1-1-2010

The relationship between campus climate and the teaching of critical thinking skills in community college classrooms

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Walden University
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Abstract

Although critical thinking skills are important for all citizens participating in a democratic society, many community college students appear to lack these skills. This study addressed the apparent lack of research relating critical thinking instruction to campus climate. Critical thinking theory and Moos's organizational climate theory served as the theoretical foundation. The relationship between faculty's perceptions of three campus climate factors and their use of five critical thinking instructional techniques in the classroom was analyzed in this quantitative study. An online instrument based on the School-Level Environment Questionnaire (SLEQ) to measure campus climate and a researcher-designed measure of critical thinking instructional techniques was used in a nonexperimental correlational design. Responses from a purposive sample of 276 community college faculty in the western United States were evaluated using multiple regression analysis. Results indicated participatory decision-making was directly related, staff freedom was inversely related, and work pressure was not related to faculty's use of critical thinking instruction in their classrooms. This study contributes to positive social change by providing information that community college leaders can use to improve their students' critical thinking skills. As a result, students and graduates will be better prepared to contribute to the community and society at large by making better social and moral decisions.

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Dedication

To my wife, Anny, who continually encouraged me to pursue intellectual endeavors in the footsteps of the two greatest thinkers I have known: my uncle, Herbert Simon, Nobel Laureate, and my father, Clarence Simon, Attorney at Law, who taught me to think critically. And, to my sons, Toshio and Hideo, my daughter-in-law, Grace, and my grandson, Vaughn, critical thinkers of this generation and the next.

Acknowledgments

Many thanks to my dissertation committee, Dr. Mary Retterer and Dr. Daniel Salter, for their guidance and support throughout this challenging process. In addition, I wish to thank my University Research Reviewer, Dr. Dunn-Reynolds, for her insightful feedback.

I wish to acknowledge all of those who have contributed to my dissertation: my colleagues at Heald College, the chief academic officers and institutional research staff for the participating community colleges, and the faculty who took time out of their busy schedules to complete the online instrument. Without the assistance of these hundreds of academics, I could not have completed this study. Thank you very much.

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Chapter 1: Introduction to the Study

Background of the Study

The majority of students in community colleges lack some of the basic cognitive skills needed to analyze everyday information (Halpern, 1998; Peirce, 2005; Snyder & Snyder, 2008; van Gelder, 2005). Studies have shown that most students believe in such notions as horoscopes, psychics, and UFOs (Halpern, 1998). Of the 22,770 second-year students attending 71 community colleges who took the ETS (2007) Proficiency Profile from 2003 to 2007, 85% scored not proficient in critical thinking and 12% scored marginal. This lack of critical thinking skills leads students to accept scientific arguments, which are sometimes used to advance a political agenda, without proper foundation (Pedicino, 2008). Critical thinking improves a student's ability to perform in college and participate in a democratic society (Brookfield, 2005; Tsui, 2006). For example, politics, the economy, and the environment are frequent topics both in and out of the classroom. People have strong opinions on both sides of many issues, and each side seems to have experts to support their position. Students can apply critical thinking skills to understand different points of view and to analyze the arguments supporting them (Brookfield, 2005; Halpern, 2003).

College administrators and faculty seem to agree that teaching critical thinking is an important objective, particularly in today's competitive

environment (Brookfield, 2005; Sezer, 2008). Although development of critical thinking is commonly included as a student learning outcome, students are graduating without these skills (Glaser, 1984; Peirce, 2005; Snyder & Snyder, 2008; van Gelder, 2005). This deficit suggests that critical thinking is not being effectively taught in most classrooms. In this study, the relationships between three organizational climate factors of community colleges—participatory decision-making, staff freedom, and work pressure—and the use of instructional techniques that imply critical thinking instruction in the classroom were examined. The purpose of this examination was to help leaders understand why students may not be learning critical thinking skills at their campus. By understanding the relationships between faculty's perception of these three climate factors and their self-reported use of critical thinking teaching techniques, community college leaders may be in a better position to create a climate that will encourage the teaching of critical thinking skills.

Discussed in more detail later, critical thinking has been defined in a number of ways. Despite the varied definitions, most theorists agree that critical thinking represents a higher level of thinking, which leads to a more correct understanding of a concept or problem (Ennis, 1985; Halpern, 1998; McPeck, 1981; Paul & Elder, 2002). Ideas about teaching critical thinking are as numerous as definitions of critical thinking. Some educators (e.g., Dale

& Ballotti, 1997) have suggested that critical thinking should be taught as a separate course. However, many educators have successfully integrated critical thinking into such courses as history, psychology, or science (e.g., Beyer, 2008; Pedicino, 2008; Solon, 2007). Furthermore, some theorists have contended that critical thinking cannot be taught independent of a discipline (e.g., McPeck, 1990).

In addition to critical thinking, organizational climate was an important aspect of this study. Organizational climate is of great interest to organizational leaders, including academic leaders, because of the relationship between climate and behavior (Ekvall, 1996; Moos, 1973; Rankin & Reason, 2008). Psychologists agree that behavior is influenced by the environment as well as personality (Moos, 1973). A method of conceptualizing the environment that influences organizational behavior is classified as organizational climate. Like any behavior, faculty's teaching and students' assimilation of critical thinking skills are likely influenced by organizational climate. Accordingly, this study analyzed campus climate—the organizational climate of a college campus—and critical thinking instruction to evaluate the extent of the relationship.

A number of theorists have examined organizational climate and its impact on organizational behavior. For example, Ekvall (1996) studied the impact of organizational climate on an organization's creativity and

innovation in European industry. Ekvall developed the Creative Climate Questionnaire (CCQ) to assist industry leaders who wanted to understand how to improve their organization's creativity and innovation. The CCQ measures 10 dimensions of climate (challenge, freedom, idea support, trust and openness, dynamism and liveliness, playfulness and humor, debates, conflicts, risk taking, and idea time), which appraise an organization's propensity for creativity and innovation. Ekvall found that the CCQ was able to differentiate between innovative and stagnant organizations. The results of Ekvall's studies suggested a causal relationship between the 10 dimensions and creativity (a cognitive process akin to critical thinking) in an organization.

As the organizing framework for this study, Rudolf Moos's seminal work has made a major contribution to the study of social environments (Conyne & Clack, 1981), especially on college campuses (Strange & Banning, 2001). Moos (1973) studied the impact of climate on nine different environments, including academic environments (e.g., classrooms, families, work environments). In particular, his Work Environment Scale (WES) focused on three domains of social-environmental dimensions: interpersonal relationships, personal growth, and organizational structure (Moos & Moos, 1983, p. 159). An organization can measure employees' perception of its

climate, and subsequently predict their behavior, by asking them to complete the WES.

This introduction has noted some of the research on critical thinking (including its instruction) and organizational climate. It has also introduced the link between campus climate and faculty behavior, including critical thinking instruction. However, research that explores this relationship seems to be missing from the literature. Chapter 2 will provide a more complete review of the literature and the justification for this study.

Problem Statement

The need for critical thinking skills to pursue academic endeavors, as well as careers in industry, is well documented (e.g., Brookfield, 2005; Halpern, 1998; Pedicino, 2008; Tsui, 2006). The United States Congress (1994) identified critical thinking as a top priority in their Goals 2000: Educate America Act, and many community college faculty have recognized its value both in and out of the classroom (Brookfield, 2005). However, students are not developing adequate critical thinking skills (ETS, 2007; Peirce, 2005; Snyder & Snyder, 2008; van Gelder, 2005), and this problem is especially important to community colleges for two reasons. First, nearly half of all undergraduate students are enrolled in community colleges (American Association of Community Colleges, 2009). Second, community colleges serve

an important role in the community, educating adults and preparing them to take their place in society.

Before they can effectively encourage critical thinking instruction, community college leaders need to know what factors may have an impact on teaching critical thinking. Prior research (Bouton, 2008) suggests that organizational climate factors, such as instructor workload and institution-wide support, may have an impact on critical thinking instruction, and a number of theorists (e.g., Ekvall & Ryhammar, 1999; O'Hara, 1992) have suggested that organizational members' behaviors can be influenced by manipulating this type of organizational climate factor. However, research analyzing the relationship between organizational climate and critical thinking instruction is lacking. Hence, the focus of this study was organizational or campus climate, as a possible means of addressing the apparent problem of teaching critical thinking on community college campuses.

Specific to this study, six climate factors were measured by a modified School-Level Environment Questionnaire (SLEQ): affiliation, innovation, participatory decision-making, professional interest, staff freedom, and work pressure (Fisher & Fraser, 1990). The relationship between faculty's perceptions of three factors of their campus climate—participatory decision-making, staff freedom, and work pressure—and their self-reported use of

critical thinking instructional techniques in their classroom were analyzed. The three climate factors were hypothesized to be directly related to the implementation of critical thinking instruction. Faculty were asked to participate in this study because faculty have the most direct influence on student learning (Nosich, 2005b; Snyder & Snyder, 2008; Tsui, 1999). Although faculty were asked for their perceptions, an aggregation of perceptions provides a measure of the environment (Strange & Banning, 2001).

Nature of the Study

This quantitative study used a nonexperimental correlational design to examine the predictive relationship between three campus climate factors and the implementation of critical thinking instruction. Faculty participants responded to an online assessment consisting of 56 items. The instrument included 49 items scored on a 5-point Likert-type scale, to measure the primary variables in the study. Based on a modified form of the SLEQ, 42 of these items measured faculty participants' perception of campus climate, and seven items measured their self-reported application of critical thinking instruction techniques in their classroom. The climate scales (consisting of seven items each), measured by the SLEQ part of the instrument, were affiliation, professional interest, staff freedom, participatory decision-making, innovation, and work pressure (Fisher & Fraser, 1990).

The seven critical thinking items, which were combined with the 42 climate items, were developed as a result of the literature review in Chapter 2 and reviewed by colleagues. Faculty were asked to self-report their use of central concepts, analyzing arguments, questioning techniques, group activities, practice, and explanation and describing the importance of critical thinking. In addition, seven multiple-choice questions collected demographic information about the faculty participants and their college. These data described the diversity of the participants.

Population and Sample

The accessible population for this study was all faculty teaching at community colleges in the seven states located west of the Rocky Mountains: Arizona, California, Idaho, Nevada, Oregon, Utah, and Washington. The total student population of these colleges was approximately 2 million (U.S. Department of Education, National Center for Education Statistics, 2009a). Assuming a student-to-faculty ratio of 17:1, the faculty population was approximately 117,000. Using the G*Power calculator (Faul, Erdfelder, Lang, & Buchner, 2007), which applies Cohen's (Cohen, Cohen, West, & Aiken, 2003) equations for power, an a priori sample size of 119 was calculated. This calculation is described in greater detail in Chapter 3. A purposive sample of approximately 3,000 faculty was used, which yielded a 9.2% response rate.

Research Questions

The research questions for this study were divided into two types: descriptive questions and inferential questions (Creswell, 2003, p. 113). This method of stating the research questions provided a logical approach to explaining the objectives of the study.

1. Descriptive Questions:
    a. How do faculty perceive three climate factors, as measured by the modified SLEQ?
    b. How do faculty report the level of use of critical thinking instruction techniques in their classroom, as measured by six Likert-type scale items?
2. Inferential Question: To what extent do faculty's perceptions of climate factors predict their level of application of critical thinking instruction in their classroom?

Hypotheses

H_0: There is no significant relationship between the climate scales participatory decision-making, staff freedom, or work pressure and the Critical Thinking scale.

H_A: The climate scales participatory decision-making, staff freedom, and work pressure are directly related to the Critical Thinking scale.

These questions and hypotheses described the focus of this study: the relationship between campus climate and critical thinking instruction. The relationship between the three climate scales (the independent variables) and the critical thinking scale (the dependent variable) was studied using multiple regression analysis. A more detailed discussion of the method is presented in Chapter 3.

Purpose of This Study

The purpose of studying the relationship between campus climate and critical thinking instruction was to provide community college leaders insight into how to encourage the teaching of critical thinking on their campus. Researchers like Ekvall and Ryhammar (1999) have shown that effective college leaders can create an atmosphere or climate that supports desired behavior. For example, innovation appears to increase in the classroom as the class size decreases (Moos, 1979). Consequently, community college leaders who want to increase innovation in the classroom might achieve this goal by decreasing class sizes. This project extends this approach to strategies that support the instruction of critical thinking.

Encouraging critical thinking instruction should increase students' learning of critical thinking skills and improve graduates' ability to analyze and understand complex issues in their daily lives (Pedicino, 2008; Snyder & Snyder, 2008; Tsui, 1999). As a result, graduates will be able to participate

more effectively in the community and society as a whole. More individuals taking an active role in society and applying the appropriate thinking skills to the issues will have a positive impact on society.

The Theoretical Base

This study was grounded in two theoretical frameworks: critical thinking and organizational climate. Because critical thinking instruction was the focus of this study, an understanding of the underlying theory of critical thinking was important. This theoretical understanding was particularly important for developing the critical thinking scale that was part of the data collection instrument. In addition, because campus climate held potential for answers to the critical thinking instruction problem, an understanding of an organizational climate theory also was important. An understanding of the theory of organizational climate helps explain the relationship between campus climate and the behavior of college faculty as well as other members of the college organization.

Critical Thinking

The early concept of critical thinking heavily emphasized logic and using logic to solve problems and analyze information (Dewey, 1910; Smith, 1959). Early theorists thought that teaching students to apply logic (i.e., inductive and deductive) would provide them the tools to think critically.

However, later research did not confirm that critical thinking is simply the application of logic (Smith, 1959).

Although many educators have suggested the top three levels—analysis, synthesis, and evaluation—of Bloom's taxonomy (Bloom et al., 1956) as a possible definition of critical thinking, theorists like Ennis (1985) have considered them, like logic, to fall short of describing critical thinking skills. Most researchers define critical thinking as a high level thinking process, which uses particular skills, such as analyzing arguments, reasoning, and recognizing assumptions, to analyze information or solve problems (e.g., Ennis, 1985; Halpern, 1998).

Some of the key definitions of critical thinking can be summarized as reflective-reasonable thinking (Ennis, 1985), reflective skepticism (McPeck, 1981), using cognitive skills for a desirable outcome (Halpern, 1998), and taking charge of one's own thinking to improve its quality (Paul & Elder, 2002). What these definitions have in common is the emphasis on actively and thoughtfully analyzing information, similar to Dewey's (1910) original definition: suspending judgment until all information is analyzed.

An aspect of critical thinking that has been debated among theorists is the *transferability* of these skills (McPeck, 1990). Transferability describes whether critical thinking skills learned in one discipline can be applied to another field and whether these skills will be useful in everyday life

(Halpern, 2003, p. 13). Hence, the approach to teaching critical thinking and the success of critical thinking learners depends heavily on the transferability question. McPeck (1990) was the primary voice arguing against transferability. However, the argument seems to be less of an argument of whether critical thinking skills are transferable and more of an argument of how much of the skill learned in one discipline is transferable to another.

Organizational Climate

Behavior in an organization is influenced by its environment as well as the personality of its members (Moos, 1973, 1979). Moos developed a model which takes into consideration both environmental and personal systems. Both of these systems are important because they influence each other through interaction. For example, environmental systems influence people by accepting new members. Personal systems in turn influence environments by selecting which environments they wish to join. To help adapt to the new situation, a person entering a new environment may use coping skills, such as joining a campus organization to help adapt to a new school.

Moos (1979) divided the environmental system into four major domains: physical setting (e.g., classroom layout), organizational factors (e.g., student-to-faculty ratio), the human aggregate (e.g., student age), and social climate (p. 6). The fourth domain, social climate, mediates the influences of

the other domains and may explain the behavior of the members in the organization. For this reason, many instruments, including Moos's Work Environment Scales (WES) and the SLEQ, are based on social climate factors.

Within social climate, Moos (1973, 1979) identified three dimensions: relationship, personal growth or goals, and system maintenance and change (p. 14). The relationship dimension includes an individual's relationships with others in the organization. The personal development dimension includes work independency and pressure. The system maintenance and system change dimension includes communications, control, and support. These three dimensions categorize the factors, which describe social climate in any environment, including a college campus. Moos divided the scales used in each of his environmental instruments into these three categories and maintained that any effective instrument (e.g., the WES) for measuring organizational climate must include items that address all three of these dimensions. Having been derived from the WES, the SLEQ includes items addressing each of these dimensions, as does the instrument for the current study, which was derived from the SLEQ.

Definition of Terms

Campus climate. The organizational climate of a college campus (Rankin & Reason, 2008). Organizational climate is a method of describing

social environmental factors, which may explain the behavior of members in the organization (Moos, 1973).

Community college. An accredited college that awards associate degrees as its highest degree (Cohen & Brawer, 1996). Private colleges, which are accredited and award associate degrees, are not included in this definition.

Critical thinking. Actively and thoughtfully analyzing information to search for the truth or the best solution to a problem (Ennis, 1985; Halpern, 1998).

Enrollment. The total number of full- and part-time students enrolled in courses creditable toward a degree or other formal award. Students enrolled in courses that are part of a vocational or occupational program, those enrolled in off-campus or extension centers, and high school students taking regular college courses for credit are included in this definition (U.S. Department of Education, National Center for Education Statistics, 2009b).

Faculty. Full-time faculty are those members of the staff who are employed full time and whose major regular assignment is instruction. Adjunct faculty are non-tenure track instructional staff serving in a temporary or auxiliary capacity. Both full-time and adjunct faculty are included in this definition (U.S. Department of Education, National Center for Education Statistics, 2009b).

Instruction. Constructing experiences in such a way to facilitate student learning (Gareis, & Grant, 2008; Johnson, & Johnson, 2004).

Assumptions

The online assessment measured faculty's perception of organizational climate, not the actual climate. However, Strange and Banning (2001) stated that "perceptual . . . models of the environment recognize that the consensus of individuals who perceive and characterize their environment constitutes a measure of environmental . . . climate" (p. 85). Accordingly, these data were assumed to provide a reasonable measure of campus climate.

Faculty were asked to self-report their use of seven instructional techniques, which have been associated with critical thinking instruction. As professional educators, the faculty were assumed to be good judges of their instructional practices. Moreover, because the instrument was anonymous, the faculty had no reason to intentionally overstate their response. Thus, the responses provided by the faculty to the critical thinking items were assumed to be a reasonable measure of the application of these techniques in the classroom.

A purpose of this study was to provide community college leaders information about particular campus climate factors that appear to influence critical thinking instruction in the classroom. To be useful, these leaders should be able to change their campus climate to improve critical thinking.

The three cultural factors that were studied—participatory decision-making, staff freedom, and work pressure—were assumed to be factors over which community college leaders will have some control.

Limitations

The Critical Thinking items, which were added to the instrument to measure the level of critical thinking instruction in the classroom, were developed based on the literature review for this study and feedback from colleagues. Although the scores were analyzed for reliability, the Critical Thinking scale does not have the supporting analysis from prior studies that the SLEQ climate scales have. Consequently, analysis of the Critical Thinking scale items was a prerequisite to the analysis of the other data.

Community college faculty were not contacted directly to participate in this study. Instead, the chief academic officers of the cooperating community colleges were asked to forward an invitation to participate to all their faculty. Because the selection of the faculty who participated in the study was not controlled, the possibility exists that the participants did not truly represent the faculty of the college. For example, faculty who were uncomfortable with an online assessment may not have participated, or only conscientious faculty may have participated, and these conscientious faculty may be the most effective critical thinking teachers.

Scope and Delimitations

Although the study was limited to the faculty of community colleges west of the Rocky Mountains, the purposive sampling should have provided participants from a diverse range of community colleges. For this reason, generalizing the results to all community colleges in the United States may be appropriate. Arguably, the demand for critical thinking in higher education transcends the community college population; hence, these results may have relevance to other types of institutions.

The focus of this study was limited to the relationship between faculty perception of campus climate and critical thinking instruction. Certainly, many other factors may contribute to the teaching of critical thinking, such as institutional support for critical thinking (Bouton, 2008), faculty training in critical thinking (Snyder & Snyder, 2008), student aptitude, or classroom-level environment. However, this study was limited to campus climate because it has a more direct relationship to administration and faculty, who have the greatest impact on student learning (Nosich, 2005b; O'Hara, 1992; Snyder & Snyder, 2008; Tsui, 1999).

This study was limited to collecting data from faculty because the instrument focused on the school-level environment (Rentoul & Fraser, 1983). Administrators could have been included. However, faculty are closer to the issue of critical thinking instruction, and including two groups of respondents

might have complicated the evaluation of the data. Students would have been the appropriate population if the instrument measured classroom-level environment.

Four demographic factors describing the participants were collected: employment status (full-time or part-time), subjects taught, years of teaching experience, and gender. As discussed in Chapter 3, these variables seemed most relevant to demonstrating that the sample was representative. However, no effort was made to measure other potentially relevant demographic characteristics of the participants, such as age, education, race, ethnic group, or special training. Consequently, the study may not represent one or more of these groups.

