that Deming's theory supports the current model under study. Improvements in quality (product/service quality) will result in improvements in greater market share (financial effectiveness) as well as improvements in fewer customer complaints (customer satisfaction). Improvement in this area could manifest as more qualified students ready to enter the workforce. There is not a direct linkage between the public responsibility variable and the methods discussed by Deming in the previous paragraph.

Customer satisfaction was a significant predictor of financial effectiveness while customer focus was not. Though customer satisfaction and customer focus may sound like similar variables, when looking at the performance measures of each one, they are clearly different. It is easy to see how an increase in the investment a college puts into its product results in an increase in the level of customer satisfaction. A college that invests in methods that keeps them on the cutting edge of education (resistance to losses to other colleges providing similar services) is more likely to have satisfied customers who feel

they have obtained a quality product from their investment. As Deming's model showed, an increase in product quality is related to an increase in customer satisfaction (Petersen, 1999). Additionally, one of Deming's definitions of quality includes focusing on customer satisfaction (Hoyer & Hoyer, 2001)

Operational Efficiency

The analysis of Research Question 3 and Hypothesis 3 leads to a rejection of the null hypothesis. In their study of TQM, Elshennawy, Maytubby, and Aly (1991) stated that continuous improvement was positively related to customer satisfaction as well as a reduction in the amount of employee time and company resources wasted. The current model defined operational efficiency as a measure of how efficient the college is in its use of energy and materials. Continuous improvement was defined as the tendency of the college to pursue incremental and innovative improvement of its processes, products, and services. The regression analysis of this model is in agreement with the definition provided by Elshennawy et al. as they stated continuous improvement increased when waste was reduced. This positive relationship is also supported by the definition of continuous improvement provided by Bhuiyan and Baghel (2005) that the reduction of waste system wide within an organization is the goal of continuous improvement. A challenge in HEIs is a constant meaning of the term waste. It is possible that one HEI defines waste as the amount of industrial waste generated while another HEI defines waste as the amount of student drop outs or financial aid that goes unused.

Public Responsibility

The analysis of Research Question 4 and Hypothesis 4 leads to a partial rejection of the null hypothesis. Public responsibility is the level to which the college is

considered a steward of the environment and a good neighbor by local parties and the surrounding community. In their original research, Grandzol and Gershon (1997) found that public responsibility influenced customer satisfaction. The research discussed in this dissertation shows the opposite. The discrepancy between the two studies is likely due to the differences between the respondents in the studies. Grandzol and Gershon (1997) were examining data from senior managers in government, public, and private industry. It is possible that these respondents placed greater emphasis on the performance measures that make up public responsibility which include measurement of the physical, chemical, and biological impact upon the environment as manufacturing firms tend to have a greater impact upon the environment when compared to colleges.

Customer Satisfaction

The analysis of Research Question 5 and Hypothesis 5 leads to a partial rejection of the null hypothesis. It is important to note that in this model employee satisfaction has the strongest relationship with customer satisfaction. This should come as no surprise if we are following Deming's model as discussed by Petersen (1999). Satisfied customers are more likely to remain customers and could recommend the service to friends. What is surprising is that product/service quality was not a significant predictor of customer satisfaction. This is in direct contrast to Deming's model (Petersen, 1999) and could be due to difficulty involved in quantifiably defining product/service quality within the HE system.

Employee Satisfaction

The analysis of Research Question 6 and Hypothesis 6 leads to a partial rejection of the null hypothesis. The results of this analysis are in line with literature, specifically

addressing the relationship between employee satisfaction and employee fulfillment. Research has shown that if an employee expects the work he or she is doing to be boring or unchallenging, then they will not be motivated to perform their job with high quality regardless of the rewards system that might be in place (Buch & Tolentino, 2004). Conversely, a fulfilled employee is a satisfied employee. Buch and Tolentino (2004) suggest a continuous evaluation of employee expectations and from that analysis create training focused on expectations.

Interpretation

The findings of this study suggest that community college presidents perceive relationships among variables identified as performance measures of TQM. However, it should be noted that while the statistical analysis of the data show these relationships exist, 55 (43%) of the respondents identified their institution as ones that practice TQM and 30 (23%) responded that they have a quality improvement council in place.

One explanation of these low numbers was offered by Ross and Greene (as cited in Boaden, 1997) who suggested that it was possible that TQM had become so accepted and integrated into organizations that its presence is almost transparent, making measurement even more difficult. Could TQM be so ingrained into a community college president's leadership and training that they are practicing TQM concepts while not seeing/identifying themselves as TQM practitioners or their colleges as TQM institutions?

In a study that evaluated six community college presidents' views on leadership, organizational pressures, and the change process, Malm (2008) discovered that each president rated leadership as the central theme of their change process. The literature is

clear in stating that TQM and other CQI processes stress the importance of leadership. While several leadership styles were discussed, all of the presidents agreed that they relied on the collaborative approach, using keywords such as visibility, praising, empowering, and coaching (Malm, 2008). While these keywords are components of TQM, none of the six presidents under study labeled themselves as a TQM practitioner.

