2002

Relationships between accreditation affiliation, definitions, and tools used to assess critical thinking as a learning outcome in schools of nursing

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Relationships between accreditation affiliation, definitions, and tools used to assess critical thinking as a learning outcome in schools of nursing

by

Joan McCleish

A dissertation submitted to the graduate faculty
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

Major: Education (Higher Education)

Program of Study Committee:
Nancy Evans, Major Professor
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Iowa State University
Ames, Iowa
2002
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Joan McCleish

has met the dissertation requirements of Iowa State University

Signature was redacted for privacy.

Major Professor

Signature was redacted for privacy.

For the Major Program
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CHAPTER 1. INTRODUCTION

General Statement of the Problem

With a current shortage of nurses and trends that indicate an even greater shortage in the future (Hopkins, 2001; Humphrey, 2001), graduates of nursing programs must enter the work force better prepared for nursing practice than ever before. Nurses are required to "think on their feet" in a variety of situations that often produce a lasting impact on people's lives. In a variety of health care settings nurses are needed who are able to make quick and accurate clinical decisions regarding patient care, analyze complex data, and evaluate situations effectively to determine appropriate therapeutic interventions (Oermann, Truesdell, & Ziolkowski, 2000).

It is imperative that graduating nurses develop sound critical thinking skills that will be needed in the health care setting. Therefore, it is crucial that nursing faculty create nursing curricula that will assist students to develop critical thinking abilities that will prepare them for entry-level practice. Faculty must not only develop a curriculum that is rich in opportunities to learn and practice critical thinking skills, they must also develop methods to accurately assess whether critical thinking has occurred as a result of the curriculum.

Criteria used to assess the critical thinking abilities of nursing students and definitions used to describe the term critical thinking may be influenced by the accrediting agency selected by the nursing program. Accrediting agencies provide nursing programs with standards and guidelines to assess certain aspects of their programs that accrediting agencies have identified as indicators of quality practice (Commission on Collegiate Nursing Education, 1998; National League for Nursing Accrediting Commission, 2000a). Therefore,
the accrediting agency a nursing program selects may influence the definitions used to
describe critical thinking abilities or the types of tools to assess learning outcomes, including
the critical thinking abilities of their students.

**Significance of the Study**

Loving and Wilson (2000) contended that nursing faculty have a responsibility to
provide nursing students with an environment where students will achieve critical thinking
skills—an environment “within which students can learn and within which students can learn
to learn” (p. 70). For faculty to provide an environment where students may learn to think
critically, first they must identify a clear definition of critical thinking so appropriate student
learning outcomes and activities needed for students to achieve the outcomes can be
developed.

It is also important that faculty choose tools to assess critical thinking that match the
nursing program’s definition of critical thinking (Rane-Szostak & Robertson, 1996).
However, defining critical thinking is a complex process. There is not a consensus among
nursing educators regarding the definition of critical thinking (Adams, 1999; Kennedy,
Fisher, & Ennis, 1991; Tanner, 1996; Videbeck, 1997). A lack of consensus makes it difficult
for faculty to select an appropriate definition and assessment tools that are consistent with the
definition. Therefore, at times nurse educators may adopt definitions of critical thinking
based on the definition of the instruments’ authors (Rane-Szostak & Robertson, 1996).

Assessment and evaluation of learning outcomes is an accreditation requirement for
baccalaureate nursing programs (Commission on Collegiate Nursing Education, 1998;
National League for Nursing Accrediting Commission, 2000a) and critical thinking is one of
the expected outcomes in nursing education (Malinski, 2001). Therefore, it is also essential that nursing faculty develop appropriate methods to measure and evaluate critical thinking abilities to maintain professional accreditation status and demonstrate development of critical thinking abilities among students.

The National League for Nursing Accrediting Commission (NLNAC) and the Commission on Collegiate Nursing Education (CCNE) are the two primary accrediting agencies responsible for regulating the quality of baccalaureate nursing programs. Together, they provide standards that guide development of nursing curricula (CCNE, 1998; NLNAC, 2000a).

Although a great deal of information exists in the literature regarding assessment and measurement of nursing students' critical thinking abilities, whenever sample populations from accredited nursing programs were identified for studies, the program accreditor was identified as NLNAC. However, with the emergence of a second baccalaureate nursing accrediting agency, the number of CCNE nursing programs has grown steadily since 1998 when they first started accrediting nursing programs, to the present when there are a total of 149 CCNE-accredited nursing programs (CCNE, 2001). Because CCNE accreditation is in its infancy, there is a lack of information in the literature from CCNE-accredited programs regarding measurement and evaluation of student nurses' critical thinking abilities. Also, there is a lack of information in the literature that compares the relationship of definitions and methods for assessing learning outcomes in baccalaureate nursing programs to the programs' accreditation affiliation.

Faculties look to their accrediting agencies as one source for guidance in the area of curriculum development and assessment. Through the process of program evaluation,
accrediting agencies have the capability to develop rich resources of information regarding complex learning outcomes such as critical thinking abilities. Faculties should use these agencies as resources to assist them in the development of consistent definitions and useful methods for assessment of critical thinking abilities.

**Purpose of Study**

The primary purpose of this study was to explore the relationship of definitions of critical thinking and the use of critical thinking measurement tools with accreditation affiliation in baccalaureate nursing programs. In addition, other aspects of the programs were investigated to determine which characteristics are associated with their selection of accrediting agencies.