Significance of the Study

The scholarship is clear on the advantages and importance of improving students' critical thinking skills. The reasons range from improving students' academic ability to increasing employees' productivity to developing citizenship (Brookfield, 2005; Sezer, 2008; Tsui, 2006). Although studies addressing how to teach critical thinking in the classroom exist (e.g., Bouton, 2008; Sezer, 2008; Solon, 2007), not enough students are acquiring these skills (ETS, 2007; Peirce, 2005; Snyder & Snyder, 2008; Tsui, 1999; van Gelder, 2005). Further, community college students need to understand how to apply the information they learn as much as they need to learn the

information (Norris, 1985). Knowing *how* to think is more important for students than knowing *what* to think (Pedicino, 2008).

As many theorists agree, critical thinking improves graduates' ability to contribute effectively to the American democratic society (Brookfield, 2005; Snyder & Snyder, 2008). Today, society is confronted with conflicting political and scientific information, a turbulent economy, rapid changes in business and technology, and instability in parts or the world (Paul & Elder, 2002; Pedicino, 2008). Faced with news networks, mass media, and politicians offering conflicting and misleading arguments to solve social problems, citizens need critical thinking skills to process this information overload and make informed decisions (Brookfield, 2005; Halpern, 2003; Tsui, 1999).

Good moral decisions can facilitate social change, and Norris (1985) argued that making moral decisions is an important aspect of critical thinking. As an example, Norris recounted Milgram's (1963) experiment in which participants were encouraged to apply a lethal shock to subjects of the experiment. Some real-life examples of situations, which required moral decisions in society, include German soldiers' participation in the Holocaust and American soldiers' participation in the My Lai Massacre.

On March 16, 1968, the men of the first platoon, Charlie Company, Task Force Barker entered the village of My Lai 4 (Hammer, 1971). Based on testimony at the trial of their platoon commander, Lt. Calley, most of the

soldiers of the first platoon participated in what became known as the My Lai Massacre. However, WO-1 Hugh Thompson, a helicopter pilot, and his crew intervened and prevented the killing of a number of civilians. Thompson demonstrated the thought process that Norris (1985) attributed to critical thinking. Had the soldiers at My Lai 4, particularly the officers who were likely college graduates, exhibited critical thinking skills when they entered the village, this incident would probably not be part of American history.

Although the advantage of applying critical thinking skills to high-level thinking situations, such as academics, employment, and societal and moral decision-making is apparent, critical thinking is as useful in everyday life (Halpern, 2003). Such matters as making consumer decisions, analyzing the family budget, and keeping healthy can all become easier with the application of critical thinking skills.

With an objective of improving critical thinking, this study was intended to illuminate a relationship between campus climate and critical thinking instruction in the classroom. Community college leaders may be able to address the climate factors, which have been found to correlate with critical thinking instruction. If leaders can create a climate for critical thinking instruction, more students may graduate with these skills and make a greater contribution to their community and society in general. As a result, this study has the potential of making significant contributions to social

change by offering community college leaders insight into how to better prepare their students to participate effectively in the democratic system and contribute the success of the United States of America.

Summary

This introduction has provided an overall description and justification of the study. In addition, background information has been presented regarding the purpose of the study, the problem it addressed, and its limitations. In summary, the purpose was to provide community college leaders information about the relationship between certain organizational climate factors and critical thinking instruction.

The next chapter reviews in greater depth the literature relating to the topics of this study, including critical thinking and organizational climate. The primary purpose of this review is to describe the gap that this study addressed. In Chapter 3, the method is described in greater detail. Chapter 3 includes a description of the instrument (a modified SLEQ) and its development.

The results of the study are presented in Chapter 4. In that chapter, the sample demographics, reliability, and descriptive statistics are described. The regression analysis provides the results, which are interpreted in Chapter 5. In addition, Chapter 5 offers recommendations for application of the findings and for further study.

Chapter 2: Literature Review

Chapter 1 provided an overview of this study, which focused on the relationship between campus climate and critical thinking instruction in community college classrooms. As will be further supported in this chapter, critical thinking skills are important for not only students and employees but every member of today's complex society (Brookfield, 2005; Lord, 2008).

This nonexperimental study employed an online instrument to solicit the perceptions of community college faculty about campus climate and critical thinking instruction. Faculty from states west of the Rocky Mountains were invited to participate in the study. Using multiple regression analysis, these data were analyzed to determine if a relationship existed between three climate factors and critical thinking instruction.

Four areas are the focus of this literature review: critical thinking, organizational climate, the research instrument, and the research method. These topics were the building blocks of this dissertation; hence, a review of the related literature provides background and describes the gaps in the current research.

This review begins with a review of the literature on critical thinking. Although this study focused on encouraging the teaching of critical thinking, it is important to understand the tenets of critical thinking, as well as how it has been taught in community colleges. This section also reviews prior

research related to encouraging the teaching of critical thinking to identify gaps in the research.

Next, the research and scholarship on organizational climate is reviewed. This research study looked at the relationship between teaching critical thinking and organizational climate. Thus, it is important to understand the prior research on organizational climate and instruments to measure it. This section is followed by a review of the literature describing the instrument that was used for this study: a modified School-Level Environment Questionnaire (Rentoul & Fraser, 1983).

The final section reviews scholarship that relates to the methods used to collect and evaluate data for this study. A quantitative method was used, and the approach was a nonexperimental correlational design. In this literature review, the advantages and disadvantages of applying this design in favor of other options are discussed.

Three strategies were used to locate information for this review. First, keywords were used to search databases including Academic Search Premier, ERIC, ProQuest, PsycINFO, SAGE, and SocINDEX. Some of the keywords that were applied included *critical thinking*, *organizational climate*, and *questionnaire*. The search emphasized articles in the field of education that were published in the last ten years. Also, the University of Hawaii Library's online catalog was searched for books on these topics.

The second strategy was to review the references in books and articles, identified by the first strategy, looking for additional relevant sources. This strategy facilitated integrating many of the articles into a coherent discussion of each topic. In addition, this strategy increased the likelihood of identifying most of the relevant literature related to each topic.

The final strategy was to search the databases using the names of authors who had been identified as significant contributors to each topic. This approach frequently uncovered additional material on the topic or additional references for use in the second strategy.

Critical Thinking

The main focus of this study was teaching critical thinking in community colleges. Accordingly, this review begins with an examination of the concept of critical thinking, its history in education, how it is taught in the classroom, and the extent to which it has been adopted in today's community colleges. In addition to presenting an in depth discussion of critical thinking and techniques for its instruction, a number of examples of successful applications in the classroom are presented.

What Is Critical Thinking?

Reference to critical thinking can be found in the early 1900s, when Dewey (1910) wrote about thinking. Dewey stated that "the essence of critical thinking is suspended judgment" (p. 74). His emphasis on critical thinking

was withholding conclusions until a problem is completely understood. Dewey offered an example of a physician diagnosing a patient's disease. If a physician, listening to a patient describe symptoms, stops the patient as soon as he hears symptoms that suggest a disease, the physician may miss critical information that suggests a different diagnosis. Philley (2005) called this type of thinking (i.e., going beyond the obvious conclusion and searching for alternate explanations) *lateral thinking* (p. 27) and emphasized its importance in incident investigation.

Dewey (1910) suggested that deduction and induction are the primary components of critical thinking. Induction is used to move from detailed facts to general principles. Deduction is used to test the hypotheses developed through induction, confirming the conclusion. In other words, Dewey likened critical thinking to the application of logic for analyzing information. For example, sitting in the student union and watching the number of students using cell phones, one may hypothesize that all college students have cell phones. This example is an application of inductive reasoning. To test this hypothesis, a class of students could be asked to raise their hand if they have a cell phone. Testing this sample of students is an example of deduction.

Fifty years later, Smith (1959) tested this concept by conducting research to determine if teaching logic in various courses improved students' critical thinking skills. However, the results of his study did not support the

theory that teaching logic is the same as teaching critical thinking. Smith speculated that unidentified factors hindered the students' understanding of logic, which prevented them from developing critical thinking skills. Later research reviewed some key aspects of these other factors.

Ennis and Paulus (1965) began with Smith's concept of critical thinking. However, Ennis did not accept the premise that deductive logic provided a complete description of critical thinking. Ennis went beyond this simple definition and developed a list of attributes of a critical thinker. Some of these characteristics included the ability to recognize (a) a conclusion that follows an assertion, (b) a generalization that is appropriate, and (c) facts versus assumptions.

Later, Ennis (1985) defined critical thinking as "reflective and reasonable thinking that is focused on deciding what to believe or do" (p. 45). Ennis proceeded to evaluate the top three levels (analysis, synthesis, and evaluation) of Bloom's taxonomy (Bloom, Engelhart, Furst, Walker, & Krathwohl, 1956) as a possible description of critical thinking. Ennis maintained that Bloom's taxonomy was not specific enough to be useful for guiding the teaching of critical thinking skills. To address this limitation, Ennis listed 13 dispositions and 12 abilities of a critical thinker (p. 46).

Bloom et al. (1956) presented a number of abilities and skills under each of their taxonomy levels. For example, under *analysis*, they listed "the

ability to recognize unstated assumptions" and "skill in distinguishing facts from hypotheses" (p. 205). Ennis's (1985) listed abilities were remarkably similar: Ability 10 was "identifying assumptions" and ability 7b was "inferring explanatory conclusions and hypotheses" (p. 46). Although Ennis minimized the significance of Bloom's taxonomy for guiding teachers, these two sets of abilities shared a variety of characteristics.

Another theorist, McPeck (1981), described critical thinking as "the appropriate use of *reflective scepticism* within the problem area under consideration" (p. 7). He considered logic to be a relatively limited aspect of critical thinking. McPeck was criticized by other theorists for his view that critical thinking is not transferable; that is to say, a person with critical thinking skills in one field, such as mathematics, cannot necessarily apply those skills to think critically in another field, such as psychology.

McPeck (1990) based his discipline-specific argument on what he considered to be common sense. His first point was that general thinking does not exist; when people think, they are always thinking about something specific. Second, McPeck noted that some people have effective thinking skills in one or more fields, whereas other people have thinking skills in other fields. For example, a person would probably not seek medical advice from a financial analyst, no matter how bright the analyst might be. Finally, McPeck noted that pertinent knowledge is an important element of critical

thinking. Thus, a thinking skill without the specialized knowledge of the discipline is meaningless.

Despite these arguments, most theorists appear to support the notion of transferability. Halpern (1998) emphasized the transferability of critical thinking skills, defined as "the use of those cognitive skills or strategies that increase the probability of a desirable outcome" (p. 450). One of the four skills Halpern recommended teaching to improve critical thinking was developing transfer. This emphasis on transferability demonstrates her support for the concept.

The transferability argument appears to be less about whether critical thinking skills are transferable and more about how much of the skill is transferable. Although McPeck (1990) argued against the transferability of critical thinking, he acknowledged certain common qualities of all critical thinkers such as reflective skepticism. In contrast, Halpern (1998) contended that her four-part critical thinking teaching model (described later) is common to any field. The question of transferability is important to the discussion of how critical thinking skills should be taught. For example, if critical thinking skills are not transferable, students cannot be expected to gain much from a critical thinking course.

Paul and Elder (2002) described critical thinking as a metacognitive skill. They defined critical thinking as "that mode of thinking—about any

subject, content, or problem—in which the thinker improves the quality of his or her thinking by skillfully taking charge of the structures inherent in thinking and imposing intellectual standards upon them" (p. 15). In other words, critical thinkers are continually analyzing and evaluating their own thinking (Paul, 2005). This process is used to think about information in a way that will allow the thinker to arrive at a better conclusion.

What is common to all of these definitions is that these theorists describe critical thinking as a form of higher level thinking, which is applied by the thinker to search for the truth or the best solution to a problem. This description of critical thinking is a starting point for the evaluation of critical thinking instruction that follows. The discussion in the following sections led to the development of seven critical thinking items which were used in Chapter 3 to develop the research instrument.

Researchers usually begin their discussion of critical thinking with one or more of the previous definitions. Now, before reviewing the literature on teaching critical thinking, it is useful to understand why this topic is important.

Why Teach Critical Thinking?

McKendree, Small, Stenning, and Conlon (2002) argued that the Internet has created an information overload. The fast-changing environment and improvements to global information have increased the demand for

critical thinking employees (Stupnisky, Renaud, Daniels, Haynes, & Perry, 2008). The Internet and these other developments have facilitated globalization and increased international competition (Pithers & Soden, 2000). This competition has further increased the demand on evaluating information critically. Paul and Elder (2002) listed some additional challenges of this new age: (a) the power of the media, (b) new technology such as DNA testing, and (c) trading freedoms for safety.

The United States Congress (1994) recognized the importance of teaching critical thinking when they identified the goal that "the proportion of college graduates who demonstrate an advanced ability to think critically, communicate effectively, and solve problems will increase substantially" (Sec. 102). In addition, numerous other government reports and faculty of many colleges have recognized the need for teaching critical thinking (Halpern, 2003).

In the academic world, the mastery of critical thinking skills has been shown to be a predictor of how students perform in college courses (Williams & Worth, 2003). In addition, because critical thinking skills appear to predict student motivation, teaching critical thinking may improve students' motivation, further improving academic performance (Rugutt & Chemosit, 2009). However, this predictability depends to some extent on what is meant

by critical thinking and whether it is measured as a general skill or a discipline specific skill.

Many students enter college lacking the basic math, reading, and writing skills required to succeed (Levin & Calcagno, 2008). Community college students requiring remedial classes include high school students who did poorly in one or more subjects, older students who need to refresh their skills, and immigrants who were educated in a language other than English. Although critical thinking instruction is often thought of as a skill to be taught to students of at least average academic performance, some educators (e.g., Dale & Ballotti, 1997) have recommended that remedial students should also be taught critical thinking skills. Also, Stupnisky et al., (2008) found that students who begin college with a disposition to think critically quickly develop control over their academic progress.

Educators have a responsibility to help students understand not only course content but the context of the information (Gardner, Jones, & Ferzli, 2009). For example, scientific information can become part of subjective opinions, which students need to be able to analyze. Critical thinking skills can help students analyze the use of facts to support opinions.

Despite the emphasis on teaching critical thinking and the agreement on its importance, students are not learning the skills they need (Peirce, 2005; Snyder & Snyder, 2008; Tsui, 1999; van Gelder, 2005). Mendelman

(2008) speculated that the majority of Americans do not use critical thinking skills because most of the schools in the United States do not teach these skills. Consequently, it is important to develop a better understanding of how to encourage real teaching of critical thinking skills in community college classrooms. The current study will address campus climate factors, which may promote critical thinking instruction in community college classrooms.

How Critical Thinking Learning Is Encouraged

Snyder and Snyder (2008) found four common reasons critical thinking is not taught in courses. First, instructors do not have the necessary training. Second, instructors do not have the information necessary to teach and students do not have the information necessary to learn critical thinking. Third, instructors' assumptions about the course material interfere with their critical thinking about the material. Finally, instructors do not want to commit the necessary class time to teach critical thinking. Colleges scheduling 50-minute class periods may contribute to this time issue (Lail, 2009).

Elder (2005) addressed the first reason, instructor training, by recommending that critical thinking be an integral part of all faculty development. Studies have indicated that most college faculty do not have a clear understanding of critical thinking (Paul, 2005). However, the training issue has been frustrated by recent changes in the make up of community

college faculty. Community colleges are hiring a larger percentage of part-time or adjunct faculty who come from industry instead of educational backgrounds (Lail, 2009; Lei 2007). Research (e.g., Lail, 2009) has shown that these newer instructors tend to rely on lecture much more than traditional faculty. Prior to this trend, most community college faculty came from elementary schools, high schools, or universities. These earlier faculty came to the community college with education degrees and teaching experience. Teaching new instructional techniques to faculty who are present on campus for only one or two classes and lack an educational background may be challenging.

Under the second reason, not enough information, van Gelder (2005) identified the following four important cognitive requirements for instructors and students learning critical thinking. First, critical thinking is not an easy skill to develop. van Gelder likened it to learning a foreign language. Second, like other skills, it takes a good deal of practice to develop effective critical thinking skills. Third, critical thinking should be learned and practiced for transfer. Fourth, understanding the underlying theory is important for students of critical thinking.

Halpern's (1998) four part recommendation for teaching critical thinking addressed most of these same cognitive requirements. First, the instructor needs to explain the underlying theory of critical thinking and why

it is important to the student. This step is used to develop the student's interest in and disposition to apply critical thinking skills. The second step is teaching and practicing the skills of critical thinking. Some of the skills that Halpern recommended teaching included verbal reasoning, argument analysis, hypothesis testing, and confidence evaluation.

The third step is to teach for transfer. Halpern (1998), a strong proponent of the transferability of critical thinking skills, believed that teaching students to use critical thinking in a variety of contexts prepares them to transfer their skills to novel situations. The fourth step is to teach metacognitive monitoring (p. 454), which refers to monitoring one's own thinking. Critical thinkers must continually monitor and adjust their own thinking to ensure that they are applying the appropriate skills to reach a correct conclusion.

Peace (2010) established participation in a democracy as the reason for students to learn to think critically. Peace provided examples for his students by examining policy making in terms of history, public debates, and official justifications. Like other educators, Peace found that the disposition to apply critical thinking is as important as acquiring critical thinking skills.

Although critical thinking is of special importance to many community college instructors, Brookfield (2005) identified a number of difficulties that confront students trying to learn critical thinking skills. Through his

research, Brookfield identified five techniques that could assist students to master these skills.

1. To create an interest, begin by describing the value of learning to think critically.
2. Provide an example for the students to follow by applying critical thinking.
3. Use group activities to allow the students to develop confidence.
4. Apply critical thinking to specific, real experiences.
5. Expose students to critical thinking gradually, step-by-step.

Brookfield's first technique—creating an interest—is consistent with previously stated recommendations (Halpern, 1998; Peace, 2010; van Gelder, 2005). However, Brookfield (2005) introduced several additional techniques: modeling, group activities, real experiences, and gradually introducing the skills. Further analysis of these and other recommended techniques were used to develop the critical thinking items for the instrument used in this study.

Nosich (2005b) described two commonly applied ineffective methods for teaching critical thinking in the classroom. The first method Nosich called the "One of Many" model (p. 60). This method was described as using critical thinking techniques as one of many methods of teaching a course. However, the instructor uses other teaching techniques to teach the majority of the

course. Many college textbooks (e.g., Triola, 2006) support this method by including critical thinking questions at the end of each chapter.

The second method is called the "Cover as Much Content as Possible" model (Nosich, 2005b, p. 61). Using this method, the instructor tries to teach as much content as possible, down to the smallest detail. The instructor may apply critical thinking techniques to teach some of the course content. However, the sheer magnitude of the content required by most course plans reduces the likelihood that critical thinking will be taught to any significant degree.

As an alternative to these two approaches, Nosich (2005b) recommended a more effective method for helping students understand a discipline. First, Nosich introduced four or five central concepts of the course. Second, Nosich asked his students to look at how the "concepts fit together to form a coherent system" (p. 66) and to apply the concepts to issues and problems within the discipline. This model provided the same opportunity to learn course content as the first two models. In addition, students gained important critical thinking skills and how to apply them to the discipline.

In the first two parts of a three part series of articles, Elder and Paul (2008a, 2008b) offered seven ideas for developing critical thinking skills in the classroom.

1. Ask students to become familiar with a new concept and apply it to solve a related problem.
2. Put students in groups of three and ask one student in each group to read from the text, explaining what is understood and identifying what needs further study.
3. Use peer assessment for written assignments.
4. Teach students to assess their speaking. Ask students to teach a concept.
5. Teach students to assess their listening. Randomly call on students to summarize what has been said.
6. Design tests that test improvements in student thinking. Ask students to explain the logic of a chapter.
7. Make students work in the course. The more interactive the class, the more they will retain.

Students need to develop the skills to evaluate course content themselves (Elder & Paul, 2008a). The Internet has helped students become very good at finding information (Lord, 2008). What students need is to learn how to analyze that information. For this reason, instructors should design courses to challenge the students' thought process. In other words, to learn a subject well, students must learn to think in that subject, which requires

instructors to challenge the students with appropriate activities and assignments.

The literature to this point has focused on classroom techniques for encouraging the learning of critical thinking skills. Most of the theorists agree that students need an understanding of what critical thinking is and why it is important (Brookfield, 2005; Halpern, 1998; van Gelder, 2005). This introduction to critical thinking helps develop the students' interest in learning and applying critical thinking skills. However, instructors also need this training and disposition toward critical thinking (Elder, 2005; Snyder & Snyder, 2008).

Like any new skill, practice was identified as an important part of learning to think critically (Elder & Paul, 2008a, 2008b; Halpern, 1998; Nosich, 2005b; van Gelder, 2005). Because they are thinking skills, the practice of critical thinking must be challenging (Elder & Paul, 2008a; Halpern, 1998; Lord, 2008; van Gelder, 2005). Furthermore, the examples used to practice the new skills should be real-life examples to facilitate students connecting these skills with the world around them (Brookfield, 2005; Lord, 2008; Nosich, 2005b). Several of the theorists emphasized the importance of students working in groups (Brookfield, 2005; Elder & Paul, 2008a, 2008b). Students often perform more at ease in groups, allowing them to learn new skills in a less intimidating environment. Finally, although the

transferability of critical thinking skills is controversial, a number of theorists emphasized teaching for transfer to better prepare students to think critically in other disciplines (Halpern, 1998; van Gelder, 2005).

