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Rashid Mohamed Bax

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An assessment of the quality improvement climate as perceived by community college leadership in Iowa

Bax, Rashid Mohamed, Ph.D.

Iowa State University, 1994
An assessment of the quality improvement climate as perceived by community college leadership in Iowa

by

Rashid Mohamed Bax

A Dissertation Submitted to the Graduate Faculty in Partial Fulfillment of the Requirements for the Degree of DOCTOR OF PHILOSOPHY

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For the Graduate College
Iowa State University
Ames, Iowa
1994
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CHAPTER I. INTRODUCTION

To achieve its desired transformation, the Total Quality movement over time has gathered in loose union ideas from systems theory, humanistic and industrial psychology, management theory, human-resource and organizational development, statistical process control, plus lessons from earlier attempts at quality improvement like quality circles. All of these ideas in many guises and combinations, aim to remake organizations so they become more focused, disciplined, quick-footed, humane and competitive. (Marchese, 1993, p. 11)

The challenges facing higher education in the United States are well documented and include rising tuition costs, declining enrollments, calls for accountability and increased productivity, low morale, burnout, collective bargaining, budget cuts and funding constraints, political lobbying, aged personnel, and underprepared students (Bonser, 1992; Chaffee & Sherr, 1992; Cornesky et al., 1992; Hartley, 1992; Kelly, 1988; Seymour, 1993a). The quality movement which evolved from the philosophies of Deming, Juran, Crosby, and others, is gathering momentum in education, and is touted as an appropriate philosophy or management strategy. It has been successfully applied in manufacturing, the service industry, and in public and government sectors. Can it transform organizations that are viewed by quality proponents as being "...bureaucratic, oversized, sluggish, self-absorbed, unresponsive, and repressive of initiative and talent, and uncompetitive" (Marchese, 1993, p. 11)?

The wave of interest in quality improvement in education is evident if one considers its expansion from mainly administrative applications such as physical plant maintenance, registration procedures, mail distribution, physical maintenance, payroll, enrollment

---

1 Quality improvement efforts have been referred to as "Quality Management," "Total Quality Management" (TQM), and "Continuous Quality Improvement" (CQI). These terms are considered to be synonymous and will be used interchangeably.
management, and management of campus facilities (Coate, 1993; Reynolds, 1992; Seymour & Collett, 1991) to more diverse areas. Total Quality Management has been considered or applied in: teaching (Hau, 1991; Ord, 1993; Sokol, 1993); assessment or outcomes assessment (Bragg, 1992; Cross, 1993; Ewell, 1991; Seymour & Chaffee, 1992); and integrating total quality into curriculum (Stephens, 1993). It has also been considered in: vocational-technical education (Crumrine & Runnels, 1991); special needs populations (Brown, 1993); continuing education (Falk, 1992); institutional research and planning (Teeter & Lozier, 1991); and instructional systems development (Macchia, Jr., 1992).

The list of universities and colleges implementing TQM and offering related courses is reported to be increasing (Axland, 1992a; Horine et al., 1993). Many universities and even more community colleges are offering TQM in-house training, classroom seminars and courses for local businesses. This is why academic departments that offer courses in total quality decide to actually "practice what they preach" (Copa, 1993; Corson, 1991; Seymour & Collet, 1991). Recently, business schools seeking accreditation are being required to demonstrate how continuous improvement concepts are used to improve critical processes related to curricula, faculty, and administration (Horine et al., 1993).

Partnerships between industry and educational institutions are helping to promote quality improvement in education. The executives of six corporations (American Express, IBM, Proctor & Gamble, Ford, Motorola, and Xerox) have stressed that companies and institutions must work together to accelerate teaching, research, and the use of quality management principles (An Open Letter: TQM on Campus, 1991). Recently, IBM
announced cash and equipment awards to nine U.S. colleges and universities to work together to accelerate the teaching, research, and use of quality management principles (Seymour, 1993b).

The Malcolm Baldrige Award, established in 1987 to encourage quality improvement efforts among business and industry, is now being considered for education. Legislation is pending to establish national educational quality awards (Axland, 1992b) which include a 4th Malcolm Baldrige National Quality Award for education, an annual award for colleges and universities that teach and model total quality management, and the National Commitment to Quality Award recognizing universities and colleges that teach total quality management while applying its principles.

Although the body of literature in quality improvement in education is growing exponentially, there is still insufficient evidence to link quality improvement with outcomes such as productivity, satisfaction, high morale, etc. In fact, Entin (1993) observed that, "The growing number of articles and books on TQM in higher education has mostly consisted of glowing accounts of its adoption and early success in model institutions, plus 'how-to' stories about TQM techniques" (p. 28). Furthermore, the growing body of literature supports the quality approach as being both viable and feasible, and one that can be translated to higher education (Chaffee & Sherr, 1992; Coate, 1993; Cornesky, et al., 1992; Marchese, 1991; Melvin III, 1991; Seymour & Collett, 1991; Sherr & Teeter, 1991; Spanbauer, 1992; Teeter & Lozier, 1993a).

Many benefits have been espoused among practitioners of quality improvement. For
example, Spanbauer (1992) stated that, "Quality processes can improve the management and operation of educational institutions while improving the learning environment and student achievement" (p. xii). "The pursuit of TQM principles can produce improvements in the classrooms, help to refocus and reorganize academic units, improve staff attitudes, and reduce costs" (Teeter & Lozier, 1993b, p. 1). Moreover, in response to the contention that TQM should be dismissed as a fad, Seymour (1993a), contended that it has made a difference in organizations around the world and that, "It is too well grounded in a scientific approach to problem solving, and it has been tested, scrutinized, and revised in thousands of organizations over a period of more than three decades" (p. ix).

At the community college level, Fox Valley Technical College (FVTC), Delaware County Community College, Lamar Community College and Maricopa District Community College System are considered the pioneers implementing quality improvement concepts. Fox Valley Technical College implemented a quality approach in 1985, and the accrued benefits are well documented (Spanbauer, 1987; 1992). In fact, FVTC has gone as far as to guarantee competence in several areas of TQM for all program graduates, starting from 1993 (Needham, 1992).

Organizational leadership and commitment has been identified as one of the crucial factors between success and failure in implementing quality improvement strategies (Entin, 1993; Melan, 1993; Seymour & Collet, 1991). In the words of Melan (1993), "... demonstrated commitment and involvement by the leaders of the organization is necessary to maintain and facilitate the change process," and that "... many failed or flagging TQM
ent initiatives are attributable to lack of management commitment" (p. 8).

Entin's (1993) findings about the initial use of TQM by 10 colleges and universities in the Boston area further stresses the importance of the commitment of presidents and senior administrators:

If TQM is to move beyond the fad stage and take firm hold . . . two conditions are necessary: college presidents must perceive TQM as a means to solve major problems facing their institutions; and senior academic affairs administrators and faculty must believe TQM is related to their concerns and interests. It may be that the schools that adopt TQM will be the survivors that prosper in the future. TQM is clearly about change, as are the forces that now buffet American higher education. (p. 31)

Industry's love affair with total quality seems to have waned with recent reports citing that it has not lived up to its claims (Miller, 1992; Schaffer & Thomson, 1992). However, other studies reveal that TQM does improve organizational success and emphasize leadership commitment as crucial to successful implementation (Kendrick, 1993; General Accounting Office, 1991). Although literature is evolving that focuses on the successes and failures of TQM, an analysis by Lozier & Teeter (1993) suggested that improper implementation—not concepts—are to be blamed.

According to Seymour and Collett (1991), many institutions "... continue to grapple with the issue of where to begin TQM implementation" (p. 6). Among the implementation models identified, the "trickle down" or "cascade" model involves the initiation of TQM by the leadership. In contrast, the "infection" or "bubble-up" model involves setting up voluntary programs whose success can be diffused throughout the organizations. The third, or "loose-tight" model, involves a loosely developed plan towards implementation. Seymour & Collett
discuss advantages and disadvantages of all three models, but suggest that the "cascade" and "loose-tight" models require top-level leadership to be truly feasible.

Notwithstanding the implementation models, the question of how to start a quality improvement initiative or management system remains to be answered. A necessary first step towards implementing a quality management system requires self-assessment of the prevailing quality climate to identify areas of strength and weaknesses. Edosomwan and Savage-Moore (1991) presented a four-stage model to assess TQM posture and readiness to compete for the Baldrige Award:

The assessment of the organizational environment is the first and most important stage for total quality improvement, in that it serves as an educational step for the top management team and the improvement team by defining the current state. (p. 23)

The technique of assessing quality improvement is also advocated by Fargher, Jr. (1991) who stated, "Self-assessment is a process of reviewing an organization's current practices, competitive strategies, policies, procedures, leadership, human resource practices, and employee and management attitudes toward customer focus, quality and productivity" (p. 375). In addition, the benefits of assessing quality utilizing "self-assessment" according to Fargher (1991):

... can be used at any stage of the quality journey. If you are just starting, it can help show you the areas that may provide the fastest and highest rate of return. If you have an excellent total quality management organization it will point to areas where improvements can be made which will result in greater customer satisfaction, profits or both. (p. 378)

The Baldrige Award represents seven dimensions of quality management: a) leadership; b) information and analysis; c) strategic quality planning; d) human resource
development and management; e) management of process quality; f) quality and operational results; and g) customer focus and satisfaction, that provide an ideal framework for a total quality management system whose criteria can be used to assess an organization's quality program (Brown, 1992; Jaehn, 1990; Knotts, Jr., et al., 1993). In fact, some companies are adopting its criteria to assess their processes and have applied for the award primarily to get an evaluation of their quality systems (Placek, 1992). Moser (1992) recommended the award criteria for the evaluation of quality in hospitals. Brown (1992) developed a self-assessment questionnaire based on the Baldrige criteria that could be used to evaluate quality in organizations. As discussed by Placek, other uses of the Baldrige criteria include: identify areas to further increase quality improvement efforts; evaluating and setting priorities; identify gaps in company strategy; and assist in the development of action plans.

Seymour and Collet (1991) found that all of the Baldrige Award criteria were considered to be extremely important by higher education respondents, with the leadership and customer satisfaction criteria being most important. Although there are many models for self-assessment, the model based on the Malcolm Baldrige Award criteria is being increasingly considered by educators as most suitable (Chaffee & Sherr, 1992; Cornesky et al., 1992; Neuroth et al., 1992; Schenkat, 1993; Spanbauer, 1992). Instruments based on the Baldrige criteria have been developed to assess quality improvement efforts (Cronesky et al., 1992–colleges and universities; Neuroth et al., 1992–schools). It appears imminent that the Baldrige Award criteria will be applied to colleges and universities (Comesky, 1993).
Statement of the Problem

Fox Valley Technical College, Delaware County Community College, Lamar Community College, Maricopa District Community College System and other pioneering colleges spearheading the quality movement in education have gained national prominence. Given the acute problems facing education and the positive claims made by quality proponents, a reasonable assumption would be that community colleges in Iowa are contemplating or have already started some form of quality improvement initiative.

Implementation of TQM is not easy, therefore, colleges need to proceed with caution. The leadership role and commitment for successful TQM implementation have been stressed; however, at this stage, no assessment of the leadership quality climate has been undertaken. The quality movement has generated much confusion and anxiety through differing philosophies, varying interpretations and variety of implementation strategies. In addition, the role of community college leadership will be critical in any quality improvement effort, and thus, the questions become: What is the current prevailing quality climate as perceived by the leadership? Is there congruence in the perceptions of the various levels of community college leadership towards quality improvement?

Therefore, the purpose of this study was to determine the status of the quality improvement climate as perceived by community college leadership in Iowa. An instrument based on the Malcolm Baldrige criteria was developed specifically to conduct this assessment. This is a necessary first step in assessing the current and ideal situations between differing levels of the leadership. Information is needed to complete the quality gap profile which will
identify issues, reveal areas of strength and weaknesses, and enable appropriate improvement strategies to be developed and deployed throughout the system.

**Purpose of the Study**

The central purpose of this study was to determine the current and ideal quality climate and the quality climate gap in Iowa’s Community Colleges as perceived by administrators by developing an instrument based on the seven quality dimensions of the Malcolm Baldrige Award framework. The quality gap is defined as the difference between the current and ideal quality climate.

**Research Questions**

More specifically, the study was designed to answer the following research questions:

1. What are the demographic characteristics of administrators in Iowa’s Community Colleges?
2. What are the current and ideal perceptions of the various levels of leadership towards the seven quality climate dimensions?
3. What are the quality climate gaps of the various levels of leadership towards the seven quality dimensions?
4. How do the perceptions of the various leadership groups for each dimension compare with the Baldrige weightings?
5. Do perceptions of quality climate (current and ideal) differ between the various levels of leadership?
6. Do perceptions of quality climate (current and ideal) differ between the leaders who had quality management/improvement training and those who did not?

Hypotheses of the Study

The following null hypotheses were formulated to answer the research questions:

1. There are no significant differences in the seven dimensions of quality climate perceptions (current) between the various levels of leadership.

2. There are no significant differences in the seven dimensions of quality climate perceptions (ideal) between the various levels of leadership.

3. There are no significant differences in the seven dimensions of quality climate perceptions (current) between leaders who had quality management training and those who did not have any such training.

4. There are no significant differences in the seven dimensions of quality climate perceptions (ideal) between leaders who had quality management training and those who did not have any such training.

Rationale for the Study

Satisfactory responses leading to the resolution of the critical issues and problems challenging community colleges depend heavily on effective leadership at all levels of the institution. (Kelly, 1988, p. 1)

Perhaps the major challenge to community colleges into the 1990s, however, will be balancing demands for increased accountability and quality in the face of declining resources. (Iowa State Department of Education, 1992, p. 40)
Many colleges and universities have embarked on the journey towards implementing TQM and hundreds more will be considering it (Fisher, 1993). Among the community colleges in Iowa, only one college, Hawkeye Institute of Technology, has been cited as implementing TQM (Corson, 1991; Sheer & Teeter, 1992). Furthermore, to date there has been no or very little information as to the levels of TQM awareness or implementation efforts in Iowa.

The importance of TQM to the community college becomes more critical, especially as it has been considered as one of the six different approaches to outcomes assessment for postsecondary education during a two-year research effort of the National Center for Research in Vocational Education (NCRVE) which, according to Bragg (1992), provides a unique perspective to conceptualizing, collecting, and analyzing outcomes. As such, TQM will play an important role in outcomes assessment and administrators in community colleges will need to consider its application in the future.

In the vocational/technical education area, ongoing reforms include integration of academic and vocational curriculum, and the development of articulation programs or "Tech Prep." Both reforms call for cooperation and use of teams or groups of teachers working together. As such, TQM will be an ideal management philosophy because of its emphasis on teamwork and the use of teams.

One of the goals in the recommendations according to a recent report, *A new vision for Vocational-technical education in Iowa* (Vocational-Technical Education Task Force, 1992), is related to quality:
Providing high quality vocational-technical education for all citizens within the state will be a challenge. Therefore, quality delivery and access within the resources available will become one of the most important issues of the future. (p. 13)

In this context of a new vision, the quality climate as perceived by the leadership becomes important and provides some insights towards the realization of this goal.

One of the strategies on staff development in Iowa is stated as: "The Department of Education and the Area Educational Agencies will conduct workshops and seminars for educational personnel at secondary schools and community colleges to increase awareness of innovative strategies and available resources" (Vocational-Technical Education Task Force, 1992, p. 21). Thus, if TQM is viewed as an innovative strategy then the findings of this study will provide valuable input toward the areas that need to be addressed.

The importance of the role of leadership is a critical factor to successful TQM implementation. The literature reveals that college presidents and administrators play a vital role in successful implementation of TQM. Administrators are crucial actors/players in the success of innovative programs. As voiced by Pollard (1993), "... their attitudes and perceptions will influence the views of faculty members in their departments who, in turn, directly affect the success of new programs" (p. 35). Therefore, this study will provide policy makers and administrators in Iowa with valuable information about the existing gaps of quality which can assist community colleges that are considering implementing TQM or are already implementing TQM.

The findings of this study could also provide information to help formulate policy to coordinate the implementation of TQM in Iowa. This might help avoid duplication and waste
of time, money, and effort:

... in more cases than not, TQM has failed to produce its promised results. Before higher education proceeds further with its infatuation with TQM, it will do well to ponder the mistakes and accomplishments of previous practitioners, thereby increasing the odds of benefiting from the intelligence and holism of TQM. (Brigham, 1993, p. 42)

Finally, the Malcolm Baldrige Award has attracted a lot of interest and it is only a matter of time before a similar award is created for education. Although various instruments have been developed based on the Malcolm Baldrige criteria, to date no instrument has been developed specifically to assess quality in the community college.

Assumptions of the Study

The study was based on the assumption that subjects respond honestly to the survey questionnaire and that perceptions of the administrators adequately represent actual behaviors or actions that are measured. The study presumes that the respondents were truthful, honest, and had correctly understood the directions and contents of the instrument. In addition, it was assumed that administrators were aware of quality improvement efforts in their institutions.

Limitations of the Study

The study was confined to the leadership of two-year public community colleges in Iowa, thus the generalizability of the study would be limited to the administrators of the above colleges and may not be applicable to teaching staff, or to other institutions or organizations in other states.
Definition of Terms

For the purposes of this study, the following definitions were used:

Two-year Public Community College - The fifteen merged area public community colleges in the State of Iowa.

Community College Administrators - Presidents, Vice-Presidents, Deans, Deputy-Deans, Department Heads/Chairs, and Directors.

Total Quality Management (TQM)/Continuous Quality Improvement (CQI) - A philosophy and set of concepts and methods employed throughout an organization by individuals with a view towards continually improving the product or service provided to customers (Melan, 1993).

Community College Quality Climate Assessment Instrument - An instrument designed to measure perceptions of quality improvement based on the Malcolm Baldrige Award criteria.

Quality Improvement Climate - Perceptions towards quality improvement as measured by the Community College Quality Climate Assessment Instrument (QCAI).

Ideal Quality Improvement Climate - Perceptions of the ideal quality improvement efforts as measured by the Community College QCAI.

Current Quality Improvement Climate - Perceptions of the current quality improvement efforts as measured by the Community College QCAI.

Quality Climate Gap - The difference between the ideal and current perceptions of the quality improvement efforts as measured by the Community College QCAI.

Malcolm Baldrige Award - An annual award to recognize U.S. companies that excel in quality
achievement and quality management.

*Malcolm Baldrige Award Criteria* - Consists of seven dimensions or categories:

1. *Leadership* (95 points): Senior executives' personal leadership and involvement in creating and sustaining a customer focus and clear and visible quality values.

2. *Information and Analysis* (75 points): Scope, validity, analysis, management, and use of data and information to drive quality excellence and to improve operational and competitive performance.

3. *Strategic Quality Planning* (60 points): The company's planning process and how all key quality requirements are integrated into overall business planning, including short- and longer-term plans.

4. *Human Resource Development and Management* (150 points): The key elements of how the work force is enabled to develop its full potential to pursue the company's quality and operational performance objectives.


6. *Quality and Operational Results* (180 points): The company's quality levels and improvement trends in quality, company operational performance, and supplier quality.

7. *Customer Focus and Satisfaction* (300 points): The company's relationships with customers and its knowledge of customer requirements and of the key quality factors that drive marketplace competitiveness.
CHAPTER II. REVIEW OF LITERATURE

Although there is an extensive amount of material on total quality management or continuous quality improvement in business, there is also a growing body of literature on TQM or CQI in education. The purpose of this chapter is to identify related literature and discuss research on total quality management, especially from a higher educational perspective. Initial sources of information came from the ERIC System and Dissertation Abstracts International, while further sources were identified from citations in books, journals, conference presentations and discussions with knowledgeable individuals.

This chapter begins by providing a historical perspective on quality, establishes the need for a new paradigm in community colleges, reviews TQM concepts in higher education, examines the Malcolm Baldrige Award, and summarizes research studies on TQM in Education.

Historical Evolution of the Quality Concept

The concept of quality has evolved over the years from a narrow focus on inspection to the current, much broader focus as a management strategy. Quality as a concept is rooted in history. Sun Tzu (480 - 221 B.C.), Aesop (6th Century B.C.), and Socrates (470 - 399 B.C.) alluded to concepts of total quality management (Brocka & Brocka, 1992). For example, Sun-Tzu's approach to political and leadership struggles embodies principles of TQM—survival, growth, and continuous improvement in a chaotic world. Aesop's fable of the four oxen and the lion (united we stand, divided we fall) could be likened to the use of
self-managing teams and quality circles. Socrates' method of always asking why until the cause is identified is analogous to root cause analysis which is a tool used for problem solving in TQM.

Garvin (1988) identified four major quality eras, starting with inspection (pre 1930s), to statistical quality control (1930s - 1950s), to quality assurance (1950s - 1980s), and to strategic quality management (1980s - 1990s). According to Garvin, each era had its own concerns, views of quality, emphasis, methods, role of quality professionals, persons responsible, orientation, and approach. Garvin's analysis provides a comprehensive view of the evolution of quality through each of the eras.