Through an examination of the literature, I have come to believe that TQM has evolved into a system with performance measures that many, though not all, believe are essential elements of a CQI program. The survey instrument used for this research explored many of these performance measures. Having analyzed the findings of the survey and conversed with several of the respondents, I think a more acceptable term for these performance measures is continuous improvement concepts.

The concept of continuous improvement governs how an organization improves quality and can take the best concepts from programs such as TQM, strategic planning, or the balanced scorecard. It suggests a program that is less rigid and structured than existing or prescribed TQM programs. I believe this holistic approach would be more accepted by quality improvement leaders and would have a positive impact upon their improvement programs.

Another possibility exists regarding the implementation of TQM within HEIs. This study evaluated presidents' perceptions of TQM as the literature clearly states that the success of any CQI program is driven by the leader. However, by limiting the sample to one specific individual within the organization, the findings represent an individual's view, one that may not be shared by or consistent with others in the organization. Potentially conflicting views are best illustrated in a study conducted by Barber (2008)

who found that community college administrators' views differed from faculty views regarding TQM. Although 81% of faculty and administrators agreed that continuous improvement was important when evaluating the college strategic plan (CSP), 57% of administrators felt that the CSP supported institutional improvement while 24% of faculty agreed with that assessment. In terms of student achievement, 57% of administrators felt the CSP supported student achievement while 24% of faculty felt it did not (Barber, 2008).

The findings from this study can be used by TQM or CQI leaders to develop an improvement program built upon perceived relationships between TQM constructs. If a leader was looking to improve employee satisfaction within a college, this research would direct him or her toward improving customer satisfaction and employee fulfillment, which could result in a corresponding positive increase in employee satisfaction.

Continuing this process, the leader could sample their customer base to determine their needs and requirements and see if these are being met. Once this was accomplished, the practitioner could return to this study, which suggests that customer satisfaction increases with a corresponding increase in process management, customer focus, financial effectiveness, and employee satisfaction increases.

Prior to any significant investment of time and money into a design of a CQI program using this study as a model, additional analyses of the data should occur. An analysis using Structural Equation Modeling (SEM) as done in the original study by Grandzol and Gershon (1997) would be useful. The ability of SEM to conduct several multiple regressions at the same time and search for relationships among the independent

and dependent variables as well as producing a detailed path diagram of the significant relationships offers the CQI practitioner both quantitative data and a visual diagram that identifies the significant relationships.

Implications for Future Study

Consistent themes seen in the literature and from the findings of this survey discuss the importance of leadership driving the improvement process. Whether the process is TQM, strategic planning, six sigma, balanced scorecard, or one of the many other CQI methods, a CQI initiative that lacks support of leadership is likely doomed to failure or at the very least, likely to experience much more difficulty during the implementation of the program. Success of any of these processes depends on the support of leaders.

To validate these claims and assess the importance of leadership within the CQI process, study should be conducted on how, specifically, a leader influences the CQI process. A study by Tatro (2007) scratched the surface of this question when he evaluated the organizational culture at Midwest Community College (pseudonym) and studied how its culture changed with a new president who was a champion of CQI. Tatro (2007) challenges those who believe that leaders are unable to influence the culture of an organization. His research led him to believe that "Leaders create culture" (Tatro, 2007, p. 170) and clearly demonstrated how one leader was able to change the culture and implement a successful CQI program. Research into successful CQI programs with a focus on the role taken by the leader would help provide a better understanding of the CQI process and offer practitioners "best practices" to follow as they manage their programs. Researchers should attempt to identify if leaders are more likely to champion

a continuous improvement program rather than a TQM program within their organization. CQI practitioners could find it interesting to explore the reasons for why this may be.

As stated in this document and in the literature, the importance of leadership to a successful CQI process is significant. This research did not examine leadership as a dependent variable, though it was examined as an independent variable. In these examinations, leadership was shown not to be a significant predictor of financial effectiveness, public responsibility, customer satisfaction, and employee satisfaction. Study of how leadership components are related to, or influence, other factors of a CQI program is warranted.

The literature reviewed indicates that TQM is a concept that has fallen out of favor with many. It is a word that has been overused and associated with programs that really are not TQM. Additionally, the literature showed that the failures of TQM were well documented while the successes were not as well documented. One possible study could be used to help determine if the problem is with the TQM model itself or with employees or leaders who are resistant to change.