How Critical Thinking Skills Are Taught

Approaches to teaching critical thinking skills are as numerous as definitions of critical thinking. Beginning with Dewey (1910), there has been an emphasis on teaching students to think critically. Dewey offered the following:

> While it is not the business of education to prove every statement made, any more than to teach every possible item of information, it is its business to cultivate deep-seated and effective habits of discriminating tested beliefs from mere assertions, guesses, and opinions; to develop a lively, sincere, and open-minded preference for conclusions that are properly grounded, and to ingrain into the individual's working habits methods of inquiry and reasoning appropriated to the various problems that present themselves. (pp. 27-28)

As one of the largest providers of post-secondary education, community colleges have emphasized the importance of teaching critical thinking skills (Barnes, 2005; Peirce, 2005; van Gelder, 2005). Community colleges are in a unique situation to teach skills to prepare students for college or trades

(Calderone, 2005). However, academics have disagreed as to whether critical thinking should be taught as a special course or should be included as part of all courses (Barnes, 2005; Bers, 2005). Although some of the literature on teaching critical thinking could be applied to either a critical thinking course or to supplement a course in another discipline, most of the studies in this literature review evaluated courses with critical thinking content added to another discipline.

The following books and articles offer suggestions or an outline for teaching critical thinking in the classroom. Some of the selected books could be used as a complete text for a critical thinking course or to supplement a course in another discipline.

In the first book, *Critical thinking: An introduction*, Fisher (2001) listed nine basic critical thinking skills that should be taught. Fisher stated that this list was not exhaustive, only a starting point.

1. Identify the sources of and conclusions in an argument.
2. Recognize and assess assumptions.
3. Clarify statements and ideas.
4. Judge the reliability of statements.
5. Analyze various types of arguments.
6. Examine and develop explanations.
7. Understand decision making.

8. Identify implications.
9. Develop arguments.

Fisher's (2001) book began with a look at several definitions of critical thinking, including those from Dewey (1910), Ennis (1985), and Paul (Paul & Elder, 2002). Fisher went on to offer explanations and examples of the basic skills, which can be used in a critical thinking course. Although some of these topics could be integrated into a course for another discipline, the book focused on the teaching of critical thinking skills as a topic in itself.

In *Learning to think things through: A guide to critical thinking across the curriculum*, Nosich (2005a) broke down critical thinking into three parts: (a) "critical thinking involves asking questions," (b) "critical thinking involves trying to answer those questions by reasoning them out," and (c) "critical thinking involves believing the results of our reasoning" (pp. 5-6).

Nosich's (2005a) book continued with an examination of the elements of reasoning, which is the focus of his critical thinking instruction. He listed eight elements, which he stated are always present during reasoning: purpose, question at issue, assumptions, implications, information, concepts, conclusions, and point of view (p. 47). Nosich described how to apply these elements as tools to critical thinking. For example, when reading an article, a critical thinker will identify the assumptions made by the author.

In another chapter, Nosich (2005a) described how to apply critical thinking to a particular discipline. Nosich described this stage of critical thinking as using the discipline as a lens through which to examine a question. This book was specifically written to be used as supplemental material for a course in another discipline, and the level of this book is appropriate for community college courses.

Halpern's (2003) book, *Thought and knowledge: An introduction to critical thinking*, has been used as a text to supplement community college courses (e.g., Solon, 2007). Her book begins with a chapter on the theory of critical thinking, which has been recommended as a starting point for teaching critical thinking skills Complete with examples and exercises, Halpern's book includes chapters on the following.

1. *Reasoning*: Inductive and deductive logic, negation, contexts, and errors in reasoning (p. 137).
2. *Analyzing arguments*: Premises, conclusions, assumptions, credibility, and scoring rubric (p. 182).
3. *Hypothesis testing*: Explanation, prediction, control, population, sampling, correlation, and cause (p. 231).
4. *Understanding probability*: Likelihood, uncertainty, odds, predictions, and risk (p. 264).

5. *Problem-solving*: Incubation, insight, persistence, simplification, brainstorming, and selecting the best strategy (p. 348).
6. *Decision-making*: Alternatives, considerations, consequences, evidence, emotion, and evaluation (p. 308).
7. *Creative thinking*: Generalization, exploration, evaluation, personality, environment, insight, and incubation (p. 396).

All three of these texts began with an explanation of critical thinking, which is consistent with the recommendations of the previous section (Brookfield, 2005; Halpern, 1998; van Gelder, 2005). Moreover, a number of themes appear repeatedly in this review of critical thinking texts. In one form or another, each author emphasized questioning information, analyzing arguments, and reasoning.

Although some college students already exhibit critical thinking skills because their high school teachers developed the skills in these students, often critical thinking skills are not taught at the high school level because teachers are focusing class time on content to address state assessments (Joseph, 2010). However, some high school teachers have been successful incorporating critical thinking instruction in their classes using a number of techniques: (a) student self assessment, (b) student questioning, and (c) problem-solving activities. For example, Mendelman (2008) introduced critical thinking skills to a ninth-grade class through writing analysis.

Mendelman used a step-by-step approach, beginning with a simple technique for identifying the *images* and *concepts* in a story and how they are related, and progressed to more advanced analyses. The next section describes successful applications of critical thinking instruction to the classroom.

Studies of Teaching Critical Thinking in the Classroom

Sezer (2008) compared two approaches to teaching elementary school teachers to instruct math. Although both classes in the study were taught the same content, the instruction in the experimental class emphasized a variety of approaches to problem-solving. Measured results indicated that the teachers in the experimental class improved in math confidence and critical thinking skills significantly over the teachers in the control class.

The following are some of the problem solving activities, which Sezer (2008) used in the experimental class.

1. *Creative solutions*: This activity is a word problem, which does not seem to provide enough information (p. 356).
2. *Re-learning base 10 concepts*: These activities are questions to check the student's understanding of number systems (p. 357).
3. *Questioning algorithms*: These questions ask the student to analyze traditional approaches to solving problems, such as long division (pp. 357-358).

4. *Why do we do what we do*: This assignment requires the student to explain the steps used to solve a simple word problem (p. 358).

Although reasoning and analyzing arguments are commonly emphasized in critical thinking instruction (Fisher, 2001; Halpern, 2003; Nosich, 2005a), Sezer (2008) obtained positive results by teaching problem-solving. This result may indicate that problem-solving requires a broad range of critical thinking skills. Consequently, teaching problem solving may teach the same skills as teaching critical thinking. Addressing this connection, Halpern's (2003) text includes a chapter on problem-solving.

Bouton (2008) studied outstanding teachers and how they teach critical thinking. Bouton found that these instructors could more easily describe how they teach critical thinking than describe the concept of critical thinking. The following are some of the techniques that experienced instructors applied to improve their students' critical thinking skills.

1. Use collaboration in the classroom to encourage feedback among peers.
2. Ask students to critically analyze the basic concepts of a course.
3. Instruct the students on the use of reflection, which helps to eliminate preconceived biases when evaluating a topic.
4. Encourage students to include their personal experiences in evaluating information.

5. Expect students to question assumptions, and answer probing questions in class discussions.
6. Use essays and oral presentations to give students an opportunity to organize and communicate their thoughts.

Solon (2007) studied the impact of teaching critical thinking in a psychology class. His study compared an experimental class with 25% of class time devoted to critical thinking to a control class taught without this additional content. To compensate for the reduction in psychology content in the experimental class, Solon assigned this material as homework. He also assigned an additional 20 hours of critical thinking homework to the experimental class. To support the critical thinking part of the course, Solon took material from four chapters of Halpern's (2003) book: reasoning, analyzing arguments, hypothesis testing, and understanding probability.

Solon (2007) administered the Cornell Z Critical Thinking Test to measure students' critical thinking skills and tests based on the course text to measure students' psychology knowledge. When the classes were compared, both classes had similar critical thinking and psychology pretest scores and similar psychology posttest scores. However, the experimental class had significantly higher critical thinking posttest scores compared to the control class. This improvement in critical thinking skills, without a

reduction in psychology learning, demonstrated the ability to add critical thinking to a class without negatively impacting course content.

Nosich (2005b) argued that teaching subject content effectively requires teaching critical thinking. Students need to be able to apply the discipline, which requires critical thinking. With a better understanding of the central concepts and their application, students can assimilate many more details.

Snyder and Snyder (2008) identified three components that are commonly recommended for inclusion in a course that teaches critical thinking. First, the instructor should model critical thinking skills. Modeling was recommended by Brookfield (2005) as well. Second, questioning techniques should be taught, which is in line with Nosich's (2005a) three parts of critical thinking. Third, the instructor should guide the students' critical thinking until they develop confidence in the skills (Snyder & Snyder, 2008).

In addition to these three components, a number of other recommendations have become evident from this review. First, instruction should begin with an explanation of critical thinking and its importance (Brookfield, 2005; Halpern, 1998; van Gelder, 2005). Second, course instruction should begin with a few central concepts and emphasize the application of these concepts to the discipline (Bouton, 2008; Elder & Paul,

2008a; Nosich, 2005b). Third, group activities are an effective technique for learning these skills (Bouton, 2008; Brookfield, 2005; Elder & Paul, 2008a, 2008b). Finally, like any skill, practice is important, and real-life examples provide the best form of practice (Bouton, 2008; Brookfield, 2005; Elder & Paul, 2008a; Nosich, 2005b; Halpern, 1998; van Gelder, 2005).

The conclusions of this literature review on critical thinking was used to develop seven measurement items for the modified SLEQ. The items are developed in Chapter 3 based on the following key critical thinking instructional techniques.

1. Questioning techniques (Fisher, 2001; Halpern, 2003; Nosich, 2005a; Snyder & Snyder, 2008).
2. Group activities (Bouton, 2008; Brookfield, 2005; Elder & Paul, 2008a, 2008b).
3. Begin course instruction with a few central concepts and emphasize the application of these concepts to the discipline (Bouton, 2008; Elder & Paul, 2008a; Nosich, 2005b).
4. Analyzing arguments and reasoning (Fisher, 2001; Halpern, 2003; Nosich, 2005a).
5. Practice is important (Bouton, 2008; Brookfield, 2005; Elder & Paul, 2008a; Nosich, 2005b; Halpern, 1998; van Gelder, 2005).

6. Instruction should begin with an explanation of critical thinking (Brookfield, 2005; Halpern, 1998; van Gelder, 2005).
7. Students should understand the importance of critical thinking (Brookfield, 2005; Halpern, 1998; van Gelder, 2005).

Organizational Climate and Teaching Critical Thinking

Scholarship addressing organizational climate and critical thinking instruction were analyzed to identify the gap in the literature. Two studies were identified that related campus climate to students' propensity to learning critical thinking. Tsui (2006) studied the educational conditions in a private college that facilitated students' learning of critical thinking skills. Bouton (2008) evaluated community college instructors' perceptions about factors that improved their students' assimilation of critical thinking skills.

Tsui (2006) described three climate characteristics, which contributed to the success of teaching critical thinking at a private college. First, students were encouraged to go beyond traditional solutions and think outside the box. Second, students' self confidence was increased by improving their thinking effectiveness. Third, self-directed learning was emphasized, so students began to impact their own learning. Self-directed learning facilitates student learning at a faster rate by encouraging students to seek out knowledge and learn through discovery instead of waiting to be taught.

Although the climate characteristics Tsui (2006) identified are often found in the classroom, the college she studied had encouraged these climate factors outside of the classroom. Furthermore, Tsui pointed out that the results of her research differed from prior research, which suggested that most campuses did not encourage critical thinking.

In Bouton's (2008) study, student and environmental factors that appeared to influence teaching critical thinking were identified. The student factors included preparation for class and having the appropriate prerequisite education. The organizational factors included instructor workload and institution-wide support for teaching critical thinking.

Although the characteristics Tsui (2006) identified related to the climate experienced by the students instead of the faculty, her study provides some insight into the conditions of an organization that encourage the teaching of critical thinking. On the other hand, Bouton (2008) identified climate factors—workload and institutional support—that relate to the present study. However, Bouton conducted a qualitative case study, which included only seven participants who taught humanities or social studies. In her implications for future research section, Bouton suggested that "future research might benefit from an exploration of the interface between instructors' beliefs about teaching and institutional values" (p. 170). This research was such a study.

Organizational Climate

The objective of this study was to understand the "behavior" of the organization, and those who study organizational behavior have been interested in organizational climate for many years. As is described here, organizational climate can help to explain the behavior of the members of an organization.

> An organization is, after all, a collection of people, and what the organization does is done by people. The activities of a group of people become organized only to the extent that they permit their decision and their behavior to be influenced by their participation in the organization. (Simon, 1976, p. 110)

The objective of this study was to identify which organizational climate factors influence faculty to emphasize the teaching of critical thinking skills. Hence, it is important to understand what is meant by organizational climate, how it can be measured, and how it may relate to teaching.

What Is Organizational Climate?

Most theorists who study personality agree that behavior is influenced by personality and the environment (Moos, 1973). Consequently, employees' behavior may be predicted by studying the environment in which they work. Moos (1973, 1979, 1983) offered one of the first theoretical frameworks for understanding the social climate in which people work. The instrument that

was used in this study to measure perceived campus climate for comparison to faculty's adoption of critical thinking instruction was grounded in Moos's framework.

Moos (1973) described six methods, which have been used to characterize environmental factors that influence behavior. These methods are (a) physical (natural and man-made) environment, (b) behavioral setting (e.g., home, school, work), (c) organizational structure, (d) characteristics of the inhabitants, (e) organizational climate, and (f) functional analysis of the environment (p. 652). These methods overlap and are not mutually exclusive. Later, Moos (1979) reduced these domains to four: physical, organizational, human, and social climate (p. 6).

In the case of a community college, the physical environment includes the buildings, classrooms, lighting, and climate control. The organizational environment describes such factors as size and structure of the staff, faculty-to-student ratio, and governance. Examples of the human environmental factors include the age, socioeconomic background, and education of the student body. All of these factors can have an impact on the organization.

In the case of organizational or social climate, organizational psychologists (e.g., Katz & Kahn, 1978) have proposed dimensions by which to analyze an organization. For example, the social-psychological dimension of an organization can be further subdivided into roles, norms, and values. A

member of the organization performs a particular role for the organization, such as accountant. The accountant must meet certain standards or norms of the position, such as applying standard accounting principles. Finally, the accountant has certain values, such as bringing attention to waste and abuse of funds.

Focusing on this fifth aspect (organizational climate), Moos (1973) developed perceived climate scales for nine categories of environments. These environments included two of particular interest: high school classrooms and work environments. Each of these climate scales were built around three categories of dimensions, which were used to group subdimensions.

1. *Relationship dimensions*: This dimension describes how supportive members of the organization are of the organization and other members of the organization (Moos, 1973, p. 657). The work environment subdimensions were involvement, peer cohesion, and staff support (Moos & Moos, 1983).
2. *Personal development dimensions*: This dimension measures the member's personal development and self-enhancement (Moos, 1973, p. 657). The work environment subdimensions were autonomy, task orientation, and work pressure (Moos & Moos, 1983).
3. *System maintenance and system change dimensions*: This dimension relates to the organization's order and clarity of control

(Moos, 1973, p. 658). The work environment subdimensions were clarity, control, innovation, and physical comfort (Moos & Moos, 1983).

The instrument, which was used in this study to collect climate data, was derived from Moos's (1983) Work Environment Scale (WES). By building on Moos's efforts, Rentoul and Fraser (1983) developed the School-Level Environment Questionnaire (SLEQ) specifically to measure climate in schools. The development of this instrument is reviewed in a later section, and the modification and application of this instrument is covered in Chapter 3.

Ekvall (1996) referred to climate as "an attribute of the organization, composed of behaviours, attitudes, and feelings, which are characteristic of life in the organization" (p. 122). He studied the organizational climate of a number of European companies to identify the characteristics, which encourage innovation. Through this research Ekvall developed a testing instrument: the Creative Climate Questionnaire (CCQ). The CCQ measured 10 dimensions of organizational climate, including freedom and independence, support for ideas, and tolerance for risk taking.

Based on research conducted at a Swedish university, Ekvall and Ryhammar (1999) posited that climate can influence many aspects of a college, including problem solving, communication, learning, coordination,

and control. Their research reached similar conclusions as Ekvall (1996) regarding the climate factors that encourage creativity. Furthermore, Ekvall and Ryhammar (1999) argued that an experienced leader can manipulate organizational climate to obtain certain outcomes. The results of the current study may offer community college leaders an opportunity to influence the teaching of critical thinking skills by manipulating climate factors on their campus.

Later, Isaksen, Lauer, Ekvall, & Britz (2000-2001) offered a similar definition: "Climate is defined as the recurring patterns of behavior, attitudes, and feelings that characterize life in the organization" (p. 172). They theorized that organizational climate is the aggregate of individuals' psychological climate—view of existence in the organization. Climate can be shaped by many aspects of the organization; at the same time, climate can impact many organizational issues, including motivation, commitment, and learning.

Climate and culture are often misunderstood and used interchangeably (Isaksen, 2007; Rankin & Reason, 2008). However, culture and climate are distinctly different aspects of an organization. Culture usually refers to the "collective programming of the mind" (Isaksen, 2007, p. 4) and is stable because of its reinforcement over an extended time. On the

other hand, climate is the collective attitudes and feelings of the organization.

This study analyzed *campus* climate. However, a universal definition of campus climate is lacking in the literature (Hart & Fellabaum, 2008). Most researchers of campus climate study race, gender, or cultural background, and most studies focus on students. Studies of campus climate to understand other campus issues, such as teaching or learning, are limited. The demand for climate studies in education has been driven by a need to address racial and other diversity concerns on college campuses (Hurtado, Griffin, Arellano, & Cuellar, 2008). Student focused studies may define campus climate as campus pride and feelings of belonging (e.g., Atkinson, 2008).

In 1990, O'Hara (1992) studied the climate of 25 community college campuses in 13 states. His study focused on nine climate factors, including "open communications, control of classroom-related matters, and adequate instructional support services" (p. 320). His conclusion, based on the evaluation of these nine factors, was that the administration of a college has a greater impact on teaching and learning than the faculty and the students.

Like Ekvall and Ryhammar (1999), O'Hara (1992) contended that administration has the "power and authority to create and control the environment" (p. 320). In their definitions of organizational climate, these researchers used such terms as attitudes, behaviors, commitment, feelings,

and motivation. Common among the climate factors studied by these researchers was communication and control. From these studies, it can be seen how understanding climate gives leaders an advantage, which would include community college leaders. However, transformation may require administrative or fiscal measures to impact group relations, curriculum and pedagogy, policies, and services (Rankin & Reason, 2008). Leaders may be able to influence climate through a change in organizational strategy or restructuring the organization (Isaksen, 2007). The next section looks more closely at the importance of organizational climate studies.

Why Study Organizational Climate?

As was hypothesized in this study, an understanding of organizational climate can explain behavior on a campus. Understanding the climate was the objective of the researchers in the previous section (Ekvall & Ryhammar, 1999; Isaksen et al., 2000-2001; O'Hara' 1992). This section reviews several studies of organization climate, which provide insight into how climate can be applied to understanding or solving a problem. Although useful for solving problems, VanWagoner, Bowman, and Spraggs (2005) cautioned that research focused on climate may provide a positive outlook and can mislead a college to believe the organization is functioning effectively. To get a clear picture of the health of the college, research focusing on its culture is more

important to a community college than a simple emphasis on a number of climate factors.

Studying the climate of the organization has helped community colleges leaders understand how to improve the organization's ability to respond to change (Ayers, 2002; McGrath & Tobia, 2008; Sullivan et al., 2005). For example, Ayers (2002) studied the organization of a rural community college to evaluate its ability to identify crucial information and react to change in the environment. Ayers identified four climate characteristics of the community college that contributed to the organization's adaptability to change.

Decentralization was the first characteristic identified (Ayers, 2002). By involving faculty and staff in the decision process, the organization can gather more information from the environment. The second characteristic, empowerment, is closely related. By allowing faculty and staff more independence, the organization encourages innovation and initiative. Third, increased interaction through improved communication supports the decentralization and empowerment of the organization. Finally, a shared vision of the future is important to the organization. Community college leaders may focus on these characteristics to facilitate changes necessary to improve critical thinking instruction.

Thaxter and Graham (1999) looked more closely at three of the factors evaluated in O'Hara's (1992) study. They focused on factors that improved faculty status: participative management, taking part in the budget, and sharing the setting of goals and objectives. They developed an instrument based on these three factors, which they used to collect data from 70 full-time faculty.

Although they concluded that faculty generally felt left out of the decision making process, the results of the study did indicate that faculty had control over the areas that are traditionally their responsibility, such as the classroom (Thaxter & Graham, 1999). An important aspect of this study was that the results provided administrators feedback on the success or failure of attempts to develop shared governance at a number of Midwestern community colleges.

Sullivan, Reichard, and Shumate (2005) reported on a college study, which used an analysis of organizational climate to facilitate the implementation of shared governance. The college administered a standard instrument to assess the present campus climate. Then, the organization looked for issues that would need to be confronted as they moved into a more participative form of governance. Instead of simply evaluating the faculty's perception of current shared governance initiatives, which was Thaxter and

Graham's (1999) objective, this study was used to implement shared governance.