The roots of the modern concepts of quality had their beginnings when mass assembly was introduced in manufacturing (Garvin, 1988; Hart & Bogan, 1992) which led to the growth of inspection. However, in 1931, Walter Shewart's *Economic Control of Quality of Manufactured Product* heralded the science of Statistical Process Control (SPC). This was a leap forward because Shewart introduced the concept of variability and provided workers with tools to monitor the quality of their work. It was during this period, too, that sampling techniques formulated by Dodge and Romig, together with SPC, lifted quality control to a new level (Hart & Bogan, 1992). Shewart's group at the Bell Laboratories, comprised of Deming, Dodge, Romig, Edwards, and Juran, is responsible for the development of the modern-day discipline of statistical quality control (Hart & Bogan, 1992). Deming, who worked with the group at Bell Laboratories, is credited with helping the Japanese achieve world-class quality in manufacturing.
The period of quality assurance saw a shifting of focus from a narrow manufacturing approach to a broader approach involving management. According to Garvin (1988), four separate elements were involved: (a) quantifying the costs of quality; (b) total quality control; (c) reliability engineering; (d) and zero defects. The first element, contributed by Juran in *The Quality Control Handbook (1951)*, introduced the concept that quality was not an expense but an investment in profitability. Another important development was Feigenbaum's *Total Quality Control (1956)*, which introduced the concept that quality is everyone's job and should be implemented company-wide. At the same time, the third element, reliability engineering, emerged as a branch relying heavily on probability and statistics. The fourth element, the concept of zero defects was popularized by Crosby (1979) in his book, *Quality is Free*. Crosby's prevention-based approach, which focused on doing things right the first time, stressed management commitment, training and education, and proper implementation to reach the feasible goal of "no defects." Hart and Bogan (1992) summarized the contribution of Juran, Feigenbaum, and Crosby:

> By the onset of the 1970s, thanks in part to Juran, Feigenbaum and Crosby, the perception of quality as a detective function had given way to the quality-assurance movement, in which quality was treated as a preventive function. Quality was something to be done before and during the making of a product or the delivery of a service, not afterward. (p. 8)

The *Strategic Quality Management* era evolved as a result of increased foreign competition as evidenced by the superior quality and reliability of Japanese products, a sharp increase in the number of product liability suits, and pressures from the government on several fronts (Garvin, 1988). Ironically, Deming's and Juran's work was largely ignored in the
United States until the 1980 showing of the CBS documentary: "If Japan Can . . . Why can't We?" which is attributed by many to have started the quality management revolution in America. Quality had finally arrived into the boardroom and was viewed by top management and leaders as an important function and a powerful competitive weapon. According to Seymour (1993a), "Quality it seems, has evolved from a narrow set of shop floor statistical tools to a management philosophy and structural system that has adapted well to organizations of all types and sizes" (p. 12).

Total quality management, as it is known today, has evolved as a concept that is broad enough to make the transition from manufacturing firms to insurance companies, utilities, hospitals, city governments, and colleges and universities (Seymour, 1993a). Deming (1982; 1986) formulated his now famous 14 points as a system of management and, together with other quality experts, has proclaimed a variety of philosophies, approaches or techniques. A summary of the total quality experts, their approaches, and their contribution to the quality movement is presented in Table 1.

### Need for a New Paradigm in Community Colleges

The need for community colleges to explore new leadership and management approaches has been advocated by many scholars. In *Changing Managerial Imperatives* (Alfred & Carter, 1993) various authors addressed the need for community colleges to change from the top-down centralized, bureaucratic, hierarchical management paradigms to ones that emphasize newer structures and shared governance.

Spanbauer (1992) wrote about the need for education to explore a new paradigm to
<table>
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<th>Table 1. Quality experts and their contributions</th>
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<td><strong>W. Edwards Deming</strong></td>
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The outmoded system and discredited practices of most American schools need fundamental changes to provide an environment that fosters creativity and greater participation by those most affected, the students and their teachers. We need cultural change from the top down and away from the authoritarian management and bureaucratic practices that have been a part of our educational system for years. (p xvii)

Alfred and Carter (1993) suggested that the focus of change in the 1990s in community colleges was due to the realization by a number of stakeholders that:

... traditional approaches to management may not work in a market characterized by quality-conscious customers, aggressive competitors, and tightening resources. Concerns are increasing about inconsistent program and service quality, slowed response to program markets, lack of innovative services, inadequate staff development and inefficient resource allocation. (p. 8)

Alfred and Carter identified three themes, similar to those in business, on which the new management approaches have focused: (a) pushing decision-making responsibility downwards; (b) involving faculty and staff in governance; and (c) involving more staff in strategic tasks such as planning and assessment. Alfred and Carter noted that the bureaucratic approach, which flourished in years of easy growth, led to administrators making decisions and directing people. Another consequence of the rapid growth of community colleges, according to Alfred and Carter, was the exclusion of staff in decision making and a gradual erosion of the shared sense of mission and core values. As such, leadership over management, accountability over control, involvement over complacency, and integration over isolation was advocated.
Parilla (1993) noted that the present management structure of community colleges, with their pyramidal organization structure and centralized decision making, does not fit the community college concept well. In fact, a mismatch existed between form and structure:

There is a growing realization that some institutions have become entities whose structures may be impeding progress. These are institutions with high-quality instructional programs, highly qualified faculty, and well run support units. However, they have become static, and the energy and creativity of the early days has largely disappeared. (p. 23)

Although one of the top ten issues facing community colleges is meeting the needs of increasingly diverse service areas and student populations (Institute for Future Studies, 1991), the importance and contributions of the growing diverse faculty should also be acknowledged. The diversity of those entering the management ranks of community colleges will necessitate new management models and leadership styles (Burgos-Sasscer, 1993).

The need for new leadership paradigms in the community college to replace the antiquated top-down model has been addressed by many scholars (Baker III, 1992; Roueche et al., 1989). Leadership was also identified as one of the top ten issues facing community colleges (Institute for Future Studies, 1991). Gratton (1993) discussed the concept of the learning organization and its implications for community college leadership. According to Gratton, the challenge to start a new leadership imperative lies with college presidents, deans, and department chairs. By their position, these are the people who have the responsibility to convert community colleges to become learning organizations based on genuine caring, competence, and continuous improvement.

As cited in the book, Cultural Leadership: Inside America's Community Colleges
(Baker III, 1992), leaders in the new quality-focused paradigm needed to be catalytic toward quality and would be tested through total quality approaches. Contrasting the growth and stability of the community colleges in the past to the present, Baker stated that the environment in today's community colleges is characterized by:

... declining initial student enrollments, alarming attrition rates, shrinking economic resources, encroaching controls by state governments, astounding levels of adult illiteracy, rising average student ages, rising pressure being placed on curricula by rapidly expanding and changing technologies, new challenges related to increased diversity in the workforce and among students, and the challenge of increasingly underprepared students at a time when business and industry are requiring higher skills in both old and new jobs. (p. 1-2)

In summary, community colleges need new approaches to management and leadership. In the words of Parilla, "A management model that values continuous improvement and is sensitive to external pressures must be nurtured if community colleges are to deal with the shifting demands of the global marketplace" (p. 24).

**TQM Applied To Higher Education**

This section reviews the application of TQM to higher education and is presented under the following headings: (a) Traditional approach to quality; (b) Emerging approaches to quality; (c) Strategies for implementing TQM in education; and (d) Barriers to TQM implementation in education.

**Traditional approach to quality**

In the past quality implied providing resources (Harris & Baggett, 1992; Kovel-Jarboe, 1993). Thus, quality in education has been assessed by using methods that focused on
compliance with standards dealing with performance and resources (Harris & Baggett, 1992; Hittman, 1993). These were summarized by Hittman as:

- Quantitatively assessing or measuring performance (e.g., number of students enrolled, completion rates, or teacher/student ratio) and assessing or measuring resources (e.g., number of volumes in the library, equipment available, or expenditures per pupil)
- Determining whether the institution's resources and performance conform to established standards and improving performance when standards are not met

The traditional approach, according to Hittman (1993), has several important limitations:

1. The static conformance approach to standards does not encourage benchmarking of successful practices. Furthermore, student input is not included in establishing the standards.

2. The problem of setting realistic quality assurance standards. Low standards will be perceived as lacking in quality while high standards will alienate or cause frustration among educators.

3. The classic definition of quality assurance is too narrow to accommodate all the demands placed on institutions that have also been called upon to meet the needs of a diverse group besides students.

4. The current approach concentrates on faculty performance while neglecting the contributions of nonfaculty and other factors such as institutional financial stability, physical surroundings, and socioeconomic environment which also affect students'
success and the overall quality of the educational program.

5. The current approach values academic credentials and technical expertise but neglects other aspects of instructor performance which also have a bearing on the quality of education delivered.

According to Hittman (1993), these shortcomings associated with traditional quality assurance have resulted in the search for new methods and strategies.

Emerging approaches to quality

Total quality management concepts and philosophies that evolved from the work of Shewhart, Deming, Juran, and Crosby have resulted in a number of similar approaches and interpretations in higher education. Various authors have articulated these concepts to higher education (Banta, 1993; Burgdorf, 1992; Comesky et al., 1992; Harris, 1992; Marchese, 1991, 1993; Teeter & Lozier, 1993a; Seymour, 1993a; Sherr & Teeter, 1991).

Comesky et al. (1991), in Implementing total quality management in higher education, identified seven common elements that bind the foundations of TQM based on the principles of Deming, Juran, Crosby, and Imai: (a) processes and systems; (b) teaming; (c) customers and suppliers; (d) quality by fact, process, and perception; (e) management by fact; (f) complexity; and (g) variation. They are described briefly as follows:

Processes and systems - Every work activity is part of a process and system. There are many processes and systems in an institution that must be improved for better results and productivity. In particular, the role of management in vitally important in improving systems and processes.
Teaming - Teams and teamwork are important for producing a quality product. Cross-functional teams should be used in identifying and solving problems. Training in TQM techniques can also help teams become more effective.

Customers and suppliers - Understanding and accepting the customer/supplier concept is important for successful TQM application. Just like normal customers in the business world, the students, alumni, and employers are important and their needs and expectations must be met by the school. Understanding and accepting the customer/supplier concept is important for the effective functioning of teams. A paramount condition for acceptance of the customer/supplier relationship is the removal of the quasi-military model of management.

Quality by fact, process, and perception - To achieve total quality, an institution must achieve all three types of quality: by fact, of process, and by perception. Quality by fact can be viewed as meeting specified requirements, while process quality is whether the intended products/services are produced, and quality by perceptions is whether customer expectations are met.

Management by fact - Decisions should be made based on complete and comprehensive data. Institutional research data should be complete and accurate, especially if it is to be used in mission-setting or process improvement. Data should be accessible to everyone. Data also enable root causes to be uncovered, leading to long-term solutions.

Complexity - Most processes and systems are of a complex nature. Complexity refers to the extra steps added to a process to deal with errors in the preceding steps, or steps added to recover from errors occurring in the process. Four common types of complexity are:
mistakes/defects; breakdown/delays; inefficiencies; and variation.

*Variation* - Excessive variation in processes causes instability, resulting in poor quality.

Processes and systems should be standardized by identifying sources of variation. Once a process is in control, common cause and special cause variation leading to improvement can be identified.

Sherr and Teeter (1991) viewed TQM as an activity that focuses on continuous quality improvement that consists of five key ingredients: (a) honesty; (b) shared vision; (c) patience; (d) commitment; and, (e) TQM theory. Accordingly, TQM theory focuses on five areas: (a) mission and customer focus; (b) systematic approach to operations; (c) vigorous development of human resources; (d) long-term thinking; and (e) commitment.

According to Sherr and Teeter (1991), TQM also espouses the values of importance of people, the need to use knowledge and continuous improvement, all of which educators believe in, but do not practice. In addition, TQM is a long-term endeavor and, if applied over a long period of time, will result in significant improvements. The five areas of TQM theory form a complete theoretical system, and are summarized as follows:

*Mission and customer focus* - Identifying and satisfying internal and external customers is important. Current mission statements of institutions do not clarify customers and their needs adequately. Knowing the mission and the customers makes it possible to measure performance against stated purposes, which enables the institution to launch initiatives resulting in quality improvement.

*Systematic approach to operations* - Systematic continuous improvement of processes using
the Deming cycle (plan-do-check-act, or PDCA) can be applied to any process in education. Institutions must try and make their processes both stable and predictable.

**Vigorous development of human resources** - Formal training should be provided for all individuals in an institution. Empowerment of employees, together with more involvement in decision-making, is also recommended.

**Long-term thinking** - Institutions should forego short-term benefits for longer term benefits congruent with the institutions' mission. They should also focus on customers, systematic improvement, and human resource development.

**Commitment** - The responsibility for quality cannot be delegated; therefore, everyone in the institution must be committed and involved in quality improvement.

Teeter and Lozier (1993a) suggested six foundations of TQM for colleges and universities: (a) Establishing a mission: Focus on the customer; (b) Creating a vision; (c) Improving the process continuously; (d) Using systematic analysis; (e) Promoting participation; and (f) Recognizing the university as a system.

**Establishing a mission: Focus on the customer** - Institutions should establish a mission that identifies not only what the organization does but also the individual or groups—the customers whom it serves. "Knowing who benefits from teaching, research and service becomes a requisite to quality enhancement" (p. 6). Identifying and satisfying a broad range of customers of an institution is important for quality improvement.

**Creating a vision** - The mission clarifies what an organization does and for whom, while a vision statement describes what the organization will be like when its mission and goals are
Improving the process continuously - Processes are the flow of work activity which are the means to carry out the mission. Pursuing quality requires eliminating or reducing mistakes in processes.

Using systematic analysis - TQM places considerable emphasis on the scientific method and the use of the PDCA cycle (plan-do-check-act) to solve problems. Understanding the role of variation is also crucial to quality improvement.

Promoting participation - Teamwork and team decision-making are important aspects of quality improvement. Teamwork should become the standard operating procedure in quality institutions. Participation requires empowerment which is "... an atmosphere in which people feel comfortable, confident, motivated, and responsible for conducting their work" (p. 9).

Recognizing the university as a system - Systems thinking reinforces the need to recognize the interrelationships among the people processes and the sub-units of an organization.

Seymour (1993a), a leading proponent of the quality movement in higher education, advocated strategic quality management which is grouped into three themes: philosophical principles; sound management practices; and a set of tools (Figure 1).

Seymour contended that all three themes, when integrated, provide a powerful set of means to implement change in organizations. The philosophy of strategic quality management is stated as:
**Philosophy**

Quality is meeting or exceeding customer needs  
Quality is everyone's job  
Quality is continuous improvement  
Quality is leadership

**Critical Management Methods**

Quality is human resource development  
Quality is in the system  
Quality is fear reduction  
Quality is recognition and reward

**Tools**

Quality is teamwork  
Quality is measurement  
Quality is systematic problem-solving

---

**Figure 1.** Components of strategic quality management (Seymour, 1993a)

The leadership of an organization must, by word and deed, convey the message that customer satisfaction, through a process of continually improving quality is the responsibility of every member of the organization. (Seymour, 1993a, p. 15)

To complement the philosophy, a structural system is needed for creating organization-wide quality improvement. Thus, to implement the new quality philosophy a new approach is needed by management which is expressed as:

The management of an organization should make a conscious investment in helping people perform their jobs better by reducing their fears and rewarding their quality-causing efforts. (Seymour, 1993a, p. 18)
Finally, a set of tools is needed to implement *strategic quality management* which is related to teamwork, measurement, and systematic problem solving:

People need to work together to generate objective data concerning the processes in which they work and then apply that wisdom to a systematic methodology for improvement. (Seymour, 1993a, p. 20)

Other authors' interpretations more or less reflect those as previously discussed. Harris (1992) stated that, "Quality improvement is a powerful paradigm to focus and integrate strategic planning; assessment; faculty and instructional development; and administrative leadership" (p. 18). According to Harris, the key concepts of quality improvement for higher education are: (a) customer orientation; (b) constancy of purpose; (c) continuous improvement; (d) leadership; and (e) statistical thinking.

Burgdorf (1992) outlined the basic principles for community college leaders if they want to implement TQM: (a) focus on continuous improvement; (b) the college must be viewed as a system made up of processes and sub-processes; (c) utilize teams and total staff involvement to improve services continuously; (d) understanding and control of variation; and (e) emphasis on leadership instead of management.

Banta (1993), on the other hand, identified the features of a quality-oriented institution. As shown in Figure 2, these features capture the essence of the quality approach.

Marchese (1991; 1993), while in agreement with the preceding authors, introduced two additional concepts: benchmarking and structures. Marchese contended that the concept of benchmarking—a systematic search for best practices and then adapting or improving them, is not widespread in education. With reference to structures, the point is made that
1. Is committed to the need for continuous improvement.
2. Identifies whom it wishes to serve and what these potential clients want and need.
3. Identifies the needs of its clients in its mission statement.
4. Identifies the values that guide its actions.
5. Develops a vision of what it would like to be in the future.
6. Has strong leadership that communicates the mission, goals, values and the vision of the institution continuously to faculty, staff and students.
7. Identifies its critical processes: teaching, research and service.
8. Aligns the implementation of its activities with its mission and values.
9. Provides continuing educational opportunities for all employees, both in group process and in job-related skills.
10. Uses cross-functional teams to improve processes: work with its suppliers, builds quality into each process and ceases dependence on inspection to achieve quality.
11. Pushes decision-making to the lowest appropriate level, thus creating an attitude of interdependence and trust throughout the organization.
12. Bases decisions about the allocation of resources on data. Uses quantitative thinking, along with competence in group problem-solving skills and relevant statistical procedures. These should be in widespread use throughout the institution.
13. Views itself as a learning organization, one that:
   - Produces student learning, research and service.
   - Studies, monitors and evaluates the processes that produce the products.
   - Makes active collaborators in the improvement process of all concerned, including faculty, staff and students, parents, suppliers, employers, and community members.
14. Recognizes and rewards those who conscientiously work to improve quality.

Figure 2. Features of a quality-oriented institution (Banta, 1993, p. 144-145)
educational institutions have outdated structures with work processes that are compartmentalized. Therefore, the TQM philosophy requires work to be organized based on the needs and preferences of customers, and not the institution or its employees.

Needham (1993) discussed the application of quality focused management (QFM) in community colleges and considered its implications on current management and governance practices. Needham stated that QFM represented a wide departure from current practices, and stressed the changing roles of management under the QFM philosophy. Accordingly, managers manage processes rather than tasks, and they are catalysts, coaches, team members, and teachers within the organization. A comparison of current and emerging focus on various dimensions is presented in Table 2.

**Strategies for implementing TQM in education**

The varied philosophies and approaches to TQM have resulted in a variety of implementation strategies, models, and approaches. At least six strategies, or approaches, have been used by organizations to implement TQM in the U.S. (Coate, 1990).

1. **TQM Element Approach** - Utilizes key elements of quality management such as quality circles, statistical process control, and quality functional deployment.

2. **The Guru Approach** - Strategies are developed based on the teachings of one of the quality experts.

3. **The Japanese Model Approach** - An approach is developed by studying implementation techniques and strategies of Deming-Prize winning companies. Florida Power and Light used this approach to win the Deming prize.
Table 2. Comparison of current and emerging practices based on TQM (Needham, 1993)

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<tr>
<th>Category</th>
<th>Current Practice</th>
<th>Emerging Focus</th>
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<tr>
<td><strong>Management</strong></td>
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<tr>
<td>Paradigms</td>
<td>Driven by the bottom line</td>
<td>Driven by the customer</td>
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<td>Crises management</td>
<td>Long-term commitment</td>
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<td></td>
<td>Inversely related quality and cost</td>
<td>Directly related quality and costs</td>
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<td></td>
<td>Quality can be assigned to one department</td>
<td>Quality is built in; it is everyone’s job</td>
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<tr>
<td>Management</td>
<td>Who made the error?</td>
<td>What allowed the error to occur?</td>
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<td>Orientation</td>
<td>Employees are the problem</td>
<td>Processes or systems are the problem?</td>
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<td></td>
<td>Measure and change individuals</td>
<td>Measure and change the processes?</td>
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<td>Emphasis on tasks within functional units</td>
<td>Emphasis on processes across functional units</td>
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<td>Process Management</td>
<td>Understanding my job</td>
<td>Knowing how my job fits into the total process</td>
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<td>Doing my job</td>
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<td>Individual effort</td>
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<td>Teamwork</td>
<td>Staff</td>
<td>People</td>
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<td></td>
<td>Control staff, motivate them</td>
<td>Remove barriers; develop people</td>
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<td></td>
<td>You cannot trust anyone</td>
<td>We are all in this together</td>
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<td>Staff Perceptions</td>
<td>Isolate staff</td>
<td>Respect each individual</td>
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<td></td>
<td>Build barriers</td>
<td>Organize people fully</td>
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<td></td>
<td>Drive out trust</td>
<td>Build trust</td>
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<td></td>
<td>Rob staff of satisfaction</td>
<td>Increase morale and job satisfaction</td>
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<td></td>
<td>Respect thinking of a few</td>
<td>Respect thinking of everyone</td>
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<td>Personnel Function</td>
<td>Insufficient orientation to job</td>
<td>Prepares individual to be successful on the job</td>
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<td></td>
<td>Varied personnel practices</td>
<td>Focus on quality and rewarding quality efforts</td>
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<td>Staff Development</td>
<td>Insufficient resources</td>
<td>Allocation of more resources</td>
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<td>Varied focus</td>
<td>Focus on quality</td>
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<td>Organizational</td>
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<td>Scan external markets</td>
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<td>Administration</td>
<td>Survey employers</td>
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<td>Committee work</td>
<td>Conduct follow up surveys</td>
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<td>Assess customer needs</td>
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<td>Governance</td>
<td>Top-down decision making</td>
<td>Participatory</td>
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4. The Industrial Company Model Approach - Companies successful in TQM implementation are visited and their strategies integrated to create a customized approach.