This study will assist nursing faculty to ascertain whether their program’s definition of critical thinking and methods used to assess it are consistent with those of their professional accrediting agency, as well as other baccalaureate nursing programs with a shared accreditation affiliation. It will also allow nursing programs to use their valuable resources in the selection of an accrediting agency that more closely matches their own beliefs regarding critical thinking learning outcomes.

**Research Questions**

The following research questions were explored:

1. Are there aspects about a baccalaureate nursing program that would make the program more likely to choose a certain accrediting agency?
a. Is there a relationship between accreditation affiliation and whether the baccalaureate nursing program is a generic BSN program or an RN-BSN program?

b. Is there a relationship between accreditation affiliation and whether other nursing degrees are offered at the institution?

c. Is there a relationship between accreditation affiliation and whether the institution is public or private?

d. Are baccalaureate nursing programs more likely to be members of the professional nursing organization that accredits them than to be members of other organizations?

e. Is there a relationship between the geographical region in which the program is located and the program's accreditation affiliation?

f. What are the most important factors that contribute to the selection of an accrediting agency?

g. Is there a relationship between reasons for selecting an accrediting agency and agency affiliation?

2. Is there a relationship between the extent of agreement with selected definitions of critical thinking used by baccalaureate nursing programs and their accreditation affiliation?

3. What is the extent of agreement across baccalaureate nursing programs regarding definitions of critical thinking?
4. Is there a relationship between the extent of agreement with definitions used by a baccalaureate nursing program to define critical thinking and the types of tools used to assess critical thinking?

5. Is there a relationship between the types of tools used by baccalaureate nursing programs to assess critical thinking and their accreditation affiliation?

6. What is the extent of agreement across baccalaureate nursing programs regarding types of tools used to assess critical thinking?

7. Is there a relationship between the types of tools used to assess critical thinking abilities and reports by nursing programs of growth in critical thinking abilities?

8. Is there reported growth in critical thinking abilities over time among baccalaureate nursing programs?

**Null Hypotheses**

The null hypotheses that were tested follow:

1. There is no relationship between accreditation affiliation and whether the baccalaureate nursing program is a generic BSN program or an RN-BSN program.

2. There is no relationship between accreditation affiliation and whether other nursing degrees are offered at the institution.

3. There is no relationship between accreditation affiliation and whether the institution is public or private.

4. Baccalaureate nursing programs are no more likely to be members of the professional nursing organization that accredits them than to be members of other organizations.
5. There is no relationship between the geographical region in which the program is located and the program's accreditation affiliation.

6. There is no difference among main factors that contribute to selection of an accrediting agency.

7. There is no relationship between reasons for selecting an accrediting agency and agency affiliation.

8. There is no relationship between the extent of agreement with selected definitions of critical thinking used by baccalaureate nursing programs and their accreditation affiliation.

9. There is agreement (that is, no difference) across baccalaureate nursing programs regarding definitions of critical thinking.

10. There is no relationship between the extent of agreement with definitions used by a baccalaureate nursing program to define critical thinking and the types of tools used to assess critical thinking.

11. There is no relationship between the types of tools used by baccalaureate nursing programs to assess critical thinking and their accreditation affiliation.

12. There is agreement (that is, no difference) across baccalaureate nursing programs regarding types of tools used to assess critical thinking.

13. There is no relationship between the types of tools used to assess critical thinking abilities and reports by nursing programs of growth in critical thinking abilities.

14. There is no reported growth in critical thinking abilities over time among baccalaureate nursing programs.
Definitions

AACN – American Association of Colleges of Nursing.

Accreditation – A nongovernmental process conducted by representatives of postsecondary institutions and professional groups. As conducted in the United States, accreditation focuses on the quality of institutions of higher and professional education and on the quality of educational programs within institutions. Two forms of accreditation are recognized: institutional accreditation and professional or specialized accreditation. Professional accrediting agencies assess the extent to which programs achieve their stated mission, educational philosophy and goals/objectives (CCNE, 1998, p. 2).

Commission on Collegiate Nursing Education (CCNE) – The CCNE is a specialized/professional accrediting agency that ensures the quality and integrity of baccalaureate and graduate nursing education programs through the accreditation process (CCNE, 1998). The CCNE is an autonomous accrediting agency that serves as the educational accrediting body for the American Association of Collegiate Nurses.

DOE – Department of Education.

NLN – National League for Nursing.

National League for Nursing Accrediting Commission (NLNAC) – The NLNAC, an autonomous arm of the National League for Nursing, is a professional nursing accrediting body for all levels of nursing programs through the master’s level (NLNAC, 2000a).

Nursing Process – The series of steps followed by nurses to plan and implement care. It is a systematic method that involves collecting data (assessment), interpreting the data
(nursing diagnosis), planning an intervention, implementing the intervention, and evaluating effectiveness (Kozier & Erb, 1987).
CHAPTER 2. REVIEW OF THE LITERATURE

Similarities and differences exist between nursing and non-nursing theorists’ definitions of critical thinking. Definitions chosen by nursing programs are used to develop learning outcomes, methods of teaching, and assessment methods for the nursing programs. From these assessments, it may be ascertained whether the nursing curriculum has contributed to growth in students’ critical thinking abilities.

In this chapter, nursing and non-nursing definitions of critical thinking are compared and contrasted. The significance of critical thinking abilities as a learning outcome for baccalaureate nursing programs is addressed for NLNAC- and CCNE-accredited programs. The history of nursing accreditation, significance to nursing, and emergence of choice of accreditation agencies are presented. Current methods, both standardized and non-standardized, used to assess critical thinking abilities are discussed. Finally, results of growth in critical thinking abilities as determined by previous studies are presented.