Reynolds (2006) studied the relationship between the faculty's perceptions of organizational climate and the faculty's job satisfaction in a community college. Organizational leaders want to know that their employees are a good fit for their organization and vice versa. Reynolds's study found that the faculty at the community college used in her study had a positive perception of organizational climate and a high level of job satisfaction, except in the areas of political climate and promotion.

In a qualitative study, Mars and Ginter (2007) analyzed the relationship between campus climate and institutional technology at three community colleges. The researchers found several relationships between organizational climate and faculty's adoption of technology in the classroom. In particular, the institutions that were more structured with clear policies and incentives for implementing technology were more successful than the institution that left the decision to the faculty.

Organizational climate has been applied to research to try to predict student persistence in community colleges. In one of these studies, Calcagno, Bailey, Jenkins, Kienzl, and Leinbach (2008) analyzed various climate conditions such as the proportion of part-time faculty, the proportion of minority and female enrollment, and whether the college was urban or rural.

The researchers looked for correlations between these conditions and student success.

To conduct their study, Calcagno et al. (2008) were able to collect data from national databases such as the Integrated Postsecondary Education Data System (IPEDS) and the National Education Longitudinal Study of 1988 (NELS:88; U.S. Department of Education, National Center for Education Statistics, 2000). As a result of the analysis of these data, the researchers found an inverse relationship between the organizational characteristic of college size and persistence and an inverse relationship between minority enrollment and persistence. In other words, the larger a college's enrollment the lower was the completion rate, and the higher a college's minority enrolment the lower was the completion rate. The later finding was attributed to a lower completion rate among minority students.

To evaluate where to focus the organization's budget to impact student success, Culp (2005) recommended assessing climate in three areas: student affairs programs, student learning, and student affairs (the student affairs division or office). Understanding the climate through these assessments facilitated understanding what was working and where change was needed. Administration used this information to determine where to continue to spend and when to redirect spending to a different area or project.

These studies are just a few examples of how an understanding of campus climate can help administrators solve problems or make improvements. One of the previous studies (Calcagno et al., 2008) analyzed data, which was available from the government, to develop its conclusions. However, most studies collect data from participants by some method, such as a survey. The next section reviews a number of existing climate instruments.

Climate Instruments

Climate instruments have been used in business and industry for many years. For example, Ekvall (1996) worked with European manufacturers to produce the Creative Climate Questionnaire (CCQ). This instrument evaluated 10 dimensions of climate, which measure an organization's creative climate: challenge, freedom, idea support, trust and openness, dynamism and liveliness, playfulness and humor, debates, conflicts, risk taking, and idea time (pp. 107-108).

The CCQ consisted of 50 items, five items per dimension. The instrument has been used by European industry to evaluate their organizations and improve their creativity and innovativeness. Later, Ekvall and Ryhammar (1999) applied the CCQ to a Swedish university. A random sample of 149 faculty completed the CCQ, and the researchers were able to

identify factors, such as the availability of resources, which contributed to faculty creativity.

Isaksen et al. (2000) developed the Situation Outlook Questionnaire (SOQ), which was based on an English translation of the CCQ. The dimensions were reduced from 10 to nine, combining dynamism with challenge, and the instrument focused on creativity and change. The SOQ also had five items per dimension, and the items were answered on a 4-point Likert-type scale. Two studies were described, which were conducted to validate SOQ scores. The results indicated that the SOQ performed as well as its predecessor, the CCQ.

In an earlier study, Siegel and Kaemmerer (1978) identified five dimensions of an innovative organization: leadership, ownership, norms for diversity, continuous development, and consistency. A team of graduate students helped the researchers develop a pool of 142 items for the instrument. Through two studies, the researchers were able to reduce this pool to 61 items. This final instrument, which was called the Siegel Scale Support for Innovation (SSSI), was used in a third study to evaluate the validity of its scores.

The dimensions identified by Siegel and Kaemmerer (1978) appear very different from the Ekvall's (1996) dimensions. Although they both claimed to describe the creativity of an organization, Ekvall emphasized the

characteristics of the members of the organization: dynamic, playful, risk taking. On the other hand, Siegel and Kaemmerer (1978) emphasized the characteristics of the leadership style: leadership and norms for diversity. However, looking closely at the definition of these dimensions reveals that Siegel and Kaemmerer's ownership described autonomy, which is similar to freedom, and leadership included support for ideas, which was an Ekvall (1996) dimension.

Many climate instruments, such as these instruments, are available to companies that want an evaluation of their organization. However, these instruments have been designed to meet the needs of a broad range of organizations, not specifically educational organizations, which have some unique demands. Also, many of these instruments are administered commercially (e.g., SOQ) and not available for a study such as this study. The next few instruments are more appropriate for this study.

Lester and Bishop (2000) compiled the *Handbook of tests and measurement in education and the social sciences,* which includes almost 400 pages of testing instruments in 37 categories, including climate and several related topics. Initially, 12 of these instruments were identified for possible use in this study. After a close review of these 12 instruments, the list was narrowed to three instruments, which are discussed here.

The first of these instruments was developed by O'Hara (1992) who made a connection between faculty's professional self-esteem and quality of the teaching and learning environment. To study community college faculty self-esteem, O'Hara developed an instrument, which asked faculty to rate their organizations in nine areas: institutional environment conditions, participatory management, communication, fair administration, shared budget development, control over the classroom, instructional support services, professional development, and participation in developing the mission (p. 320). These topics were selected because they were repeatedly mentioned by faculty as factors that affected their job satisfaction.

To evaluate the effectiveness of this instrument, O'Hara (1992) conducted a study, which included 1,286 faculty from 25 community college campuses. The instrument used a 10-point scale for each item and included a space for a short comment. The researcher's results were consistent among campuses, indicating that the instrument's scores were reliable. Also, the written responses were consistent with the numeric answers. The results provided the campuses useful data about their performance.

The second instrument was based on the results of a project by Short and Greer (1989). From the project it was concluded that empowering faculty improved their productivity. Furthermore, empowering the faculty meant they would have more to say about student outcomes and course objectives,

which could include critical thinking. For these reasons, an instrument that measures empowerment was considered appropriate for this study.

Short and Rinehart (1992) constructed an instrument for measuring faculty's perceptions of empowerment. The School Participant Empowerment Scale (SPES) was developed over the course of three studies. During the first study, faculty were asked to suggest factors that increased their empowerment. These factors were reduced to 68 items by a team of experts. The second study asked faculty to rate these items on a 5-point Likert-type scale. Through factor analysis, the researchers identified six dimensions of empowerment: decision making, professional growth, status, self-efficacy, autonomy, and impact (p. 957). In addition, the results of this analysis were used to reduce the number of items to 38. The original 68-item instrument was used in a third study to test the validity of the scores.

In a related study, Thaxter and Graham (1999) wanted to examine community college faculty's perceptions of their participation in decision-making on their campus. In particular, they were interested in the extent that faculty participated in decisions about finance, instruction, personnel, mission, and students. To collect data for this study, the researchers developed an instrument that was mailed to faculty.

The instrument was developed from an analysis of the work of the authors of the two previously described instruments. First, the instrument

took into consideration three of the factors evaluated in O'Hara's (1992) study: participative management, taking part in the budget, and shared setting of goals and objectives. Second, the instrument reflected five of Short and Rinehart's (1992) original 11 dimensions of empowerment: involvement in decision-making, influence, control, responsibility, and collaboration. The resulting instrument was mailed to 100 faculty at community colleges in six states to validate the instrument's scores.

Thaxter and Graham's (1999) instrument consisted of 20 items scored on a 5-point Likert-type scale. In addition, the researchers included several demographic questions and two final items, for faculty to rate their campus's leadership style on a 10-point scale and provide comments.

The third of the three selected instruments was the School-Level Environment Questionnaire (SLEQ; Rentoul & Fraser, 1983). Lester and Bishop's (2000) handbook included a later revision described by Fisher and Fraser (1990). This 56-item instrument will be covered in detail in the next section. As the analysis will show, the SLEQ offered an excellent fit for this study and was developed specifically for educational organizations from another instrument with a proven track record.

School-Level Environment Questionnaire

School-level environment and classroom-level environment are distinctly different (Rentoul & Fraser, 1983). The classroom-level

environment involves relationships among students and relationships between students and their instructor. On the other hand, the school-level environment involves the relationships among faculty and the relationships between faculty and administration. Thus, the theory that supports school-level environment instruments is different from the theory behind classroom-level environment instruments.

The SLEQ is grounded in the theory of Moos's (1973) perceived climate scales. His theory identified three categories of dimensions, which can describe a wide range of environments: relationship dimensions, personal development dimensions, and system maintenance and system change dimensions. As was explained previously, the development of the Work Environment Scale (WES) was grounded in this theory, and the SLEQ was closely modeled after the WES.

Development of the SLEQ

In addition to modeling the SLEQ closely after the WES, the developers evaluated numerous other instruments. In particular, they analyzed the Learning Climate Inventory (LCI; Hoyle, 1975), the School Survey (Coughlan, 1970), the College Characteristics Index (CCI; Pace, & McFee, 1960), and the Institutional Functioning Inventory (IFI; Centra, Hartnett, & Peterson, 1970). However, they found shortcomings in all of these instruments (Rentoul & Fraser, 1983).

To develop an instrument that met their standards for a school-level environment instrument, Rentoul and Fraser (1983) established six criteria for the design.

1. *Consistency with literature*: Measurement items must be based on a literature review and the positive points found in other instruments (p. 28).
2. *Coverage of Moos's general categories*: Measurement items must cover all three categories of dimensions—relationship dimensions, personal development dimensions, and system maintenance and system change dimensions (p. 28).
3. *Salience to practicing teachers*: Measurement items must be relevant to the teachers who will be surveyed (p. 29).
4. *Specific relevance to schools*: Measurement items must be relevant to a school environment. Instruments like the WES were designed for a wide range of organizations, not specifically a school (p. 29).
5. *Minimal overlap with classroom environment instruments*: Consistent with the distinction between school-level and classroom-level environment, the measurement items must be based on the appropriate theory (p. 29).

6. *Economy*: The instrument must take a reasonable length of time to complete and score, so as not to consume excessive teacher or researcher time (p. 29).

The resulting 56-item instrument included seven items that addressed each of eight scales: "Affiliation, Student Supportiveness, Professional Interest, Achievement Orientation, Formalisation, Centralisation, Innovativeness, and Resource Adequacy" (Rentoul & Fraser, 1983, p. 29). The items were developed through the assistance of groups of educational researchers and tested with a sample of 83 faculty.

Two of the scale factors, affiliation and student supportiveness, fall into Moos's (1973) relationship dimensions, two factors, professional interest and achievement, fit the personal development dimensions, and the remaining four scale factors fit into Moos's system maintenance and system change dimensions (Rentoul & Fraser, 1983). After some initial use of the SLEQ, two factor names were changed and one factor was replaced. The final instrument consisted of 56 items with the following scale factors: student support, affiliation, professional interest, staff freedom, participatory decision-making, innovation, resource adequacy, and work pressure.

Fisher and Fraser (1990) stated three advantages of the SLEQ over other instruments: it is more accessible, it is designed for schools, and testing and scoring does not require much time (p. 2). In addition, validation data is

available from three studies (i.e., Fisher & Fraser, 1990; Johnson & Stevens, 2001; Rentoul & Fraser, 1983). These data indicate a satisfactory internal consistency for the scores of seven of the scales. The validity of the scores for the eighth scale—work pressure, which was substituted later—was evaluated in a later study. Also, these data indicated that the SLEQ was able to differentiate between schools.

Revisions to the SLEQ

Based on their study, Johnson and Stevens (2001) suggested a need to revise the SLEQ. Their factor analysis found that two of the scale factors, staff freedom and work pressure, did not appear to fit into the campus climate model. Also, two factors, student support and resource adequacy, were not strong contributors to the overall study. Their second point was taken into consideration in developing the instrument for this study.

In their revised SLEQ, Johnson, Stevens, and Zvoch (2007) eliminated three of the original scale factors: professional interest, staff freedom, and work pressure. After an evaluation of the remaining 35 items, they identified 14 items, which did not directly relate to their respective scale factors and deleted them. They also changed the names of the remaining five scale factors, as follows: collaboration, decision making, instructional innovation, student relations, and school resources (p. 835). Based on the SLEQ, this

instrument provided valid scores, despite the extensive deviation from the original instrument.

Duggan (2008) recommended community college leaders evaluate employee job satisfaction in relation to organizational climate to facilitate improvements. Eaton (1998) used the SLEQ to study the relationship between community college climate and two factors: faculty job satisfaction and job stress. Data were collected using an instrument developed by combining a job satisfaction instrument and a modified version of the SLEQ. The items were combined into one instrument, and some of the wording was changed to be appropriate for a community college. The same approach was used in this study to develop the instrument used to collect data.

The respondents consisted of 224 full-time faculty in one community college district. Eaton's (1998) instrument provided reliable scores, with internal consistency (i.e., Cronbach's alpha) coefficients ranging from .70 to .78. The study provided information that may contribute to improving the climate, as recommended by Duggan (2008), in the district where the research took place. This application of the SLEQ has a number of similarities to the use of the SLEQ in this study, such as the substitution of some items and the rewording of other items.

For this study, most of the SLEQ was kept intact. However, four changes were made to the instrument to meet the objectives of the study.

1. Items for two scales, student support and resource adequacy, were removed. These scales were removed for two reasons. First, Rentoul and Fraser (1983) made a case for limiting the total number of items to 56. Consequently, items needed to be eliminated to allow the addition of critical thinking and demographic items. Second, Johnson and Stevens (2001) noted that these two scale factors did not contribute significantly in their study.
2. Several words were replaced with words that are more appropriate for a community college instrument. For instance, faculty was substituted for teacher, college for school, and administration for senior staff or similar references. The new wording is consistent with wording used by O'Hara (1992) and others.
3. Seven critical thinking instruction items were added. These items were derived from this literature review.
4. Seven demographic questions were added to collect information about the participants and their colleges.

Based on these four recommendations and the recommendations for the critical thinking items described in the previous section, the SLEQ was modified and is described in detail in Chapter 3. The next section reviews literature related to the research method, which was applied to this study.

Quantitative Research Design

Research studies are generally categorized as quantitative, qualitative, or mixed methods (Leedy & Ormrod, 2005). Quantitative research uses a traditional or positivist approach to explain or predict phenomena by looking at the relationships among measured data. Qualitative research uses an interpretive or postpositive approach to analyze the nature of phenomena. Mixed methods is a combination of these two methods. The purpose of this study was to look at the relationship between teaching critical thinking and several climate factors. Hence, this study aligned with the objectives of quantitative research.

Two primary types of quantitative research methods are experimental and nonexperimental (Johnson & Christensen, 2004). In experimental research, the researcher uses an intervention to control an independent variable and measures the effect on a dependent variable. In nonexperimental research, the researcher collects data about all of the variables without controlling any of the variables (Kerlinger, 1986). Because the independent variables (campus climate factors) are not easily manipulated, this study used a nonexperimental approach and collected data by means of an online instrument.

Causal-comparative research and correlational research are two common approaches to nonexperimental research (Johnson & Christensen,

2004). Although the name seems to imply cause and effect, causal-comparative research is no more predictive than correlational research (Johnson, 2001). The difference is in the type of variables analyzed; causal-comparative research includes one or more categorical variables, such as gender or employment status (full-time or part-time). The following sections review some of the literature on research, with an emphasis on quantitative research and the application of a nonexperimental correlational design. Chapter 3 describes the application of these methods to this study.

Quantitative Versus Qualitative

Francisco, Butterfoss, and Capwell (2001) offered a comparison of qualitative and quantitative research. Some of the recommended usages of qualitative methods include (a) developing a depth of knowledge about a small group, (b) discovering new variables to be studied, and (c) identifying new relationships not previously known. Qualitative research looks for similar cases to expand its conclusions (Lund, 2005). However, generalization is less appropriate in qualitative studies because of the small numbers of participants that are studied.

Qualitative research may use cases to study internal phenomenon (Lund, 2005) and often involves observation, interviews, or other interactive data gathering activities. Qualitative research is sometimes used to understand a phenomenon from an insider's point of view (Pole, 2007). The

researcher is interested in the interconnection between the individuals in the study and the world in which they live.

In contrast, quantitative research is generally used to test or confirm an understanding of some relationship between measured variables (Francisco et al., 2001). Quantitative research does not usually assist in finding new relationships. Traditionally, quantitative research has been considered more objective and, as a result, more accurate and more repeatable than qualitative research (Pole, 2007). This assumption is primarily influenced by its scientific nature and its use in the physical sciences.

The objective of quantitative research is to understand the relationship among variables (Francisco et al., 2001). Using data from a larger sample than used in qualitative studies, the researcher can provide a broader understanding. Quantitative research uses samples of populations to study observable phenomenon and applies statistical methods to generalize sample data to a population (Lund, 2005). Similarly, this study used a sample of community college faculty to study campus climate and critical thinking instruction.

This discussion of quantitative and qualitative research has presented the aspects of quantitative research that appeared to have been a good fit for this study—confirm a relationship among variables and generalize it to a

sizeable population, which requires a large sample (Francisco et al., 2001). Although Lund (2005) suggested the differences between quantitative and qualitative research have narrowed in recent years, qualitative research would not implement the sample size needed to apply the statistical methods necessary to answer the research questions for this study (Pole, 2007).

Experimental Versus Nonexperimental Design

One only needs to look at a recent presidential election in the United States to see the power of nonexperimental research using a representative sample. By polling a fraction of a percent of the voters, polling organizations have been able to make extremely accurate predictions (Cook, Heath, & Thompson, 2000). In addition to this impressive strength, a number of other reasons for selecting a nonexperimental method for this study, particularly a correlational design, are described here. After all, many of the variables researchers study in the field of education cannot be easily manipulated. For this reason, much quantitative educational research depends on nonexperimental designs to collect data (Johnson, 2001). This variable manipulation limitation was true for this study. The independent variables—campus climate scales: participatory decision-making, staff freedom, and work pressure—could not be easily manipulated in an experiment.

The evaluation of student achievement and behavior is an example of an application of a nonexperimental correlational study (Ware & Galassi,

2006). School counselors can compare test scores recorded over a number of years to the specific time the tests were taken using regression analysis. The regression line can be compared to other students' growth over the same period of time to evaluate a student's achievement. In a correlational study more similar to this study, the researcher analyzed the relationship between organizational climate and faculty job satisfaction (Eaton, 1998). The study used the SLEQ (the instrument modified for this study) to measure organizational climate. The researcher concluded that affiliation—the interaction among faculty—had the greatest effect on job satisfaction.

Three aspects describe a correlational study (Thompson, Diamond, McWilliam, Snyder, & Snyder, 2005). First, correlational studies are quantitative designs. Second, correlational studies include multiple participants. Finally, in correlational studies, participants are not randomly assigned to conditions. One additional requirement of a correlational design is a relationship between the same number of observations of the independent and dependent variables (Leedy & Ormrod, 2005). This study fit this outline of a correlational study.

Multiple regression analysis is one of several methods commonly applied to complex correlational designs (Thompson et al., 2005). The need to understand the relationship among the variables in a correlational study calls for the aid of this analytical tool (Graham, & Nafukho, 2007). Moreover,

studies of the relationship between organizational climate and dependent variables generally use this type of analysis (Schulte, Shmulyian, Ostroff, & Kinicki, 2009). Described in detail in Chapter 3, multiple regression offers a flexible approach to study complex relationships among multiple variables (Hoyt, Leierer, & Millington, 2006).

Selected as the best method of analyzing the relationship between independent and dependent variables, multiple regression was used in a study to evaluate demographic characteristics of small businesses (Graham, & Nafukho, 2007). An interesting finding of the study was that employees with less than one year of work experience were highly correlated with employees without a college education and negatively correlated with college graduates. Eaton (1998) used multiple regression to analyze the relationship between climate factors, which were measured by the SLEQ, and job satisfaction, which was measured by another instrument. Eaton's application of regression analysis was a similar to the use in this study.

Sampling and Power

Purposeful sampling is a common technique for sampling minorities (Rankin & Reason, 2008). Random sampling may lead to a measurement of the climate heavily influenced by the majority represented in the population. The majority of the community colleges and faculty in the population (the western states) were located in California (U.S. Department of Education,

National Center for Education Statistics, 2009a). Hence, a technique, such as purposeful sampling, was needed in this study to ensure the minority colleges and faculty (non-California) were represented.

Power is the probability of identifying a relationship that exists between the independent and dependent variables in a study (Scherbaum & Ferreter, 2009). In the power calculation, a value of 0.05 is typically used for α, the probability of a Type I error (incorrectly rejecting the null hypothesis), and a value of 0.80 to 0.95 is typically used for the power. With an estimate of effect size, the required sample size can be calculated. Cohen (1992) recommended small, medium, and large values for estimating effect size (ES). For multiple regression analysis his estimates were ES = .35 (large), ES = .15 (medium), and ES = .02 (small). Cohen (Cohen, Cohen, West, & Aiken, 2003) also developed an equation for calculating an a priori sample from power

$$n = (L / ES) + k + 1$$

where L is found in a table for α = .05 by locating the column for power and the row for k; ES is selected as either large, medium, or small, and k is the number of independent variables. For example, for α = .05, power = .95, and k = 3 (three independent variables), L = 17.17 (from Table E.2 on page 651). For a medium effect size of .15, n = 119. A minimum sample of 119 participants would be recommended for this example.