5. The Hoshin Planning Approach - Developed by Bridgestone and used successfully by Hewlett-Packard. This approach focuses on successful planning, deployment, execution, and monthly diagnosis.

6. The Baldrige Award Criteria Approach - Criteria for the Malcolm Baldrige Award are used to identify areas for improvement.

Implementation models in education range from conceptual to highly prescriptive, and from general to very specific. Most models stress the importance of leadership commitment, assessment of the climate, identifying customers, developing a vision, developing new structures, utilizing teams, and training (Coate, 1990; Crumrine & Runnels, 1991; LeTarte, 1993; Matthews, 1993; Spanbauer, 1992).

Crumrine and Runnels (1991) proposed a five-phase model for implementing TQM in vocational education. The five phases are summarized as follows:

1. Commitment - investigate, evaluate readiness, decision to implement, develop policy, and demonstrate management and employee commitment.

2. Organizational Development - develop resources to support TQM, integrate TQM into key management processes, educate and train, and initiate employee involvement.

3. Customer Focus - determine natural work teams, analyze customers, and analyze products/services.

5. Continuous Improvement - develop methods for identifying opportunities, develop methods for improvement, and integrate improvement process into daily operations.

Most of the models incorporate the approaches and methods of one of the quality experts. An example of a specific model is the sixteen-step model used by Fox Valley Technical College—The Quality First Process Model (Figure 3) which, according to Spanbauer (1992), included the best approaches by the quality experts. On the other hand, Oregon State's TQM implementation model (Figure 4) represents a generic model that incorporates all the features of TQM.

Planning is an important component of TQM implementation, and most institutions have adopted and incorporated TQM planning techniques and tools to identify needs of customers and translate them into operational plans. Oregon State University and El Camino Community College, for example, have both incorporated Quality Function Deployment (QFD) into their planning processes (Coate, 1990; Schauerman & Peachy, 1994).

Schauerman and Peachy (1994) described how QFD resulted in identifying functions that needed to be addressed to improve customer satisfaction. These were: (a) teaching and learning; (b) learning support; (c) human resource development; and (d) institutional leadership. Coate (1990) described QFD as one of the new strategies utilized at Oregon State University in its efforts to implement TQM. Six important customer groups at Oregon State University were identified: (a) the general public; (b) college-bound Oregon high school students; (c) OSU alumni living in Oregon; (d) OSU undergraduate students; (e) classified
1. Demonstrate management commitment
2. Establish a total quality leadership council
3. Determine the cost of quality
4. Provide education and training
5. Identify roles and establish performance requirements
6. Implement a quality communication system
7. Measure and set goals
8. Identify and eliminate problems
9. Research and develop new initiatives
10. Create a structure for employee involvement
11. Establish accountability
12. Launch a customer revolution
13. Recognize, reward, and celebrate
14. Conduct quality audits
15. Link to the community
16. Strive for continuous improvement

Figure 3. Fox Valley Technical College Quality First Process Model (Spanbauer, 1992)

staff; and (f) faculty. The information gained from the QFD process enabled an accurate assessment of where the university should be in its customers' eyes and highlighted areas where data on customer needs and expectations are incomplete or non-existent.

Hoshin, or Breakthrough Planning, a method of integrating strategic planning into the
Figure 4. The Oregon State University Management Implementation Model (Coate, 1990)

1. President's Cabinet Explores TQM
2. Initiates a functional pilot team
3. Defines customer needs through QFD
4. Cabinet develops Vision, Breakthrough Planning, and 5-Year Plan; Cabinet decides to implement TQM
5. Divisions and Colleges do breakthrough planning and 5-year Plan
6. Daily Management teams and systems are established to improve processes and to hold gains
7. Cross-functional pilot teams initiated
8. Rewards and recognition system developed
9. Cross-Functional Management teams operate and systems are established to hold gains

Review progress
Revise 5-Year Plan
daily work of all units in an organization, has been used by Delaware Community College and Oregon State University (Coate, 1990; Heverly & Parker, 1993). Compared to the traditional strategic planning approach, this method allows identification of a small number strategic areas to realize maximum benefits and aligns the daily work of individual units with the organizations' vision and strategic plan.

In terms of administration coordination and support, most colleges have created councils, steering groups, or management teams to coordinate TQM implementation efforts. In addition, permanent positions with titles such as director of quality, quality coordinator, director of continuous improvement, or quality manager have been established. The role of this position is to provide employee training and development and communicate TQM accomplishments (Howard, 1993).

**Barriers to TQM implementation in education**

Implementing TQM in education is not merely a process of learning new problem-solving skills, but requires a significant change in the culture and the way organizations function which makes identifying and understanding barriers important (Winter, 1991). Winter categorized potential barriers to TQM implementation in higher education into two broad areas: (a) those reflecting tradition, culture, and infrastructure of educational institutions; and (b) those due to the processes utilized to implement TQM programs.

According to Winter, " Tradition and culture significantly determine the receptiveness to and application of TQM" (p. 58). The perception that institutions view themselves as participatory while in fact they are not represents a significant barrier. In addition, the highly
hierarchical and centralized structures, together with the semi-autonomous functioning of the academic world, create barriers towards TQM implementation.

Another barrier relates to college and university presidents devoting time to image-building in order to obtain legislative, community, and funding support. The delegation of policy and leadership responsibilities to other administrators does not encourage potential TQM efforts. Weak institutional missions and institutional climates where there is a perceived lack of loyalty from the top also presents a barrier to TQM. Minimal emphasis on human resource development impacts the attitude of employees who view it as another indicator of a lack of institutional commitment of its employees. Besides focusing on students as customers, most institutions concern themselves with maximizing resources, improving institutional image, and minimizing criticism. Furthermore, conflicting demands on faculty draws them away from their primary customers which are the students.

Barriers may also arise as a result of the TQM implementation process. Winter (1991) identified the following barriers faced by problem solving teams: recurring meetings which do not add to productivity, training costs, difficulty in establishing the effectiveness of solutions, and time involved in achieving significant results.

Potential solutions offered by Winter include: (a) integrate TQM philosophies and concepts into already accepted processes like planning and accreditation; (b) place more emphasis on staff development and make leadership the focus of managerial training; (c) encourage local rather than institution-wide programs if there is no commitment from top leaders; and (d) make customer satisfaction a significant criterion in resource allocation.
decisions.

Coate (1993), based on Oregon State University's experiences with TQM implementation, identified the barriers as: (a) skepticism that TQM is only a fad; (b) time involved; (c) the foreign nature of terminology of TQM; (d) middle management's reluctance to give up power; (e) the way institutions are run; (f) dysfunctional units—such units need to resolve their problems before participating in TQM; and (g) common attitudes such as looking for the big fix, a refusal to acknowledge problems, suspicion because of TQM's origin, and unwillingness to change.

Matthews (1993) suggested that TQM and academia interface in four basic areas: (a) curriculum; (b) operations; (c) overall direction of the institution; and (d) functional areas of teaching and research. According to Matthews, TQM has had considerable success in two of the four areas: development of curriculum, and operations. Barriers which impede the progress of TQM in the overall direction of the institution, and teaching and research were identified as: (a) the highly generic and inappropriate nature of the average institution's mission; (b) a lack of agreement—within the academic environment—as to the meaning or implications of "quality" and "excellence"; (c) the independence of key individuals within the academic environment; and (d) the reluctance of college leaders to play an aggressive and creative role.

Wolverton (1993) identified the following challenges to total quality implementation in higher education: (a) customer image; (b) faculty identity; (c) reward system; and (d) tenure system. Wolverton also identified five common mistakes in TQM implementation:
(a) a lack of strong leadership and commitment from the top; (b) an insufficient base of support; (c) a failure to recognize the costs; (d) complexity of projects, together with insufficient time and resources; and (e) concentrating TQM application to administrative and support functions.

Seymour and Collett (1991), in their study of 22 pioneering colleges and universities involved in TQM, identified the following barriers by respondents in their attempts to implement TQM: (a) time taken; (b) lack of leadership support; (c) aversion to change; (d) difficulty in making TQM part of their regular job; (e) inexperience of team leaders in working with teams; and (f) difficulty in showing that TQM produced tangible results.

The Malcolm Baldrige National Quality Award

Quality awards have been created to promote quality, serve as models of TQM, and recognize organizations that successfully implement and integrate quality principles. These awards have brought attention to quality issues and enhanced understanding of the meaning, dimensions, and requirements of quality (Nakhai & Neves, 1994).

The Malcolm Baldrige National Quality Award (MBNQA) is an annual award to recognize U.S. companies that excel in quality management and quality achievement. Created by the Malcolm Baldrige Quality Improvement Act of 1987 (Public Law 100-107), it is managed by the National Institute of Standards and Technology (NIST), and administered by an outside contractor (currently the American Society for Quality Control). At present, there are two awards in each of the following categories: manufacturing; service companies; and small businesses.
The purposes of the award are to: stimulate quality and productivity improvement efforts in American companies; recognize quality achievements; establish guidelines and criteria for self-evaluation; and publicize and disseminate information from successful companies (NIST, 1993). Applicants are reviewed by members from the board of examiners and high-scoring applicants are visited by a team of examiners. All applicants receive written feedback highlighting the strengths and weaknesses of their company's quality system.

Baldrige Award criteria framework

The Baldrige Award criteria (1993) contain 10 core values and concepts representing "... the underlying basis for integrating the overall customer and company operational performance requirements" (NIST, 1993, p. 2). These are: customer-driven quality; leadership; continuous improvement; employee participation and development; fast response; design quality and prevention; long-range outlook; management by fact; partnership development; and corporate responsibility and citizenship.

The core values and concepts are integrated into a framework consisting of seven categories, or dimensions, which are further broken down into 28 examination items. Finally, each item includes a set of areas to address that illustrate and clarify the intent of the items, and guide the applicant in preparing the application.

Elements of the criteria framework

The framework has four basic elements: the goal, the driver, the system, and measures of progress. Senior executive leadership as the driver, creates the values, goals, and
systems, and guides the sustained pursuit of customer value and company performance improvement. The system comprises a set of well-defined and well-designed processes for meeting the company's customer, quality, and performance requirements while measures of progress provide a results-oriented basis for channeling actions to delivering ever-improving customer value and company performance. The goal of the quality process is the delivery of ever-improving value to customers (NIST, 1993).

Dimensions of the Baldrige Quality Award 1993

The dynamic relationships between the four basic elements and the seven dimensions is shown in Figure 5.

The seven dimensions and their point values are:

1. Leadership (95 points): Senior executives' personal leadership and involvement in creating and sustaining a customer focus and clear and visible quality values.

2. Information and Analysis (75 points): Scope, validity, analysis, management, and use of data and information to drive quality excellence and to improve operational and competitive performance.

3. Strategic Quality Planning (60 points): The company's planning process and how all key quality requirements are integrated into overall business planning including short- and longer-term plans.

4. Human Resource Development and Management (150 points): The key elements of how the work force is enabled to develop its full potential to pursue the company's quality and operational performance objectives.
5. Management of Process Quality (140 points): The systematic processes the company uses to pursue ever-higher quality and company operational performance.

6. Quality and Operational Results (180 points): The company's quality levels and improvement trends in quality, company operational performance, and supplier quality.

7. Customer Focus and Satisfaction (300 points): The company's relationships with
customers and its knowledge of customer requirements and of the key quality factors that drive marketplace competitiveness.

Evaluation criteria

The evaluation system is based on three factors: a) approach; b) deployment; and c) results. Reimann (1989) interpreted the factors:

1. **Approach:** refers to the methods used to achieve the purposes addressed in the examination items and the scoring criteria include: degree of utilization of the prevention based approach; the appropriateness and effectiveness of the tools, techniques and methods; and the degree to which the approach is systematic, integrated, and consistent.

2. **Deployment:** refers to the extent to which the approaches are applied to all relevant areas and activities that are addressed and implied in the examination items. The scoring criteria include: the appropriate and effective application of all transactions and interactions with customers, providers of good and services, and the public; the appropriate and effective application to all internal processes, activities, facilities, and employees; and the appropriate and effective application to all product and service characteristics.

3. **Results:** refers to outcomes and effects in achieving the purposes addressed and implied in the examination items. The scoring criteria include: the quality levels demonstrated; the contributions of the outcomes and effects to quality improvement; the quality improvement gains; and the company's ability to account for gains in terms of specific quality improvement actions. (p. 35-36)

The point values of the seven examination categories total 1,000 and are depicted graphically in Figure 6. Customer focus and satisfaction is the most important category, with an assigned score of 300 (30%), followed by Quality and Operational Results 180 (18%), Human Resource Development and Management 150 (15%), Leadership 95 (9.5%), Information and Analysis 75 (7.5%), and Strategic Quality Planning 60 (6%).
Figure 6. The Baldrige Award criteria weightings

Criticisms and support for the Baldrige Award

Although the MBQA has "... come to symbolize the resurgence of quality in the United States" (Reimann, 1990, p. 63) and "... has become the most important catalyst for transforming American Business" (Garvin, 1991, p. 80), it has generated controversy, especially with regards to its criteria. Hart and Bogan (1992) summarized concerns about the Baldrige into seven major areas: (1) Suspicion that the award is just not fair; (2) The award is superficial, marketing-oriented fluff; (3) There is something amiss in the criteria; (4) The award process is permeated with conflicts of interest; (5) Something is amiss in the application and judging processes; (6) The award is held hostage by its winners; and (7)
Winning the Baldrige award may be its own punishment. Hart and Bogan's summary of the suggestions to improve the award included rewording of the criteria, increasing the time required to complete the application, and limit commercialization of the award by winners.

Garvin (1991) identified three main criticisms against the award: a) requires large expenditures and time; b) fails to predict a company's financial success; and c) does not honor superior service or product quality. Garvin labeled these criticisms as myths and argued that they reflected misunderstandings of the criteria. However, Garvin's defense of the Baldrige Award generated considerable debate regarding its merits and demerits (Debate, 1992).

Deming and Crosby (Debate, 1992), among others, opposed the Baldrige Award. Deming contended that the award does not reflect principles of management of quality and focused mainly on results. In addition, emulating winning companies quality practices without any theoretical foundation is not a sound approach to manage quality.

Crosby's criticisms focused on: the self-nomination nature of the award; the role of financial performance; the confusion caused by lack of a usable definition of quality; conflict of interest by consultants who served as examiners; the limited number of yearly awards; and the relinquishing of leadership by executives who treat the award criteria as a package to be implemented.

Reimann (1991) responded to Crosby's criticisms, and maintained that most of the misconceptions stem from a misreading of the award criteria:

Quality is not only defined but also accompanied by information on the basic system requirements to achieve quality. Moreover, the definitions and requirements are incorporated into a diagnostic system that everyone can use. (p. 44)
The findings of two studies General Accounting Office (GAO, 1991) and Knotts, Jr., et al. (1993) support the Baldrige framework and criteria. The GAO study, although limited in scope to finalists in the 1988 and 1989 competition, concluded that TQM practices outlined in the award criteria improved productivity, customer satisfaction, employee relations, market share, and profitability.

Knotts, Jr., et al. (1993) found that the respondents from service and industrial firms agreed that the Baldrige Award currently provides the best framework for a total quality management system and that there seems to be no need to revise the criteria. Other findings revealed that the award fostered quality awareness, promoted understanding of the requirements for quality excellence, promoted information sharing on quality strategies, and recognized companies that excelled in quality management.

Comparing the Deming, Baldrige, and European quality awards

Besides the Baldrige Award, the Deming Prize and the more recent European Quality Award (EQA), are making major contributions to the definitions and practices of TQM (Nakhai & Neves, 1994). The Deming Prize was established by the Union of Japanese Scientists and Engineers (JUSE) in 1951 to increase quality in industry. The EQA was established in 1992 with criteria patterned after the Baldrige (George & Weimerskirch, 1994).

Many studies have compared the Baldrige Award with the Deming Award (Bush & Dooley, 1989; Cole, 1991). Nakhai and Neves (1994) compared the Deming, Baldrige, and European Quality Awards Criteria (Table 3). According to Nakhai and Neves (1994), the Deming Prize emphasizes company-wide quality efforts, continuous improvement, and the
Table 3. The Deming, Baldrige, and European quality awards criteria (Nakahai & Neves, 1994, p. 34)

<table>
<thead>
<tr>
<th>Deming Prize</th>
<th>Baldrige Award</th>
<th>European Quality Award</th>
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<tbody>
<tr>
<td>1. Company policy and planning</td>
<td>1. Leadership</td>
<td>1. Leadership</td>
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<tr>
<td>2. Organization and its management</td>
<td>2. Information and analysis</td>
<td>2. Policy and strategy</td>
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<td>Policy and strategy</td>
<td>3. Strategic quality planning</td>
<td>3. People management</td>
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<td>7. Control</td>
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<td>8. Impact on society</td>
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<td>8. Quality Assurance</td>
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<td>9. Effects</td>
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Based on an analysis of the three awards (Table 4), Nakahai and Neves (1994) highlighted the differing perspectives on the definitions of quality and contended that these represented a "quality management continuum." "The Deming Prize views quality as defined by the producers, the Baldrige Award clearly indicates that quality is defined by the customer, and the EQA takes the view that the customer as well as the employees and the community at large all contribute to the definition of quality" (p. 36).
Table 4. The quality management continuum 1951-1992 (Nakhai & Neves, 1994, p. 36)

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<td>Definition of quality</td>
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<td>Customer-driven quality</td>
<td>Quality of corporate</td>
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<td>specifications</td>
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<td>citizenship</td>
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<td>Purpose</td>
<td>Promote quality</td>
<td>Promote competitiveness</td>
<td>Promote European identity</td>
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<td>control techniques</td>
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<td>Scope</td>
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<td>National (United States)</td>
<td>Regional (Western</td>
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<td>(Japan)</td>
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<td>Europe)</td>
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<td>Types of organizations</td>
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<td>Essentially large</td>
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<td>Key contributions</td>
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<td>control/total quality</td>
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<td>satisfaction, employee</td>
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<td>nonfinancial results</td>
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Applications of the Baldrige Award

The Baldrige Award not only permits evaluation of excellent manufacturing and service businesses, but it is also "designed as a value system, an education/communications tool, a vehicle for cooperation, and a device to help evaluate quality standards" (Reimann, 1989, p. 36). Reimann described the uses of the award in four areas: assessment; setting up a quality system; communications; and education and training.

1. Assessment - The award can be used for self-assessment, assessment of suppliers, and evaluation of candidates for awards. It can also be used for comprehensive assessment of overall company efforts or individual units.
2. Setting up a quality system - The comprehensive nature of the award guides organizations starting quality improvement systems, and helps management develop a shared meaning of quality and TQM.

3. Communications - It provides a focus for communication within companies, between companies and suppliers, and among companies to share information on quality.

4. Education and Training - It provides training specialists an overall picture of the company, adds an evaluative dimension, and supplements education and training courses with case materials and characteristics of excellence.

Hart and Spizizen (1992) further elaborated on the assessment-type applications of the Baldrige which included its use as a basis for discussion to familiarize employees with quality concepts, and for surveys as a quick way to assess perceptions of quality among managers and employees. In addition, the criteria could be used to evaluate a particular department or for an comprehensive in-depth study to evaluate the total quality system of a company.

The Baldrige Award has gained widespread acceptance as indicated by the results of a recent survey which revealed that 27 of the 39 states' quality award programs are using the Baldrige Award to some degree (Bemowski, 1993). Recently, the Minnesota Council for Quality which is patterned after Baldrige Award framework, introduced an education category which included elementary/secondary, higher education, and other educational institutions. (Minnesota Council for Quality, 1994).