General Critical Thinking Theory

Before meaningful learning outcomes regarding students’ critical thinking abilities can be developed and measured, critical thinking must be defined by faculty members. According to Kennedy, Fisher, and Ennis (1991), “Agreement on a definition of and a vocabulary for critical thinking is needed in order to get a better idea of what should be assessed by a critical thinking evaluation instrument” (p. 29). Despite this, there is a lack of consensus on a definition of critical thinking in the literature and “just what is meant by critical thinking is not a matter of total agreement” (p. 13).
Much of the research regarding measurement of critical thinking abilities among nurses is based on theory developed by non-nursing disciplines, including education, philosophy, and psychology (Hicks, 2001). Table 1 illustrates selected general definitions of critical thinking used by educators.

Although individual definitions of critical thinking are wide-ranging, nearly all definitions emphasize logic and reasoning (Di Vito-Thomas, 2000). Watson and Glaser (1980) developed a widely used critical thinking tool, the Watson-Glaser Critical Thinking Appraisal (WGCTA), based on the definition of Dressel and Mayhew (1954). Five abilities related to critical thinking were described as ability to: define a problem, select pertinent information for the solution of a problem, recognize stated and unstated assumptions, formulate and select relevant and promising hypotheses, and draw valid conclusions and judge the validity of inferences.

Although problem solving was a component of the definition used for the WGCTA, Kurfiss (1988) asserted that critical thinking involves a more sophisticated process than problem solving. Usually problem solving involves a problem that might be complex but has only one right answer. Critical thinking involves complex problems that are open-ended, with more than one possible answer.

Ennis (1993) attempted to minimize confusion in definitions of critical thinking by simplifying the definition (see Table 1) and describing it according to its attributes. According to Ennis, characteristics of critical thinking include:

(a) judge the credibility of sources; (b) identify conclusions, reasons, and assumptions;
(c) judge the quality of an argument, including the acceptability of its reasons, assumptions, and evidence; (d) develop and defend a position on an issue; (e) ask
Table 1. Selected general definitions of critical thinking

<table>
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<th>Author</th>
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<tr>
<td>American Philosophical Association (1990)</td>
<td>This definition refers to the critical thinker as: “habitually inquisitive, well informed, trustful of reason, open-minded, flexible, fair-minded in evaluation, honest in facing personal biases, prudent in making personal judgments, willing to reconsider, clear about issues, orderly in complex matters, diligent in seeking relevant information, reasonable in the selection of criteria, and persistent in seeking results that are as precise as the subject and the circumstances of inquiry will permit” (p. 3).</td>
</tr>
<tr>
<td>Ennis (1993)</td>
<td>“Reflective and reasonable thinking that is focused on deciding what to believe or do” (p. 180).</td>
</tr>
<tr>
<td>Kurfiss (1988)</td>
<td>“An investigation whose purpose is to explore a situation, phenomenon, question, or problem to arrive at a hypothesis or conclusion about it that integrates all available information and that, therefore, can be convincingly justified” (p. 2).</td>
</tr>
<tr>
<td>McPeck (1981)</td>
<td>Critical thinking is “the propensity and skill to engage in an activity with reflective skepticism” (p. 81).</td>
</tr>
<tr>
<td>Paul (1992)</td>
<td>“The art of thinking about your thinking while you are thinking in order to make your thinking better: more clear, more accurate, or more defensible” (p. 643).</td>
</tr>
<tr>
<td>Watson &amp; Glaser (1964)</td>
<td>Critical thinking is: “A composite of attitudes, knowledge, and skills, including: (a) attitudes of inquiry that involve an ability to recognize the existence of problems and an acceptance of the general need for evidence in support of what is asserted to be true; (b) knowledge of the nature of valid inferences, abstractions, and generalizations in which the weight or accuracy of different kinds of evidence are logically determined; and (c) skills in employing and applying the above attitudes and knowledge” (p. 1).</td>
</tr>
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appropriate clarifying questions; (f) plan experiments and judge experimental designs; (g) define terms in a way appropriate for the context; (h) be open-minded; (i) try to be well informed; and (j) draw conclusions when warranted, but with caution. (p. 180)

Paul (1992) asserted that critical thinking involves not just thinking, but thinking that involves self-improvement. He stated that “this improvement comes from skill in using standards by which one appropriately assesses thinking” (p. 7). Paul maintained that critical thinking involves a self-monitoring process. Although critical thinking may be described as a process of interactions between individuals involving interpretations of knowledge that is created (McPeck, 1981), Paul (1984) emphasized the importance of independent, higher-level thinking, where learning occurs as a result of the process itself, as opposed to accepting another's conclusions.