Reliability

Cronbach's alpha was used to evaluate the reliability of the scores in this study. Coefficient alpha is an extension of a simpler method of evaluating reliability known as *split-half reliability* (Trochim, 2001). In split-half reliability, the correlation is calculated between the scores of one half of the items in a scale and the scores of the other half of the items in the same scale. Because all of the items measure the same construct, the scores should be highly correlated. Cronbach's alpha is the same as averaging all possible split-half calculations.

A condition that may adversely affect the calculation of coefficient alpha is known as outlying data points or simply as outliers (Liu & Zumbo, 2007). These data, also known as spurious or extreme data points, are inconsistent with the majority of the data points. The source of outliers falls into three categories: (a) errors occurring from data collection or manipulation, (b) errors produced by the participant's misunderstanding or inattentiveness, and (c) errors caused by including inappropriate participants in the research. Because of the nature of the data collection procedure and method of inviting participants for this study, the first and third situations are unlikely to occur in this study.

In this study, the second reason is the most likely cause of outliers: misunderstanding or inattentiveness. A participant may misinterpret a

question and provide a misleading response. Alternatively, a participant may be distracted or in a hurry, and, as a result, the participant may inadvertently select a response other than the one intended.

Online Instruments

An online instrument was used to collect data for this study. Some advantages of e-mail surveys can be applied to online instruments. Today, e-mail (online) is convenient for most people, particularly young adults and those associated with colleges and universities (Daley, McDermott, Brown, & Kittleson, 2003). E-mail and online instruments can be distributed quickly and completed at the participants' convenience. These online instruments are inexpensive and easy to construct and make changes.

A disadvantage of e-mail surveys is that they are not anonymous (Daley et al., 2003). However, online instruments do not have this shortcoming. Online instruments using services like SurveyMonkey (http://www.surveymonkey.com) can be set up to be virtually anonymous. Both e-mail and online surveys lack the control that is available to researchers applying face-to-face surveys. Response rates of e-mail surveys have been similar to mail surveys—about 30% (Kittleson, 1997). However, follow-up e-mails sent within a week can double this rate.

The rate is not the only response issue in the use of online data collection. The researcher needs to be conscious of possible bias caused by

those who do not respond (Miskel & Sandlin, 1981). In other words, those who do not complete the instrument may represent a group with a particular point of view that is important to the study.

Another advantage of surveys and similar instruments, like the one used in this study, is that most items are multiple-choice (Fink, 2006). A multiple-choice item is easy for the participant to answer and easy for the researcher to score. Moreover, because answers are based on a common measure, they are likely to produce better data than other types of responses. Rating scales or Likert-type items, which ask for several levels of agreement or disagreement, are multiple-choice. Hence, all of the items in the instrument for this study were the preferred, multiple-choice items.

Summary

In this chapter, some of the literature relating to the two major concepts of this study (critical thinking instruction and organizational climate) was described. In addition to describing the related literature, a need for a study that brings these concepts together has been demonstrated. Just as understanding campus climate has been an effective tool for administrators struggling with other issues, an understanding of climate may offer solutions to the critical thinking instruction problem.

Also reviewed in this chapter was literature describing the methods used in this study. In the next chapter, the research methods and their application are described in greater detail.

Chapter 3: Research Method

Chapters 1 and 2 have set the stage for this study. In Chapter 1, an overview of the study was presented, including brief summaries of the research design and the theoretical basis. The scholarship that explains and supports the basis for this study was described in Chapter 2. Also in Chapter 2, the gap in the research, which this study was designed to fill, was identified. This chapter provides details of the research method that was used in this study.

The chapter begins with a closer look at the research design and the reasons for choosing a quantitative approach. The next section describes the population and the group of community colleges, which include the population. This section also describes the sample, the targeted sample size, and the steps that were taken to draw the sample. Following sections describe the data collection process, instrument design, data collection and analysis, and the steps taken to protect the privacy of the participants.

Research Design

This study used a nonexperimental correlational design (Johnson & Christensen, 2004). Although qualitative research was considered for this study, the purpose of a qualitative design is to describe a phenomenon or develop a theory by studying a relatively small sample or group (Creswell, 2003). After a qualitative study has been used to develop a theory about a

topic by studying a representative group, such as a few faculty, the theory may be tested using a quantitative study. In this case, the first step had been accomplished in prior research and reported in the literature review. Consequently, a quantitative design to test the developed hypotheses was appropriate for this study.

Quantitative research is generally divided into experimental and nonexperimental designs. In an experimental study, the researcher tries to show a cause-and-effect relationship between an independent variable and a dependent variable by manipulating the independent variable and measuring the effect on the dependent variable (Johnson & Christensen, 2004). For example, a researcher may administer a test to students, raise the room temperature, and then administer a similar test to determine if room temperature (the independent variable) has an effect on test scores (the dependent variable).

In this study, the independent variables—three climate scales: participatory decision-making, staff freedom, or work pressure—could not be manipulated. Consequently, a nonexperimental design was necessary. Because so many variables cannot be manipulated in the field of education, nonexperimental research is a common strategy (Johnson, 2001). In correlational studies, the researcher studies the relationship between independent variables and dependent variables, without manipulating the

independent variables (Johnson, 2001; Johnson & Christensen, 2004). The purpose of this research was to study the relationship between three climate scales (the independent variables) and critical thinking instruction (the dependent variable) and generalize that relationship to the population. A correlational design fit this purpose.

In a correlational study, data representing a number of observations of the independent variable are compared to data representing the related observations of the dependent variable (Leedy & Ormrod, 2005). Similar to the previous example, the researcher could administer tests on several different days, measuring the room temperature and collecting the test scores on each day. The measured temperatures could subsequently be compared to the respective mean test scores. If the scores vary as the temperature varies, a correlation exists between the scores and the temperatures. Because this study is nonexperimental (the temperature was not controlled by the researcher), it is more difficult to draw a conclusion about causality (i.e., the change in temperature caused the change in test scores; Johnson, 2001). This relationship between temperature and test scores could be spurious, meaning that the outcome could be attributed to some other factor. Nevertheless, the predictive relationship may still be meaningful to understanding the focus of the study.

The purpose of this study was to examine the predictive relationship between campus climate and the implementation of critical thinking instruction in community college classrooms. Testing this hypothesis and making generalizable conclusions required a large sample. These objectives are consistent with quantitative research (Creswell, 2003).

Sample

Faculty were selected as the unit of study because they have the greatest impact on students' acquisition of critical thinking skills in the classroom (Nosich, 2005b; Snyder & Snyder, 2008; Tsui, 1999). Although classroom-level climate may have an effect on student learning, including learning critical thinking skills, school-level climate was studied because it affects faculty (Rentoul & Fraser, 1983), who have a direct impact on student learning. Administrators can have an indirect effect on classroom learning (Cohen & Brawer, 1996; O'Hara, 1992). However, administrators were not selected for the population because their influence is not likely as strong as that of faculty.

The Population

Although the theoretical population for this study was all U.S. community college faculty, the sample for this study was drawn from community college faculty from the seven contiguous states west of the Rocky Mountains: Arizona, California, Idaho, Nevada, Oregon, Utah, and

Washington. These colleges make up a significant representation, almost 20%, of the 1022 community colleges in the United States (U.S. Department of Education, National Center for Education Statistics, 2009a). There were 191 community colleges in the western states, with a total student enrollment of approximately 2 million in the fall of 2007.

A factor that contributed to the selection of this particular group of states was their diversity. For example, California has a large population, and its community colleges have a long history (Cohen & Brawer, 1996); four of the states are right-to-work states, which do not require their faculty to join unions (National Right to Work Legal Defense Foundation, 2008); and the colleges in these states are accredited by three different regional accrediting agencies (Council for Higher Education Accreditation, 2009). The diversity of this group strengthens the generalizability of the results of this study.

Although the size of the accessible faculty population was not directly available, data were available that could be used to interpolate the size of the population. The total number of faculty for all community colleges in the United States was 361,000 in the fall of 2003 (U.S. Department of Education, National Center for Education Statistics, 2009a). The total enrollment for all community colleges was 6.3 million students in the Fall of 2002. As a result, the student-to-faculty ratio was approximately 17:1 for that period of time.

The total enrollment for all community colleges was still 6.3 million in the fall of 2007, suggesting that the student-to-faculty ratio had likely remained constant. If the calculated nationwide student-to-faculty ratio of 17:1 was applied to the total enrollment of the western state community colleges (2 million), the population of faculty could be estimated to be 117,000. Using these same data, the average number of faculty per college could be estimated to be 600.

Sampling

The G*Power calculator was used to calculate the requisite sample size for a multiple regression test (Faul et al, 2007). The calculation assumed the following: α error probability = 0.05, power (ß – 1 error probability) = 0.95, number of predictors = 3, and effect size $f^2 = 0.15$ (medium effect size from Cohen, 1992). A sample size of 119 was calculated, which was exceeded in this study.

Purposive sampling was used to select the community colleges from which faculty were sampled for this study. Purposive sampling is a systematic approach to selecting participants based on a particular purpose (Johnson & Christensen, 2004; Leedy & Ormrod, 2005; Trochim, 2001). In this study, the purpose was to ensure diversity in the sample. The community colleges from which the sample was drawn were selected in two steps. First, the number of colleges to be selected from each state was determined, similar

to stratified sampling (sampling from divisions in the population). Second, colleges that are located in various types of communities and have varying student enrollments were selected from each state, similar to quota sampling (ensuring the sample includes a representation of particular groups). This sampling plan included participants from a diverse mix of community colleges.

Random sampling, which is considered to be the most representative sample of a population (Leedy & Ormrod, 2005), was not chosen for this study for two reasons. First, the population—all community college faculty in the western states—was not directly accessible. Second, a random sample of the population may not have been as representative of the diversity of this population as the purposive sample.

Thirteen community colleges were included in the study: one in Arizona, five in California, two in Idaho, two in Oregon, one in Utah, and two in Washington. The number of colleges selected from each state, although not proportional, was intended to relate to the number of community colleges in each state. For example, five colleges were selected from California, which had the largest number of community colleges, and one college was selected from Utah, which had only seven community colleges. Nevada was the only state without a participating community college. Drawing the sample from 13 colleges in six states likely offered a representative sample. Further

diversification was achieved by selecting colleges of varying enrollments and from various locations, such as large cities, suburbs, and rural areas. Estimating an average of 230 faculty per college for the selected 13 community colleges, the potential sample was about 3,000. The actual participation was 276 faculty, which resulted in a participation rate of 9.2%.

The colleges were selected by identifying the chief academic officer (CAO) of four or five colleges in each state, where possible. An e-mail request for cooperation was sent to each CAO. The e-mail briefly described the research and requested cooperation in the study. The first e-mails returned from each state were used in the study, and those CAOs received a second e-mail, which they were asked to forward to their faculty. This second e-mail was an invitation to faculty to complete the instrument and included a link to the online assessment. After the initial batch of e-mails was sent, this procedure was simplified. A new e-mail was used, which included both the request to participate and the faculty invitation with a link to the online assessment. This new e-mail requested the CAO forward the invitation to faculty if the college was willing to participate in the study. Samples of both invitation to participate e-mails can be found in Appendix A. Contacting more than the number of colleges needed for the study and selecting the initial respondents was similar to the method used by O'Hara (1992) to select colleges for his study.

The sampling strategy for this study provided a representative sample of faculty from a diverse collection of community colleges. The faculty sampled were representative of a variety of community colleges, both in size and location. To confirm the diversity of the sample, responses to seven demographic questions were tallied and reported. The demographic questions include three questions about the college: state, type of community, and student enrollment, and four questions about the faculty: full-time or part-time, subjects taught, years of teaching, and gender.

Instrumentation and Materials

As stated previously, the variables in this study were measured with a single online assessment approach. This instrument was used to measure faculty perceptions of their campus climate, their self-reported use of critical thinking instructional techniques in their classroom, and seven demographic factors. The first section of the instrument was based on a modified version of Rentoul and Fraser's (1983) School-Level Environment Questionnaire (SLEQ). The second section contained a researcher-designed measure of critical thinking instruction. The third section contained six demographic items to help describe the responding sample.

The Instrument

For this instrument to be usable in this research context, four modifications to the SLEQ were needed. As described in Chapter 2 and

detailed in Table 1, the modifications were (a) eliminate two scales, (b) add Critical Thinking scale items, (c) add demographic questions, and (d) change some wording of the SLEQ items. Permission to use and modify the SLEQ can be found in Appendix B.

Table 1

Modifications to the SLEQ

Original SLEQ	Revised SLEQ	Description of change
Seven items of the Affiliation scale	Seven items of the Affiliation scale	Only minor changes to wording appropriate to a college assessment
Seven items of the Innovation scale	Seven items of the Innovation scale	No change
Seven items of the Participatory Decision Making scale	Seven items of the Participatory Decision Making scale	Only minor changes to wording appropriate to a college assessment
Seven items of the Professional Interest scale	Seven items of the Professional Interest scale	Only minor changes to wording appropriate to a college assessment
Seven items of the Resource Adequacy scale	Seven items of the Critical Thinking scale	The Critical Thinking scale will be substituted for the Resource Adequacy scale, which did not contribute significantly to an earlier study
Seven items of the Staff Freedom scale	Seven items of the Staff Freedom scale	Only minor changes to wording appropriate to a college assessment
Seven items of the Student Support scale	Seven demographic questions	Seven demographic questions will be substituted for the Student Support scale, which did not contribute significantly to an earlier study
Seven items of the Work Pressure scale	Seven items of the Work Pressure scale	Only minor changes to wording appropriate to a college assessment

The perception of campus climate was measured in six scales: affiliation, professional interest, staff freedom, participatory decision-making, innovation, and work pressure. Through the literature review in Chapter 2, a list of seven topics was derived for defining Critical Thinking scale items, to

measure this construct. The seven topics are repeated here without the references.

1. Questioning techniques
2. Group activities
3. Begin course instruction with a few central concepts and emphasize the application of these concepts to the discipline
4. Analyzing arguments and reasoning
5. Practice is important
6. Instruction should begin with an explanation of critical thinking
7. Students should understand the importance of critical thinking

In developing the Critical Thinking scale items, an attempt was made to use wording that was consistent with the existing SLEQ items in order to improve the validity of the scores. Since some of the existing items were scored positive and some scored in reverse, two of the Critical Thinking scale items (items 3 & 5) were worded for reverse scoring. From the list of topics, the following items were developed.

1. My students frequently question the validity of course concepts.
2. I require my students to participate in frequent class discussions.
3. I always cover all of the course content in my classes.
4. My students have opportunities to use logic to analyze the arguments that support course concepts.

5. My lesson plans do not allow students much time to practice applying the course concepts.
6. I explain the concept of critical thinking to my students.
7. My students understand the importance of thinking critically.

Item 3 may require some explanation. The third topic is to teach a few central concepts. Nosich (2005b) introduced the Cover As Much Content As Possible Model, which is in direct opposition to teaching a few central concepts. For this reason, item 3 is a negatively worded item relating to this topic.

Seven demographic questions were added to the online assessment to collect data about various aspects of the participants and their colleges. Three questions related to the college size (student enrollment) and location (state and type of community), and four questions related to the faculty's employment (full-time or part-time), discipline (subjects taught, such as English, math, or science), experience (length of teaching), and gender. The selected college demographic factors were typical of those used to categorize colleges by organizations such as the National Center for Education Statistics (U.S. Department of Education, National Center for Education Statistics, 2009a) and commonly used in research (e.g., Calcagno et al., 2008). The selected faculty demographic questions were also commonly used in research (e.g., Hardy & Laanan, 2006; Thaxter & Graham, 1999).

The original SLEQ can be found in a number of the sources referenced here (e.g., Fisher & Fraser, 1990; Rentoul & Fraser, 1983), and the entire assessment, including the modified SLEQ, the Critical Thinking scale, and the demographic questions, can be found in Appendix C. As stated in Appendix C, the 49 climate and critical thinking items were answered on a 5-point Likert-type scale, ranging from 1 (*strongly agree*) to 5 (*strongly disagree*). Items 1, 3, 4, 5, 7, 9, 11, 14, 15, 16, 17, 19, 20, 28, 29, 30, 33, 34, 38, 39, 43, 45, 46, 49 were scored from 1 to 5 according to the order the selections are listed. The remaining items were scored in reverse order.

The item scores were combined by scale, providing seven totals, ranging from 7 to 35. These scores provided a measure of faculty's perception of each climate scale and self-reported application of critical thinking instructional techniques. The six demographic questions presented multiple-choice answers to the participants. The responses to these questions were totaled to describe the demographics of the respondents and their community colleges. The next section explains how these data were analyzed.

Reliability and Validity

As stated in the literature review, the reliability and validity of the scores from the SLEQ have been assessed in a number of studies (e.g., Fisher & Fraser, 1990; Johnson & Stevens, 2001; Rentoul & Fraser, 1983). Fisher and Fraser (1990) reported results of three samples that supported each

scale's internal consistency (reliability) and discriminant (construct) validity. This prior research supports the part of the current instrument that was based on the original SLEQ.

The Critical Thinking scale items were carefully developed from the literature review. However, the reliability and validity of the critical thinking scores were evaluated as part of this study. Three approaches were used in this study: internal consistency (i.e., Cronbach's alpha), face validity, and content validity.

The four types of reliability are inter-rater, test-retest, parallel-forms, and internal consistency (Johnson & Christensen, 2004; Trochim, 2001). Measuring inter-rate reliability is appropriate when humans are involved in the measurement process. Test-retest requires administering the instrument twice on two different occasions. Parallel-forms requires two similar tests to be administered to two samples of the population. Internal consistency, which measures the consistency among items within an instrument, was the most practical approach for this study.

Internal consistency was the approach previously used to demonstrate the reliability of the SLEQ scores. Split-half reliability compares the responses to half of the items in a category to the answers to the other half of the items (Johnson & Christensen, 2004; Trochim, 2001). Consistency between the two halves suggests that the instrument produces reliable

scores. Cronbach's alpha is a calculation that is equivalent to comparing all combinations of all halves of the instrument's items. This method was used to evaluate the reliability of all the scores in this study, including those produced by the Critical Thinking scale. In general, only scales with an alpha coefficient of at least .70 are used in a data analysis to assure acceptable measurement precision (Henson, 2001).

Leedy and Ormrod (2005) identified four types of instrument validity: face, content, criterion, and construct (p. 92). Face validity relies on the opinion of others about whether the instrument's scores are likely to be valid. When experts evaluate the face validity of an instrument, they also provide a check of content validity (Hubley & Zumbo, 1996), which indicates how well the instrument's scores measure a content area, such as critical thinking skills (Leedy & Ormrod, 2005). Criterion validity assesses how well an instrument's scores perform when compared to another instrument; construct validity assesses how well an instrument's scores measure a construct, such as campus climate.

As stated previously, discriminant validity was used to establish construct validity for the SLEQ scores in several previous studies (Fisher & Fraser, 1990). For this study, two types of validity were evaluated for the Critical Thinking scale items. First, expert face (content) validity has been strengthened by asking two groups to evaluate the items: the dissertation

committee and nine faculty members of various disciplines for a 2-year career college. The members of the dissertation committee and the selected faculty members served as teams of experts who evaluated the Critical Thinking scale items to determine if their scores would likely be valid. Several changes to the questions were recommended and incorporated.

The second type, content validity, indicates how well the instrument represents the domain to be measured (Leedy and Ormrod, 2005, p. 92). Content validity begins with a detailed description of the content domain to be measured (Trochim, 2001). To establish evidence of content validity, Johnson and Christensen (2004) recommended three steps, which were applied to developing the Critical Thinking scale. First, an understanding of the construct was developed, which was accomplished by the literature review. Second, the scale items were evaluated, which occurred as the items were developed from the list of topics derived from the literature review. Finally, a decision was made as to whether the scale items adequately represented the domain described in the first step. This decision was made after reviewing the information developed in the first two steps and completing a corrected item and scale analysis.

Data Collection and Analysis

The purpose of the online assessment was to collect data, which answered the following research question: To what extent do faculty's

perceptions of selected climate factors predict the self-reported use of critical thinking instructional techniques in the classroom? The following are the hypotheses.

Hypotheses

H_0: There is no significant relationship between the climate scales participatory decision-making, staff freedom, or work pressure and the Critical Thinking scale.

H_A: The climate scales participatory decision-making, staff freedom, and work pressure are directly related to the Critical Thinking scale.

Definition of Variables

The independent variables were three key campus climate scales: participatory decision-making, staff freedom, and work pressure, as measured by three scales on the modified SLEQ. The dependent variable for this study was the self-reported use of critical thinking teaching techniques in the classroom, as measured by the Critical Thinking scale. As stated previously, each variable was measured by a score from 7 to 35. The following are descriptions of the scales.

Critical thinking. Faculty assist students in learning critical thinking skills in their classrooms.

Participatory decision-making. Faculty have the opportunity to participate in college decision-making (Fisher & Fraser, 1990, p. 9).

Staff freedom. Faculty are free of restrictive rules and procedures, and they are not closely supervised to ensure rule compliance (Fisher & Fraser, 1990, p. 9).