Spanbaeur (1992) described how Fox Valley Community College adopted the Baldrige criteria and used it to evaluate its quality system. According to Spanbaeur:
The criteria help to summarize strengths, determine areas for improvement, and identify quality management profiles. They incorporate a rigorous and objective evaluation of a school's total quality system, including underlying services and customer satisfaction. (p. 127)

Neuroth et al. (1992) developed an instrument based on the Baldrige criteria to determine the quality index of a school system. Cornesky et al. (1992) modified the criteria so that it could be used by institutions of higher education to assess their quality index. It was reported that the rating and scoring process was tried at a number of workshops attended by representatives from community colleges, universities, and an armed forces academy, and in most cases participants agreed that their final quality index score reflected their institutional quality.

Chaffee and Sherr (1992) advocated the use of the Baldrige in education. They modified the criteria to suit educational institutions (Appendix A) and converted it to a series of questions for each category. Chaffee and Sherr emphasized that the criteria are not prescriptive in nature and that organizations need to develop their own approach to find the most effective ways of answering these questions.

In summary, the Baldrige criteria represents a quality management system and can be applied educational settings. In the words of Garvin (1991):

The Baldrige Award not only codifies the principles of quality management in clear and accessible language but also provides companies with a comprehensive framework for assessing their progress toward the new paradigm of management and such commonly acknowledged goals as customer satisfaction and increased employee involvement. (p. 80)
Review of Research in TQM

In 1991, it was reported that 78 universities and 14 community colleges implemented some form of TQM and offered quality-related courses and degrees to full-time students. In 1992, the figures were 160 universities and 60 community colleges (Axland, 1992a). However, for 1993, the numbers leveled off to 139 universities and 46 community colleges (Horine et al., 1993). The latter survey focused on measuring the maturity of TQM efforts in two areas: the administrative side as measured through employee involvement, quality councils, improvement efforts and teams; and the academic side as measured through the integration of TQM into curricula.

Most institutions reported that they were in the early stages of TQM implementation and had been using TQM in administrative applications for two years or less. Both universities and colleges reported less than 25% employee involvement in institution-wide TQM efforts. Approximately half of the institutions had quality councils, officers, or centers to coordinate their TQM efforts. Community colleges were more active in pursuing improvements in five out of the six categories which included: administration, teaching methods, student achievement, communication, maintenance, and purchasing.

Four types of process-improvement teams were evaluated: central-administration level, across disciplines, within disciplines, and with students. It was reported that the greatest area of concentration was within the central administration teams while student teams represented the least active area in both universities and colleges.

The greatest concentration of quality-related courses for universities were offered
through schools of management, followed by divisions of statistics, engineering, continuing education, and education. Community colleges, however, offered quality courses to community businesses and organizations through continuing education, followed by schools of management, statistics, engineering, and education. Total Quality Management courses ranged from statistical quality control and design of experiments to courses in quality management, team building, problem solving, quality tools, benchmarking, ISO 9000, and the Malcolm Baldrige National Quality Award Criteria. Universities were reported as offering quality-related doctorate, master's, and bachelor's degrees, while community colleges offered quality-related associate's degree and certificates.

Seymour and Collett (1991) reported survey findings from 22 pioneering colleges and universities that had experience in implementing TQM. The findings revealed that:

1. The most comprehensive TQM efforts were found at community colleges and small private institutions, and were more widespread in administrative units such as business services, physical plant, purchasing, and custodial services.

2. Most of the institutions in the study developed and implemented their own plan.

3. Flowcharting and teams were the most useful tools being used.

Respondents were also asked questions based on the seven Baldrige Criteria. For each question, two seven-point response scales were provided. The two scales were anchored on what-is while the second scale was concerned with what should be. All the seven criteria were considered to be extremely important by respondents with leadership and customer satisfaction being most important. Community colleges had the smallest gap between the
what should be and what is scales. One explanation, as suggested by Seymour and Collett (1991), is that the community colleges in the survey had been implementing TQM for a longer period and had been in a position to develop human resources, generate quality results, and affect customer satisfaction to a greater degree.

Comments were also elicited from the respondents regarding the Baldrige Criteria. A summary of Seymour and Collett's analysis is as follows:

Leadership - Although leadership is important and need to be visible and active, it is not a requisite condition for success. What is needed is a local champion/leader who can be one or two levels from the top.

Information and Analysis - Universities and colleges seem to have some difficulty generating and using data for decision-making. "There is a generally well-established perception that much of what we do in higher education is not measurable" (p. 18). There is also a tendency to value individual experience and reliance on traditional values in decision making.

Human Resource Utilization - The human resource category is recognized as being important with institutions increasing their efforts in this area. However, people are asked to participate without proper reward or recognition.

Strategic Quality Planning - Eventually strategic quality planning and quality improvement efforts must merge into one systematic approach to managing the institution.

Quality Results - This was the area that showed the greatest gap between what has been and what should be. In the short term this is not a problem because institutions have just began implementing TQM and are focusing on initial "start-up" issues. However, in the long term a
lack of results will effect the implementation of TQM. The perceptions that measurements and in education are difficult, will make quality results an issue because quality data must be collected before quality results can be articulated. Benchmarking is another problem because most institutions are still new to have developed objective measures of customer requirements and expectations.

Customer Satisfaction - Comments reinforced the concept of customer satisfaction as being crucial to TQM implementation. A few even suggested that the gap between what has been and what should be could be reduced by changing the term customers to stakeholders.

Among the major benefits reported were that TQM: (a) involved people and gave them a voice in what they do; (b) shifted towards a customer-orientation philosophy; (c) eliminated redundant steps in processes; (d) increased employee morale; (e) encouraged fact-based decision making; (f) encouraged teamwork; (g) facilitated communication through the development of a common language; (h) energized people by clarifying purpose; (i) reduced rework and scrap; and (j) saved costs.

As to whether TQM is worth the effort, respondents fell into three categories: (a) the too early to tell group; (b) unconditional yes group—consisting of practitioners who feel emotionally towards TQM and those who demonstrate cost/benefits of TQM; and (c) conditional yes—a core group that believe TQM has been beneficial, but with some reservations.

Henderson's (1991) study to analyze the status of total quality in higher education identified 126 institutions that were currently applying principles of TQM. The analysis was
based on in-depth interviews with presidents, deans, quality coordinators, faculty, and staff at seven selected institutions. Among the findings were:

1. All seven institutions were implementing TQM based on a combination of philosophies.
2. Top leadership provided the initial impetus for TQM implementation, and at six schools the top leadership (presidents/deans) were the champions of total quality management.
3. The following structural components were identified: quality coordinator; central team(s) or executive councils; and cross-functional and work unit teams.
4. Six of the seven schools reported that the organizational structure had changed as a result of the quality efforts, with three reporting major changes which included: a reduction from seven colleges to four; an increase in number of departments; and permitting deans to report directly to the president by shifting the positions of vice presidents from line to staff.
5. Two general strategies for implementing TQM were observed: spontaneous—an organization-wide or departmental blanket approach; or deliberate or quiet implementation whereby top management laid the foundations for TQM implementation.
6. The majority of applications were administrative in nature although applications directed at academic processes (instruction, curriculum development, course development, and delivery) were also pursued.
7. Faculty were generally more resistant to the concept of total quality management than administrators or support staff.
8. Five of the schools reported a change in the recognition/reward system as a result of the
quality effort, but only one had a well-developed system of celebration.

9. All institutions viewed education and training as crucial to TQM success, and established the goal of training everyone in the institution. Time was also allocated from the normal workday for training.

10. All the institutions understood the concept of variation, and that measurement is a means and not an end. Two levels of measurements were employed: (a) organizationally-oriented, e.g., retention and placement rates; and (b) process-oriented, e.g., course critiques or reproduction center measures. Measurements are situation-specific and defined by the owners of a process.

11. Many successes were reported, not only limited to dollar savings and administrative improvements, but also educational improvements in the form of increased average Graduate Record Examination (GRE) scores, decreased drop-out rate, decreased class ratios, increased enrollments; and decreased budgets.

12. Problems encountered were of two types: (a) relating to philosophical differences, quality definitions, communications, and teamwork, and (b) relating to academic processes within the institution—including faculty allegiance and resistance, and the tendency of teams to stall as a result of academic discourse.

Hogan (1992) conducted a study to determine the applicability of the Malcolm Baldrige National Award Criteria (MBNQA) in the evaluation of quality of administrative services as perceived by chief administrative officers. A random sample of 500 institutions representing research, doctorate-granting, comprehensive, and liberal arts categories were
surveyed. Respondents evaluated the applicability of each criterion, suggested additional
criteria, and identified strengths and weaknesses of the criteria.

The findings of the Hogan study revealed that the MBNQA criteria are perceived to be
applicable to evaluating the quality of administrative services in higher education. Quality of
financial management was suggested as an additional criterion. Significant differences were
found in the perceived applicability of the seven dimensions of the MBNQA criteria.
Leadership and customer satisfaction were viewed as most applicable. The concept of
benchmarking was viewed as less applicable than other criteria to higher education. Concerns
included the language and definitions of TQM, difficulty in measuring the processes and
quality results of education, and the role of the faculty. Recommendations included expanding
the MBNQA to administrative services in higher education, and that institutions of higher
education should use the criteria as guidelines for developing quality management systems.

Stern and Tseng (1993) conducted a study to determine what organizational, faculty
development, and curricular changes business schools have made as a result of the TQM
movement. Specifically, the purposes were to: (a) examine the awareness levels of business
school deans to the TQM movement; and (b) determine whether and how these schools are
assisting in the development of faculty knowledge about TQM, using TQM in the design of
organizational structures and processes, and incorporating TQM in the schools' curricula.

The findings revealed that although the awareness level of deans was quite high, the
perceived faculty members' awareness was much lower. The authors were concerned about
this lack of awareness and recommended well-planned staff development programs with a
variety of activities to be implemented. They also stressed that if business schools resisted change, then they were doing a disservice to their students and future employers. A proactive approach which involved planning for faculty development and curricular reform was recommended.

Summary

In this chapter the literature pertaining to TQM and its relationship with higher education in general and community colleges in particular was reviewed. The concept of quality evolved from a narrow inspection perspective to a broader concept incorporating continuous improvement and customer satisfaction.

Community colleges and other educational institutions are facing serious challenges that include declining enrollments, alarming attrition rates, shrinking economic resources, and calls for accountability. Concerns were uncovered that the traditional approaches to management need to be replaced by newer models, especially those based on continuous quality improvement.

The concepts and philosophy of quality management as translated to education were presented. Strategies for implementing TQM in education, the role of planning, and barriers to implementation were also discussed.

Quality awards have been created to promote quality, serve as models of TQM, and recognize organizations that successfully implement and integrate quality principles. The Malcolm Baldrige Award and its potential use as an assessment instrument was described. The Baldrige Award criteria represent an appropriate framework for a total quality
management system that is applicable to many settings, including education.

Finally, research studies on TQM were reported which indicate that TQM in education is at its infancy and it is too early to tell whether it will gain widespread acceptance among educators.
CHAPTER III. METHODOLOGY

This chapter describes the method and procedures used in conducting this study, and is divided into the following sections: Procedures of the Study; Population of the Study; Research Design and Variables of the Study; Development of the Instrument; Procedures for Data Collection; and Statistical Analysis of the Data.

Procedures of the Study

The following procedure was followed in conducting this study:

1. The researcher performed a review of the relevant literature and formulated the problem of the study.

2. Administrators in Iowa's Community Colleges were identified as the population for the study using information published in the Directory of Iowa Community Colleges (Iowa Department of Education, 1994) and Directories of Programs (Bureau of Technical and Vocational Education, 1993-94).

3. The survey instrument was developed based on the seven dimensions of the Baldrige criteria.

4. The researcher identified a panel of experts to validate the instrument.

5. The instrument was modified and revised as needed based on suggestions from the panel of experts.

6. The instrument was pilot-tested with graduate students in the Department of Industrial Education and Technology.

7. The instrument was revised as needed based on the results of the pilot test.
8. Approval was sought and obtained from the Iowa State University Committee on the Use of Human Subjects in Research.

9. The questionnaire and an introductory letter were mailed to the subjects identified in Step 2.

10. Follow-up mailings were utilized after three weeks to increase the return rate.

11. The data were coded and analyzed using the SPSS statistical package.

12. Conclusions were drawn and a final report written which was then presented to the researcher's Program of Study committee for final approval.

Population of the Study

The population of this study consisted of all Iowa community college personnel holding leadership positions as defined earlier. Administrators were chosen as the population for the study because they represent and provide the leadership in Iowa's community colleges and it was important to assess their perceptions towards quality. Additionally, the leadership role and commitment of leaders have been identified as being important in successful TQM implementation.

Specifically, administrators as identified by the *Directory of Iowa Community Colleges, 1994* (published by the Iowa Department of Education) and *Directory of Programs 1993-94* (lists published by the Bureau of Technical and Vocational Education) were selected. The total number of administrators identified was 321 and included presidents, vice-presidents, deans/associate deans, department chairs/heads, and directors. The entire population was utilized for the study and no sampling was necessary.
Research Design and Variables of the Study

A survey design was used to answer the research questions. The instrument consisted of two parts: Part I - Background and work related information; and Part II - Perceptions of quality climate. The dependent variables were: the perceptions of current quality improvement efforts within the institution; and the perceptions of ideal quality improvement efforts within the institution. The main independent variable of this study was the leadership level/position of the administrator. An additional independent variable was the quality management/ improvement training status of the administrators. The variables of the study are shown in Table 5.

Table 5. Variables of the study

<table>
<thead>
<tr>
<th>Quality Climate Dimension</th>
<th>Demographic &amp; Other Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leadership</td>
<td>Position/Title</td>
</tr>
<tr>
<td>Information &amp; Analysis</td>
<td>Age</td>
</tr>
<tr>
<td>Strategic Quality Planning</td>
<td>Gender</td>
</tr>
<tr>
<td>Human Resource Dev. and Mgmt.</td>
<td>Education Level</td>
</tr>
<tr>
<td>Management of Process Quality</td>
<td>Experience in Leadership position</td>
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<tr>
<td>Quality and Operational Results</td>
<td>Quality management/improvement training</td>
</tr>
<tr>
<td>Customer Focus and Satisfaction</td>
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</tr>
</tbody>
</table>

Development of the Instrument

A Quality Climate Assessment Instrument (QCAI) was developed to collect data for the study. This section describes the development of the survey instrument and includes an overview of the initial instrument, review by an expert panel, and pilot testing.
Overview of initial instrument development

The instrument consisted of two parts. Part I was developed to solicit background and work-related information of administrators in the community college system in Iowa as well as to obtain the status of quality management/improvement training. Two recent studies concerning leadership in Iowa Community Colleges were used as references to identify demographic and other job related factors (Easler, 1993; Shelstrom, 1992). These demographic and work-related items were: a) gender; b) age; c) years of experience as community college administrator; d) educational level; and e) leadership position/title. In addition, respondents were asked whether they had received any form of quality management/quality improvement training.

Part II was developed to measure the perceived current and ideal quality improvement climate. It was based primarily on the 1991 Malcolm Baldrige Award Criteria framework consisting of the following seven dimensions: a) Leadership; b) Information and Analysis; c) Strategic Quality Planning; d) Human Resource Utilization; e) Quality Assurance; f) Quality Results; and g) Customer Satisfaction.

For each of the dimensions, statements were written which are applicable to the community college setting, and respondents were asked to what extent they agreed or disagreed on a continuum of five possible responses for the current and ideal situation. (agree; strongly agree; neutral; disagree; and strongly disagree). Six items were written for each criteria, bringing the total number of items to forty-two. When writing the items, reference was made to various sources in which the Baldrige criteria had been considered in education (Chaffee & Sherr, 1992; Cornesky et. al., 1992; Neuroth et. al., 1992; Schenkat, 1993;
Spanbauer, 1992). Specifically, reference was made to Spanbauer's interpretation (Appendix B) because it relates to community colleges.

**Validation of the instrument**

The instrument was validated by a knowledgeable panel of Iowa State University professors and personnel. Professors and individuals who had taught courses in TQM or supervised dissertations, and others with experience in TQM were considered. A list of the names and titles of the panel members is found in Appendix C. The draft instrument and letter sent to the panel to solicit their assistance is found in Appendices D and E, respectively. The panel's task was threefold:

1. Assure each item is appropriately placed within each of the seven criteria as defined in the Baldrige framework.
2. Evaluate items for clarity and understanding.
3. Suggest new items where appropriate.

**Results of panel review process**

Based on the recommendations of the panel, the instrument was revised and a final draft produced. Changes were made to the following dimensions to reflect the current 1993 Malcolm Baldrige Criteria: *Human Resource Utilization* to *Human Resource Development and Management*, *Quality assurance* to *Management of Process Quality*, *Quality Results* to *Quality and Operational Results*, and *Customer Satisfaction* to *Customer Focus and Satisfaction*. The total number of items were increased to 46. The final version and the item specification table is shown in Appendix F and G, respectively. The final draft was then
presented to the major professors of the study for approval prior to mailing.

**Pilot testing**

A pilot test was conducted on the instrument to check for clarity and understandability. The pilot test was conducted with a group of 18 graduate students enrolled in the research seminar class in the Department of Industrial Education and Technology. In addition, the instrument was also reviewed by a former community college administrator. The instrument was modified based on the feedback from these sources. There was consensus that the degree of readability and clarity was adequate and further modifications to the instrument were not necessary.

**Data Collection Procedure**

The final form of the survey instrument was reviewed and approved by the major professors associated with this study. It was then submitted for approval by the Human Subjects Review Committee at Iowa State University to ensure that the rights and welfare of the human subjects were adequately protected, risks were outweighed by the potential benefits and expected value of the knowledge sought, confidentiality of data was assured, and that informed consent was obtained by appropriate procedures. The signed approval form is shown in Appendix H. The survey instrument was mailed directly to each participant on February 11, 1994. To increase the rate of return, a follow-up survey was sent on March 3, 1994 to non-respondents after a period of three weeks. This resulted in the return of 220 usable surveys out of the 321 mailed out and represented a return rate of 62.3%. Copies of the cover letter and follow-up letter are shown in Appendix I.
Statistical Analysis of the Data

Statistical techniques were used to test the research hypotheses. Measures of central tendency and variability were calculated for the responses toward the seven criteria as defined on the Baldrige framework (a total of 46 questions). A value of Cronbach's alpha was computed to determine reliability coefficients for each of the seven Baldrige criteria and for the overall instrument. The statistical procedures used for testing the four hypotheses were the one-way Analysis of Variance and the multivariate analysis of variance (MANOVA) procedure. The Statistical Package for the Social Sciences (SPSS Inc., 1990) software, operating on the mainframe computer system at Iowa State University, was utilized to perform the required statistical analyses.
CHAPTER IV. RESEARCH RESULTS AND FINDINGS

The findings of the study are presented in this chapter and are organized into the following sections: (a) General Characteristics of the Sample; (b) Reliability Analysis of the Instrument (c) Quality Climate Perceptions; (d) Comparison with the Baldrige Weightings; (e) Results of Hypotheses Tested; (f) Evaluation of the Quality Climate Instrument; and (g) Summary.

General Characteristics of the Sample

The primary purpose of this section is to describe community college administrators with respect to the following demographic and background variables: (a) position/title; (b) gender; (c) age; (d) years of experience as a community college administrator; (e) educational level; and (f) status of quality management/improvement training. The descriptive information is presented in Table 6.

Position/Title. The position/title distribution is the first row of Table 6. This group consisted of 220 administrators, out of which 13 were Presidents (5.9 %), 36 Vice-Presidents (16.4 %), 60 Deans (27.3 %), 54 Heads/Chairs (24.5%), and 57 directors (25.9 %).

Gender. The number of male administrators were slightly more than twice the female administrators. The number of female administrators totaled 65 (29.5%) while the number of male administrators was 155 (70.5%).

Age. The age of the respondents was divided into five categories: 20-25 years; 26-35 years; 36-45 years; 46-55 years; and over 55 years. The largest group of administrators were
Table 6. Demographic and background information of respondents

<table>
<thead>
<tr>
<th>Category</th>
<th>Frequency</th>
<th>Percent</th>
<th>Cumulative Frequency</th>
<th>Cumulative Percent</th>
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</table>
in the 46-55 year age category (46.4%). There were no administrators in the 20-25 year age category, but the next category (26-35 years) had 9 (4.1%). In addition, 95.9% of the administrators were over 35, and 24.5% were over 55 years old.

**Years of Experience as Community College Administrator.** The years of experience of the respondents were divided into five categories: 1-5 years; 6-10 years; 11-15 years; 16-20 years; and over 20 years. The findings revealed that 73 (33.2%) of the administrators had more than 20 years of experience and over half the administrators had more than 10 years of experience (66.3%). Overall, the number of administrators in each experience category were more or less equal.

**Educational Level.** The educational level of the respondents was classified into five categories: (1) less than BS/BA degree; (2) bachelor's degree; (3) master's degree; (4) master's degree + 30 credits; and (5) doctorate degree. The largest category represented those who had completed a master's degree, with the number equaling 85 (38.8%). Eight (3.7%) administrators had less than a bachelors degree, while 50 (22.8%) had a doctorate degree. One respondent did not complete this item.