A possible study closely related to the one mentioned could explore if TQM has become so ingrained into organizational culture that individuals do not identify they are practicing TQM, when in fact they are. This theory is supported by my own leadership experience, which I discussed in the beginning. It is a possible explanation for the 54% of respondents to this study who indicated that their community college did not practice TQM and the 74% who responded that their community college did not have a quality improvement council, though it is possible that the HEIs had some type of council yet

labeled it as something different. The statistical analysis showed that relationships existed between TQM components within these colleges. A study that helps to distinguish perceptions and reality regarding TQM implementation would be valuable in examining how ingrained TQM is in the culture.

Another study could use the survey instrument deployed in this study and explore the relationships that were not examined. There were 13 variables, with 62 performance items that were evaluated using the survey instrument. This study did not explore the relationships that could exist among all of these variables and performance measures and many more potential relationships could exist. Leaders of CQI looking to implement only a portion of TQM could administer the survey and conduct an analysis in the area they are concerned with. With a large enough sample, factor analysis could provide useful information on the composition of the constructions. This study would be especially valid as Deming stated (as cited in Hoyer & Hoyer, 2001) that "Quality is multidimensional. It is virtually impossible to define the quality of a product or service in terms of a single characteristic or agent" (p. 55).

Summary

The data from this research examined community college president's perceptions as to the existence of relationships among variables associated with TQM. Recognizing these relationships can help identify which components of TQM are in use and more importantly highlight those concepts that influence each other. This can help leaders develop a plan for implementing a continuous improvement program within their organization.

The most important aspect of any quality improvement program is support from leadership and a clearly articulated vision. The reviewed literature showed that any improvement program faced an almost insurmountable hurdle if it did not have the full support from the leadership. Regardless of whatever continuous improvement program an organization undertakes, the first and most important step is involving the leadership of the organization. A study that examined the organizational culture of a community college in the Midwestern United States found that the dramatic change that occurred at the college was due to the arrival of a new president who was less autocratic and not willing to accept the status quo like his predecessor. The faculty and staff fed off the energy and enthusiasm of the new president and thus were much more receptive to change and became actively engaged in finding ways to improve the college (Tatro, 2007).

This research explored specific relationships that exist among components of TQM and should allow TQM planners to refine their TQM programs by focusing on those components. Ideally, this knowledge would prevent a TQM practitioner from attempting to implement components that are not mutually supportive of each other, such as employee satisfaction and internal/external cooperation, thus saving time and money.

Of course, this knowledge might not be enough. Even though this and other research show that TQM components exist within organizations, the bias against TQM is well documented in the literature. This bias will make it more difficult to manage an effective TQM program. The challenge facing implementation of TQM into community colleges was summed up by one of the respondents in this research who said:

> We have a strong CQI process, but I would not call it TQM. TQM is generally a bomb in higher ed, because the goal ends up becoming the process rather than the

> outcome/end result. I realize that's not the intended goal of TQM, but that is how it usually plays out when a college tries to use the model. The culture of education does not fit well with the semantics of the word "management" for starters. Educators like to be supported for continuous improvement rather than "managed". Thus we shy away from terminology like TQM. (Survey Respondent, personal communication, June 6, 2008)

Understanding the relationships among TQM components and how they fit into the specific goals of the community college environment can allow leaders to focus on those components they need for their colleges. A specific plan targeted at areas needing improvement would allow leaders to implement a program with specific goals that can be measured for success as they are implemented. This would help avoid some of the criticism found in the literature regarding TQM programs that could not measure their success rates and were lacking in focus. Measurable goals that demonstrate either the success or failure of TQM or any CQI process would help to address the concerns cited by Birnbaum (2000) and help decide the argument of whether TQM is anything more than a fad.

Finally, years of personal leadership experience in an organization that demands efficiency and continuous improvement combined with my research for this dissertation, leads me to believe that many of the programs in existence are similar to each other though their specific methods and cultures may be unique. And while the literature has many publications that align individuals and organizations with one specific method, I believe that it is best to take individual pieces from each of the programs and apply them to the organization as needed. This is an area in which this research is most helpful to CQI practitioners. Though this research focused solely on TQM, it should allow researchers to take an objective look at which TQM components are related to each other

and potentially use some of them in combination with components from other CQI programs to tailor a program specifically for their organization.

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APPENDIX A – Sample Calculation