Work pressure. Faculty are not under excessive pressure or required to work more than what they consider reasonable (Fisher & Fraser, 1990, p. 9).

Justification of Independent Variables

Shared governance improves faculty's feeling of empowerment, and empowerment improves learning opportunities (Alfred, 1998; Short & Greer, 1989). Participatory management was one of the factors that O'Hara (1992) identified as contributing to faculty effectiveness. In addition, Alfred (1998) stated that shared governance contributes to a college's ability to make improvements, which could include adopting critical thinking instruction. For these reasons, there is likely a positive correlation between participatory decision making and critical thinking instruction.

In a number of the studies cited in the literature review, the instructor deviated from the standard course plan or suggested that instructors should deviate from their standard course plans (e.g., Nosich, 2005b; Solon, 2007). These activities are only possible if faculty have a significant level of freedom

in the classroom, which O'Hara (1992) suggested contributes to their effectiveness. Thus, staff freedom is likely directly related to critical thinking instruction.

Workload was one of the most important environmental factors found by Bouton (2008) to have an effect on teaching critical thinking. Her dissertation was found to be the closest related study and was part of the justification for this study. This previous research suggests that the work pressure scale is directly related to critical thinking instruction.

Instrument Administration

The online assessment was administered using SurveyMonkey (http://www.surveymonkey.com). This widely used service offers a broad range of features, including the ability to retrieve the assessment data in a spreadsheet. Selected faculty were forwarded an e-mail with instructions and a link to the online assessment. The assessment began with a Consent to Participate (Appendix D), followed by five pages of items, which required less than 15 minutes to complete. The participant's consent was implied by completing the assessment. Screen shots of the online assessment can be found in Appendix E.

There are a number of advantages of using an online assessment (Creswell, 2003). First, data can be collected from a large sample relatively quickly. Second, an online instrument can offer an inexpensive method of

distributing the assessment, collecting the data, and tabulating the results. Third, an individual can administer this instrument and collect the data without the need of assistance, which may be needed for interviews or observations. The result of administering the instrument online was that a large amount of data, which provided a significant description of the population, was collected by a single researcher in a relatively short period of time.

There are some disadvantages of using an online administered instrument to collect data (Leedy & Ormrod, 2005). First, the data are self-reported and rely on the openness and honesty of the respondents. However, because the survey was anonymous, there was no reason for the respondent to provide socially desirable responses. Second, the response rate is generally lower for an instrument that is solicited via e-mail than types of research that involve face-to-face interaction. Consequently, the number of faculty asked to participate in this study had to be large enough to compensate for a lower response rate.

Data Analysis

The campus climate and critical thinking items were scaled using a 5-point Likert-type format. The total scores for each scale were organized in a spreadsheet for analysis. The independent variables were the total scores for each of the three previously identified campus climate scales: participatory

decision-making, staff freedom, and work pressure. The dependent variable was the total score for the Critical Thinking scale. Multiple regression analysis was used to compare the relationship between the three climate scales (the independent variables) and the Critical Thinking scale (the dependent variable).

Regression analysis is used to compare the relationship between two variables in experimental or nonexperimental research (Green & Salkind, 2005). In experimental research, the independent variable (*X*) is compared to the dependent variable (*Y*). In nonexperimental research, *X* is called the predictor and *Y* is called the criterion variable. The correlation between the *X* and *Y* variables is described by the regression equation $Y = BX + B_0$ and the correlation coefficient (*r*). B is the slope of the regression equation, which describes how much change in *Y* will result from a given change in *X*, and B_0 is a constant. The value of *r* will be between +1, indicating X and Y are directly related, and -1, indicating that X and Y are inversely related; a value of 0 indicates that *X* and *Y* are not related. r^2 indicates the amount of the *Y* variance, which is described by the relationship with *X*. For example, if *r* is 0.7, then r^2 is 0.49, or 49% of the variance in Y is accounted for by the relationship with X.

This study applied multiple regression analysis, which is used to compare the relationship among more than two variables. In an analysis with

three independent or predictor variables (like this study), the variables are labeled X_1, X_2, and X_3, and the dependent or criterion variable is labeled Y (Green & Salkind, 2005). Thus, the three climate scales were the predictor variables, and the Critical Thinking scale was the criterion variable. The correlation among the Xs and Y variables is described by the multiple regression equation $Y = B_1X_1 + B_2X_2 + B_3X_3 + B_0$ (Hoyt, Leierer, & Millington, 2006) and the multiple correlation coefficient (R), which will be between 0 and 1: 0 indicates no relationship among the variables and 1 indicates the change in the criterion variable is completely described by the predictor variables. The B factors indicate the weighting of the criterion variables or how much change in each of the criterion variables will result in a given change in the predictor variable. However, a standardized form of B, known as ß, may prove to be more meaningful in the analysis. ß is calculated by multiplying B by sd_1/sd_Y. As with regression analysis, the square of the multiple correlation coefficient (R^2) represents the percentage of the variance in Y described by the relationship.

In addition to calculating the Bs or ßs, R, and R^2, the F ratio was calculated to determine if the regression was statistically significant (Kerlinger & Pedhazur, 1973). The probability of the F ratio for the given degrees of freedom must be less than the error specified for the study—0.05 for this study. If this test is met, the values for B, R, and R^2 are considered

statistically significant and are used in the analysis. SPSS (2006) was used to calculate B, R, R^2, and the probability. After these calculations were made, conclusions were drawn from the results.

Only summary data and the statistical analysis of these data were included in this dissertation. The quantity of data made publication of individual data impractical and could have violated the protection of the human subjects.

Protection of Privacy

Three measures were taken to protect the participants' privacy in this study. First, the participants were not asked any questions of a personal nature. Second, the data for this study were collected by means of an online assessment, and participants were not asked for any identifying information, thus, ensuring their anonymity. Finally, only summary data was included in this dissertation. The raw data was not made available.

As required by Walden University, this study was approved by the Institutional Review Board (IRB) before the process of data collection began. Walden University's approval number for this study is 03-18-10-0219131 and it expires on March 17, 2011. The IRB process ensures that the study complies with the university's ethical standards and applicable United States regulations. Completion of a course in research ethics, federal regulations, and protection of privacy was a prerequisite to making the IRB submission.

Another requirement of the IRB is that all participants in the study acknowledge their consent to participate in the research. The Consent to Participate in this study, which provided the participant with important information about the study and advised them of their rights, can be found in Appendix D. Before completing the instrument, participants were presented with this page and informed that completing the instrument implied their consent.

Summary

Chapters 1 and 2 provided the background for this study. This chapter contains a description of the method for collecting and analyzing the data, which offered answers to the research questions. This chapter also provides a description of the research instrument—an instrument based on the SLEQ—and its development.

In Chapters 4 and 5, the results and conclusions of this study are presented. The appendices, which follow, include information supporting this study.

Chapter 4: Results

In Chapters 1 and 2, the reason and background for this study were described. In Chapter 3, the method, applied in this chapter, to collect and analyze the data for this study was described. In this chapter, the data analysis begins with a description of the actual data collection process. For the most part, data collection proceeded as it was planned, but some minor deviations are described. The report of the results includes the details of the demographic questions, reliability and validity estimations, and the multiple regression analysis. Some issues with the Critical Thinking scale are addressed, and the results of the regression analysis are reported.

Data Collection Process

The targeted community colleges for this research study were located in the western United States: Arizona, California, Idaho, Nevada, Oregon, Utah, and Washington. E-mails requesting participation in the study were sent to the chief academic officer (CAO) or other chief administrator of 55 community colleges located in these seven states. Although the original proposal prescribed contacting four or five colleges in each state, virtually every community college in Arizona and Oregon was contacted to achieve adequate participation in these two states.

Each e-mail was followed up by a phone call or second e-mail. Twenty three community colleges did not reply; 16 community colleges replied that

they were unable to participate in the study for various reasons, and 13 community colleges agreed to participate in the study. The remaining three colleges indicated that they were considering participation, but the administrators stopped responding to follow-up e-mails, suggesting that they had decided not to participate. About half of the participating colleges requested additional information from the dissertation proposal or the entire proposal before making a decision to participate.

The first 23 e-mails requested college participation without including information for faculty. Three of the colleges that received these e-mails promptly e-mailed their agreement to participate in the study. The CAOs for these three community colleges received a second e-mail acknowledging the agreement and inviting faculty participation; the e-mail included a link to the online instrument. In all other cases, an e-mail which included a request for college participation and an invitation to faculty was sent to each community college CAO. The e-mail requested that the CAO forward the *invitation to participate*, which included a link to the online instrument, to the faculty if the college was willing to participate in the study. Samples of the invitation to participate e-mails can be found in Appendix A.

Participating faculty, who received the invitation e-mail and clicked on the link to the online instrument, were redirected to SurveyMonkey. The online instrument consisted of 56 items: 42 campus climate items in six

scales, seven critical thinking instruction items, and seven demographic questions (see Appendix E). After completing the online instrument, the participants' responses were recorded in a database, which was accessible through a password protected web interface. After collecting responses over a 2-month period, the data were downloaded as Excel spreadsheets.

Research Question

A following section describes the multiple regression analysis used to answer the research question: To what extent do faculty's perceptions of selected climate factors predict the self-reported use of critical thinking instructional techniques in the classroom? These are the hypotheses, which follow from this research question.

Hypotheses

H_0: There is no significant relationship between the climate scales participatory decision-making, staff freedom, or work pressure and the critical thinking scale.

H_A: The climate scales participatory decision-making, staff freedom, and work pressure are directly related to the critical thinking scale.

The analysis which follows describes the reliability of the scores, as well as the results of the regression analysis. Because researchers are expected to go beyond reporting null hypothesis statistical significance

testing (American Psychological Association, 2010), effect sizes and confidence intervals provided a clearer picture of the results of the study. However, first, the sample, including some of its demographics, is described.

Sample

The population for this study was all faculty teaching at community colleges located in the seven contiguous states west of the Rocky Mountains. The total population was estimated to be 117,000 (U.S. Department of Education, National Center for Education Statistics, 2009a). The required sample size, which was calculated using the G*Power calculator (Faul, Erdfelder, Lang, & Buchner, 2007) and Cohen's (Cohen et al., 2003) equations, was 119. The actual sample, which completed the online survey, was over twice the required sample.

Of the 278 responses to the online instrument, two responses were removed from the data, leaving 276 valid responses. One of the respondents selected Nevada for the state and one of the respondents selected *other* for the state. The Nevada response was assumed to be an error because a Nevada college did not participate in the study. Because it was not possible to determine what the respondent intended to select, this response was removed. The *other* state response was eliminated from the data because the population for the study was the western states.

The instrument included seven demographic questions. Although the responses to the demographic questions indicated a diverse sample of respondents, the distribution of the sample may not have been the same as the distribution of the population. A detailed description of the demographics of the sample follows.

Campus Demographics

The first three demographic questions were related to the respondent's campus. The responses to these questions demonstrated the diversity of the campuses that participated in this study.

The highest number of responses was from California with 43.8% of the responses. In the population, the percentage of faculty teaching at California community colleges was over 50% (U.S. Department of Education, National Center for Education Statistics, 2009a). Although the next largest group of respondents was from Idaho with 26.1% of the responses, faculty teaching at Idaho community colleges made up a much lower percentage of the population. All of the responses are presented by state in Table 2.

Nearly half of the respondents were teaching in community colleges located in small cities. Although it is likely that most faculty teach in large cities or suburbs, these types of communities made up for only about one-fourth of the responses. All of the responses by community can be found in Table 3.

Table 2

Location of Respondent's Community College

State	n	%
Arizona	24	8.7
California	121	43.8
Idaho	72	26.1
Nevada	0	0.0
Oregon	16	5.8
Utah	14	5.1
Washington	29	10.5
Total	276	100.0

Table 3

Type of Community Where Respondent's College is Located

Community	n	%
Large city	19	6.9
Large city suburb	58	21.0
Small city	115	41.7
Small town	48	17.4
Rural	36	13.0
Total	276	100.0

Over half of the respondents were teaching in community colleges with an enrollment of 5,000 students or more, and nearly one-fourth taught at large colleges of over 10,000 students. Slightly less than 10% of the respondents were teaching at small community colleges. Table 4 includes a complete list of the enrollment data.

Table 4

Enrollment of Respondent's Community College

Students	n	%
Less than 1,500	23	8.3
1,501 to 3,000	51	18.5
3,001 to 5,000	45	16.3
5,001 to 10,000	90	32.6
More than 10,000	67	24.3
Total	276	100.0

Faculty Demographics

The preceding data described the respondents' institutions; the following data refer to the respondents. The responses to these questions indicate that the faculty were as diverse as the campuses where they taught. Full-time faculty comprised 183 or 66.3% of the sample, and 93 or 33.7% of the respondents were part-time faculty. Nationally, 33.3% of community college faculty were full-time and 66.7% of the faculty were part-time (U.S. Department of Education, National Center for Education Statistics, 2004), suggesting that part-time faculty participated at a much lower rate than full-time faculty.

Table 5 lists the subject or subjects taught by the respondents. About one-fourth of the responding faculty taught career or technical courses, which are emphasized in community colleges. The next largest group of courses was *other*, which indicates that nearly a quarter of the faculty taught in an unidentified discipline. The other subjects were more evenly distributed. The

total percentage in Table 5 exceeds 100% because some faculty reported teaching more than one subject.

Table 5

Respondent's Teaching Discipline

Subject	n	%
Career/Technical	72	26.1
English/Speech/ESL	43	15.6
Humanities	25	9.1
Math	27	9.8
Natural Science	32	11.6
Social/Behavioral Science	55	19.9
Other	64	23.2
Total	318	115.2

More than half of the faculty responding to the study had over 10 years of teaching experience. Only 6.9% had less than 2 years of experience. The complete list of experience data is found in Table 6.

Table 6

Respondent's Teaching Experience

Years experience	n	%
Less than 2	19	6.9
2 to 5	53	19.2
6 to 10	56	20.3
11 to 20	83	30.1
More than 20	65	23.6
Total	276	100.0

The final demographic question indicated that 164 or 59.4% of the respondents were women and 112 or 40.6% were men. Nationally, the split between men and women faculty was nearly equal, with about 50.7% men

and 49.3% women (U.S. Department of Education, National Center for Education Statistics, 2004). None of the demographic data suggested that a particular group was over or under represented.

Results

The campus climate and critical thinking data were analyzed using SPSS (2006) version 14.0. Before using multiple regression analysis to answer the research question, the reliability and descriptive statistics of the scores were evaluated. As stated in Chapter 3, internal consistency was used to evaluate the reliability of the scores.

Critical Thinking Scale

The three campus climate scales used in the regression analysis were taken from the original SLEQ (Fisher & Fraser, 1990). These scales have been evaluated in a number of prior studies, which evaluated the reliability and validity of their scores (e.g., Fisher & Fraser, 1990; Johnson & Stevens, 2001; Rentoul & Fraser, 1983). The Critical Thinking scale used in this study was developed from the literature review and evaluated by a number of academics. However, this scale was not subjected to the prior research and analysis that the SLEQ scales experienced. Consequently, the critical thinking scores were carefully analyzed before proceeding with the regression analysis.

The inter-item correlation matrix for the Critical Thinking scale is presented in Table 7. The table indicates poor correlation between item 1 and the other items, varying from r = -.19 to r = -.01, and only one correlation coefficient (the correlation with item 4) was significant. Also, the correlation between item 3 and the other items, although mostly significant, was negative, varying from r = -.25 to r = -.07. All of the remaining correlation coefficients, except for the correlation between item 2 and item 5, were significant, positive, and at least .22. Significant, positive inter-item correlation coefficients suggest that the items in the scale measured the same construct.

Table 7

Inter-item Correlation Matrix for Critical Thinking Scale

Item	1	2	3	4	5	6	7
1. My students frequently question the validity of course concepts.	1						
2. I require my students to participate in frequent class discussions.	-.01	1					
3. I always cover all of the course content in my classes.	-.07	-.14*	1				
4. My students have opportunities to use logic to analyze the arguments that support course concepts.	-.19**	.22**	.21**	1			
5. My lesson plans do not allow students much time to practice applying the course concepts.	-.12	.08	-.25**	.26**	1		
6. I explain the concept of critical thinking to my students.	-.05	.34**	-.17**	.38**	.26**	1	
7. My students understand the importance of thinking critically.	-.10	.30**	-.18**	.43**	.22**	.49**	1

Note. ** denotes correlation is significant at the .01 level (2-tailed).
* denotes correlation is significant at the .05 level (2-tailed).

Another indication of how well an item "fits" a scale—corrected item-total correlation—is presented in Table 8. Corrected item-total correlation is the correlation between an item and the total scale without that item. These values are consistent with the discussion on inter-item correlation. The corrected item-total correlation for item 1 is a low negative value, suggesting poor correlation. The corrected item-total correlation for item 3 is negative but a relatively high value, suggesting an inverse relationship.

Table 8

Item Statistics of Critical Thinking Scale

Item	Corrected item-total correlation	Cronbach's alpha if item deleted
1	-.17	.42
2	.28	.13
3	-.31	.53
4	.31	.14
5	.12	.24
6	.46	-.02
7	.42	.04

The correlation coefficients for item 1 are very low and not significant, and the corrected item-total correlation is low and negative. These results suggested that this item did not measure the same construct as the other items. Further analysis revealed that this item asked about students' behavior, not how instruction was provided to students. Although the item was meant to solicit responses indicating whether the students were taught questioning techniques (taught to question concepts), the responses more likely indicated something about the students. Because students and their

behavior can vary from class-to-class, the responses to this item were not likely to correlate with any of the other items or scales.

On the other hand, the corrected item-total correlation for item 3 is negative and relatively high. This result suggested that this item measured the inverse of what it was intended to measure. A close evaluation of the instrument and the data indicated that the item had been scored correctly, ruling out the possibility that the inversion was caused by a data collection error. The purpose of this item was to determine whether faculty focused on teaching the central concepts instead of trying to get through all of the course content. Scoring high on this item required a *disagree* or *strongly disagree* response. However, faculty who effectively teach critical thinking skills may have interpreted this item to mean "I always cover all of the *essential* course content in my classes" or something to that effect. In this case, effective faculty would select *agree* or *strongly agree* and receive a low score for this response, which would inversely correlate with their other responses.

Based on the lack of correlation between these two items and the remainder of the scale, removing items 1 and 3 from the Critical Thinking scale seemed appropriate. Calculating Cronbach's alpha for the Critical Thinking scale further supported the removal of items 1 and 3 from the scale. The calculation with all items included yielded an alpha coefficient of .35, considerably lower than the recommended minimum (Henson, 2001). When

calculating coefficient alpha, SPSS can generate a table that lists the values of alpha if each item is deleted. The values from that table are presented in Table 8. Note that deleting item 1 or item 3 would result in a significant increase in alpha. In fact, deleting both items 1 and 3 resulted in an increase of the internal consistency estimate from .35 to .68, nearly the recommended minimum of .70.

Based on the evaluation of the inter-item correlation coefficients, corrected item-total correlation, possible explanations for the poor correlations, and the results of the internal consistency estimates, items 1 and 3 were deleted from the Critical Thinking scale before the scores were used in the multiple regression analysis. The scores, based on the remaining five items, likely provided a reasonable measure of critical thinking instruction.

Reliability

The Cronbach's alpha (internal consistency) coefficients for the scores on each of the scales used in the regression analysis are listed in Table 9. The alpha coefficients for scores on participatory decision-making and work pressure exceeded .70, a recommended minimum (Henson, 2001). However, the reliability estimates for scores on staff freedom and critical thinking fell short of this recommendation.

Table 9

Reliability of the Scales

Scale	Cronbach's alpha
Staff Freedom	.57
Participatory Decision-making	.83
Work Pressure	.75
Critical Thinking Instruction	.68

Note. Items 1 and 3 removed from the Critical Thinking scale.

The internal consistency for the Critical Thinking scale was addressed in the previous section. After removing two items, which did not correlate with the scale, the alpha coefficient approached the recommended minimum. The Staff Freedom scale was part of the SLEQ, and acceptable reliability of its scores has been demonstrated in a number of prior studies (e.g., Fisher & Fraser, 1990; Johnson & Stevens, 2001). The alpha coefficients for staff freedom in the three samples Fisher and Fraser (1990) used to validate the SLEQ ranged from .64 to .73. In addition, Eaton (1998) used the SLEQ in a study of community colleges and reported an alpha coefficient for staff freedom of .77. The internal consistency for this scale appears to have varied from sample-to-sample, even dropping below .70.

A possible explanation for the low alpha coefficient estimates for the Staff Freedom and Critical Thinking scales is what is known as outliers (Liu & Zumbo, 2007). Three causes for outliers were presented in Chapter 3, and the second reason—misunderstanding or inattentiveness—was described as the most likely cause of outliers in this study. In other word, respondents

may have misinterpreted some items in these two scales, providing responses that were inconsistent with the other items in the scales. Given the strength of the instrument in previous studies, a choice was made to move forward with the current level of internal consistency and risk spurious results.

Descriptive Statistics

Table 10 displays the descriptive statistics for the variables used in the regression analysis. The means for staff freedom, participatory decision-making, and critical thinking are located near their respective medians (21, 21, and 15), and the scales are normally distributed around the means. However the mean for work pressure is well below its median (21), indicating that work pressure is skewed below the median. These results suggest that the majority of faculty perceived they were working under significant pressure or working long hours.