Nursing-Based Definitions of Critical Thinking

Definitions of critical thinking proposed by nurses are congruent in some areas and different in others from definitions used by non-nurses (Adams, 1999; Gordon, 2000; Kennedy et al., 1991). Selected definitions of critical thinking specific to the practice of nursing are identified in Table 2. Within the nursing community there is no consensus regarding the definition of critical thinking (Adams, 1999; Hicks, 2001; Videbeck, 1997). Tanner (1996) postulated that critical thinking measures in nursing have “suffered from lack of clear conceptualization” (p. 3) of the term. This poses difficulties for nurse educators when they fail to define, measure, and demonstrate clearly the effect of the educational process on the critical thinking ability of their graduating students (Malinski, 2001).
<table>
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<tr>
<td>Alfaro-LeFevre (1995)</td>
<td>Critical thinking is: “Purposeful, goal-directed thinking that aims to make judgments based on evidence (fact), rather than conjecture (guesswork). Based on principles of science and the scientific method, critical thinking requires developing strategies that maximize human potential and compensate for problems caused by human nature” (p. 9).</td>
</tr>
<tr>
<td>Bandman &amp; Bandman (1988)</td>
<td>“The rational explanation of ideas, inferences, assumptions, principles, arguments, conclusions, issues, statements, beliefs, and actions” (p. 5).</td>
</tr>
<tr>
<td>Miller &amp; Malcolm (1990)</td>
<td>Critical thinking is “an inherent cognitive activity in the process of forming clinical judgments” (p. 69).</td>
</tr>
<tr>
<td>NLNAC (200b)</td>
<td>“Critical thinking is the deliberative non-linear process of collecting, interpreting, analyzing, drawing conclusions about, presenting, and evaluating information that is both factually and belief based. In nursing this is demonstrated by clinical judgment [sic] which includes: ethical, diagnostic and therapeutic dimensions; and research” (p. 8).</td>
</tr>
<tr>
<td>Wilkinson (1996)</td>
<td>Critical thinking is “goal-oriented, purposeful thinking that involves a number of mental skills, such as determining what data [sic] is relevant, evaluating the credibility of sources, and making inferences” (p. 11).</td>
</tr>
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</table>
Facione and Facione (1996) described critical thinking abilities needed by nurses using the American Philosophical Association’s (1990) international expert consensus conceptualization of critical thinking (see Table 1). They applied the definition to the nursing curricula, which serves as a guide for nurse educators on curricula development and measurement of nursing students’ critical thinking abilities (Facione, 1990).

Some experts have suggested that there are general critical thinking skills and discipline-specific critical thinking skills (Di Vito-Thomas, 2000). Lewis (1997) supported this conclusion by pointing out that one difference in critical thinking skills may be the thinking involved in the nursing process, where both decision making and problem solving are involved. The nursing process is defined as a series of steps followed by nurses to plan and implement care. It is a systematic method that involves collecting data (assessment), interpreting the data (nursing diagnosis), planning an intervention, implementing the intervention, and evaluating effectiveness (Kozier & Erb, 1987).

However, Jones and Brown (1991) identified the nursing process as one of the limiting forces that prevents the nursing profession from its full development as a legitimate science. They purported that decision making in clinical practice is less driven by the linear models of the nursing process and more often composed of contextually defined value judgments. Furthermore, Facione, Facione, and Sanchez (1994) hypothesized that the definition of critical thinking developed through the Delphi Research project on critical thinking allows nursing to move beyond the narrow, linear models historically used in nursing curricula to guide development of critical thinking and to advance nursing’s “understanding and assessment of the cognitively complex clinical judgment process inherent in nursing practice” (p. 345).

Gordon (2000) conducted a study using a sample of 201 baccalaureate nurse educators in Midwest nursing programs to ascertain their agreement about characteristics of critical thinkers, as compared to the ideas of a panel of non-nursing critical thinking experts as assessed by the Delphi Report findings (Facione, 1990). Gordon found that nurse educators agreed with non-nurse critical thinking experts on the basic characteristics of critical thinkers. However, nurse educators also identified factors they considered to be components of critical thinking that were not identified by the expert panel. These factors included the nursing process, decision making, and clinical reasoning.

Due to a lack of consensus regarding the definition of critical thinking abilities both among nursing educators and outside of nursing, careful consideration should be given to measurements of critical thinking abilities of nursing students that will accurately reflect this ability in a practice discipline. It will be imperative that nursing faculties follow the NLNAC’s (2000a) advice and dialogue with colleagues to determine each nursing program’s own definitions of critical thinking, then develop appropriate ways to measure these skills based on identified definitions.
Emergence of Choice in Nursing Accrediting Agencies

Accreditation infers a certain standard of quality has been achieved by educational institutions, and, therefore, is a desired status for many institutions. From 1952 until 1996, nursing programs were accredited by one main accrediting agency. In 1996, with the emergence of CCNE, nursing programs were, for the first time, provided a choice in accrediting agencies. Following is a summary of the significance of accreditation to nursing, the evolution of accreditation in nursing programs, and relationship between accreditation standards and critical thinking requirements.

Significance of accreditation in education

Quality is an important aspect of nursing education. Program approval by an accrediting agency is one way for a nursing program to demonstrate that a certain level of quality has been achieved. Programs of nursing may be located in educational settings that have attained state, regional, and/or professional accreditation. All nursing programs in the United States must be approved by their state boards of nursing for their graduates to take state licensure examinations. Although state rules and regulations vary to a degree, all types of nursing programs must meet their state requirements to receive approval by their state boards of nursing (Cherry & Jacob, 2002).

Nursing programs also may be located in college or university educational settings. Colleges and universities are accredited by regional accrediting bodies that act under federal authority. Regional accreditation assures the public that the academic institutions are actually offering the programs and services they claim to offer, and are carrying out their stated
mission. Regional accreditation is a crucial element for publicly supported institutions (Cherry & Jacob, 2002).

In addition to state and regional accreditation, nursing programs often seek voluntary accreditation by a professional nursing organization. Professional accreditation conveys to the public that a certain level of standards has been achieved and that quality education in a particular professional area will be offered by the program. In addition, graduation from a professionally accredited program allows students to qualify for certain scholarships, loans, and military service. It is also a requirement for acceptance into graduate nursing programs. Benefits the nursing programs receive through professional accreditation include: (a) recognition by a peer review resulting in current and ongoing achievement, (b) opportunities of professional development for faculty, (c) impetus for continuous self-evaluation and re-evaluation of the program, (d) increased potential for student recruitment, (e) opportunities for licensure and eligibility for entitlement programs, (f) assurance of quality to employers searching for competent graduates, and (g) ease in transfer of credit to other educational institutions (NLNAC, 2000a).