**Quality Management/Improvement Training.** Respondents were asked to indicate whether they had received any form of quality management or quality improvement training. The results showed that 156 administrators (71.6%) had some form of quality management or quality improvement training. Two respondents did not complete this item.
Analysis by position/title

Since the main variable of interest was position/title of the administrators, further analysis was conducted by generating cross-tabulations with the other variables: gender; age; years of experience as community college administrator; educational level; and status of quality management/improvement training. The results are shown in Table 7. In addition, a series of charts were also generated to depict graphically the breakdown of the position/title variable with respect to the other variables.

Position/title with gender. As shown in Table 7, there were more males at all levels of position/title. Overall, most females were in the lower level administrative positions. The numbers of female administrators increased as the importance of the position/title decreased, from 7.7% for presidents to 16.7% for vice-presidents, 28.3% for deans, 37.0% for department head/chairs, and 36.8% for directors. The results are depicted graphically in Figure 7.

Position/title with age. The age distribution of the presidents show that all of the presidents and 86.1% of the vice-presidents were over the age of 45 years. For the deans, 96.7% were above 35 years old; the figures were 96.3% and 93.0% for department head/chairs and directors, respectively. The results are depicted graphically in Figure 8.

Position/title with experience. The results from Table 7 show that 61.5% of the presidents had more than 20 years of experience compared to 44.4% for vice-presidents, 33.3% for deans, 22.2% for department head/chairs, and 29.8% for directors. The results are depicted graphically in Figure 9.
Table 7. Demographic and background information of respondents by position/title

<table>
<thead>
<tr>
<th>Category</th>
<th>President</th>
<th>Vice Pres.</th>
<th>Dean</th>
<th>Head/Chair</th>
<th>Director</th>
<th>Total</th>
<th>Percent</th>
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</thead>
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An analysis of the education category, as shown in Table 7, revealed that 92.3% of the presidents had doctorates, compared with 41.7% for vice-presidents, 20% for deans, 7.5% for dept. heads/chairs, and 12.3% for directors. The results are depicted graphically in Figure 10.

Position/title with training. As in the preceding category, the numbers of administrators who had quality training were higher for those occupying higher administrative positions (Figure 11). The results show that 84.6% of the presidents had training, compared to 80.5% for vice-presidents, 79.7% for deans, 66% for heads/chairs, and 59.6% for directors.
Figure 8. Age by position/title

Figure 9. Experience by position/title
Figure 10. Education level by position/title

Figure 11. TQM training by position/title
Reliability Analysis of the Instrument

The SPSS package was utilized to conduct the reliability analyses of the instrument. Analyses were conducted for each of the seven Baldrige categories and for the overall scale (total instrument). The alpha reliability coefficients are reported in Table 8. The alpha coefficients ranged from .78 to .87 for the current section of the instrument, with an overall reliability of .96. On the other hand, the alpha coefficients were slightly higher for the ideal section, ranging from .86 to .91, with an overall reliability of .97.

Table 8. Reliability analysis of current and ideal sections of the instrument

<table>
<thead>
<tr>
<th>Baldrige Dimension</th>
<th>Item Numbers</th>
<th>Current</th>
<th>N</th>
<th>Ideal</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leadership</td>
<td>1 - 6</td>
<td>.86</td>
<td>215</td>
<td>.89</td>
<td>211</td>
</tr>
<tr>
<td>Information and Analysis</td>
<td>7 - 12</td>
<td>.86</td>
<td>210</td>
<td>.90</td>
<td>205</td>
</tr>
<tr>
<td>Strategic Quality Planning</td>
<td>13 - 18</td>
<td>.87</td>
<td>214</td>
<td>.91</td>
<td>209</td>
</tr>
<tr>
<td>Mgmt. of Process Quality</td>
<td>26 - 32</td>
<td>.83</td>
<td>214</td>
<td>.88</td>
<td>209</td>
</tr>
<tr>
<td>Quality &amp; Operational Results</td>
<td>33 - 38</td>
<td>.78</td>
<td>211</td>
<td>.87</td>
<td>208</td>
</tr>
<tr>
<td>Customer Focus &amp; Satisfaction</td>
<td>39 - 46</td>
<td>.84</td>
<td>214</td>
<td>.86</td>
<td>208</td>
</tr>
<tr>
<td>Overall</td>
<td>1 - 46</td>
<td>.96</td>
<td></td>
<td>.97</td>
<td></td>
</tr>
</tbody>
</table>
Quality Climate Perceptions

Summary statistics for the perceptions of the five groups of administrators towards current and ideal quality improvement efforts are presented in this section. Means and standard deviations were calculated for each of the Baldrige dimensions based on the position/title of the respondents and for all administrators taken as a whole. The mean gaps—the differences between the ideal and current means for each of the dimensions, were also calculated and charts showing the gap profile are presented in Figure 12 through Figure 19.

Overall results for all administrators taken as a whole

As shown in Table 9, the mean perceptions for all administrators taken as a whole on the current situation ranged from a low of 3.07 (Human Resource Development & Management) to a high of 3.73 (Management of Process Quality), which suggested that administrators as a whole were in agreement with the seven dimensions of the instrument. In contrast, the mean scores for the ideal scale were much higher, and ranged from 4.36 (Human Resource Development and Management) to 4.60 (Leadership). An inspection of the gap profile (Figure 12) reveals that the largest perceived gap was in the Human Resource Development and Management (1.28) category while the smallest mean gap was in the Quality and Operational Results (0.70) category. The standard deviations for the current situation, which ranged from 0.66 to 0.80, suggest a fair amount of variability among the perceptions. However, these were consistently higher than for the ideal situation, which ranged from 0.49 to 0.52. This could be interpreted as denoting a higher level of agreement.
Table 9. Means and standard deviations for the seven Baldrige categories for all administrators

<table>
<thead>
<tr>
<th>Category</th>
<th>Current Situation</th>
<th>Ideal Situation</th>
<th>Gap</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Std. Dev.</td>
<td>Mean</td>
</tr>
<tr>
<td>Leadership</td>
<td>3.65</td>
<td>0.80</td>
<td>4.60</td>
</tr>
<tr>
<td>Information &amp; Analysis</td>
<td>3.28</td>
<td>0.80</td>
<td>4.44</td>
</tr>
<tr>
<td>Strategic Quality Planning</td>
<td>3.42</td>
<td>0.83</td>
<td>4.51</td>
</tr>
<tr>
<td>Human Resource Development &amp; Management</td>
<td>3.07</td>
<td>0.82</td>
<td>4.36</td>
</tr>
<tr>
<td>Management of Process Quality</td>
<td>3.73</td>
<td>0.67</td>
<td>4.50</td>
</tr>
<tr>
<td>Quality and Operational Results</td>
<td>3.72</td>
<td>0.66</td>
<td>4.43</td>
</tr>
<tr>
<td>Customer Focus and Satisfaction</td>
<td>3.25</td>
<td>0.72</td>
<td>4.31</td>
</tr>
</tbody>
</table>

Figure 12. Gap profile for all administrators
in perceptions of respondents on the ideal situation.

**Summary of results by Baldrige category**

Means and standard deviations for each of the dimensions based on the position/title of the respondents are shown in Table 10. The results are presented based on the perceptions of administrators according to their position/title and by the Baldrige categories: (1) Leadership; (2) Information and Analysis; (3) Strategic Quality Planning; (4) Human Resource Development and Management; (5) Management of Process Quality; (6) Quality and Operational Results; and (7) Customer Focus and Satisfaction.

**Leadership** Generally, the means for all groups were higher on the ideal scale than on the current scale. The mean scores on the ideal scale all were greater than 4.5, indicating a high level of agreement in perceptions between the groups. Comparing the scores of the groups on the current scale reveals that presidents had a higher mean (4.29), while the mean scores for each of the other four groups were below 4.0.

Mean gaps for this category ranged from 0.49 to 1.14. An inspection of the gap profile for this category (Figure 13) indicates differences between the groups. Presidents as a group showed the smallest gap (0.49), while heads/chairs had the largest gap, of 1.14.

**Information and analysis** The perceptions on the current scale in this category show that the means ranged from a low of 3.15 (heads/chairs) to a high of 3.68 (presidents). However, scores on the ideal scale ranged from 4.37 to 4.63, indicating a high level of
Table 10.  Means and standard deviations for the seven Baldrige categories

<table>
<thead>
<tr>
<th>Category</th>
<th>Current Situation</th>
<th>Ideal Situation</th>
<th>Gap</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Std. Dev.</td>
<td>Mean</td>
</tr>
<tr>
<td>Leadership</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>President</td>
<td>4.29</td>
<td>0.50</td>
<td>4.78</td>
</tr>
<tr>
<td>V. President</td>
<td>3.65</td>
<td>0.57</td>
<td>4.63</td>
</tr>
<tr>
<td>Dean</td>
<td>3.61</td>
<td>0.87</td>
<td>4.53</td>
</tr>
<tr>
<td>Head/Chair</td>
<td>3.46</td>
<td>0.82</td>
<td>4.61</td>
</tr>
<tr>
<td>Director</td>
<td>3.71</td>
<td>0.82</td>
<td>4.62</td>
</tr>
<tr>
<td>All Groups</td>
<td>3.65</td>
<td>0.80</td>
<td>4.60</td>
</tr>
<tr>
<td>Information &amp; Analysis</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>President</td>
<td>3.68</td>
<td>0.65</td>
<td>4.63</td>
</tr>
<tr>
<td>V. President</td>
<td>3.35</td>
<td>0.71</td>
<td>4.37</td>
</tr>
<tr>
<td>Dean</td>
<td>3.30</td>
<td>0.89</td>
<td>4.39</td>
</tr>
<tr>
<td>Head/Chair</td>
<td>3.15</td>
<td>0.76</td>
<td>4.46</td>
</tr>
<tr>
<td>Director</td>
<td>3.23</td>
<td>0.79</td>
<td>4.49</td>
</tr>
<tr>
<td>All Groups</td>
<td>3.28</td>
<td>0.80</td>
<td>4.44</td>
</tr>
<tr>
<td>Strategic Quality Planning</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>President</td>
<td>3.61</td>
<td>0.61</td>
<td>4.58</td>
</tr>
<tr>
<td>V. President</td>
<td>3.53</td>
<td>0.73</td>
<td>4.56</td>
</tr>
<tr>
<td>Dean</td>
<td>3.27</td>
<td>0.91</td>
<td>4.42</td>
</tr>
<tr>
<td>Head/Chair</td>
<td>3.38</td>
<td>0.86</td>
<td>4.52</td>
</tr>
<tr>
<td>Director</td>
<td>3.50</td>
<td>0.83</td>
<td>4.54</td>
</tr>
<tr>
<td>All Groups</td>
<td>3.42</td>
<td>0.83</td>
<td>4.51</td>
</tr>
<tr>
<td>Human Resource Development &amp; Management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>President</td>
<td>3.68</td>
<td>0.63</td>
<td>4.49</td>
</tr>
<tr>
<td>V. President</td>
<td>3.15</td>
<td>0.57</td>
<td>4.31</td>
</tr>
<tr>
<td>Dean</td>
<td>3.09</td>
<td>0.79</td>
<td>4.32</td>
</tr>
<tr>
<td>Head/Chair</td>
<td>2.93</td>
<td>0.95</td>
<td>4.45</td>
</tr>
<tr>
<td>Director</td>
<td>2.99</td>
<td>0.83</td>
<td>4.33</td>
</tr>
<tr>
<td>All Groups</td>
<td>3.07</td>
<td>0.82</td>
<td>4.36</td>
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<tr>
<td>Management of Process Quality</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>President</td>
<td>4.03</td>
<td>0.56</td>
<td>4.63</td>
</tr>
<tr>
<td>V. President</td>
<td>3.80</td>
<td>0.58</td>
<td>4.58</td>
</tr>
<tr>
<td>Dean</td>
<td>3.77</td>
<td>0.73</td>
<td>4.44</td>
</tr>
<tr>
<td>Head/Chair</td>
<td>3.55</td>
<td>0.68</td>
<td>4.47</td>
</tr>
<tr>
<td>Director</td>
<td>3.75</td>
<td>0.64</td>
<td>4.50</td>
</tr>
<tr>
<td>All Groups</td>
<td>3.73</td>
<td>0.67</td>
<td>4.50</td>
</tr>
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</table>
Table 10. (Continued)

<table>
<thead>
<tr>
<th>Category</th>
<th>Current Situation</th>
<th>Ideal Situation</th>
<th>Gap</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Std. Dev.</td>
<td>Mean</td>
</tr>
<tr>
<td>Quality and Operational Results</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>President</td>
<td>4.05 0.59</td>
<td>4.54 0.39</td>
<td>0.49 0.60</td>
</tr>
<tr>
<td>V. President</td>
<td>3.88 0.55</td>
<td>4.55 0.43</td>
<td>0.67 0.51</td>
</tr>
<tr>
<td>Dean</td>
<td>3.76 0.66</td>
<td>4.40 0.64</td>
<td>0.64 0.53</td>
</tr>
<tr>
<td>Head/Chair</td>
<td>3.48 0.73</td>
<td>4.40 0.46</td>
<td>0.91 0.78</td>
</tr>
<tr>
<td>Director</td>
<td>3.74 0.61</td>
<td>4.38 0.52</td>
<td>0.64 0.51</td>
</tr>
<tr>
<td>All Groups</td>
<td>3.72 0.66</td>
<td>4.43 0.52</td>
<td>0.70 0.61</td>
</tr>
<tr>
<td>Customer Focus and Satisfaction</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>President</td>
<td>3.45 0.56</td>
<td>4.27 0.47</td>
<td>0.82 0.51</td>
</tr>
<tr>
<td>V. President</td>
<td>3.43 0.57</td>
<td>4.34 0.45</td>
<td>0.90 0.63</td>
</tr>
<tr>
<td>Dean</td>
<td>3.33 0.68</td>
<td>4.27 0.63</td>
<td>0.96 0.67</td>
</tr>
<tr>
<td>Head/Chair</td>
<td>3.07 0.80</td>
<td>4.33 0.49</td>
<td>1.21 0.94</td>
</tr>
<tr>
<td>Director</td>
<td>3.17 0.77</td>
<td>4.32 0.46</td>
<td>1.09 0.69</td>
</tr>
<tr>
<td>All Groups</td>
<td>3.25 0.72</td>
<td>4.31 0.52</td>
<td>1.04 0.74</td>
</tr>
</tbody>
</table>

Figure 13. Gap profile for the Leadership category
agreement (Figure 14). Again, the mean gaps for the presidents (0.95) were smaller than for the other groups (1.02 to 1.28).

**Strategic quality planning**  As shown in Figure 15, there appears to be a high level of agreement in perceptions between the groups on the ideal scale, with scores ranging from 4.42 to 4.58. Among the groups, the deans had the lowest mean score (4.42). In addition, the mean scores for the current scale were somewhat similar for all the groups, ranging from 3.27 to 3.61. As such, the mean gaps for this category do not appear to differ between the groups, ranging from 0.97 to 1.15.

![Figure 14. Gap profile for the Information and Analysis category](image-url)
Figure 15. Gap profile for the Strategic Quality Planning category

**Human resource development and management**  On the ideal scale, all the groups had high mean scores over 4 (Figure 16) indicating a high level of agreement in perceptions on this scale. However, on the current scale, mean scores were lower, ranging from 2.93 for heads/chairs to 3.68 for presidents. The mean scores for presidents appeared to be different from the other groups. It is noteworthy that two groups, head/chairs and directors, had means below 3, i.e., 2.93 and 2.99, respectively. Presidents had the smallest mean gaps (0.81) among the groups. The largest mean gap was shown by heads/chairs (1.51), followed by directors (1.29), deans (1.25), and vice-presidents (1.15), respectively.
Figure 16. Gap profile of the Human Resource Development and Management category

**Management of process quality** As shown in Figure 17, the means for all the groups on the ideal scale were somewhat high, with values ranging from 4.44 to 4.63, indicating a high degree of agreement in perceptions. In comparing the mean score between groups, presidents had the highest mean score of 4.63 while deans had the lowest score of 4.44. On the current scale, perceptions were somewhat lower for all groups, with presidents having the highest score of 4.03 while all the other groups had a mean score below 4.0. The presidents had the lowest mean gap of 0.59, followed by deans (0.68), directors (0.70), vice-presidents (0.76), and directors (0.70).
Figure 17. Gap profile for the Management of Process Quality category

Quality and operational results As shown in Figure 18, for this category, presidents and vice-presidents had mean scores that were similar on the ideal scale (4.55; 4.54). The other three groups had mean scores ranging from 4.38 to 4.40. When comparing current perceptions, presidents had the highest means (4.05), followed by vice-presidents (3.88), deans (3.76), directors (3.74), and heads/chairs (3.48), respectively. In order of increasing values, the mean gaps were: presidents (0.49); directors (0.61); deans (0.66); vice-presidents (0.67); and head/chairs (0.91).

Customer focus and satisfaction In this category, all groups had high means on the ideal scale, with scores over 4.0 (Figure 19). For the current scale, although most of the groups had mean scores over 3.0, it is interesting to note that head/chairs had the lowest mean
Figure 18. Gap profile for the Quality and Operational Results category

Figure 19. Gap profile for the Customer Focus and Satisfaction category
scores at 3.07. As in the preceding categories, the mean score gaps for presidents were lowest (0.82) while that of the heads/chairs were the largest (1.21).

**Comparison of Instrument Weightings with the Baldrige Weightings**

The categories of the Baldrige criteria framework are assigned weights to reflect their relative importance. For example, *Customer Focus and Satisfaction* is assigned 300 points (30% weight) out of a total of 1000 (see Table 10, column 1). The purpose of this section is to compare the weightings of the QCAI instrument with that of the Baldrige framework. The proportions of mean perceptions to the total score for each category expressed as a percentage were calculated and used as a basis for the comparison. Deviations from the Baldrige weightings were then calculated for the current and ideal scales and the results are shown in Tables 6 and 7. A graphical representation of these deviations from the Baldrige weightings is shown in Figures 20 and 21.

**Current scales**

As shown in Table 11 and Figure 20, for the current situation, positive deviations are evident for three out of the seven categories for all groups. This indicates that the *Leadership, Information & Analysis*, and *Strategic Quality Planning* category weightings were higher than the corresponding Baldrige weightings. The magnitudes of the deviations ranged from 0.89% to 4.32% for the five groups. This suggests that the levels of importance attributed by respondents to these three categories were comparable to the corresponding Baldrige categories.
Figure 20. Differences between the current instrument weightings for each Baldrige category and Baldrige weightings by position/title.
Figure 21. Differences between the ideal instrument weightings for each Baldrige category and Baldrige weightings by position/title
Table 11. Differences in current climate means between the proportion for each Baldrige category to total score and the Baldrige weightings for position/title.

<table>
<thead>
<tr>
<th>Baldrige dimension</th>
<th>% Baldrige Weights</th>
<th>Deviation from the Baldrige Weights (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Presidents</td>
<td>VP's</td>
</tr>
<tr>
<td>Leadership</td>
<td>9.0</td>
<td>+3.27</td>
</tr>
<tr>
<td>Information and Analysis</td>
<td>8.0</td>
<td>+2.51</td>
</tr>
<tr>
<td>Strategic Quality Planning</td>
<td>6.0</td>
<td>+4.32</td>
</tr>
<tr>
<td>H.R. Dev. &amp; Management</td>
<td>15.0</td>
<td>-4.48</td>
</tr>
<tr>
<td>Quality &amp; Operational Results</td>
<td>18.0</td>
<td>-6.42</td>
</tr>
</tbody>
</table>

The deviations were negative for the following four dimensions of the Baldrige: **Human Resource Development and Management**, **Management of Process Quality**, **Quality and Operational Results**, and **Customer Focus and Satisfaction**. This indicates that the instrument weightings on these dimensions were lower in magnitude when compared to the corresponding Baldrige weightings. The magnitudes revealed that these deviations were higher than the previously mentioned three dimensions and ranged from -2.48\% to -21.23\% for the five groups. Three categories, **Human Resource Development and Management**, **Quality and Operational Results**, and **Customer Focus and Satisfaction** category had relatively larger deviations (-6.23; -7.37; -20.72) compared with the other four categories. This suggests that these categories were not perceived as having the same level of importance as reflected in the corresponding Baldrige category.
Ideal scales

As in the current scales, the Leadership, Information & Analysis, and Strategic Quality Planning categories reflected a positive deviation but with slightly higher magnitudes, ranging from 3.94 to 7.08 for all five groups (Table 12 and Figure 21). Again, the deviations were negative for the following four dimensions of the Baldrige: Human Resource Development and Management; Management of Process Quality; Quality and Operational Results; and Customer Focus and Satisfaction. This indicates that the instrument weightings on this dimensions were lower in magnitude than the Baldrige weightings. An examination of the magnitudes reveals that these deviations ranged from -2.16 to -2.69 for the Human Resource Development and Management category, -0.78 to -1.31 for the Management of

Table 12. Differences in ideal climate means between the proportion for each Baldrige category to total score and the Baldrige weightings for position/title.