	Number of Colleges				Numbers required for a Sample of 600			
State	Public	Independent	Tribal	Total	Selected	Public	Independent	Tribal
Alabama	27 (.93)	2 (.07)	0	29 (0.025)	16	15	1	0
Alaska	5 (1)	0	0	5 (0.004)	2	2	0	0
Arizona	19 (.86)	1 (.05)	2 (.09)	22 (0.019)	12	10	1	1
Arkansas	24 (.96)	1 (.04)	0	25 (0.021)	13	12	1	0
California	111 (.90)	12 (.09)	1 (.01)	124 (0.110)	66	59	6	1
Colorado	15 (1)	0	0	15 (0.013)	8	8	0	0
Connecticut	12 (.71)	5 (.29)	0	17 (0.015)	9	6	3	0
Delaware	1 (1)	0	0	1	1	1	0	0
Florida	28 (.90)	3 (.10)	0	31 (0.027)	17	15	2	0
Georgia	34 (.92)	5 (.08)	0	39 (0.034)	20	18	2	0
Hawaii	7 (.78)	2 (.22)	0	9 (0.008)	5	4	1	0
Idaho	4 (1)	0	0	4 (0.003)	2	2	0	0
Illinois	49 (.84)	9 (.16)	0	58 (0.050)	31	26	5	0
Indiana	3 (.60)	2 (.40)	0	5 (0.004)	2	1	1	0
Iowa	15 (.75)	5 (.25)	0	20 (0.017)	11	8	3	0
Kansas	22 (.88)	3 (.12)	0	25 (0.021)	13	11	2	0
Kentucky	18 (.90)	2 (.10)	0	20 (0.017)	11	10	1	0
Louisiana	11 (1)	0	0	11 (0.009)	6	6	0	0
Maine	8 (.80)	2 (.20)	0	10 (0.009)	5	4	1	0
Maryland	18 (.95)	1 (.05)	0	19 (0.016)	10	9	1	0
Massachusetts	17 (.65)	9 (.35)	0	26 (0.022)	14	9	5	0
Michigan	28 (.88)	2 (.06)	2 (.06)	32 (0.028)	17	15	1	1
Minnesota	29 (.82)	3 (.09)	3 (.09)	35 (0.030)	19	15	2	2
Mississippi	16 (.94)	1 (.06)	0	17 (0.015)	9	8	1	0
Missouri	14 (.74)	5 (.26)	0	19 (0.016)	10	7	3	0
Montana	8 (.53)	0	7 (.47)	15 (0.013)	8	4	0	4
Nebraska	7 (.78)	0	2 (.22)	9 (0.008)	5	4	0	1
Nevada	4 (.80)	1 (.20)	0	5 (0.004)	2	1	1	0
New Hampshire	4 (.57)	3 (.43)	0	7 (0.006)	4	2	2	0
New Jersey	19 (.90)	2 (.10)	0	21 (0.018)	11	10	1	0
New Mexico	15 (.88)	0	2 (.12)	17 (0.015)	9	8	0	1
New York	45 (.70)	19 (.30)	0	64 (0.055)	34	24	10	0
North Carolina	58 (.95)	3 (.05)	0	61 (0.052)	32	30	2	0
North Dakota	5 (.50)	0	5 (.50)	10 (0.009)	4	2	0	2

Ohio	34 (.85)	6 (.15)	0	40 (0.034)	22	19	3	0
Oklahoma	15 (1)	0	0	15 (0.013)	8	8	0	0
Oregon	17 (.94)	1 (.06)	0	18 (0.015)	10	9	1	0
Pennsylvania	19 (.68)	9 (.32)	0	28 (0.024)	15	10	5	0
Rhode Island	1 (1)	0	0	1	1	1	0	0
South Carolina	17 (.89)	2 (.11)	0	19 (0.016)	10	9	1	0
South Dakota	4 (.44)	1 (.12)	4 (.44)	9 (0.008)	5	2	1	2
Tennessee	13 (.72)	5 (.28)	0	18 (0.015)	10	7	3	0
Texas	66 (.92)	6 (.08)	0	72 (0.062)	38	35	3	0
Utah	5 (.83)	1 (.17)	0	6 (0.005)	3	2	1	0
Vermont	2 (.50)	2 (.50)	0	4 (0.003)	2	1	1	0
Virginia	23 (.92)	2 (.08)	0	25 (0.021)	13	12	1	0
Washington	33 (.94)	1 (.03)	1 (.03)	35 (0.030)	20	18	1	1
West Virginia	12 (.92)	1 (.08)	0	13 (0.011)	7	6	1	0
Wisconsin	17 (.89)	0	2 (.11)	19 (0.016)	10	9	0	1
Wyoming	7 (1)	0	0	7 (0.006)	4	4	0	0
*Outlying Areas	7 (1)	0	0	7 (0.006)	4	4	0	0
Totals	992	140	31	1163	616	518	81	17

*Outlying areas include Guam, Puerto Rico, American Samoa, Northern Marianas, Palau, Micronesia, and the Marshall Islands.

APPENDIX B – Cover Letter

Dear President,

You have been invited to participate in a research study concerning how community college presidents perceive the relationship between specific leadership traits associated with Total Quality Management (TQM). The title of this research project is "Relationships among Total Quality Management (TQM) and 13 Operational Practices Displayed by Community College Leaders". This research is being conducted through Colorado State University under the supervision of Dr. Clifford Harbour who is the principal investigator. The co-principal investigator who is conducting this survey today is Mark Riccardi who is a doctoral student. He can be reached at riccardim@comcast.net following the completion of this survey.