In addition, Bellack, Gelmon, O’Neil, and Thomsen (1999) identified perceived benefits of accreditation to nursing programs as: a hallmark of program excellence; professional marketability and educational mobility of graduates; opportunity to engage in periodic self-study as a basis for improvement; demonstrated accountability to funders, consumers, and the public; peer review and consultation; leverage for an equitable share of institutional resources; and entitlement to federal funds.

Professional accreditation involves a process of external review, whereby the accrediting agency compares the nursing program with established criteria and standards.
Areas of programs that undergo review generally include administration and governance, finances and budget, faculty, students, program effectiveness and outcomes, and resources. Professional accrediting agencies are approved to accredit by the United States Department of Education (Chitty, 2001).

**History of nursing accreditation**

The first professional accrediting agency for nursing was the National League for Nursing (NLN), which was formed in 1952. It served as the sole accrediting agency for all areas of nursing education in the United States until 1996. In 1996, the Department of Education recommended that the Secretary of Education withdraw recognition of NLN as an accrediting agency due to concerns in accrediting practices (Overbay & Aaltonen, 2001). In response to United States Department of Education changes in standards that affect accrediting agencies of educational and professional organizations, the National League for Nursing Accrediting Commission (NLNAC) was formed in 1996 as an independent entity within the NLN and began operations in 1997. The accrediting agency received renewed recognition by the Department of Education in 1999 as an accrediting agency for nursing with the purpose of accrediting "all types of nursing education programs and schools, both post-secondary and higher degree, which [sic] offer either a certificate, a diploma, or a recognized professional degree (Master’s, Baccalaureate, Associate Degree, Diploma, and Practical Nursing)” (NLNAC, 2000a, p. 1).

During the same period that NLNAC was forming, the American Association of Colleges of Nursing (AACN) created a task force to explore aspects of developing an accrediting agency for baccalaureate and graduate nursing education programs. The task
force recommended formation of an "alliance model" that would bring general and subspecialty (e.g., nurse practitioner) nursing accrediting bodies together in a coordinated effort (Bellack et al., 1999). The task force also recommended that AACN form its own autonomous accrediting body, the Commission on Collegiate Nursing Education (CCNE), to accredit baccalaureate and graduate nursing programs. Formed in 1996, CCNE formally began to accredit programs in 1998. CCNE received recognition by the Department of Education in 2000 to accredit baccalaureate and graduate nursing programs (CCNE, 2002).

**Comparison of accreditation commissions**

The emergence of CCNE offered baccalaureate and higher degree nursing programs a choice of accrediting agencies. Nursing programs were offered an opportunity to compare CCNE and NLNAC for the purpose of selecting the agency that would best meet their programs’ needs, and most closely match their programs’ beliefs. With valuable resources at stake, including time, money, and human effort, selection of accrediting agencies becomes a very important decision for nursing programs; therefore, it is essential for the programs to compare the two accrediting agencies and find the best fit for their nursing program. The following discussion provides a comparison of selected areas between CCNE and NLNAC.

The mission, purpose, and goal statements of CCNE and NLNAC may be found in Appendix A. NLNAC explicitly identifies their mission, purpose, goals, and philosophy of accreditation (NLNAC, 2000a). CCNE identifies their agency’s mission and five general purposes as well as “Goals for Accrediting Nursing Education Programs” (CCNE, 2002). Several similarities may be found between the agency documents. Both accrediting agencies identify the accreditation process as a voluntary, self-regulatory, nongovernmental review
process. Each agency identifies itself as serving the interests of the public, nursing education, and nursing practice by setting standards for quality nursing education. Also, they both state that only programs meeting certain standards will be recognized by their agency through the process of accreditation.

One difference identified in the mission and purpose statements of the agencies is the type of programs they accredit. CCNE identifies programs they accredit as baccalaureate and graduate programs; NLNAC identifies programs they accredit as “all types of nursing education programs and schools, both post-secondary and higher degree, which [sic] offer either a certificate, a diploma, or a recognized professional degree (Master’s, Baccalaureate, Associate Degree, Diploma, and Practical Nursing)” (NLNAC, 2000a, p. 1). A related difference in NLNAC’s goals is a statement regarding the agency’s actions as gatekeeper to Title IV-HEA programs. This relates to neither baccalaureate nor graduate nursing programs, but rather to specific programs such as practical nursing and hospital diploma programs and their ability to receive funds based on NLNAC accreditation (Overbay & Aaitonen, 2001).

Overall, the Philosophy of Accreditation (NLNAC) and the Goals for Accrediting Nursing Education Programs (CCNE) are similar. Both identify a role of accreditation as improving nursing education through a peer review process. In addition, NLNAC stresses the inclusion of “consultation by external peers” as one way to achieve these goals. One of NLNAC’s core values identifies “people,” which is defined as “staff, peer evaluators, practitioners, and commissioners [who] represent the source of NLNAC’s strength and quality” (NLNAC, 2000a, p. 2). On the other hand, CCNE places additional emphasis on those receiving educational services, and stresses the importance of “communities of interest” becoming involved with the accreditation process to establish the program’s
reliability. Communities of interest are described in the agency’s general purposes as the nursing profession, consumers, employers, higher education, students and their families. CCNE also recognizes the need to establish and implement an accreditation process that is efficient, cost effective, and cost accountable for the institution and students (CCNE, 2002). From these explanations by the agencies, it appears that CCNE proposes a stronger reliance upon the public and consumers, as well as nurse educators, peers, and health care experts, versus NLNAC, which emphasizes nursing experts and peer consultants, with less emphasis on the public and consumers.