<table>
<thead>
<tr>
<th>Baldrige dimension</th>
<th>% Baldrige Weights</th>
<th>Deviation from the Baldrige Weights (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Presidents</td>
<td>VPs</td>
</tr>
<tr>
<td>Leadership</td>
<td>9.0</td>
<td>+4.66</td>
</tr>
<tr>
<td>Information and Analysis</td>
<td>8.0</td>
<td>+5.22</td>
</tr>
<tr>
<td>Strategic Quality Planning</td>
<td>6.0</td>
<td>+7.08</td>
</tr>
<tr>
<td>Mgmt. of Process Quality</td>
<td>14.0</td>
<td>-0.78</td>
</tr>
<tr>
<td>Quality &amp; Operational Results</td>
<td>18.0</td>
<td>-5.03</td>
</tr>
<tr>
<td>Customer Focus &amp; Satisfaction</td>
<td>30.0</td>
<td>-17.80</td>
</tr>
</tbody>
</table>
Process Quality category, -4.99 to -5.48 for the Quality and Operational Results category, and -17.61 to -17.79 for the Customer Focus and Satisfaction category. Three categories, Strategic Quality Planning, Quality and Operational Results, and Customer Focus and Satisfaction, had relatively larger deviations (+6.87; -5.34; -17.69) compared with the other four categories. This suggests that these categories were not perceived as having the same level of importance as reflected in the corresponding Baldrige category.

Tests of Hypotheses

Hypothesis 1: There are no significant differences in the current perceptions of the seven dimensions of the quality climate between presidents, vice-presidents, deans, department heads/chairs and directors.

The purpose of this hypothesis was to determine significant differences in the current perceptions of the quality climate between presidents, vice-presidents, deans, department heads/chairs and directors. The one-way ANOVA procedure was used to test the above hypothesis and the results of the procedure are shown in Table 13. Significant differences were found (α = .05) between the perceptions of the five groups on three of the seven dimensions: Leadership (F = 3.11; p = 0.016); Human Resource Development and Management (F = 2.53; p = 0.042); Quality and Operational results (F = 3.39; p = 0.010). Therefore, Hypothesis 1 was rejected.

Further examination using the Tukey-HSD multiple range tests revealed that the specific differences in perceptions were as follows: (a) Leadership. Presidents (mean = 4.29) differed significantly from deans (mean = 3.61) and department heads/chairs (mean = 3.46), respectively; (b) Human Resource Development and Management. Presidents (mean = 3.68)
Table 13. One-way analysis of variance (current climate)

<table>
<thead>
<tr>
<th>Baldrige dimension</th>
<th>D.F.</th>
<th>S. S.</th>
<th>M. S.</th>
<th>F Ratio</th>
<th>F-prob.</th>
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<tr>
<td>Leadership</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between Groups</td>
<td>4</td>
<td>7.62</td>
<td>1.90</td>
<td>3.11</td>
<td>0.016*</td>
</tr>
<tr>
<td>Within Groups</td>
<td>214</td>
<td>131.19</td>
<td>0.61</td>
<td></td>
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</tr>
<tr>
<td>Information and Analysis</td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>Between Groups</td>
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<td>3.30</td>
<td>0.82</td>
<td>1.31</td>
<td>0.269</td>
</tr>
<tr>
<td>Within Groups</td>
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<td>135.08</td>
<td>0.63</td>
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<tr>
<td>Strategic Quality Planning</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between Groups</td>
<td>4</td>
<td>2.61</td>
<td>0.65</td>
<td>0.94</td>
<td>0.442</td>
</tr>
<tr>
<td>Within Groups</td>
<td>214</td>
<td>148.64</td>
<td>0.69</td>
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</tr>
<tr>
<td>H.R. Dev. &amp; Management</td>
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</tr>
<tr>
<td>Between Groups</td>
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<td>6.57</td>
<td>1.64</td>
<td>2.53</td>
<td>0.042*</td>
</tr>
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<td>Within Groups</td>
<td>214</td>
<td>139.06</td>
<td>0.65</td>
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</tr>
<tr>
<td>Mgmt. of Process Quality</td>
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</tr>
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<td>1.81</td>
<td>0.129</td>
</tr>
<tr>
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<td>0.44</td>
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</tr>
<tr>
<td>Quality &amp; Operational Results</td>
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</tr>
<tr>
<td>Between Groups</td>
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<td>5.68</td>
<td>1.42</td>
<td>3.39</td>
<td>0.010*</td>
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<tr>
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<td>89.67</td>
<td>0.42</td>
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</tr>
<tr>
<td>Customer Focus &amp; Satisfaction</td>
<td></td>
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</tr>
<tr>
<td>Between Groups</td>
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<td>4.20</td>
<td>1.05</td>
<td>2.06</td>
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</tr>
<tr>
<td>Within Groups</td>
<td>214</td>
<td>109.13</td>
<td>0.51</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*significant at .05
differed significantly from department heads/chairs (mean = 2.93) and directors (mean = 2.99), respectively; (c) **Quality and Operational Results.** Department heads/chairs (mean = 3.48) differed significantly from presidents (mean = 4.05) and vice-presidents (mean = 3.88), respectively.

**Hypothesis 2:** There are no significant differences in the ideal perceptions of the seven dimensions of the quality climate between presidents, vice-presidents, deans, department heads/chairs and directors.

The purpose of this hypothesis was to determine significant differences in the ideal perceptions of the quality climate between presidents, vice-presidents, deans, department heads/chairs and directors. The one-way ANOVA procedure was used to test the above hypothesis and the results of the procedure are shown in Table 14. No significant differences were found (α = .05) between the perceptions of the five groups on all of the seven dimensions.

**Hypothesis 3:** There are no significant differences in the seven dimensions of quality climate perceptions (current) between administrators who had quality management training and those who did not have any such training.

The purpose of Hypothesis 3 was to detect if there were differences in the current perceptions of administrators between those who had quality training on the seven Baldrige dimensions and those who did not have any such training. The means and standard deviations for the two groups are shown in Table 15. A MANOVA procedure with α = .05 was used to test the hypothesis and the results are shown in Table 16. The test yielded an F of 3.39 (p = 0.002) which was significant. Therefore, the null hypothesis was rejected. A statistically significant difference was found between the perceptions of the two groups on the seven
Table 14. One-way analysis of variance (ideal climate)

<table>
<thead>
<tr>
<th>Baldrige dimension</th>
<th>D.F.</th>
<th>S. S.</th>
<th>M. S.</th>
<th>F Ratio</th>
<th>F-prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Leadership</strong></td>
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<td></td>
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<td></td>
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<tr>
<td>Between Groups</td>
<td>4</td>
<td>0.80</td>
<td>0.20</td>
<td>0.72</td>
<td>0.580</td>
</tr>
<tr>
<td>Within Groups</td>
<td>209</td>
<td>57.84</td>
<td>0.28</td>
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<td></td>
</tr>
<tr>
<td><strong>Information and Analysis</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between Groups</td>
<td>4</td>
<td>0.87</td>
<td>0.22</td>
<td>0.81</td>
<td>0.518</td>
</tr>
<tr>
<td>Within Groups</td>
<td>210</td>
<td>56.37</td>
<td>0.27</td>
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<td></td>
</tr>
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<td><strong>Strategic Quality Planning</strong></td>
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<td>0.69</td>
<td>0.17</td>
<td>0.67</td>
<td>0.611</td>
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<tr>
<td>Within Groups</td>
<td>210</td>
<td>53.59</td>
<td>0.26</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>H.R. Dev. &amp; Management</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between Groups</td>
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<td>0.87</td>
<td>0.22</td>
<td>0.80</td>
<td>0.528</td>
</tr>
<tr>
<td>Within Groups</td>
<td>210</td>
<td>57.57</td>
<td>0.27</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Mgmt. of Process Quality</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between Groups</td>
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<td>0.66</td>
<td>0.16</td>
<td>0.69</td>
<td>0.597</td>
</tr>
<tr>
<td>Within Groups</td>
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<td>49.70</td>
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<tr>
<td><strong>Quality &amp; Operational Results</strong></td>
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<td></td>
</tr>
<tr>
<td>Between Groups</td>
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<td>0.88</td>
<td>0.22</td>
<td>0.80</td>
<td>0.527</td>
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<tr>
<td>Within Groups</td>
<td>210</td>
<td>57.68</td>
<td>0.27</td>
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</tr>
<tr>
<td><strong>Customer Focus &amp; Satisfaction</strong></td>
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<td></td>
</tr>
<tr>
<td>Between Groups</td>
<td>4</td>
<td>0.14</td>
<td>0.04</td>
<td>0.13</td>
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<tr>
<td>Within Groups</td>
<td>210</td>
<td>56.63</td>
<td>0.27</td>
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</tr>
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</table>
Table 15. Means and standard deviations for the seven Baldrige categories for groups classified with training and without training

<table>
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<tr>
<th>Category</th>
<th>Current Situation</th>
<th>Ideal Situation</th>
<th>Gap</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Std. Dev.</td>
<td>Mean</td>
</tr>
<tr>
<td>Leadership</td>
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<td></td>
</tr>
<tr>
<td>Had training</td>
<td>3.69</td>
<td>0.82</td>
<td>4.60</td>
</tr>
<tr>
<td>No training</td>
<td>3.52</td>
<td>0.75</td>
<td>4.60</td>
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<tr>
<td>Information &amp; Analysis</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Had training</td>
<td>3.21</td>
<td>0.81</td>
<td>4.45</td>
</tr>
<tr>
<td>No training</td>
<td>2.94</td>
<td>0.76</td>
<td>4.43</td>
</tr>
<tr>
<td>Strategic Quality Planning</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Had training</td>
<td>3.50</td>
<td>0.82</td>
<td>4.53</td>
</tr>
<tr>
<td>No training</td>
<td>3.22</td>
<td>0.84</td>
<td>4.44</td>
</tr>
<tr>
<td>H.R. Development &amp; Management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Had training</td>
<td>3.19</td>
<td>0.85</td>
<td>4.38</td>
</tr>
<tr>
<td>No training</td>
<td>2.75</td>
<td>0.64</td>
<td>4.32</td>
</tr>
<tr>
<td>Management of Process Quality</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Had training</td>
<td>3.81</td>
<td>0.68</td>
<td>4.51</td>
</tr>
<tr>
<td>No training</td>
<td>3.52</td>
<td>0.67</td>
<td>4.44</td>
</tr>
<tr>
<td>Quality and Operational Results</td>
<td></td>
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<tr>
<td>Had training</td>
<td>3.81</td>
<td>0.67</td>
<td>4.47</td>
</tr>
<tr>
<td>No training</td>
<td>3.48</td>
<td>0.60</td>
<td>4.32</td>
</tr>
<tr>
<td>Customer Focus and Satisfaction</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Had training</td>
<td>3.34</td>
<td>0.74</td>
<td>4.32</td>
</tr>
<tr>
<td>No training</td>
<td>3.00</td>
<td>0.63</td>
<td>4.27</td>
</tr>
</tbody>
</table>
Table 16. MANOVA of current perceptions of groups with training and without training

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
<th>Exact F</th>
<th>Hypoth. DF</th>
<th>Error DF</th>
<th>Sig. of F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pillais</td>
<td>0.102</td>
<td>3.395</td>
<td>7.00</td>
<td>209.00</td>
<td>0.002*</td>
</tr>
<tr>
<td>Hotellings</td>
<td>0.114</td>
<td>3.395</td>
<td>7.00</td>
<td>209.00</td>
<td>0.002*</td>
</tr>
<tr>
<td>Wilks</td>
<td>0.898</td>
<td>3.395</td>
<td>7.00</td>
<td>209.00</td>
<td>0.002*</td>
</tr>
</tbody>
</table>

*significant at .05

Baldrige dimensions.

A further inspection of the univariate portion of the MANOVA output (Table 17) revealed that the means for the two groups were different on five of the seven dimensions: (a) Strategic Quality Planning (Means = 3.50; 3.22; F = .11; p = 0.025); (b) Human Resource Development and Management (Means = 3.19; 2.75; F = 13.76; p = 0.00); (c) Management of Process Quality (Means = 3.81; 3.52; F = 8.92; p = 0.003); (d) Quality and Operational results (Means = 3.81; 3.48; F = 11.57; p = 0.001); and (e) Customer Focus and Satisfaction (Means = 3.34; 3.00; F = 9.94; p = 0.002).

Hypothesis 4: There are no significant differences in the seven dimensions of quality climate perceptions (ideal) between administrators who had quality management training and those who did not have any such training.

The purpose of Hypothesis 4 was to detect if there were differences in the ideal perceptions between administrators who had quality training on the seven Baldrige dimensions and those who did not have any such training. A MANOVA procedure, with α = .05, was used to test the hypothesis and the results are shown in Table 18. The test yielded an F of 1.37 (p = 0.218) which was not significant. Therefore, the null hypothesis was not rejected.
### Table 17. Univariate tests

<table>
<thead>
<tr>
<th>Category</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Hyp. MS</th>
<th>Error MS</th>
<th>F</th>
<th>Sig. of F</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Leadership</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Had training</td>
<td>3.69</td>
<td>0.82</td>
<td>1.254</td>
<td>0.637</td>
<td>0.90</td>
<td>0.162</td>
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<tr>
<td>No training</td>
<td>3.52</td>
<td>0.75</td>
<td></td>
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<td></td>
</tr>
<tr>
<td><strong>Information &amp; Analysis</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Had training</td>
<td>3.21</td>
<td>0.81</td>
<td>1.851</td>
<td>0.634</td>
<td>2.92</td>
<td>0.089</td>
</tr>
<tr>
<td>No training</td>
<td>2.94</td>
<td>0.76</td>
<td></td>
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</tr>
<tr>
<td><strong>Strategic Quality Planning</strong></td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Had training</td>
<td>3.50</td>
<td>0.82</td>
<td>3.509</td>
<td>0.686</td>
<td>5.11</td>
<td>0.025*</td>
</tr>
<tr>
<td>No training</td>
<td>3.22</td>
<td>0.84</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>H.R. Development &amp; Management</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Had training</td>
<td>3.19</td>
<td>0.85</td>
<td>8.725</td>
<td>0.634</td>
<td>13.76</td>
<td>0.000*</td>
</tr>
<tr>
<td>No training</td>
<td>2.75</td>
<td>0.64</td>
<td></td>
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</tr>
<tr>
<td><strong>Management of Process Quality</strong></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Had training</td>
<td>3.81</td>
<td>0.68</td>
<td>3.844</td>
<td>0.431</td>
<td>8.92</td>
<td>0.003*</td>
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<tr>
<td>No training</td>
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<td>0.67</td>
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<td></td>
<td></td>
</tr>
<tr>
<td><strong>Quality and Operational Results</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Had training</td>
<td>3.81</td>
<td>0.67</td>
<td>4.864</td>
<td>0.420</td>
<td>11.57</td>
<td>0.001*</td>
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<td>No training</td>
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<tr>
<td><strong>Customer Focus and Satisfaction</strong></td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Had training</td>
<td>3.34</td>
<td>0.74</td>
<td>4.980</td>
<td>0.501</td>
<td>9.94</td>
<td>0.002*</td>
</tr>
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<td>No training</td>
<td>3.00</td>
<td>0.63</td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

*significant at .05

### Table 18. MANOVA of ideal perceptions of groups with training and without training

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
<th>Exact F</th>
<th>Hypoth. DF</th>
<th>Error DF</th>
<th>Sig. of F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pillais</td>
<td>0.045</td>
<td>1.375</td>
<td>7.00</td>
<td>204.00</td>
<td>0.218</td>
</tr>
<tr>
<td>Hotellings</td>
<td>0.047</td>
<td>1.375</td>
<td>7.00</td>
<td>204.00</td>
<td>0.218</td>
</tr>
<tr>
<td>Wilks</td>
<td>0.955</td>
<td>1.375</td>
<td>7.00</td>
<td>204.00</td>
<td>0.218</td>
</tr>
</tbody>
</table>
Summary of Hypotheses Testing

Out of the four hypotheses that were tested, two were rejected and two were retained.

Following is a summary of the results:

Hypothesis 1 (rejected): Significant differences were found on the current perceptions between the five groups of administrators on three of the seven Baldrige dimensions: (a) Leadership; (b) Human Resource Development and Management; and (c) Quality and Operational Results.

Further testing revealed that the differences were found: (a) in the Leadership category: (i) between presidents and deans; and (ii) between presidents and heads/chairs; (b) in the Human Resource Development and Management category: (i) between presidents and department heads/chairs; and (ii) between presidents and directors; and (c) in the Quality and Operational Results category: (i) between department heads/chairs and presidents; and (ii) between department heads/chairs and vice-presidents.

Hypothesis 2 (Retained): No significant differences were found on the ideal perceptions between the five groups of administrators on the seven Baldrige dimensions.

Hypothesis 3 (Rejected): Significant differences in current perceptions were found between administrators who had quality training and those who did not on five of the seven dimensions: (a) Strategic Quality Planning; (b) Human Resource Development and Management; (c) Management of Process Quality; (d) Quality and Operational Results; and (e) Customer Focus and Satisfaction.

Hypothesis 4 (Retained): No significant differences in ideal perceptions were found
between administrators who had quality training compared with those who did not.

**Evaluation of the Quality Climate Instrument**

This section describes the methods to determine if the items on the current and ideal scales of the instrument would factor-analyze consistently with the seven a-priori determined dimensions based on the Baldrige criteria. A factor analysis utilizing unweighted least squares with mean substitutions for missing values was conducted followed by a varimax rotation. The results of the analysis suggested four possible factors with Eigenvalues greater than 1.0, on the current and ideal scales, respectively (Tables 19 and 20). The four factors accounted for 47.5% and 54.6% of the total variance on the current and ideal scales, respectively. The distribution of the number of items from each Baldrige category as it pertains to the suggested empirical factors is shown in Tables 19 and 20. For example, the six a-priori items for the Leadership category were distributed as follows: Factor 1-1 item; Factor 6-4 items; and Factor 7-1 item (Table 19). The results, as shown in Tables 19 and 20, suggest that the seven original a-priori dimensions may be reduced to four factors on both scales. However, on both the current and ideal scales, two dimensions (Management of Process Quality, and Quality and Operational Results) seem to load on one factor (factor 2 on the current scale; and factor 1 on the ideal scale) which suggests that respondents were not able to differentiate between these two dimensions as originally conceptualized.

The construct validity of each dimension of the instrument was evaluated by conducting a factor analysis of the measurement items for each of the seven dimensions. The results are shown in Table 21. The factor matrices on both the current and ideal scales
Table 19. Comparison of the current a-priori Baldrige dimensions with empirical factors

<table>
<thead>
<tr>
<th>Scale</th>
<th>Item</th>
<th>Factor 1</th>
<th>Factor 2</th>
<th>Factor 3</th>
<th>Factor 4</th>
<th>Factor 5</th>
<th>Factor 6</th>
<th>Factor 7</th>
<th>Factor 8</th>
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</thead>
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</tr>
<tr>
<td>Information &amp; Analysis</td>
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</tr>
<tr>
<td>H.R. Development &amp; Management</td>
<td>19-25</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Management of Process Quality</td>
<td>26-32</td>
<td>1</td>
<td></td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quality &amp; Operational Results</td>
<td>33-38</td>
<td>5</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Customer Focus &amp; Satisfaction</td>
<td>39-46</td>
<td>1</td>
<td></td>
<td>4</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 20. Comparison of the ideal a-priori Baldrige dimensions with empirical factors

<table>
<thead>
<tr>
<th>Scale</th>
<th>Item</th>
<th>Factor 1</th>
<th>Factor 2</th>
<th>Factor 3</th>
<th>Factor 4</th>
<th>Factor 5</th>
<th>Factor 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eigenvalue</td>
<td>21.15</td>
<td>1.91</td>
<td>1.05</td>
<td>1.02</td>
<td>0.89</td>
<td>0.64</td>
<td></td>
</tr>
<tr>
<td>IDEAL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leadership</td>
<td>1-6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Information &amp; Analysis</td>
<td>7-12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Strategic Quality Planning</td>
<td>13-18</td>
<td></td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>H.R. Development &amp; Management</td>
<td>19-25</td>
<td></td>
<td></td>
<td>6</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Management of Process Quality</td>
<td>26-32</td>
<td>5</td>
<td></td>
<td></td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quality &amp; Operational Results</td>
<td>33-38</td>
<td>5</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Customer Focus &amp; Satisfaction</td>
<td>39-46</td>
<td>2</td>
<td>1</td>
<td></td>
<td></td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>
Table 21. Summary of factor matrices for the seven dimensions of the instrument

<table>
<thead>
<tr>
<th>Scale</th>
<th>Item</th>
<th>Current Scale</th>
<th>Ideal Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Loading Range</td>
<td>Eigenvalue</td>
</tr>
<tr>
<td>Leadership</td>
<td>1-6</td>
<td>.23 to .65</td>
<td>3.10</td>
</tr>
<tr>
<td>Information &amp; Analysis</td>
<td>7-12</td>
<td>.33 to .50</td>
<td>3.07</td>
</tr>
<tr>
<td>Strategic Quality Planning</td>
<td>13-18</td>
<td>.30 to .60</td>
<td>3.11</td>
</tr>
<tr>
<td>H.R. Development &amp; Management</td>
<td>19-25</td>
<td>.26 to .65</td>
<td>2.58</td>
</tr>
<tr>
<td>Management of Process Quality</td>
<td>26-32</td>
<td>.30 to .48</td>
<td>2.64</td>
</tr>
<tr>
<td>Quality &amp; Operational Results</td>
<td>33-38</td>
<td>.20 to .56</td>
<td>2.27</td>
</tr>
<tr>
<td>Customer Focus &amp; Satisfaction</td>
<td>39-46</td>
<td>.21 to .61</td>
<td>3.30</td>
</tr>
</tbody>
</table>

showed that the items in each scale formed a single factor. Thus, this provides tentative evidence of construct validity that each of the seven scales were unidimensional and measuring a single construct. A separate factor analysis was also conducted on both the current and ideal scales using all 46 items across the seven a-priori dimensions and the results (Table 22) show that only one factor emerged, which suggests that, overall, the instrument is measuring one underlying concept on both scales.