Table 10

Descriptive Statistics of the Variables

Scale	Mean	Standard Deviation	Minimum	Maximum
1. Staff Freedom	22.52	3.93	12	34
2. Participatory Decision-making	21.66	5.30	7	34
3. Work Pressure	16.86	4.51	7	34
4. Critical Thinking Instruction	19.70	2.92	12	25

Note. Items 1 and 3 removed from the Critical Thinking scale.

The descriptive statistics may offer some insight into the low alpha coefficients for Staff Freedom and Critical Thinking. In the equation for coefficient alpha, the ratio of item variances to total variance is a meaningful

factor (Henson, 2001). If the number of items is held constant, coefficient alpha will increase with total scale variance and decrease with the sum of the item variances. Consequently, the relatively low variance of the Staff Freedom scale (15.4) and Critical Thinking scale (8.5) make a higher alpha coefficient mathematically more difficult for these scales.

Multiple Regression Analysis

A multiple regression analysis was conducted to predict the use of critical thinking instructional techniques in the classroom from staff freedom, participatory decision-making, and work pressure. Staff freedom describes faculty's perception that they are free from restrictive rules and procedures and are not closely supervised to ensure rule compliance. Participatory decision-making describes faculty's perception of opportunity to participate in college decision-making. Work pressure describes faculty's perception of working without excessive pressure and having a reasonable workload. The dependent variable, critical thinking instruction, describes faculty's assistance of students in learning critical thinking skills in their classrooms.

The multiple correlation coefficient $R = .27$, and $R^2 = .07$. SPSS also reported an adjusted $R^2 = .06$, $F(3, 272) = 6.88$, $p < .001$. $R^2 = .06$ indicates that 6% of the variance in critical thinking instruction (the dependent variable) was accounted for by the weighted three independent variables (Cohen et al., 2003).

Table 11 presents the regression coefficients associated with the multiple regression analysis. The values of B suggest that critical thinking instruction is directly related to participatory decision-making and inversely related to staff freedom and work pressure. The regression equation is

$$Y_{CT} = -.13X_{SF} + .14X_{PD} - .04X_{WP} + 20.24$$

where Y_{CT} (critical thinking instruction) is the dependent variable and X_{SF} (staff freedom), X_{PD} (participatory decision-making), and X_{WP} (work pressure) are the independent variables. The largest contribution to the relationship is from staff freedom, and the smallest contribution to the relationship, which is not statistically significant, is from work pressure.

Table 11

Regression Coefficients

Scale	B	95% confidence interval	Beta
Constant	20.24**	17.96 to 22.52	
Staff Freedom	-.13*	-.22 to -.04	-.17
Participatory Decision-making	.14**	.07 to .21	.25
Work Pressure	-.04	-.12 to .03	-.07

Note. ** $p < .001$.
* $p = .007$.

Critical thinking instruction varied inversely with staff freedom, suggesting that faculty teaching in a more structured environment (less staff freedom) may be more likely to emphasize critical thinking instruction in their classrooms. The regression coefficient for staff freedom was significant ($p = .007$) and the effect size is presented in Table 11. Critical thinking varied

directly with participatory decision-making, suggesting that faculty who have an opportunity to participate in campus decision-making may be more likely to emphasize critical thinking instruction. The regression coefficient for participatory decision-making was also significant ($p < .001$) and the effect size is presented in Table 11.

Critical thinking instruction varied inversely with work pressure, suggesting that faculty under excessive pressure or heavy workloads might be more likely to emphasize critical thinking instruction. However, the regression coefficient for work pressure was not significant as can be seen from the effect size, which varies from -.12 to .03 (refer to Table 11). This range indicates that the regression coefficient for work pressure could be positive or zero (indicating no relationship between work pressure and critical thinking instruction), as well as negative.

The regression analysis did answer the question: to what extent do faculty's perceptions of the selected climate factors predict critical thinking instruction. However, the alternative hypothesis was only partially confirmed. Participatory decision-making was the only factor directly related to critical thinking instruction. Staff freedom was inversely related to critical thinking instruction, and the relationship between work pressure and critical thinking instruction was inconclusive.

Summary

In this chapter, the data collection process, which closely followed the original proposal, was described. The sample that was drawn using this process appears to have met the objectives of the research proposal. The diversity of the sample was demonstrated by the demographic data. The climate data and Critical Thinking scale were analyzed for reliability using Cronbach's alpha. In all but one case, these calculations were found to meet recommended standards.

The multiple regression analysis confirmed that there is a relationship between two of the independent variables—staff freedom and participatory decision-making—and the dependent variable—critical thinking instruction. However, the relationship between staff freedom and critical thinking instruction was the inverse of what was hypothesized. Furthermore, the relationship between the third independent variable (work pressure) and critical thinking instruction was inconclusive.

Chapter 5: Discussion, Conclusions, and Recommendations

In the previous chapter, the results of the data analysis were reviewed. In this chapter, the entire study, including the purpose, research question, and how the collected data answered the research question are reviewed. The chapter provides an analysis of the results as they relate to the scholarship presented in Chapter 2. In addition, recommendations for applying the knowledge gained from this study are offered as well as suggestions for further research in this area. Finally, this study's contribution to social change is explored.

Findings of the Study

For many years, critical thinking has been recognized as an important skill for students, employees, and members of a democratic society (Brookfield, 2005; Halpern, 1998; Pedicino, 2008; Tsui, 2006). Critical thinking skills improve students' ability to perform academically and increase their motivation to learn (Rugutt & Chemosit, 2009; Williams & Worth, 2003). Today's employers expect their employees to think critically (Pithers & Soden, 2000; Stupnisky et al., 2008), and analyzing social and political issues requires critical thinking (Halpern, 2003; Peace, 2010). Despite these requirements, research suggests that students are graduating from college without these skills (Peirce, 2005; Snyder & Snyder, 2008; van Gelder, 2005).

The knowledge of factors that influence critical thinking instruction in community college classrooms may lead to an improvement of this situation. Empirical research on critical thinking instruction (Bouton, 2008) suggests that organizational climate factors may partially explain the level of instruction in the classroom, and theoretical research (e.g., Ekvall & Ryhammar, 1999; O'Hara, 1992) suggests that leaders can influence organizational behavior by transforming organizational climate. Accordingly, understanding the relationship between critical thinking instruction and organizational or campus climate may offer community college leaders a method of increasing their students' opportunity to learn critical thinking skills. However, research studying the relationship between campus climate and critical thinking instruction appears lacking.

To fill this gap, this study used a purposive sample of faculty from 13 community colleges located in six states west of the Rocky Mountains: Arizona, California, Idaho, Oregon, Utah, and Washington. The chief academic officers for these colleges were asked to forward an invitation to participate e-mail to their faculty. The 276 faculty, who volunteered to participate in the study, selected a link in the e-mail and were redirected to an online instrument consisting of 56 multiple-choice items. The instrument consisted of 42 campus climate items in six categories, seven critical thinking instruction items, and seven demographic questions.

The campus climate items were taken from the School-Level Environment Questionnaire (SLEQ; Fisher & Fraser, 1990), which was based on Moos's (1973, 1979) organizational climate theory. Moos's theory has been applied to studying the climate of a number of environments, such as family, work, and academic environments. The critical thinking instruction items were based on the concepts of a number of theorists (e.g., Brookfield, 2005; Halpern, 1998, 2003; Nosich, 2005a, 2005b; van Gelder, 2005). The techniques that repeatedly appeared in their models provided guidance for developing seven items, which were combined with the campus climate items.

The demographic data for the population were insufficient to determine how closely the sample matched the population. However, the collected demographic data demonstrated the diversity of the sample, although not necessarily identical to the population. Three demographic questions described the location, community, and size of the respondent's college, and four questions described the experience, teaching discipline, employment status, and gender of the respondent. All of the demographic categories, other than colleges located in Nevada, were represented in the sample data.

Although the responding faculty represented six of the seven states in the target population, distribution of the sample among the states was not the same as the population. One reason for this difference in the demographic

distribution was purposive sampling, which was used to increase the representation of under-represented groups—states with significantly less community colleges than a state like California. Another reason for the distribution difference was the variation in cooperation of colleges and their faculty from various states and communities. For example, two colleges in Idaho (a state with relatively few community colleges) readily agreed to participate, and their faculty participated at a higher rate (36 faculty per college) than the college average (21 faculty per college).

The distribution among types of communities followed a similar pattern. Purposive sampling was used to ensure representation from all types of communities. However, the likelihood of a college's participation appeared to be related to the type of community. For example, large cities usually have a number of community colleges. However, these colleges were less likely than colleges in smaller communities to respond to a request to participate.

The faculty demographics were more normally dispersed. One of the limitations stated for this study was that a particular group may be underrepresented. To the extent that the responses to demographic questions describe groups of faculty (e.g., gender, teaching experience, full-time or part-time), all of the groups appeared to have been well represented. However, other demographic factors, which were not measured, may describe an unrepresented group.

National statistics for community colleges were available for comparison with the results of two of the demographic questions (U.S. Department of Education, National Center for Education Statistics, 2004). Compared to national statistics, women were slightly over represented and full-time faculty were significantly over represented in this study. Full-time faculty may have had greater availability and interest in completing the online instrument. Neither of these disparities is likely to have an adverse effect on the results.

Before analysis, internal consistency (i.e., Cronbach's alpha) was calculated to evaluate the reliability of the scores. The calculations for two of the scales—staff freedom and critical thinking instruction—fell short of the .70 recommended minimum (Henson, 2001). However, after removing two items from the Critical Thinking scale, the alpha coefficient for those scores increased to .68, nearly the recommended minimum.

The validity of the scores for the critical thinking scales has been demonstrated in a number of studies (e.g., Fisher & Fraser, 1990; Johnson & Stevens, 2001; Rentoul & Fraser, 1983). The validity of the Critical Thinking scale scores has been demonstrated by three methods. First, the scale was developed based on a literature review of the scholarship relating to critical thinking instruction applied to college classrooms. This detailed review illuminated seven instructional techniques, which were the basis for the

seven items in the scale (content validity). Second, to establish face validity, the scale items were reviewed by the dissertation committee and a group of college faculty representing various disciplines. Finally, the results of this study partially supported the hypothesis, which indicated a degree of construct validity in the Critical Thinking scale scores.

The descriptive statistics for the independent and dependent variables indicated that all of the variables were normally distributed around a mean. The mean of staff freedom, participatory decision-making, and critical thinking instruction were close to their respective medians. However, the mean for work pressure was below the median, suggesting that the responses were skewed. These results indicated that most faculty perceived that they work long hours or under significant pressure.

A multiple regression analysis was conducted to answer the primary research question, which looked for a relationship between the independent variables—staff freedom, participative decision-making, and work pressure—and the dependent variable—critical thinking instruction. The regression analysis confirmed a relationship between two of the independent variables and the dependent variable, and an interpretation of the findings is presented in the next section.

Interpretation of the Findings

The primary research question assessed the extent to which faculty perceptions of staff freedom, participatory decision-making, and work pressure predict the self-reported use of critical thinking instructional techniques in the classroom. Although the multiple correlation coefficient (R^2 = .06) indicated a relationship between the independent variables and the dependent variable, the results of the multiple regression analysis provided some unexpected results. As predicted, the regression coefficients suggested a direct relationship between participatory decision-making and critical thinking instruction. However, the staff freedom coefficient was negative, suggesting an inverse relationship between staff freedom and critical thinking instruction. Moreover, the coefficient for work pressure was not statistically significant.

Staff freedom was hypothesized to be a factor contributing to critical thinking instruction because some researchers in the literature (e.g., Nosich, 2005b; Solon, 2007) deviated from their standard course plan to implement critical thinking instruction techniques in their classrooms, which would require a significant level of freedom in the classroom. In addition, O'Hara (1992) suggested that freedom contributes to faculty effectiveness. However, Mars and Ginter's (2007) study of the relationship between campus climate and institutional technology found that more structured institutions with

clear policies and incentives were more successful at implementing technology. The same concept may be true for implementing critical thinking instruction in the classroom, suggesting the need for structure, an implementation policy, and incentives. Mars and Ginter's findings appear to explain the inverse relationship suggested by the regression analysis.

The direct relationship between participatory decision-making and critical thinking instruction suggests that arguments for this relationship were valid. These arguments included the direct relationship between shared governance and faculty's feeling of empowerment (Alfred, 1998; Short & Greer, 1989) and Alfred's (1998) finding that shared governance contributes to a college's ability to make improvements. In addition, O'Hara (1992) identified participatory management as one of the factors that contributes to faculty effectiveness.

An initial reaction may be that an inverse relationship between staff freedom and critical thinking instruction and a direct relationship between participatory decision-making and critical thinking instruction are a contradiction. However, this relationship is similar to other organizational situations. For example, military staff may participate in organizational decision-making, including policy making. Nevertheless, after decisions are made, strict adherence to policies is required and enforced. Thus, community college faculty may participate in developing a critical thinking instructional

program, which includes stringent instructional guidelines. Following the adoption of the plan, faculty will be required to adhere to those guidelines in their classrooms.

Although the regression coefficient for work pressure was negative, the result was not statistically significant. The effect size for work pressure indicated that the regression coefficient could vary from -.12 to .03. Consequently, with 95% confidence, the regression coefficient could be positive or zero (indicating no relationship), as well as negative. Although Bouton's (2008) study suggested that there may be a direct relationship between work pressure and critical thinking instruction, her sample was comprised of only seven faculty.

Prior to this study, the research analyzing the relationship between campus climate and critical thinking instruction was lacking. This study demonstrated a relationship between two campus climate factors—staff freedom and participatory decision-making—and critical thinking instruction. Although the sample consisted of 276 faculty in six western states, the results can likely be generalized to all community colleges in the United States.

Recommendations for Action

The purpose of studying campus climate factors that may influence critical thinking instruction was to help community college leaders identify a

means of improving their students' critical thinking skills. To this end, the findings of this study should be disseminated to community college leaders (administration and faculty leaders) throughout the United States, so those leaders can apply the information. As a first step, this study will be sent to the chief academic officer of each of the participating community colleges.

The sharing of this information may lead to some leaders taking steps to transform one or both campus climate factors identified as having a relationship with critical thinking instruction. For example, college administration may implement or improve a faculty senate to increase faculty's opportunity to participate in campus decision-making. Or, college leaders may develop critical thinking instruction programs, which include strict guidelines for implementing critical thinking instruction in the classroom.

Although not a primary objective of this study, Chapter 2 describes an extensive list of references for developing a critical thinking instruction program. Of particular interest are the works of Barnes (2005), Browne and Meuti (1999), Elder (2005), and Peirce (2005), who offer insight into how to design and manage a critical thinking program for a community college. Some of their recommendations include (a) secure administrative support for the program, (b) involve faculty in the planning and implementation (participatory decision-making), (c) provide workshops for all faculty, (d)

implement critical thinking assessments, and (e) find a critical thinking champion to keep the program on track.

Chapter 2 and the reference list for this study may provide a starting point for those who wish to take on the challenge of developing a critical thinking program. Halpern (1998) offers a simple set of guidelines for developing curriculum, and a number of other researchers offer suggestions for implementation (e.g., Beyer, 2008; Nosich, 2005b; Peace, 2010; Sezer, 2008; Snyder & Snyder, 2008; Solon, 2007; van Gelder, 2005). In addition, Halpern's (2003) text can supplement a course in most any discipline or serve as the primary text for a critical thinking course.

Recommendations for Further Study

A number of new studies could build on or support the findings of this study. The first recommendation is to repeat this study with a new sample. However, before repeating the study, the Critical Thinking scale needs to be revised and tested. Using the literature review was an effective approach to developing the critical thinking scale items, but items 1 and 3 need to be replaced and the scale pilot tested before any new studies.

Second, the data from this study (or a new study) could be divided by demographic factors to determine if the results vary by those factors. For example, the data could be divided by state. Then, the data for the right-to-work states (Arizona, Idaho, and Utah; National Right to Work Legal Defense

Foundation, 2008) would be combined, and the data for the remaining states (California, Oregon, and Washington) would be combined. A separate multiple regression analysis on each set of data would determine if the relationship between the independent and dependent variables varies relative to the college structure. The same analysis could be conducted by gender to determine if the relationship between the independent and dependent variables varies relative to that factor. Obtaining similar results from each demographic group would strengthen the findings of this study.

The third recommendation is to conduct a longitudinal study of a community college implementing changes to one or both of the campus climate factors shown to be related to critical thinking instruction. The college would need to periodically assess students' critical thinking skills in early term and late term courses. An instrument like the Cornell Z Critical Thinking Test (Solon, 2007) could be used for these assessments. A longitudinal study of this type may confirm the relationships identified in this study.

This study analyzed the relationship between three independent variables—staff freedom, participatory decision-making, and work pressure—and critical thinking instruction. The fourth recommendation is to analyze the relationship between other climate scales, such as affiliation, professional interest, or innovation, and critical thinking instruction. Although, the data

for this study could be used for the analysis, improving the critical thinking scale and repeating the study before the analysis is recommended.

Implications for Social Change

Agreement is strong that critical thinking is an important skill for participation in a democratic society (Brookfield, 2005; Snyder & Snyder, 2008). Critical thinking is often required to evaluate the conflicting information presented by politicians, the media, and the Internet (Brookfield, 2005; Halpern, 2003; Peace, 2010; Tsui, 1999). Norris (1985) also noted that making moral decisions often requires critical thinking. For these reasons, improving the critical thinking skills of members of a democracy constitutes a positive social change.

Community colleges have played an important role in the education of society's adults (Cohen & Brawer, 1996). The open-access policies of community colleges position them as the ideal institutions for developing critical thinking skills. Accordingly, this study focused on community colleges and critical thinking with a goal of facilitating an improvement in adults' critical thinking skills and a significant positive social change.

This study identified two climate factors related to critical thinking instruction, which community college leaders may be able to influence. By transforming their colleges' climate, these leaders may encourage faculty to focus on critical thinking instruction, resulting in more students leaving

community colleges with greater critical thinking skills. This improvement in students' critical thinking skills could make a significant contribution to society and the success of the United States of America.

Conclusion

Critical thinking is an important skill for members of society, as well as students and employees of twenty-first century companies. Community colleges play an important role in preparing adults to participate in society and the workplace, and teaching critical thinking skills should be included in that preparation. The findings of this study may assist community college leaders to increase critical thinking instruction at their campuses. This improvement in instruction can have a significant impact on the performance of their students in school and long after they leave college.

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Appendix A: Invitation to Participate

E-MAIL

Subject: Dissertation Research

Dr. First Last Name, Vice President of Academic Affairs
Name Community College

Dear Dr. Name:

I am a doctoral student at Walden University, and I wish to include your college in the research I am conducting for my dissertation. The topic of the research is campus climate at community colleges in the Western United States, and the purpose of the study is to identify climate factors that may improve student learning.

If you are able to participate, please forward the following to your faculty and reply to this email, so I know you are participating. If you need additional information before making a decision, please email me and describe what you need.

Name Community College Faculty,

As part of a study on campus climate and student learning, I need faculty volunteers to complete a brief survey. This survey is anonymous, consists of only multiple choice questions, and can easily be completed in less than 15 minutes. The link below will take you to the first page of the survey, which provides additional details of the study and explains your rights as a participant.

http://www.surveymonkey.com/s/tsimon_dissertation

Participation in this study is completely voluntary, However, I hope you will take the time to complete the survey and contribute to this research on climate factors that may improve student learning.

Thank you for your assistance.

Sincerely,

Thomas Simon
Ph.D. in Education Student
Walden University
thomas.simon@waldenu.edu

E-MAIL

Subject: Dissertation Research

Dr. First Last Name, Vice President of Academic Affairs
Name Community College

Dr. Name,

Thank you for agreeing to participate in my doctoral study of community college campus climate. Please forward the following to your faculty.

Name Community College Faculty,

As part of a study on campus climate and student learning, I need faculty volunteers to complete a brief survey. This survey is anonymous, consists of only multiple choice questions, and can easily be completed in less than 15 minutes. The link below will take you to the first page of the survey, which provides additional details of the study and explains your rights as a participant.

http://www.surveymonkey.com/s/tsimon_dissertation

Participation in this study is completely voluntary, However, I hope you will take the time to complete the survey and contribute to this research on climate factors that may improve student learning.

Thank you for your assistance.

Sincerely,

Thomas Simon
Ph.D. in Education Student
Walden University
thomas.simon@waldenu.edu

Appendix B: Permission to Use the SLEQ

Permission from Dr. Barry Fraser

RE: School-Level Environment Questionnaire

Date : Thu, May 21, 2009 09:14 PM CDT
From : Barry Fraser <B.Fraser@curtin.edu.au>
To : Thomas Simon <thomas.simon@waldenu.edu>, Darrell Fisher <D.Fisher@curtin.edu.au>
Reply To : Barry Fraser <B.Fraser@curtin.edu.au>
Subject : **RE: School-Level Environment Questionnaire**

Tom

Good luck with your study involving the SLEQ.

No, I'm unaware of any studies that have used the SLEQ in community colleges or in research on teaching critical thinking.