Each agency stresses the importance of working with other accrediting bodies to avoid duplication of services. Both agencies identify one of their roles as assessing whether nursing programs fulfill their objectives in preparing individuals for professional practice. NLNAC emphasizes inclusion of practitioners and faculty in the development of accreditation standards, criteria, policies, and procedures related to participation in accreditation, and the review process itself. CCNE encourages input from their constituents by offering an opportunity on their website for educators and the public to comment on the agency’s standards, “including any problems you may have interpreting or applying these standards, and whether you think any gaps exist in the standards” (CCNE, 2002, p. 1).

Certain statements found within the documents lead the reader to believe that CCNE values and encourages autonomy and innovation more than NLNAC. CCNE documents reveal that the agency stresses self-evaluation of all aspects of their programs with a goal of continuous improvement while acknowledging and respecting the institution’s autonomy and diversity of their programs. CCNE also stresses curricular innovation, and believes that their “standards and key elements are designed to encourage innovation and experimentation in
teaching and instruction” (CCNE, 2002, p. 4). Continuous improvement is evident in another stated goal of CCNE, through their encouragement of “programs to pursue academic excellence through improved teaching/learning and assessment practices and in scholarship and public service in accordance with the unique mission of the institution” (p. 2).

Overbay and Aaitonen (2001) completed an in-depth review of similarities and differences between NLNAC and CCNE related to several areas including purpose, philosophy, self-study and accreditation process, fees for accreditation, review and decision cycle, length of accreditation, and interim report requirements. Their findings are found in Appendix B. Findings were consistent with this researcher’s own review of agency documents. When comparing philosophies between the two agencies, Overbay and Aaitonen described CCNE’s philosophy: “Standards are broad statements that are not meant to be prescriptive and allow for innovations” (p. 19). A quote from NLNAC’s philosophy also was used by Overbay and Aaitonen for comparison of the two philosophies—“Emphasis is placed upon the total nursing program and its compliance with established standards and criteria” (p. 19)—indicating the more prescriptive nature of this agency.

In their comparison of CCNE and NLNAC, Overbay and Aaitonen (2001) also reviewed the accreditation process, fees, and accreditation standards. Comparing the accreditation process, they found that the CCNE self-study is limited to 75 pages, whereas the length of the NLNAC study is not established. The site visits are similar in length (3 days), with three CCNE site visitors assessing a baccalaureate program and two to three site visitors assessing NLNAC baccalaureate programs. They found agency fees for initial accreditation and annual fees to be higher for CCNE baccalaureate programs ($3,500 and $2,320, respectively) than for NLNAC programs ($1,000 and $1,900, respectively). Finally,
they reviewed the accreditation standards and found that both organizations publish accreditation standards that are to be used as guides for nursing programs as they develop a self-study report and prepare for the site visit by the accreditors.

During a similar time frame as the emergence of CCNE, the Center for the Health Professions at the University of California in San Francisco, developed a task force to examine accreditation in the health care profession. The Center for the Health Professions was a product of the Pew Health Professions Commission, which is highly regarded in health care for their work on preparing influential reports and analyses on health care needs and methods to improve health care of the American public (Bellack et al., 1999; Overbay & Aaltonen, 2001; Pew Health Professions Commission, 1995). Among other recommendations, the task force stressed the need to streamline and standardize the accreditation process (Task Force on Accreditation of Health Professions Education, 1999). Furthermore, the task force pointed out the need to respond to the many criticisms of accreditation, “including costliness, duplication, excessive focus on inspection, limited opportunity for innovation, and redundancy of work processes” (p. 19).

In 1997, as a direct result of the Task Force on Accreditation of Health Professions Education findings, Bellack et al. (1999) completed a comprehensive survey of 480 baccalaureate and graduate nursing programs, in part to determine programs’ selection of accrediting agencies and factors that influenced their decision. Their study sample consisted of all baccalaureate and higher-level nursing programs accredited by NLN. Authors of the study pointed out that NLN’s list of accredited programs was selected because AACN’s accrediting body had not yet begun accrediting nursing programs. Various aspects related to the programs were analyzed, including their relationship with an accrediting agency, nursing
degrees offered by respondent institutions, agency membership of respondents, geographic
distribution by regional accrediting agency, and whether the program was public or private.
Following is a profile summary of respondent institutions in the study:

1. Most of the respondents (98%) offered baccalaureate degrees, 57% offered master’s
degrees, 13% offered doctorate degrees, and 16% offered associate degrees.
2. More respondents selected agency membership with NLN (96%) than AACN, and
77% were members of both NLN and AACN.
3. Geographic distribution by regional accrediting agency indicated 36% North
Central, 28% Southern, 18% Middle, 8% New England, 5% Western, and 4%
Northwestern states.
4. More institutions (52%) were public than private (48%).

In the same study, Bellack et al. (1999) studied patterns of choice of the respondents
and determined that 24% of the agencies planned to continue accreditation by both agencies
for the immediate future, 24% planned to continue with NLN-NLNAC, 21% were undecided,
18% had switched to AACN-CCNE, and 12% planned to switch to AACN-CCNE before the
next accrediting cycle. These results indicated a fluctuation in the nursing community
regarding accreditation selection. Bellack et al. found it surprising that within the first year
after CCNE had emerged as a choice, nearly a quarter of the baccalaureate and graduate
programs that responded indicated they would change accrediting agencies to be solely
accredited by a relatively new accrediting organization. In addition, nearly another quarter of
the respondents indicated they intended to be accredited by both accrediting agencies for the
immediate future. These findings led the authors to surmise that there was a great deal of
dissatisfaction with NLN as an accredditor. It was predicted by the researchers that the
decision to be accredited by both agencies would be temporary due to cost constraints.