**Summary**

This chapter presented the findings of the study and answered each research question.

Demographic characteristics of administrators in Iowa’s community colleges were described
Table 22. Eigenvalues for factor analysis of the seven dimensions of the instrument

<table>
<thead>
<tr>
<th>Factor</th>
<th>Current Scale</th>
<th></th>
<th></th>
<th></th>
<th>Ideal Scale</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Eigenvalue</td>
<td>% Variance</td>
<td>Cumulative %</td>
<td></td>
<td>Eigenvalue</td>
<td>% Variance</td>
<td>Cumulative %</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>5.19</td>
<td>74.1</td>
<td>74.1</td>
<td></td>
<td>5.34</td>
<td>76.2</td>
<td>76.2</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>.55</td>
<td>7.9</td>
<td>82.1</td>
<td></td>
<td>.53</td>
<td>7.5</td>
<td>83.8</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>.33</td>
<td>4.7</td>
<td>86.7</td>
<td></td>
<td>.33</td>
<td>4.7</td>
<td>88.4</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>.31</td>
<td>4.4</td>
<td>91.2</td>
<td></td>
<td>.31</td>
<td>4.4</td>
<td>92.8</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>.24</td>
<td>3.4</td>
<td>94.6</td>
<td></td>
<td>.22</td>
<td>3.2</td>
<td>96.0</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>.20</td>
<td>2.8</td>
<td>97.4</td>
<td></td>
<td>.17</td>
<td>2.4</td>
<td>98.3</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>.18</td>
<td>2.6</td>
<td>100.0</td>
<td></td>
<td>.12</td>
<td>1.7</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

by position/title; age; gender; education level; and experience as an administrator. In addition, the number of administrators who had quality management training was also determined.

Summary statistics were used to describe the current and ideal perceptions of the five groups of administrators towards quality improvement efforts. In addition, gap profiles were generated for the five groups of administrators. A comparison was also made between the weightings of the instrument and that of the Baldrige framework.

The results of the hypothesis testing procedures were also presented. Out of the four hypotheses tested, two were rejected and two were retained. Significant differences were found on the current perceptions among the five group of administrators on three of the seven Baldrige dimensions. Significant differences were also found between current perceptions of
administrators who had quality training and those who did not on five of the seven dimensions. Finally, the instrument was evaluated utilizing factor analysis techniques.
CHAPTER V. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Within the preceding chapters the problem of the study, purpose, literature review, methodology, data analysis, and findings were presented. The purpose of this chapter is to present a summary of the previous chapters and of the findings, draw conclusions, and make recommendations based on the findings of the study.

Summary

The purpose of this study was to determine the current and ideal quality climate, and the quality climate gaps in Iowa's Community Colleges as perceived by administrators based on the seven quality dimensions of the Malcolm Baldrige Award framework.

Specifically, this study attempted to answer the following research questions:

1. What are the demographic characteristics of the leadership in Iowa's Community Colleges?
2. What are the current and ideal perceptions of the various levels of leadership towards the seven quality climate dimensions?
3. What are the quality climate gaps of the various levels of leadership towards the seven quality dimensions?
4. How do the perceptions of the various leadership groups for each dimension compare with the Baldrige weightings?
5. Do perceptions of quality climate (current and ideal) differ between the various levels of leadership?
6. Do perceptions of quality climate (current and ideal) differ between the leaders that had
quality management/improvement training and those who did not?

Questions 5 and 6 required statistical testing of the following null hypotheses:

1. There are no significant differences in the seven dimensions of quality climate perceptions (current) between the various levels of leadership.

2. There are no significant differences in the seven dimensions of quality climate perceptions (ideal) between the various levels of leadership.

3. There are no significant differences in the seven dimensions of quality climate perceptions (current) between leaders who had quality management training and those who did not have any such training.

4. There are no significant differences in the seven dimensions of quality climate perceptions (ideal) between leaders who had quality management training and those who did not have any such training.

A Quality Climate Assessment Instrument (QCAI) was developed based on the Malcolm Baldrige Award Criteria. Quality climate was defined as the perceptions of administrators towards quality improvement, and respondents were asked to rate the current and ideal situation. The instrument was validated by a knowledgeable panel of experts and pilot-tested prior to being mailed.

The population of the study was comprised of administrators in Iowa's community colleges including presidents, vice-presidents, deans/associate deans, department heads/chairs, and directors. The instrument was sent to 321 administrators and a total of 220 usable surveys were returned, indicating a response rate of 62.3%.
Findings of the Study

The findings and results of the study were presented in Chapter 4. The findings are summarized by (a) research questions, and by (b) hypotheses.

Findings by research question

Research question 1 - The purpose of this question was to determine demographic characteristics of administrators in Iowa's community colleges. The total number of administrators responding to the survey was 220 of which 60 (27.3%) were deans, 57 (25.9%) directors, 54 (24.5%) heads/chairs, 36 (16.4%) vice-presidents, and 13 (5.9%) presidents. The number of male administrators were slightly more than twice that of the female administrators. There were more females at lower leadership positions, such as directors or heads/chairs, than as presidents or vice-presidents. The largest group of administrators was in the 46-55 year age group (46.4%). More administrators reported having a master's degree (38.8%) than any other education level. Presidents and vice-presidents accounted for 54% of the doctorate degrees. Most administrators had 20 or more years of experience (33.2%). A large number of administrators (71.6%) reported having had quality training. This number was higher for persons occupying higher administrative positions than for lower level administrators.

Research question 2 - The purpose of this question was to determine the current and ideal perceptions of the various levels of leadership towards the seven quality climate dimensions. In general, the mean perceptions of all administrators on the current situation taken as a whole ranged from 3.07 to 3.73 which suggested that there was agreement to the
The mean scores for the ideal situation were much higher, ranging from 4.36 to 4.60 which also suggested a relatively strong agreement to the seven dimensions. A summary of the results by Baldrige category is as follows:

1. **Leadership** - Generally, the means for all five groups of administrators were higher on the ideal scale than on the current scale. The mean scores on the ideal scale had values greater than 4.5, indicating a high level of agreement in perceptions between the groups as to the role of leadership in promoting quality. The mean scores of the groups on the current scale revealed that presidents had the highest mean (4.29) while the mean scores for the other four groups were above 3.5 but below 4.0.

2. **Information and analysis** - The perceptions on the ideal scale in this category ranged from 4.37 to 4.63, indicating a high level of agreement towards the use of data and information. However, the mean perceptions for the current situation, ranged from a low of 3.15 (heads/chairs) to a high of 3.68 (presidents), indicating agreement towards this category.

3. **Strategic quality planning** - There was a high level of agreement in perceptions between the groups on the ideal scale, with scores ranging from 4.42 to 4.58. Among the groups, the deans had the lowest mean score (4.42), while presidents had the highest (4.58). The mean scores for the current scale were somewhat similar for all the groups, ranging from 3.27 to 3.61, indicating agreement towards the utilization of quality planning.

4. **Human resource development and management** - On the ideal scale, all the groups had high mean scores over 4, ranging from 4.31 to 4.49, indicating a high level of agreement
in perceptions towards human resource development and management. However, on
the current scale, mean scores were lower, ranging from 2.93 for heads/chairs and 3.68
for presidents. Two groups, head/chairs and directors, had means below 3, i.e., 2.93
and 2.99, respectively.

5. Management of process quality - The means for all the groups on the ideal scale were
somewhat high, with values ranging from 4.44 to 4.63, indicating a high degree of
agreement in perceptions towards this category. Presidents had the highest mean score
(4.63) while deans had the lowest (4.44). Current perceptions were somewhat lower for
all groups, with presidents having the highest score (4.03) while all the other groups had
a mean score below 4.0.

6. Quality and operational results - The ideal mean scores ranged from 4.38 to 4.54,
indicating a degree of agreement in perception towards this category. Presidents and
vice-presidents both had similar perceptions, with mean scores of 4.55 and 4.54, while
the mean scores for the other three groups ranged from 4.38 to 4.40. When comparing
current perceptions, presidents had the highest means (4.05), followed by vice-
 presidents (3.88), deans (3.76), directors (3.74), and heads/chairs (3.48), respectively.

7. Customer focus and satisfaction - All groups had high means on the ideal scale, with
scores ranging from 4.27 for presidents and 4.34 for vice-presidents. For the current
scale, all the groups had mean scores over 3.0, and these ranged from 3.07
(heads/chairs) to 3.45 (presidents).

Research question 3 - The purpose of this question was to determine the quality
climate gaps of the five groups of administrators towards the seven quality climate
dimensions. In general, the gap of all administrators taken as a whole ranged from 0.70 (Quality and Operational Results) to 1.28 (Human Resource Development and Management).

A summary of the results by Baldrige category is as follows:

1. **Leadership** - The mean gaps ranged from 0.49 (presidents) to 1.14 (heads/chairs).
2. **Information and analysis** - The mean gaps ranged from 0.95 (president) to 1.28 (heads/chairs).
3. **Strategic quality planning** - The mean gaps ranged from 0.97 (presidents) to 1.15 (deans).
4. **Human resource development and management** - The mean gaps ranged from 0.81 (presidents) to 1.51 (heads/chairs).
5. **Management of process quality** - The mean gaps ranged from 0.59 (presidents) to 0.90 (heads/chairs).
6. **Quality and operational results** - The mean gaps ranged from 0.49 (presidents) to 0.91 (heads/chairs).
7. **Customer focus and satisfaction** - The mean gaps ranged from 0.82 (presidents) to 1.21 (heads/chairs).

**Research question 4** - The purpose of this question was to compare the weightings of the QCAI instrument with that of the Baldrige framework. The results suggest that, of the current sections, the **Human Resource Development and Management, Quality and Operational Results**, and the **Customer Focus and Satisfaction** categories had relatively larger deviations (-6.23; -7.37; -20.72) compared with the other four categories. On the ideal section, the **Strategic Quality Planning, Quality and Operational Results, and the Customer**
Focus and Satisfaction categories had relatively larger deviations (+6.87; -5.34; -17.69) compared with the other four categories.

Findings by hypothesis

Questions 5 and 6 required statistical testing of the null hypotheses. Four hypotheses were tested and this section summarizes the results of the tests. Hypotheses 1 and 2 were tested using the one-way ANOVA procedure with the Tukey-HSD post-hoc procedure. Hypotheses 3 and 4 were tested using the MANOVA procedure. All hypotheses were tested at the .05 level of significance.

Hypothesis 1  The purpose of this hypothesis was to determine if significant differences existed in the current perceptions of the quality climate between presidents, vice-presidents, deans, department heads/chairs, and directors. Significant differences were found between the perceptions of the five groups on three of the seven dimensions: Leadership (F = 3.11; p = 0.016); Human Resource Development and Management (F = 2.53; p = 0.042); Quality and Operational Results (F = 3.39; p = 0.010). The Tukey-HSD multiple range tests revealed that the differences in perceptions were as follows: (a) Leadership—Presidents differed significantly from deans and department heads/chairs; (b) Human Resource Development and Management—Presidents differed significantly from department heads/chairs and directors; (c) Quality and Operational Results—Department heads/chairs differed significantly from presidents and vice-presidents.
Hypothesis 2  The purpose of this hypothesis was to determine if significant differences existed in the ideal perceptions of the quality climate between presidents, vice-presidents, deans, department heads/chairs and directors. No significant differences were found between the perceptions of the five groups on any of the seven dimensions.

Hypothesis 3  The purpose of this hypothesis was to detect if there were differences in the current perceptions of administrators who had quality training and those who did not have any such training on the seven Baldrige dimensions. Significant differences were found between the perceptions of the two groups on five of the seven Baldrige dimensions: (a) Strategic Quality Planning; (b) Human Resource Development and Management; (c) Management of Process Quality; (d) Quality and Operational results; and (e) Customer Focus and Satisfaction.

Hypothesis 4  The purpose of this hypothesis was to detect if there were differences in the ideal perceptions of administrators who had quality training and those who did not have any such training on the seven Baldrige dimensions. No significant differences were found between the two groups.

Discussion and Conclusions

According to Galvin (1991), judges and examiners of the Baldrige award agree that companies can be arranged along a continuum from best to worst. They can be classified into mature high-scoring quality programs, medium-rung performers, and low scorers based on their Baldrige scores. For example, high scorers will have relatively high scores on all seven
categories, which indicates that quality principles and concepts have been successfully integrated. Applying this concept to the current ratings within this study, perceptions towards quality could be classified as moderate, as the means on all the categories for administrators taken as a whole exceeded the scale mid-point value of three. This finding may contradict widely-shared perceptions that community college administrators were resistant to change (Alfred & Carter, 1993; Parilla, 1993)

Regarding the current situation, significant differences existed between the five groups of administrators on three of the seven dimensions: Leadership, Human Resource Development and Management, and Quality and Operational Results. The perceptions of department heads/chairs and deans differed significantly from perceptions of presidents in the Leadership category. In the Human Resource Development and Management categories, the perceptions of heads/chairs were significantly lower than that of presidents and vice-presidents, while in the Quality and Operational Results category the perceptions of heads/chairs were significantly lower than presidents and vice-presidents. These differences in perceptions could have implications to quality improvement efforts as deans and department heads/chairs can be viewed as middle managers. As noted by Schauerman and Peachy (1994) and Thor (1994), middle managers have a difficult time in making the transition to a quality environment which requires managers to accept new roles and be coachers, facilitators, and problem-solvers.

The levels of perceptions on the ideal scale indicated that administrators were generally in agreement with all seven of the Baldrige categories. There were no significant differences between the perceptions of administrators towards the seven Baldrige categories.
This leads one to suggest that administrators in Iowa's community colleges were in agreement as to what the ideal situation should be as reflected by the Baldrige criteria. It appears that all administrators, regardless of position/title, had similar perceptions as to what the ideal climate should be.

The existence of gaps between the ideal and current means indicated that there were perceptual differences between administrators towards the current and ideal situation with regards to quality improvement efforts. Ideally, one would want the mean gaps to be as small as possible, with the current value anchored on the high end of the scale. The differences between the ratings on the current and ideal situations could be used as the basis to initiate improvement strategies. Generally, presidents had smaller gaps than other administrators in all the seven categories. This implies that presidents as leaders of the system would have to do more, especially in the areas of human resources and development, and leadership; otherwise, presidents initiating improvement programs or strategies will encounter resistance by other administrators and also by instructors. This problem could be compounded if a president operates in an autocratic environment, which may be probable considering the findings of Easler (1993) that 34% of the administrators surveyed in Iowa's community colleges considered their institution to be an autocratically governed institution.

In comparing the weightings of the survey instrument with that of the Baldrige framework, the results suggested that respondents did not perceive the Strategic Quality Planning, Human Resource Development and Management, Quality and Operational Results, and the Customer Focus and Satisfaction categories as having the same level of importance as reflected in the corresponding Baldrige categories. The Baldrige weightings are
indicative of their relative importance in a total quality management system. The implication of this finding indicates that one might have to be cautious in applying the Baldrige weightings to educational settings. Further investigation is needed to establish weightings for educational settings.

The high percentage of administrators who had quality-related training is indeed encouraging for Iowa's community colleges and indicates that administrators in Iowa are up-to-date and willing to explore new paradigms or management techniques. Hypothesis 3, which related to training, revealed that those administrators who had quality management or quality-related training had significantly higher means on five of the seven categories on the current scale. This would lead one to speculate that there is a relationship between TQM training and the perception of administrators towards quality improvement efforts. Furthermore, the high number of administrators who had TQM training could be taken as an indicator of the levels of awareness of TQM in Iowa's community colleges. Although college-wide training is an important strategy in TQM implementation (Spanbauer, 1992; Schauerman & Peachy, 1994), the training must be coordinated, organized, and disseminated throughout the organization. Further investigation into the nature and scope of training would provide some valuable insights. Perhaps an evaluation of the training undergone by this group of administrators would provide useful information as to its impact on TQM implementation in the community colleges.

The results of the factor analysis resulted in four factors which accounted for 47.5% and 54.6% of the total variance on the current and ideal scales, respectively. This suggested that the seven original a-priori dimensions may be reduced to four factors on both scales. The
factor analysis revealed that further investigation is necessary to improve the psychometric properties of the measuring instrument used in this study.

Finally, the findings of this study could provide some indication as to whether community colleges in Iowa are in favor of TQM. The relatively high mean score on the current situation with corresponding small gaps suggests that there exists a favorable climate for quality improvement efforts. This favorable climate, as expressed by administrators in Iowa's community colleges, suggests that quality improvement efforts have a high probability of success.

**Recommendations**

Based on the findings and conclusions of the study, the following recommendations are made by the researcher:

1. This study revealed differences in the perceptions between administrators on the seven dimensions on the Baldrige instrument. More detailed studies should be conducted to explore the differences in perceptions among administrators. Exploratory and qualitative research methods are recommended since TQM is still new in education.

2. It was found that a very high percentage of administrators had some form of quality management training. Further investigation into the nature and scope of the training would provide valuable insights. An evaluation of the effectiveness of the training would also prove worthwhile. In addition, the training needs of instructors and other support staff would also be necessary if TQM is to be deployed throughout the organization.
3. The applicability of the Malcolm Baldrige criteria to the community college setting needs to be investigated further. Additional research is needed to identify appropriate weightings between the categories for educational settings.

4. As the number of community colleges implementing TQM increases, there will be a need for measuring quality improvement efforts. Thus, other methods and techniques need to be examined. Since a consensus rating procedure may have more value than summed individual or mean ratings, a team approach utilizing the Baldrige Award Criteria as proposed by Cornesky (1992) could be more useful.

5. The results of the factor analysis suggested that further revision of the instrument is necessary. The revised instrument could be tested on a larger population selected from colleges implementing TQM to produce a more valid instrument.

6. The utility of an instrument based on the Baldrige criteria could be further improved by using it in conjunction with other established measures of organizational performance.
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APPENDIX A. BALDRIGE CRITERIA MODIFIED FOR EDUCATION
Malcolm Baldrige National Quality Award Criteria for Education

1. Leadership

What are the top administrators' leadership, personal involvement, and visibility in developing and maintaining a focus on beneficiaries and an environment for excellent quality? What are our quality values, how are they projected in a consistent manner, and how do we assess and reinforce adoption of the values throughout the organization? How are the focus on beneficiaries and quality values integrated into day-to-day leadership, management, and supervision of all departments? How do we include our responsibilities to the public for health, safety, environmental protection, and ethical practices in our policies and activities to improve quality?

2. Information and Analysis

What is our base of data and information used for planning, management, and evaluation of quality, and how do we ensure reliability and timeliness of and access to data and information? How do we select data and information for competitive comparisons and world-class benchmarks to support planning, evaluation, and improvement of quality and performance? How do we analyze data and information to support our key operational and planning objectives?

3. Strategic Quality Planning

What is our strategic quality planning process for short-term (one to two years) and longer-term (three years or more) quality leadership and satisfaction of beneficiaries? What are our principal priorities for quality and plans for the short term (one or two years) and longer term (three years or more)?

4. Human Resource Development and Management

How do our plans and practices for the development and management of human resources support our plans for quality and organizational performance? What means are available for all our personnel to contribute effectively to meeting our objectives for quality? What are the trends in personnel involvement? How do we decide what education and training in quality our personnel need, and how do we use the knowledge and skills they acquire? What types of education and training in quality does each category of personnel receive? How do our performance, recognition, promotion, compensation, reward, and feedback support improvement in quality? How do we maintain a work environment conducive to the well-being and growth of all personnel? What are the trends in well-being and morale of our personnel?
5. Management of Process Quality

How do we design and introduce new or improved programs and services to meet or exceed beneficiaries' requirements? How do we design processes to deliver according to the requirements? How do we manage the processes that produce our programs and services (including business processes and support services) so that current requirements for quality are met and quality and performance are continuously improved? How do we ensure, assess, and improve the quality of materials, components, and services furnished by our suppliers? How do we assess the quality and performance of our systems, processes, and practices and the quality of our products and services?