Once the surveys have been completed, the data will be combined and analyzed. The combined results of this survey will be shared with the dissertation committee. No individual results will be shared and your participation in this survey will be confidential. No names will be used on the survey forms.

Your participation in this research is completely voluntary. Questions about your rights as a participant may be directed to Janell Barker at 970-491-1563. There are no known risks in participating in this study. This study is important as it may help to identify which concepts within TQM are most beneficial to community college leaders.

If you wish to participate, please do the following. At the bottom of this letter you will find an internet link with a password that will allow you secure access to the survey. Once you enter the password, the survey will appear in your browser. It is anticipated that completion of the survey should take no more than 20 minutes. Please answer the questions based on how you feel about the concepts discussed, not how others might feel.

Thank you for your time and consideration. It is only with the generous help of individuals like yourself that this research can be successful.

Sincerely,

Mark T. Riccardi

APPENDIX C – Pilot Study Tables

Table C3. Reliability Analysis for Exogenous and Endogenous Variables

Variable	Item	Item Name	Alpha if Deleted
Leadership	X1	Clarity of vision	.804
(α = .793)	X2	Long-range orientation	.652
	X3	Coaching management style	.771
	X4	Employee empowerment	.718
	X5	Plan and implement change	.773
Continuous	X6	Refinement cycles No. 1	.547
improvement	X7	Refinement cycles No. 2	.747
(α = .715)	X8	Demonstrated improvements No. 1	.679
	X9	Demonstrated improvements No. 2	.605
Employee	X10	Job satisfaction No. 1	.793
fulfillment	X11	Job satisfaction No. 2	.787
(α = .807)	X12	Job commitment	.707
	X13	Pride of workmanship No. 1	.835
	X14	Pride of workmanship No. 2	.720
Learning	X15	Company-wide training	.853
(α = .887)	X16	Foundational knowledge	.839
	X17	Process knowledge	.873
	X18	Continuous self-improvement	.866
	X19	Managerial learning	.881
Process	X20	Prevention orientation	.191
management	X21	Reduction of mass inspection	.318
(α = .302)	X22	Design quality	.153
	X23	Statistical process control	.290
	X24	Understanding variation	.546
	X25	Elimination of quotas	.207
	X26	Understanding motivation	.062
	X27	Total cost accounting	.257

Internal/External cooperation (α = .622)	X28	Firm-supplier partnerships	.583
	X29	Single-supplier orientation	.777
	X30	Collaborative organization	.635
	X31	Teamwork	.482
	X32	Organization-wide involvement	.527
	X33	Systems view	.515
	X34	Trust and elimination of fear No. 1	.548
	X35	Trust and elimination of fear No. 2	.552
Customer focus (α = .671)	X36	Customer-driven focus No. 1	.571
	X37	Customer-driven focus No. 2	.425
	X38	Customer-driven focus No. 3	.637
	X39	Customer-driven focus No. 4	.717
Product service quality (α = .788)	Y1	Accuracy	.761
	Y2	Completeness	.637
	Y3	Conformance	.707
	Y4	Innovation	.813
Financial effectiveness (α = .788)	Y5	Return on investment	.573
	Y6	Market share	.778
	Y7	Capital investment	.757
Operational efficiency (α = .819)	Y8	Productivity	.802
	Y9	Scrap/waste	.775
	Y10	Energy/efficiency	.704
	Y11	Material usage	.791
Public responsibility (α = .855)	Y12	Environmental complaints	-
	Y13	Community involvement	-
Customer satisfaction (α = .793)	Y14	Customer surveys	.741
	Y15	Customer satisfaction results	.784
	Y16	Customer inquiries	.507
	Y17	Customer complaints	.730
Employee satisfaction (α = .821)	Y18	Employee turnover	.847
	Y19	Requests for transfer	.752
	Y20	Absenteeism	.753
	Y21	Grievances/complaints	.734
	Y22	Employee satisfaction surveys	.835
	Y23	Employee satisfaction results	.812

Table C4. Correlation of Scores for Independent and Dependent Variables

Independent Variables	Dependent Variables					
	Product Service Quality	Financial Effectiveness	Operational Efficiency	Public Responsibility	Customer Satisfaction	Employee Satisfaction
Leadership	.591	.465	.384	.191	.527	.461
CI	.756	.470	.554	.232	.515	.754
EmpFul	.652	.704	.688	.675	.388	.878
Learning	.472	.604	.515	.523	.507	.476
ProcAdmin	.616	.608	.563	.374	.532	.582
In/Ex Coop	.428	.440	.339	.246	.685	.429
Cust Focus	.646	.329	.588	.136	.778	.575

APPENDIX D – Survey Authorization Letter

Department of Management

April 11, 2007

Mr. Mark T. Riccardi
Colorado State University
20148 E. Kenyon Place
Aurora, CO 80013

Mark,

In accordance with your undated request sent via email on March 31, 2007, I grant permission to administer the Total Quality Management survey published in the *International Journal of Quality Science* 3(1) (1998), modified only as necessary for the target research audience. Please realize that any substantive changes to the survey format and organization, or the specific survey items, may undermine the survey's already established statistical validity and reliability. This would likewise undermine the legitimacy of any conclusions or recommendations you derive from its application.