In the study by Bellack et al. (1999), respondents were asked to identify reasons for
intended choice of accrediting agency. Selected findings reveal the most important reasons
for intended selection of a specific agency were: desire to be accredited by an agency
(CCNE) that accredits only baccalaureate and higher degree programs (40%), AACN’s
proposed alliance model (38%), NLN’s established history and track record in accreditation
(32%), and NLN’s problem with the Department of Education (31%). Other factors found to
play a significant role in selection of accrediting agency included cost (33%), clarity of
agency’s accreditation criteria (29%), agency’s focus on continuous improvement (26%),
flexibility of agency’s accreditation criteria (22%), and desire to be accredited by an agency
that accredits all levels of nursing programs (14%).

The Bellack et al. study (1999) was completed during a transition period when nursing
programs were initially being offered a choice in accrediting agencies, the NLN had
experienced recent scrutiny by the DOE, and CCNE was in its infancy with limited
recognition as an accrediting body by the military and other federal funding institutions.
Since that time, the NLNAC has received renewed recognition by the DOE and CCNE has
become established as a major accreditor of baccalaureate and graduate nursing education
programs. Continued studies comparing the two agencies will indicate trends regarding the
effects of the emergence of a second accrediting body on selection of accrediting agency.
Relationship between Accreditation Standards and Critical Thinking Requirements

Criterion 19 of NLNAC (2000b) standards and criteria for accreditation identifies critical thinking as a required learning outcome for nursing programs. The document states that nursing programs must define critical thinking, how they are to be evaluated, and outcome data.

The Standards for Accreditation of Baccalaureate and Graduate Nursing Education Programs (CCNE, 1998) does not explicitly identify critical thinking as a required learning outcome; rather, the CCNE standards for accreditation are written as broad statements that describe expected institutional performance. CCNE describes their absence of prescriptive language throughout the standards document as intentional, to encourage autonomy within the institutions. However, CCNE requires nursing programs to show evidence that the curriculum contains clear statements of "expected results" and how these results are achieved. Expected results are defined by CCNE as "measurable indicators of the program and are reflected in the intended student outcomes. . . . Student outcomes may be demonstrated as attained competencies, knowledge, skills and attitudes" (CCNE, 1998, p. 15).

The Essentials of Baccalaureate Education for Professional Nursing Practice (American Association of Colleges of Nursing, 1998) is identified in Standard I of the Standards for Accreditation of Baccalaureate and Graduate Nursing Education Programs (CCNE, 1998) as a guide for baccalaureate nursing education and curriculum development. In this document, the American Association of Colleges of Nursing described critical
thinking as one of the core competencies of BSN graduates. Therefore, the CCNE accrediting body views critical thinking as a core component of the baccalaureate nursing curriculum.

**Common Standardized Tools Used in Nursing to Measure Critical Thinking Abilities**

In an evaluation of current tools used to measure student nurses’ critical thinking abilities, Adams, Whitlow, Stover, and Johnson (1996) identified four standardized instruments most frequently found in the nursing literature: the Watson-Glaser Critical Thinking Appraisal (WGCTA), Forms A and B (Watson & Glaser, 1980); the California Critical Thinking Skills Test (CCTST), Forms A and B (Facione, 1992); the Ennis-Weir Critical Thinking Essay Test (EWCTET) (Ennis & Weir, 1985); and the Cornell Critical Thinking Test (CCTT), Levels X and Z (Ennis, Millman, & Tomko, 1985).

In a later review of nursing literature, Hicks (2001) similarly identified the three most commonly used tools in nursing as the WGCTA, CCTST, and the California Critical Thinking Dispositions Inventory (CCTDI) (Facione & Facione, 1994). And, in an integrated review of research between 1977 and 1995 that summarized 20 research studies related to nursing students’ critical thinking abilities, Adams (1999) found that the WGCTA was used most frequently (18 of the 20 studies) to measure students’ critical thinking abilities.

The WGCTA is one of the most commonly used standardized tools to measure critical thinking skills. It consists of an 80-item multiple choice exam that tests the areas of inference, recognition of assumptions, deduction, interpretation, and evaluation of arguments (Watson & Glaser, 1980).
The CCTST and CCTDI (Facione & Facione, 1992, 1994), provide a broad measurement of critical thinking by measuring skills of analysis, evaluation, and inference, and dispositions of maturity, open-mindedness, analyticity, systematicity, inquisitiveness, truth-seeking, and confidence. The CCTST consists of a 34-item multiple-choice test that assesses skills, whereas the CCTDI consists of 75 statements reflective of critical thinking dispositions and addressing the affective aspects of critical thinking.