6. Quality and Operational Results

What are our trends in quality and current levels of quality for features of key programs and services? How do our current levels of quality compare with national averages and national leaders in comparable organizations? What are our trends in overall performance of operational, process, and support services, and how do they compare with competitors and appropriate benchmarks? What are our trends and current levels in quality of supplies and services furnished by other providers?

7. Beneficiaries' Satisfaction

Who are our beneficiaries? How do we determine their current and future requirements and expectations? How do we provide effective management of our relationships with beneficiaries? How do we use information gained from beneficiaries to improve management's strategies and practices? What explicit and implicit commitments do we make to our beneficiaries? How do we determine beneficiaries' satisfaction, both in itself and relative to competitors, and how do we improve our methods for determining satisfaction? What are our trends in beneficiaries' satisfaction and key indicators of dissatisfaction? How do they compare with those of competitors? How do we determine our beneficiaries' future requirements and expectations?

APPENDIX B. BALDRIGE CRITERIA APPLIED TO COMMUNITY COLLEGES
Application of Malcolm Baldrige Criteria To Community Colleges

1. **Leadership**: This category measures the extent of leadership by the chief executive officer and the senior executives of the organization. It examines commitment made to the quality process and actions taken to enhance the movement. Also examined are the organization's quality leadership in the external community and how it integrates its public responsibilities with its quality values and practices.

2. **Information and Analysis**: This category examines the scope, validity, and use of data and information that underlie the college's total quality management system. It looks at how the college "manages by fact." Information used for planning and budgeting is also examined.

3. **Strategic Quality Planning**: This category demonstrates how the college has integrated quality improvement planning into overall business planning. It examines how the school's short-term priorities are set to achieve and/or sustain a quality leadership position among other two-year colleges.

4. **Human Resource Utilization**: This category examines the effectiveness of the college in developing and realizing the full potential of the faculty and staff. It looks at human resource development at all levels of the school and evaluates whether the environment is conducive to good teaching, quality leadership, and personal and organizational growth.

5. **Quality Assurance Of Products And Services**: This category examines the systematic approaches used by the college for total quality control of goods and services. Evaluated is the integration of quality control through process design and measurement.

6. **Quality Results**: This category examines quality levels and improvement based on objective measures which are derived from customer requirements. Also examined are quality levels in relation to competing colleges.

7. **Customer Satisfaction**: This category examines the school's knowledge of the customer, overall customer service systems, responsiveness, and its ability to meet and exceed customer expectations. Current levels and trends in customer satisfaction are also examined.

APPENDIX C. LIST OF PANEL MEMBERS
Instrument Validation Panel

<table>
<thead>
<tr>
<th>NAME</th>
<th>POSITION/TITLE</th>
<th>DEPARTMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. Dugger, J. C.</td>
<td>Assoc Prof &amp; Chair</td>
<td>Industrial Education and Technology</td>
</tr>
<tr>
<td>Dr. Johnson, D. A.</td>
<td>Asst Prof</td>
<td>Industrial Education and Technology</td>
</tr>
<tr>
<td>Dr. Drake, S. K.</td>
<td>Mgr Training/Dev</td>
<td>Personnel</td>
</tr>
<tr>
<td>Dr. Manatt, R. P.</td>
<td>Prof</td>
<td>Professional Studies in Education</td>
</tr>
<tr>
<td>Dr. Ebbers, L. H.</td>
<td>Prof</td>
<td>Professional Studies in Education</td>
</tr>
<tr>
<td>Dr. Chase, G.W.</td>
<td>Assoc Prof</td>
<td>Civil and Construction Engineering</td>
</tr>
<tr>
<td>Dr. Stephenson, R. W.</td>
<td>Assoc Prof</td>
<td>Statistics</td>
</tr>
<tr>
<td>Dr. Hetland, P. W.</td>
<td>Manager TQM</td>
<td>Business and Finance Administration</td>
</tr>
<tr>
<td>Dr. Carolyn Heising</td>
<td>Prof</td>
<td>Industrial and Manufacturing Systems Engineering</td>
</tr>
<tr>
<td>Dr. Elizabeth Hoffman</td>
<td>Dean</td>
<td>Liberal Arts and Sciences Administration</td>
</tr>
<tr>
<td>Mr. Don Bjelland</td>
<td>Training/Safety Specialist</td>
<td>Facilities Planning and Management</td>
</tr>
</tbody>
</table>
APPENDIX D. PROPOSED INSTRUMENT
Community College Quality Climate Assessment
Instrument Validation Form

Directions:
1. Please read each item for clarity and appropriateness as it relates to the seven Malcolm Baldrige Criteria
2. Mark each item accordingly on the columns to the right
3. Make changes to the items as required
4. Suggest additional items if necessary
5. This instrument consists 42 Items

Category 1. Leadership

1. Top management is committed to improving quality
2. The institution's quality policy or statement is communicated to all staff
3. Top management is visibly involved and actively promotes quality
4. Top management is recognized outside the institution for promoting quality
5. Adequate resources for quality improvement efforts are provided
6. Quality improvement efforts are recognized and rewarded

Comments or additional items: _______________________________________

Category 2. Information & Analysis

7. Data is used to improve course offerings and schedules
8. Information is communicated in a systematic manner
9. A comprehensive plan is in place to collect data from a variety of sources
10. Decisions are made based on data collection and analysis
11. Improved quality results from data collection and analysis
12. Quality audits of programs and courses are conducted regularly

Comments or additional items: _______________________________________

Category 3. Strategic Planning

13. The planning process is integrated, cross-functional and institution-wide
14. Quality tools and techniques are used in the normal planning process
15. Input from staff and community is used for strategic planning
16. Quality improvement teams are formed to address strategic goals
17. Each department or unit has a mission which identifies key processes and customers
18. Quality improvement is emphasized in strategic planning

Comments or additional items: _______________________________________

continued on reverse side
Category 4. Human Resource Utilization
19. Quality awareness training is provided to everybody
20. Teams are regularly used to solve problems
21. Empowerment, risk taking and innovation is encouraged
22. Quality improvement suggestions are always implemented
23. Individualized professional development plans are used for staff development
24. Staff are involved in developing their own performance and recognition systems

Comments or additional items:
________________________________________________________________________
________________________________________________________________________

Category 5. Quality Assurance
25. Articulation with high schools and universities is encouraged
26. Staff satisfaction surveys are conducted on a regular basis
27. Validation of program competencies is regularly done
28. Advisory committees are extensively used to maintain program relevency
29. Systems have been established to retain students and reduce dropout rates
30. Reports and findings are shared freely with the board, staff, and community members

Comments or additional items:
________________________________________________________________________
________________________________________________________________________

Category 6. Quality Results
31. Major trends of key programs and services are identified and tracked
32. The number of customized and technical assistance contracts have increased
33. Graduate placement rates are continuously tracked and analyzed
34. Strategies are in place to attract more high school graduates to the institution
35. Quality of suppliers and services provided are improving
36. The institution's quality processes are compared with those in other colleges

Comments or additional items:
________________________________________________________________________
________________________________________________________________________

Category 7. Customer Focus
37. Procedures for handling complaints are well established
38. Institution wide surveys are regularly used to solicit student feedback
39. Employer satisfaction with graduates is monitored on a regular basis
40. Special training in customer service is provided to all service departments and support staff
41. Satisfaction and retraining guarantees are provided to students and industry
42. Data is generated on a variety of evaluation criteria to monitor yearly improvements

Comments or additional items:
________________________________________________________________________
________________________________________________________________________

Please return to: Rashid Box, Dept. of Ind. Ed. & Tech., ISU
APPENDIX E. COVER LETTER TO PANEL MEMBERS
I am proposing a study to assess the quality climate as perceived by community college leadership in Iowa. The population of this study will consist of administrators in leadership positions and will include presidents, vice-presidents, deans, department chairs/heads, program coordinators and directors of community colleges in Iowa.

As a person knowledgeable about continuous quality improvement, I would like to request your assistance in validating the survey instrument which is based on the seven criteria of the Baldrige framework as applied to the community college setting. For your reference, enclosed is an "Information Sheet" which describes the application of the Baldrige criteria to education.

Please examine the enclosed instrument validation form and provide suggestions regarding:
1. the appropriateness of each item as it relates to the Baldrige criteria
2. the clarity of each item
3. additional items that may have been omitted

In addition, please feel free to make any other suggestions that might help to improve the instrument. I am sure your suggestions and comments taken together with those of your colleagues will help increase the validity of the instrument.

Please return the completed validation form in the envelope provided by December 1, 1993.

If you have any questions or need any clarification, please call me at (515) 296-4241. Thank you for your cooperation and assistance.

Sincerely,

Rashid Bax
Doctoral Candidate
(515)296-4241

Dr. William D. Paige
Co-Major Professor
(515)294-5927

Dr. Bill Poston
Co-Major Professor
(515)294-9468
APPENDIX F. REVISED INSTRUMENT
QUALITY CLIMATE ASSESSMENT INSTRUMENT

Rashid Bax
Department of Industrial Education and Technology
Iowa State University

This instrument is designed to measure your perceptions regarding the current and ideal quality climate in your institution.

Directions

1. Please provide the background information below, then turn over to the next page.

2. Consider each statement carefully, and decide the extent to which you agree or disagree with it.

3. Mark your response to the right of the statement on both the current and ideal situation columns.

4. After completing the instrument, please fold and tape it closed, then drop it in the U.S. Mail. Thank you for your assistance and cooperation.

Definitions

Current Situation: What is the current situation in your institution with regards to quality improvement efforts—With respect to each item, how do you assess the current state of affairs?

Ideal Situation: What should be the ideal or desired situation in with regards to quality improvement efforts—With respect to each item, what would you like the situation to be?

Background Information

Please complete the following:

1. Gender:  □ Female  □ Male

2. Age:  □ 20 - 25 yrs  □ 26 - 35 yrs  □ 36 - 45 yrs  □ 46 - 55 yrs  □ above 55 yrs

3. Years of Experience as community college administrator:
   □ 1 - 5 yrs  □ 6 - 10 yrs  □ 11 - 15 yrs  □ 16 - 20 yrs  □ above 20 yrs

4. Educational Level:
   □ Less than BS/BA degree  □ Bachelors degree  □ Masters degree
   □ Masters + 30 credits  □ Doctorate degree

5. Position/Title:
   □ President  □ Vice President  □ Dean/Associate/Deputy Dean
   □ Department Chair/Head  □ Director  □ Other: _______________________

6. Have you received any form of quality management/improvement training?  □ Yes  □ No

Responses are strictly confidential and will be reported only in aggregate form.
## Quality Climate Assessment Instrument

Please indicate to what extent you agree or disagree with each item. Respond to both columns on each item, and mark only one response in each column.

<table>
<thead>
<tr>
<th>Current Situation</th>
<th>Ideal Situation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Disagree</td>
<td>Strongly Agree</td>
</tr>
</tbody>
</table>

### A. Leadership
1. Top management is committed to improving quality.
2. The institution's quality policy or statement is communicated to all employees.
3. Top management is visibly involved and actively promotes quality within the institution.
4. Top management is recognized outside the institution for promoting quality.
5. The institution's customer focus and quality values are integrated into day-to-day leadership, management, and supervision of all units.
6. Public health, safety and environmental issues are addressed by the institution's quality policies and improvement efforts.

### B. Information and Analysis
7. Data are used to improve course content, offerings and schedules.
8. Information is communicated in a systematic manner.
9. Adequate procedures are in place to collect data about organizational performance from a variety of sources.
10. Decisions are made based upon collected data and analysis.
11. Improved quality has been the result of data collection and analysis.
12. The institution's quality processes are compared with those in other exemplary colleges.

### C. Strategic Quality Planning
13. The institution's planning process involves all administrative, academic, and support areas.
14. Quality tools and techniques are used in the normal planning process.
15. Information from staff and community is used for strategic planning.
16. Each department or unit has a mission, and has identified key processes and customer needs.
17. Continuous improvement is emphasized in strategic planning.
18. Teams are formed and used in strategic planning involving all levels of employees.

### D. Human Resource Development and Management
19. Quality training is made available to all employees on a regular basis.
20. Teams are regularly used to solve problems and manage processes.
21. Empowerment, risk taking and innovation are encouraged and supported.
22. There are opportunities for individuals and groups to contribute to quality goals and plans.
23. Individualized professional plans are used for staff development and training.
Quality Climate Assessment Instrument

Please indicate to what extent you agree or disagree with each item.

Respond to both columns on each item and mark only one response in each column.

<table>
<thead>
<tr>
<th>Item</th>
<th>Current Situation</th>
<th>Ideal Situation</th>
</tr>
</thead>
<tbody>
<tr>
<td>24. Employees are involved in developing their own performance and recognition systems.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25. Employee satisfaction surveys are conducted on a regular basis.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>26. Articulation with high schools and universities is encouraged.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>27. Quality improvement teams are formed to address strategic goals.</td>
<td></td>
<td></td>
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<tr>
<td>28. Validation of program competencies is done regularly.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>29. Advisory committees are used extensively to maintain program relevancy.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30. Procedures have been established to retain students and reduce dropout rates.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>31. Reports and findings are shared freely with the board, staff, and the community.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>32. Quality audits of programs and courses are conducted regularly.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>33. Major trends of key programs and services are identified and monitored over time.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>34. The number of customized and technical assistance contracts have increased over time.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>35. Graduate placement rates are continuously tracked and analyzed.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>36. Strategies are in place to attract more high school graduates to the institution.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>37. Qualities of suppliers and services (equipment, instructional resources, training etc) provided are improving.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>38. Strategies are in place to diagnose continuously the skills and ability levels of students in key learning areas.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>39. Procedures for handling inquiries and complaints are well established and operate smoothly.</td>
<td></td>
<td></td>
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<tr>
<td>40. Surveys are regularly used to obtain feedback.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>41. Employer satisfaction with graduates is monitored on a regular basis.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>42. Satisfaction and retraining guarantees are provided to students and employers.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>43. Information is gathered systematically to monitor progress and improvement from year to year in all areas.</td>
<td></td>
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<tr>
<td>44. Future customer expectations are identified and tied to curriculum development.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>45. The institution is continuously assessing its processes for meeting future student curricular and program needs.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>46. Special training in customer service is provided to all service departments and support staff.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX G. ITEM SPECIFICATION TABLE
<table>
<thead>
<tr>
<th>Dimension/Category</th>
<th>Element</th>
<th>Item Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leadership</td>
<td>Leadership Commitment</td>
<td>1, 3</td>
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<tr>
<td></td>
<td>Quality Management</td>
<td>2, 5</td>
</tr>
<tr>
<td></td>
<td>Public Responsibility</td>
<td>4, 6</td>
</tr>
<tr>
<td>Information &amp; Analysis</td>
<td>Management of data &amp; information</td>
<td>7, 8, 9</td>
</tr>
<tr>
<td></td>
<td>Comparisons &amp; benchmarking</td>
<td>12</td>
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<tr>
<td></td>
<td>Analysis &amp; uses of data</td>
<td>10, 11</td>
</tr>
<tr>
<td>Strategic Quality Planning</td>
<td>Planning Process</td>
<td>13, 14, 15,17,18</td>
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<tr>
<td></td>
<td>Quality plans</td>
<td>16</td>
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<tr>
<td>HRD &amp; Management</td>
<td>Human Resource Planning</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>Employee involvement</td>
<td>20, 22, 21</td>
</tr>
<tr>
<td></td>
<td>Education &amp; training</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>Performance &amp; Recognition</td>
<td>24</td>
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<tr>
<td></td>
<td>Well-being &amp; satisfaction</td>
<td>25</td>
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<tr>
<td>Management of Process Quality</td>
<td>Design and introduction of quality products and services</td>
<td>28, 29</td>
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<tr>
<td></td>
<td>Process management</td>
<td>27, 30</td>
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<td></td>
<td>Supplier quality</td>
<td>26</td>
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<tr>
<td></td>
<td>Quality assessment</td>
<td>31, 32</td>
</tr>
<tr>
<td>Quality and Operational Results</td>
<td>Product and service quality results</td>
<td>33, 38</td>
</tr>
<tr>
<td></td>
<td>Operational results</td>
<td>34, 35</td>
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<tr>
<td></td>
<td>Supplier quality results</td>
<td>36, 37</td>
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<tr>
<td>Customer Focus and Satisfaction</td>
<td>Customer expectations</td>
<td>40, 44, 45</td>
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<td></td>
<td>Customer relationship management</td>
<td>39, 46</td>
</tr>
<tr>
<td></td>
<td>Customer commitment</td>
<td>42</td>
</tr>
<tr>
<td></td>
<td>Customer satisfaction determination</td>
<td>41</td>
</tr>
<tr>
<td></td>
<td>Customer satisfaction results</td>
<td>43</td>
</tr>
</tbody>
</table>
APPENDIX H. HUMAN SUBJECTS APPROVAL FORM
Checklist for Attachments and Time Schedule

The following are attached (please check):

12.☐ Letter or written statement to subjects indicating clearly:
   a) purpose of the research
   b) the use of any identifier codes (names, #s), how they will be used, and when they will be
      removed (see item 17)
   c) an estimate of time needed for participation in the research and the plans
   d) if applicable, location of the research activity
   e) how you will ensure confidentiality
   f) in a longitudinal study, note when and how you will contact subjects later
   g) participation is voluntary; nonparticipation will not affect evaluations of the subject

13.☐ Consent form (if applicable)

14.☐ Letter of approval for research from cooperating organizations or institutions (if applicable)

15.☐ Data-gathering instruments

16. Anticipated dates for contact with subjects:
   First Contact Last Contact
   Month/Day/Year Month/Day/Year
   Feb. 15, 1994 April 15, 1994

17. If applicable: anticipated date that identifiers will be removed from completed survey instruments and/or audio or visual tapes will be erased:
   August 31, 1994

18. Signature of Departmental Executive Officer Date Department or Administrative Unit
   ____________________________________________________________
   Dept. of Ind. Ed. & Technology

19. Decision of the University Human Subjects Review Committee:
   ☐ Project Approved ☐ Project Not Approved ☐ No Action Required
   ____________________________________________________________
   Name of Committee Chairperson Date Signature of Committee Chairperson

Patricia M. Keith

GC:1/90
APPENDIX I. COVER AND FOLLOW-UP LETTERS
Iowa State University
Of Science and Technology

February 11, 1994

[Name]
[Address]
[City, State, Zip Code]

Dear [Name]:

I am a doctoral candidate in the Department of Industrial Education and Technology at Iowa State University. As part of the degree requirements, I am conducting a study to assess the quality climate as perceived by the community college leadership in Iowa.

As you are aware, the quality movement has attracted a lot of attention and is considered to be a viable system for education especially at two year institutions. It is hoped that the results of this study will provide valuable information as to the current and ideal perceptions of quality in Iowa's community colleges.

To complete my study, I need your help in completing and returning the enclosed booklet. This task will take about 15 minutes of your time. Your participation in this study is entirely voluntary and will remain strictly confidential. In addition, information from the study will be pooled and reported in aggregate form. A numerical identification code will be used to ensure anonymity and enable non-respondents to be identified for a follow-up mailing. These numbers will be removed immediately upon the return of each booklet.

After completing the questionnaire, please fold the booklet in two and tape it shut at the edges and return it by U.S. mail. Please do not staple the booklet as prepaid postage machines cannot process stapled materials. If you have any questions about this research or the instrument itself, please call one of the numbers below.

Thank you for your cooperation and assistance.

Sincerely,

Rashid Bax
Doctoral Candidate
(515)296-4241

Dr. William D. Paige
Associate Professor
(515)294-5927

Dr. William K. Poston Jr.
Associate Professor
(515)294-9468
Dear [Name]:

Recently your assistance was requested in completing a questionnaire as part of a study to assess the quality climate as perceived by the community college leadership in Iowa. Perhaps you have been busy and that is why I have not received your completed questionnaire for the study. Your response is very important as it will make a significant contribution to this study.

As mentioned in my last letter, you are assured of complete confidentiality. Identification numbers have been used solely to enable this type of follow-up request. No one will be able to associate your responses with you individually. Would you please take about fifteen minutes to complete the questionnaire and return it to me?

In case your questionnaire has been misplaced, a replacement is enclosed. Please fold the booklet in two and tape it shut at the edges and return it by U.S. mail. Please do not staple the booklet as prepaid postage machines cannot process stapled materials. If you have any questions about this research or the instrument itself, please call one of the numbers below.

If you have already mailed the questionnaire, please disregard this notice. Thank you very much for your cooperation and assistance.

Sincerely,

Rashid Bax
Doctoral Candidate
(515)296-4241

Dr. William D. Paige
Associate Professor
(515)294-5927

Dr. William K. Poston Jr.
Associate Professor
(515)294-9468