While there are no other conditions for use of this survey instrument within the scope of your research agenda detailed in your letter, I will appreciate periodic updates as you proceed through your data analysis and dissertation preparation.

Sincerely,

John R. Grandzol, Ph.D.

Professor of Management

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APPENDIX E – Survey

Total Quality Management Questionnaire

Please provide the following information about yourself and your college. It will be used to study the results of this survey by considering different perspectives. In no way will any attempt be made to identify you or your college based on this information.

1) Do you believe that your institution practices TQM?

2) If you answered yes to question 1, where do you use TQM (classroom, finance office, other departments)?

3) Does your institution have a quality improvement counsel?

4) If you answered yes to question 3, are they formally trained and how long has it been in existence?

5) What is the size of your student population?

6) How long has your college existed?

7) What type of community college is your institution? Please circle one.

PUBLIC INDEPENDENT TRIBAL

7) How long have you been the President?

Please respond to each of the following statements by circling 1 for strongly disagree, 2 for disagree, 3 for somewhat disagree, 4 for somewhat agree, 5 for agree, or 6 for strongly agree. Please respond to every statement.

This state of statements is about "Leadership" in your community college. Leadership is the ability of administrators to establish, practice, and lead a long-term vision for the entire community college, driven by changing customer requirements, as opposed to internal administrative control.

Circle Your Response

	Strongly Disagree			**Strongly Agree**		
1. Senior administrators share similar beliefs about the future direction of this community college.	1	2	3	4	5	6

2. Activities and investments that have long-term benefits receive little support from senior administrators.	1	2	3	4	5	6
3. Employees have the opportunity to share in and are encouraged to help the college implement change.	1	2	3	4	5	6
4. Administrators and supervisors rarely allow employees to take necessary actions on their own.	1	2	3	4	5	6
5. Senior administrators anticipate change and make plans to accommodate it.	1	2	3	4	5	6

This set of statements is about "Continuous Improvement" in your community college. Continuous improvement is the tendency of the college to pursue incremental and innovative improvement of its processes, products, and services.

6. This college encourages continual study and improvement of all its products, services, and processes.	1	2	3	4	5	6
7. Employees usually don't get an opportunity to suggest changes or modifications to existing processes.	1	2	3	4	5	6
8. Many of our services have been improved in the recent past.	1	2	3	4	5	6
9. This college has received recent compliments and recognition for improving its services/processes.	1	2	3	4	5	6

This set of statements is about "Employee Fulfillment" in your community college. Employee fulfillment means the degree to which employees of the college believe that the college continually satisfies their needs.

10. My work duties and responsibilities contribute little to satisfying my need to create quality services.	1	2	3	4	5	6
11. I like my job because I'm doing what I want to do.	1	2	3	4	5	6
12. Employees in this college are dedicated to their jobs.	1	2	3	4	5	6
13. Administrators and supervisors sometimes ask employees to compromise their desire for excellence.	1	2	3	4	5	6
14. Administrators and supervisors create a work environment that encourages employees to perform to the best of their abilities.	1	2	3	4	5	6

This set of statements is about "Learning" in your community college. Learning is the college's capability to recognize and support the development of its employees' skills, abilities, and knowledge.

15. Administrators and supervisors ensure that all employees receive training that helps them understand hwo and why the college does what it does.	1	2	3	4	5	6
16. Many employees in this college do not possess sufficient knowledge about the basics of our industry.	1	2	3	4	5	6

17. Few employees in this college understand the basic processes used to create our services.	1	2	3	4	5	6
18. Top administration has established an environment that encourages continous education.	1	2	3	4	5	6
19. Administrators and supervisors participate in specialized training on how to conduct business, whether dealing with employees or external customers.	1	2	3	4	5	6

This set of statements is about "Process Management" in your community college. Process management is the set of technical and behavioral practices emphasizing the administration of processes, or means of actions, rather than results.

20. Preventing defective services from occurring is a strong attitude in this college.	1	2	3	4	5	6
21. The processes used in his college do not include in-process measures of quality.	1	2	3	4	5	6
22. The processes for designing new services in this college ensure quality.	1	2	3	4	5	6
23. Employees involved in different processes know how to use statistical process control methods to evaluate their processes.	1	2	3	4	5	6
24. Explaining the variation in processes is rarely used as an analysis technique in this college.	1	2	3	4	5	6
25. In this college, numerical quotas are not the only, or the most important, measures of an employee's performance.	1	2	3	4	5	6
26. Administrators and supervisors understand how to motivate employees and encourage them to perform at their highest levels.	1	2	3	4	5	6
27. Senior administrators look at the total costs of products and services, including indirect and overhead costs.	1	2	3	4	5	6

This set of statements is about "Internal/External Cooperation" in your community college. This cooperation is the tendency of the college to engage in noncompetitive activities internally among employees and externally among suppliers.