Best wishes

Barry

From: Thomas Simon [mailto:thomas.simon@waldenu.edu]
Sent: Thursday, 21 May 2009 3:07 PM
To: Barry Fraser; Darrell Fisher
Subject: School-Level Environment Questionnaire

Dr. Fraser and Dr. Fisher,

I am writing to request permission to use your School-Level Environment Questionnaire (SLEQ).

I am a Walden University graduate student completing a PhD in Community College Leadership, and I have just started working on my dissertation. I have looked at a number of instruments, and your SLEQ appears to be the most appropriate questionnaire for my study. I want to look for a relationship between campus climate and teaching critical thinking in community college classrooms. In other words, I hope to learn whether community college faculty are more likely to teach critical thinking on a campus that scores high in particular environmental aspects. My plan is to reduce the number of questions--perhaps remove the questions on student support--and substitute some questions to assess the level of critical thinking instruction.

Although all of the literature I have read has applied the SLEQ to elementary and high schools, it appears to be an appropriate instrument for community colleges. Do you know of anyone who has used the SLEQ to study the climate of community colleges? Also, do you know of anyone who has used the SLEQ in a study of teaching critical thinking?

Please let me know if you need additional information. I would appreciate any advice you can offer.

Thanks and aloha,

Tom Simon

Permission from Emerald Group Publishing

Subject : **RE: Copyright Question**
Date : Wed, Dec 02, 2009 08:41 AM CST
From : **Emily Hall <EHALL@emeraldinsight.com>**
To : 'Thomas Simon' <thomas.simon@waldenu.edu>

Dear Thomas,

Many thanks for your email. Please allow me to introduce myself. My name is Emily Hall and I am the Rights Manager here at Emerald. In this particular case, then because it is for your doctoral dissertation and only for academic purposes, then so long as you use full referencing (you might be best asking your tutor about this because without seeing your SLEQ, and the other 2 ones, then it is difficult for me to say which one your version is closest to).

Good Luck with your thesis,

Kind regards,

Emily Hall
Rights Manager
Email: ehall@emeraldinsight.com
Phone: 01274 785212
Fax: 01274 785000

From: Thomas Simon [mailto:thomas.simon@waldenu.edu]
Posted At: 29 November 2009 21:58
Posted To: Inbox
Conversation: Copyright Question
Subject: Copyright Question

I am a doctoral student at Walden University, and I wish to use a modified version of the School-Level Environment Questionnaire (SLEQ) to collect data for my dissertation. Although my modified SLEQ will be based on the version of the SLEQ described in Fisher and Fraser (1990), the instrument is similar to the SLEQ found in Rentoul and Fraser (1983), which was published in Emerald's Journal of Educational Administration. I have already obtained permission from Dr. Fraser to modify and use the SLEQ.

Because of the similarity to the original SLEQ, I am writing to inquire whether I need permission from Emerald to publish my modified SLEQ in my dissertation. If I do need permission, please explain how I get this permission.

Thank you for your assistance.

Best regards,

Thomas Simon

Fisher, D. L., & Fraser, B. J. (1990, April). *Validity and use of the school-level environment questionnaire.* Paper presented at the annual meeting of the American Educational Research Association, Boston, MA.

Rentoul, A. J., & Fraser, B. J. (1983). Development of a school-level environment questionnaire. *Journal of Educational Administration, 21*(1), 21–39.

Appendix C: Modified SLEQ

1. I seldom receive encouragement from colleagues.
2. Faculty frequently discuss teaching methods and strategies with each other.
3. I am often supervised to ensure that I follow directions correctly.
4. Decisions about the running of the college are usually made by administration or a small group of faculty.
5. It is very difficult to change anything in this college.
6. My students frequently question the validity of course concepts.
7. There is constant pressure to keep working.
8. I feel accepted by other faculty.
9. Faculty avoid talking with each other about teaching and learning.
10. I am not expected to conform to a particular teaching style.
11. I have to refer even small matters to administration for a final answer.
12. Faculty are encouraged to be innovative in this college.
13. I require my students to participate in frequent class discussions.
14. Faculty have to work long hours to complete all their work.
15. I am ignored by other faculty.
16. Professional matters are seldom discussed during faculty meetings.
17. It is considered very important that I closely follow syllabuses and lesson plans.
18. Action can usually be taken without gaining the approval of administration.
19. There is a great deal of resistance to proposals for curriculum change.
20. I always cover all of the course content in my classes.
21. Faculty do not have to work very hard in this college.
22. I feel that I could rely on my colleagues for assistance if I should need it.
23. Many faculty attend inservice and other professional development courses.
24. There are few rules and regulations that I am expected to follow.
25. Faculty are frequently asked to participate in decisions concerning administrative policies and procedures.
26. Most faculty like the idea of change.
27. My students have opportunities to use logic to analyze the arguments that support course concepts.
28. There is no time for faculty to relax.
29. My colleagues seldom take notice of my professional views and opinions.
30. Faculty show little interest in what is happening in other colleges.
31. I am allowed to do almost as I please in the classroom.

32. I am encouraged to make decisions without reference to administration.
33. New courses or curriculum materials are seldom implemented in the college.
34. My lesson plans do not allow students much time to practice applying the course concepts.
35. You can take it easy and still get the work done.
36. I feel that I have many friends among my colleagues at this college.
37. Faculty are keen to learn from their colleagues.
38. My classes are expected to use prescribed textbooks and prescribed resource materials.
39. I must ask administration before I do most things.
40. There is much experimentation with different teaching approaches.
41. I explain the concept of critical thinking to my students.
42. Seldom are there deadlines to be met.
43. I often feel lonely and left out of things in the faculty room.
44. Faculty show considerable interest in the professional activities of their colleagues.
45. I am expected to maintain very strict control in the classroom.
46. I have very little say in the running of the college.
47. New and different ideas are always being tried out in this school.
48. My students understand the importance of thinking critically.
49. It is hard to keep up with your work load.
50. In which state is your college located?
    a. Arizona
    b. California
    c. Idaho
    d. Nevada
    e. Oregon
    f. Utah
    g. Washington
    h. Other

51. Which of these choices best describes the location of your college?
    a. Large city
    b. Large city suburb
    c. Small city
    d. Small town
    e. Rural

52. What is the approximate total enrollment of your college?
    a. Less than 1500 students
    b. 1501 to 3000 students
    c. 3001 to 5000 students
    d. 5001 to 10,000 students
    e. More than 10,000 students

53. What is your employment status?
    a. Full-time
    b. Part-time

54. What subject or subjects do you teach? Check all that apply.
    a. Career / Technical
    b. English / Speech
    c. Humanities
    d. Math
    e. Natural Science
    f. Social / Behavioral Science
    g. Other

55. How many years have you been teaching?
    a. Less than 2 years
    b. 2 years to 5 years
    c. 6 years to 10 years
    d. 11 years to 20 years
    e. More than 20 years

56. What is your gender?
    a. Male
    b. Female

Responding:
Participants respond to items 1-49 by selecting one of the following.

1. SA If you Strongly Agree with the statement
2. A If you Agree with the statement
3. N If you Neither agree nor disagree with the statement or are not sure
4. D If you Disagree with the statement
5. SD If you Strongly Disagree with the statement

Questions 50-52 are answered by selecting the appropriate choice.

Scoring:
Items 1, 3, 4, 5, 7, 9, 11, 14, 15, 16, 17, 19, 20, 28, 29, 30, 33, 34, 38, 39, 43, 45, 46, 49 are scored according to the numbers before the choices above. The remaining items are scored in reverse order.

Scale factors:
Affiliation (AF) 1, 8, 15, 22, 29, 36, 43
Professional Interest (PI) 2, 9, 16, 23, 30, 37, 44
Staff Freedom (SF) 3, 10, 17, 24, 31, 38, 45
Participatory Decision-making (PD) 4, 11, 18, 25, 32, 39, 46
Innovation (IN) 5, 12, 19, 26, 33, 40, 47
Critical Thinking Instruction (CT) 6, 13, 20, 27, 34, 41, 48
Work Pressure (WP) 7, 14, 21, 28, 35, 42, 49

Appendix D: Consent to Participate

Consent to Participate

You are invited to take part in a research study of community colleges. You were chosen for this study because you teach at a community college in the western United States. This form is part of a process called "informed consent" to allow you to understand the study before deciding whether to take part.

Researcher: Thomas Simon, a doctoral student at Walden University.

Purpose: To analyze specific campus climate factors of community colleges in the western United States.

Procedures:
• Complete a survey, which begins on the next page and continues for 5 pages.
• The survey consists of 56 multiple-choice questions.
• The survey is anonymous and does not include personal questions.
• Completing the survey requires less than 15 minutes.

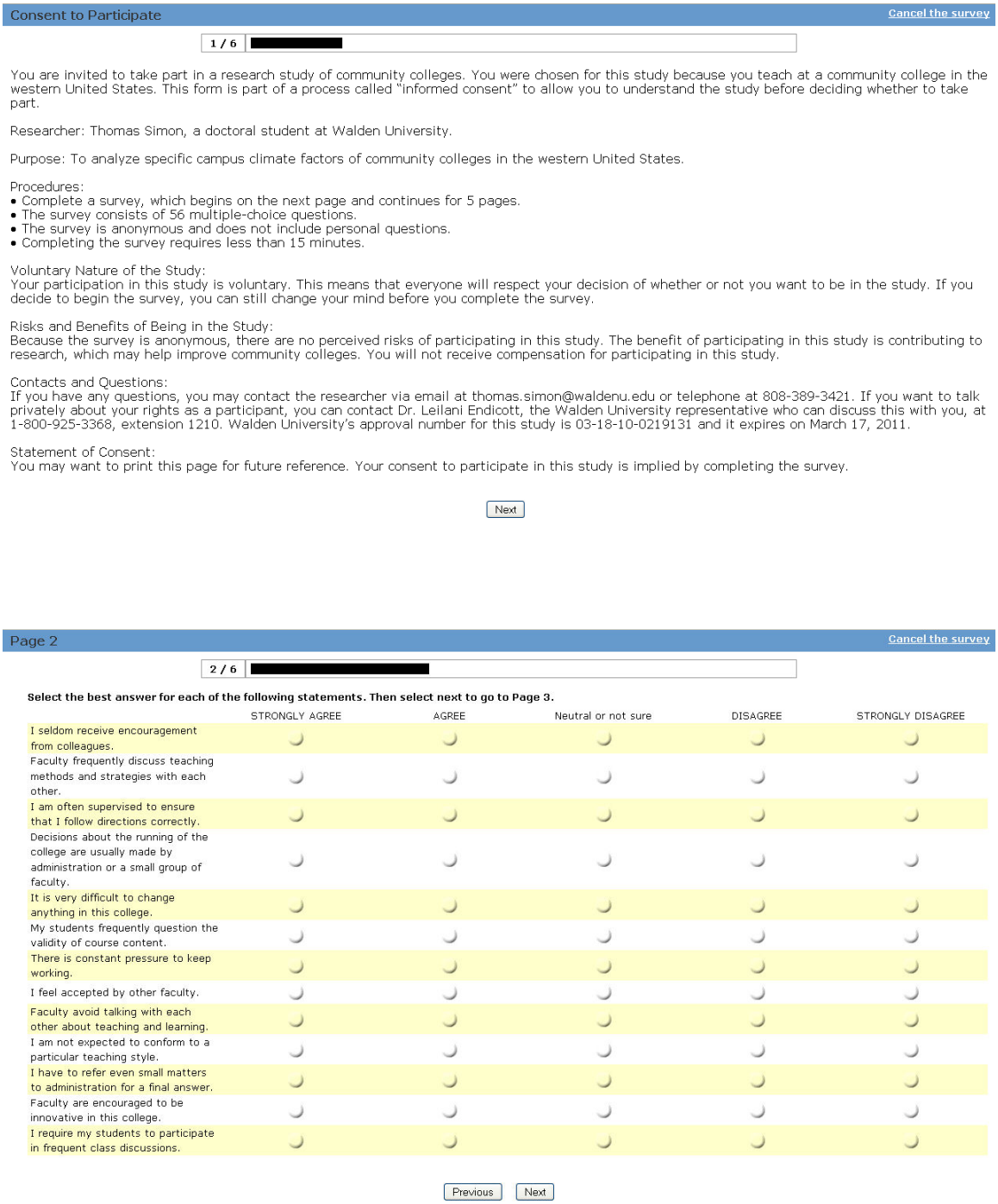
Voluntary Nature of the Study:
Your participation in this study is voluntary. This means that everyone will respect your decision of whether or not you want to be in the study. If you decide to begin the survey, you can still change your mind before you complete the survey.

Risks and Benefits of Being in the Study:
Because the survey is anonymous, there are no perceived risks of participating in this study. The benefit of participating in this study is contributing to research, which may help improve community colleges. You will not receive compensation for participating in this study.

Contacts and Questions:
If you have any questions, you may contact the researcher via email at thomas.simon@waldenu.edu or telephone at 808-389-3421. If you want to talk privately about your rights as a participant, you can contact Dr. Leilani Endicott, the Walden University representative who can discuss this with you, at 1-800-925-3368, extension 1210. Walden University's approval number for this study is 03-18-10-0219131 and it expires on March 17, 2011.

Statement of Consent:
You may want to print this page for future reference. Your consent to participate in this study is implied by completing the survey.

Appendix E: Online Survey



Consent to Participate — Cancel the survey

1 / 6

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Next

Page 2 — Cancel the survey

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Select the best answer for each of the following statements. Then select next to go to Page 3.

	STRONGLY AGREE	AGREE	Neutral or not sure	DISAGREE	STRONGLY DISAGREE
I seldom receive encouragement from colleagues.					
Faculty frequently discuss teaching methods and strategies with each other.					
I am often supervised to ensure that I follow directions correctly.					
Decisions about the running of the college are usually made by administration or a small group of faculty.					
It is very difficult to change anything in this college.					
My students frequently question the validity of course content.					
There is constant pressure to keep working.					
I feel accepted by other faculty.					
Faculty avoid talking with each other about teaching and learning.					
I am not expected to conform to a particular teaching style.					
I have to refer even small matters to administration for a final answer.					
Faculty are encouraged to be innovative in this college.					
I require my students to participate in frequent class discussions.					

Previous Next

Page 3 Cancel the survey

3 / 6

Select the best answer for each of the following statements. Then select next to go to Page 4.

	STRONGLY AGREE	AGREE	Neutral or not sure	DISAGREE	STRONGLY DISAGREE
Faculty have to work long hours to complete all their work.					
I am ignored by other faculty.					
Professional matters are seldom discussed during faculty meetings.					
It is considered very important that I closely follow syllabuses and lesson plans.					
Action can usually be taken without gaining the approval of administration.					
There is a great deal of resistance to proposals for curriculum change.					
I always cover all of the course content in my classes.					
Faculty do not have to work very hard in this college.					
I feel that I could rely on my colleagues for assistance if I should need it.					
Many faculty attend inservice and other professional development courses.					
There are few rules and regulations that I am expected to follow.					
Faculty are frequently asked to participate in decisions concerning administrative policies and procedures.					

Previous Next

Page 4 Cancel the survey

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Select the best answer for each of the following statements. Then select next to go to Page 5.

	STRONGLY AGREE	AGREE	Neutral or not sure	DISAGREE	STRONGLY DISAGREE
Most faculty like the idea of change.					
My students have opportunities to use logic to analyze the arguments that support course concepts.					
There is no time for faculty to relax.					
My colleagues seldom take notice of my professional views and opinions.					
Faculty show little interest in what is happening in other colleges.					
I am allowed to do almost as I please in the classroom.					
I am encouraged to make decisions without reference to administration.					
New courses or curriculum materials are seldom implemented in the college.					
My lesson plans do not allow students much time to practice applying the course concepts.					
You can take it easy and still get the work done.					
I feel that I have many friends among my colleagues at this college.					
Faculty are keen to learn from their colleagues.					

Previous Next

Page 5 Cancel the survey

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Select the best answer for each of the following statements. Then select next to go to Page 6.

	STRONGLY AGREE	AGREE	Neutral or not sure	DISAGREE	STRONGLY DISAGREE
My classes are expected to use prescribed textbooks and prescribed resource materials.	○	○	○	○	○
I must ask administration before I do most things.	○	○	○	○	○
There is much experimentation with different teaching approaches.	○	○	○	○	○
I explain the concept of critical thinking to my students.	○	○	○	○	○
Seldom are there deadlines to be met.	○	○	○	○	○
I often feel lonely and left out of things in the faculty room.	○	○	○	○	○
Faculty show considerable interest in the professional activities of their colleagues.	○	○	○	○	○
I am expected to maintain very strict control in the classroom.	○	○	○	○	○
I have very little say in the running of the college.	○	○	○	○	○
New and different ideas are always being tried out in this school.	○	○	○	○	○
My students understand the importance of thinking critically.	○	○	○	○	○
It is hard to keep up with your work load.	○	○	○	○	○

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Page 6 Cancel the survey

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In which state is your college located?

○ a. Arizona ○ California ○ Idaho ○ Nevada ○ Oregon ○ Utah ○ Washington ○ Other

Which of these choices best describes the location of your college?

○ Large city ○ Large city suburb ○ Small city ○ Small town ○ Rural

What is the approximate total enrollment of your college?

○ Less than 1500 students ○ 1501 to 3000 students ○ 3001 to 5000 students ○ 5001 to 10,000 students ○ More than 10,000 students

What is your employment status?

○ Full-time ○ Part-time

What subject or subjects do you teach? Check all that apply.

☐ Career/Technical ☐ Math ☐ Other
☐ English/Speech/ESL ☐ Natural Science
☐ Humanities ☐ Social/Behavioral Science

How many years have you been teaching?

○ Less than 2 years ○ 2 years to 5 years ○ 6 years to 10 years ○ 11 years to 20 years ○ More than 20 years

What is your gender?

○ Male ○ Female

Previous Submit

Curriculum Vitae

Thomas C. Simon

Education:

Doctor of Philosophy – Education — Expected 2010
Walden University, Minneapolis, MN

Master of Business Administration — 1984
Santa Clara University, Santa Clara, CA

Bachelor of Science – Business Administration — 1981
San Jose State University, San Jose, CA

Relevant Professional Experience:

Dean — 2002 to 2008
Heald College, Honolulu, HI
Provided overall educational leadership for technology programs offered at Heald College's Honolulu Campus. Responsibilities included designing and implementing curriculum, advising students, and hiring and supervising faculty. Developed software that saves hundreds of hours by simplifying student progress evaluation and projection of class schedules.

Instructor — 1995 to 1996 and 2000 to 2002
Heald College, Honolulu, HI
Taught electronics and networking courses. Responsibilities included developing lesson plans, presenting course material, supervising hands-on activities, and assessing student performance.

Other Professional Experience:

Systems Engineer — 2008 to present
Hawaii State Civil Defense, Honolulu, HI
Analyze and evaluate telecommunications objectives and design systems to support these objectives, including major projects such as the next generation Emergency Alert System, which will use digital technology to deliver emergency messages to broadcasters, cell phones, and the Internet.

Radio Technician — 1991 to 2000
Hawaii State Civil Defense, Honolulu, HI
Designed and managed major telecommunications projects, including a statewide emergency satellite system and the department's intranet. After Hurricane Iniki, directed the re-establishment of communications on Kauai by coordinating government, commercial, and volunteer assets.

Functional Analyst — 1989 to 1991
HMSA, Honolulu, HI
Coordinated the development and implementation of claims processing software, including the development of hospital claims processing software, which cut claims processing time by 50%.

Director 1986 to 1989
TMS Division, Getz Inc., Taiwan, R.O.C.
Directed the sourcing and inspection of products for export from Asia. Responsibilities included supervising a staff in Taiwan and Korea, and assisting U.S. and European customers purchase products from Asia.

Product Line Manager 1981 to 1985
Boschert Inc., Sunnyvale, CA
Developed and implemented marketing strategy for the Low Power switch-mode power supply line. Responsibilities included defining new standard products and managing custom design projects.

Design Engineer 1976 to 1981
Boschert Inc., Sunnyvale, CA
Designed AC to DC and DC to DC switch-mode power supplies. Responsibilities included project management; supervising drafting and printed circuit board layout; prototype assembly and testing; environmental, safety, and RFI testing; and pre-production. Designed Boschert's innovative current mode 3T series, which remained in production for 20 years.

Senior Engineering Technician 1973 to 1976
Teledyne MEC, Palo Alto, CA
Supported engineers designing switch-mode power supplies and high-speed pulse modulators for traveling wave tube amplifiers. Responsibilities included building, testing, and analyzing breadboards and prototypes.

Military Service:

Radio Relay Technician 1968 to 1972
United States Marine Corps Honorable discharge
Installed, operated, and maintained multi-channel VHF and microwave radios in the United States, Asia, and Europe. Promoted to sergeant and supervised depot level maintenance of radio relay equipment in Okinawa and Vietnam.

Publications:

Simon, T., & Forge, C. (1984). Using current control to improve SMPS regulation. *Electronic Engineering, 56*, 47-50.

Honors and Awards:

Academic Affairs Team of the Year, Heald College 2001 and 2004

Hawaii's Top High Technology Leaders Award 2003

Team Certificate of Recognition, State of Hawaii 1999

Beta Gamma Sigma, San Jose State University 1982