28. Administrators emphasize activities that lead to lack of cooperation between our college and our suppliers.	1	2	3	4	5	6
29. Administrators encourage use of few suppliers based on quality rather than price alone.	1	2	3	4	5	6
30. Administrators, supervisors, and employees from different departments work independently to achieve their own department's goals.	1	2	3	4	5	6
31. In this college, teamwork is commonplace – the expected way of doing business.	1	2	3	4	5	6
32. In this college, everyone participates in improving our products, services, and processes.	1	2	3	4	5	6

33. Senior administrators look at the "whole picture" when they make decisions.	1	2	3	4	5	6	
34. Employees are hesitant to voice their opinions, make suggestions, or inquire about any of the activities of the college.	1	2	3	4	5	6	
35. Senior administrators insist on accuracy and reliability of all information and communications within the college.	1	2	3	4	5	6	

This set of statements is about "Customer Focus" in your community college. Customer focus is the degree to which the college's customers continually perceive that their needs are being met by the way the college's products and services are designed and produced.

36. Our processes and activities are centered on satisfying our customers.	1	2	3	4	5	6
37. Administrators and supervisors encourage activities that improve customer satisfaction.	1	2	3	4	5	6
38. Satisfying our customers, and meeting their expectations, is the most important thing we do.	1	2	3	4	5	6
39. Senior administrators behave in ways that lessen the importance of our customers.	1	2	3	4	5	6

The following set of statements pertains to different measures of total quality. While all statements may not always apply to your community college, most will. Please read each and every statement and then decide whether it applies to your college and circle the appropriate response.

This set of statements is about "Product Service Quality" in your community college. Product service quality is the degree to which the college strives for accuracy, completeness, conformance, and innovation.

40. Our services usually have some kind of mistakes, defects, or errors.	1	2	3	4	5	6	NA
41. Our services have all necessary parts, features, or elements.	1	2	3	4	5	6	NA
42. Our services meet customers' requirements.	1	2	3	4	5	6	NA
43. This college doesn't develop new ideas or methods in its services.	1	2	3	4	5	6	NA

This set of statements is about "Financial Effectiveness" in your community college. Financial effectiveness is the degree to which the college receives a return on its investment.

44. This college's return on investment reflects sound investments.	1	2	3	4	5	6	NA
45. This college's market position enables it to resist losses to other colleges providing the same services.	1	2	3	4	5	6	NA

46. This college rarely reinvests in the processes it uses to provide services.	1	2	3	4	5	6	NA

This set of statements is about "Operational Efficiency" in your community college. Operational efficiency is a measure of how efficient the college is in its use of energy and material usage.

47. Productivity, in terms of yielding desired results, benefits, or profits, is continuously improving.	1	2	3	4	5	6	NA
48. The amount of scrap or waste this college produces, whether in material, time, or employees' capabilities is continually decreasing.	1	2	3	4	5	6	NA
49. This college wastes energy utilities, resulting in costs that are needlessly inflated.	1	2	3	4	5	6	NA
50. The processes used in this college are very efficient in terms of converting inputs (labor, data, raw material) into desired outputs (learning).	1	2	3	4	5	6	NA

This set of statements is about "Public Responsibility" in your community college. Public responsibility is the degree to which the college is considered a steward of the environment and a good neighbor.

51. This college rarely receives notice of dissatisfaction, formal or otherwise, from government, industry, or local parties about it's physical, chemical, or biological impact on the surrounding community.	1	2	3	4	5	6	NA
52. This college practices "good neighbor" relationships, participating in many community-enhancing activities.	1	2	3	4	5	6	NA

This set of statements is about "Customer Satisfaction" in your community college. Customer satisfaction is the degree in which your college communicates with your customer in order to provide them with better service.

53. This college doesn't bother collecting information from its customers to measure their satisfaction.	1	2	3	4	5	6	NA
54. Customer satisfaction results show improvement over time.	1	2	3	4	5	6	NA
55. This college lacks a process to provide satisfactory responses to customer inquiries.	1	2	3	4	5	6	NA
56. This college has processes in place to listen to and resolve customer complaints.	1	2	3	4	5	6	NA

This set of statements is about "Employee Satisfaction" in your community college. Employee satisfaction is the degree to which the employees in your college feel valued and enjoy their jobs.

57. This college has very low employee turnover i.e., most employees choose to remain here rather than work somewhere else.	1	2	3	4	5	6	NA

58. Very few employees in this college ask to be transferred from their present jobs because of dissatisfaction with their supervisors.	1	2	3	4	5	6	NA
59. Absenteeism, i.e., chronic absence from work, is high in this college.	1	2	3	4	5	6	NA
60. Employees file very few grievances/ complaints against administration in this college.	1	2	3	4	5	6	NA
61. This college collects pertinent information from employees to measure their satisfaction.	1	2	3	4	5	6	NA
62. Employee satisfaction results show improvement over time.	1	2	3	4	5	6	NA

63. Please indicate the college's position on the following total quality scale. Check **only one** of the possible responses (A,B,C,D, or E). The list of characteristics under each response should help you determine the most accurate position for your college.

___A. Short-Term Focus
Revenues and budgets are a higher priority than quality.
No mission statement about quality exists.
Little or no quality data are available or used.
Only skill-related, on-the-job training is provided for employees.
Quality of incoming materials is not controlled.
High incidence of scrap or rework exists.
Customer complaints are frequent.
Repeat business is relatively low.

___B. Product Focus
Quality is viewed as "meeting specifications".
Statistical analysis is used very little or not at all.
Strategic quality plan is short-term (<2 years).
Employee involvement in quality activities is selective.
Training is limited to skills.
Quality indicators for products are tracked.
Some customer complaints still exist.
Senior administrators only meet key customers.

___C. Product and Service Focus
Some statistical analysis is performed.
Financial, product, and product quality plans are long term.
Job-related and basic-quality training is available for all employees.
Supplier qualification and certifications programs exist.
Production processes are statistically controlled.
Periodic customers surveys determine expectations.
Customer complaints are rare.
Senior administrators meet many customers, but sporadically.

___D. Process or System Focus

Widespread internal and some external quality data exist.
Effective long and short-term quality plans are based on benchmarking.
Cross-functional quality teams are functioning.
Considerable quality training is available for all employees.
Analytical design tools are used consistently.
Quality indicators are driven by customer requirements.
Senior administrators drive customer partnering.
Continual, real-time customer input is sought.

___E. Continuous Improvement Focus

Employees are completely empowered to fulfill the college's quality mission.
The college's quality mission is totally customer driven.
Expanded partnering exists with all key suppliers.
Continuous improvement and optimization of all processes is occurring.
The entire college is experiencing world-class total quality results.
Customer needs and services are anticipated.
Products and services are benchmarked against the best competitors.

Thank you for your participation.

APPENDIX F – Human Subjects Approval

Research Integrity & Compliance Review Office
Office of Vice President for Research
Fort Collins, CO 80523-2011
(970) 491-1553 FAX: (970) 491-2293

Notice of Approval for Human Research

Principal Investigator: Clifford Harbour, Education, 1588
Co-Principal Investigator: Mark Riccardi, Education, 1588

Title: Relationships Among Total Quality Management (TQM) and 13 Operational Practices Displayed by Community College Leaders
Protocol #: 08-060H **Funding Source:** N/A
Number approved: 1,000 participants
Committee Action: Approval Date: March 12, 2008 **Expires:** March 11, 2009

RB Administrator: Janell Barker

Consent Process: Because of the nature of this research, it will not be necessary to obtain a signed consent form. However, all subjects must receive a copy of the approved cover letter printed on department letterhead. The requirement of documentation of a consent form is waived under § _ _.117(c)(2).

Investigator Responsibilities:

- It is the PI's responsibility to obtain consent from all subjects.
- It is the responsibility of the PI to immediately inform the Committee of any serious complications, unexpected risks, or injuries resulting from this research.
- It is also the PI's responsibility to notify the Committee of any changes in experimental design, participant population, consent procedures or documents. This can be done with a memo describing the changes and submitting any altered documents.
- Students serving as Co-Principal Investigators must obtain PI approval for any changes prior to submitting the proposed changes to the IRB for review and approval.
- The PI is ultimately responsible for the conduct of the project.
- A status report of this project will be required within a 12-month period from the date of review. Renewal is the PI's responsibility, but as a courtesy, a reminder will be sent approximately two months before the protocol expires. The PI will be asked to report on the numbers of subjects who have participated this year and project-to-date, problems encountered, and provide a verifying copy of the consent form or cover letter used. The necessary continuation form (H-101) is available from the RICRO web page http://ricro.research.colostate.edu.
- Upon completion of the project, an H-101 should be submitted as a close-out report.

- If approval did not accompany a proposal when it was submitted to a sponsor, it is the

PI's responsibility to provide the sponsor with the approval notice. This approval is issued under Colorado State University's OHRP Federal Wide Assurance 00000647.

- **Should the protocol not be renewed before expiration, all activities must cease until the protocol has been re-reviewed.**

Please direct any questions about the Committee's action on this project to me for routing to the Committee. Additional information is available from the RICRO web site at http://ricro.research.colostate.edu.

Attachment Date of Correspondence: April 8, 2008