Despite the widespread use of the WGCTA, Bauwens and Gerhard (1987) concluded that, whereas the WGCTA may be a valid tool to measure general critical thinking abilities in general education students, it “is not a valid measure of specific cognitive processes underlying the nursing process” (p. 278). Furthermore, Adams et al. (1996) concluded that, although the WGCTA is the most commonly used tool for measuring critical thinking abilities of nursing students:

because of the inconsistencies in results from the various studies in which the WGCTA has been used, this instrument may not be the one of choice for measuring nursing students’ critical thinking abilities as a criterion for determining the effectiveness of educational programs. (p. 31)

In addition, even though Watson and Glaser (1980) identified critical thinking as playing an important role in occupations that require analytic thinking, Hicks (2001) asserted that components of reflective or contextual aspects of critical thinking are absent in the WGCTA. The lack of these aspects in the tool leads nurse educators to conclude that, although the WGCTA may be a commonly used tool to measure nursing students’ critical thinking abilities, it may not be the most appropriate tool to measure critical thinking abilities related to the practice of nursing (Adams et al., 1996; Bauwens & Gerhard, 1987). These
findings challenge nurse educators to develop and evaluate other more appropriate means to measure nursing students’ critical thinking abilities.

**Results of Previous Studies Using Standardized Testing**

Although definitions of critical thinking adopted by faculty vary greatly, the WGCTA is the most frequently used tool to measure critical thinking skills found in nursing literature (Hicks, 2001). Despite its popularity and widespread use, Hicks (2001) pointed out that in the majority of studies the tool consistently failed to show growth in critical thinking scores from program entry to exit, which would indicate changes as a result of nursing education (Adams, Stover, & Whitlow, 1999; Frye, Alfred, & Campbell, 1999; Saucier, 1995). Few studies actually showed growth in critical thinking abilities when measured at entrance and exit (Berger, 1984; Pepa, Brown, & Alverson, 1997). Hicks (2001) noted that when nursing educators used the CCTDI and CCTST, they often found results that were different from the WGCTA, frequently showing an increase in critical thinking abilities and disposition with the CCTDI and CCTST versus no growth with the WGCTA.

Despite the clear direction that faculty must find ways to support student learning outcomes in critical thinking abilities, findings indicate these outcomes are not always demonstrated through standardized methods of measurement. These findings led some researchers to believe that other and varied methods must be used that may reflect more accurately actual critical thinking abilities in nursing students (Dexter et al., 1997; Facione & Facione, 1996).
Other Methods Used to Assess Nursing Students’ Critical Thinking Abilities

A variety of methods beyond standardized tests are currently used by nursing programs to assess students’ critical thinking abilities. These methods include attitudinal measures, self-reflective writings, guided assignments (Facione & Facione, 1996), rubrics, and portfolios (Facione & Facione, 1996; Huba & Freed, 2000). Facione and Facione (1996) proposed that no one method alone should be used to measure critical thinking abilities; rather, multiple methods of assessment of critical thinking abilities must be used to produce an authentic assessment. In addition, Dexter et al. (1997) indicated that multiple methods of assessment provide a more accurate view of students’ critical thinking abilities. Reilly and Oermann (1992) concurred, adding that critical thinking does not occur in any given course or assignment. Rather, critical thinking must occur over time and is enhanced by faculty who, through their interactions with students, support the critical thinking process. Furthermore, Malek (1986) purported that optimal learning occurs through experience; therefore, student nurses should practice critical thinking and decision making skills in the clinical setting guided by faculty who are comfortable with teaching these skills.

Methods other than standardized testing have been used successfully to show growth in critical thinking. Lumsden and Knight (1991) supported faculty use of locally or faculty-developed instruments to assess student outcomes in addition to other methods. The use of student portfolios is a growing trend used to assess students’ critical thinking abilities (Facione & Facione, 1996; Huba & Freed, 2000; Marriner Tomey, 2000) and provides the added benefit of correlating the competency of critical thinking with curricular outcomes in a summative evaluation (Karlowicz, 2000). The difficulty identified with portfolios, according
to Karlowicz, is ascertaining the validity of portfolio scoring. Reliability of portfolios is achieved through inter-rater consensus among faculty, uniformity of content, and clearly articulated scoring protocol.

Critical thinking rubrics are also used to assess students' critical thinking abilities. Rubrics are used as a means to explain to students how their work compares to a standard (Huba & Freed, 2000). One such rubric used in nursing is the Holistic Critical Thinking Scoring Rubric (Facione & Facione, 1996). The authors of this rubric strongly urged that for this tool to be scored correctly, great care must be taken to assure inter-rater reliability in its application.

Tests administered in the classroom can provide valuable information for assessing students' critical thinking abilities. Marriner Tomey (2000) described testing methods such as: (a) problem recognition tasks, where students are asked to recognize and identify a type of problem and match it to a solution method; (b) analytic memos, where students write an analysis of an issue or problem; (c) word journals, where students are asked to summarize a short text in one word and write a paragraph to explain why it was used; (d) approximate analogies, in which students are asked to complete the last half of an analogy to determine relationships; and (e) concept maps, which are diagrams that depict mental connections between concepts.

Oermann, Truesdell, and Ziolkowski (2000) encouraged development of tests that are context-dependent. They asserted that this type of test provides the opportunity for students to analyze provided information and determine a course of action.

Mastrian and McGonigle (1999) identified technology-based assignments as a method used to develop critical thinking skills. In keeping with Paul's (1992) beliefs that critical
thinking involves solving problems that are open-ended, the authors stressed development of technology-based assignments that also are open-ended in nature and require students to make a convincing argument for their position. One such technology-based assignment is development of supporting arguments of opposing viewpoints. This method is based on the work of O’Neill (1994) and challenges students to question their own beliefs and assumptions by considering others’ opinions or the views of those with whom they disagree.

**Summary of Literature Review**

Components of critical thinking vary at times between nursing and non-nursing disciplines; however, there are commonalties in the basic definitions. A variety of methods based on these definitions used to assess critical thinking skills are described in the literature. Literature indicates that standardized tests developed outside the discipline of nursing are the most common method used to assess critical thinking skills. Study results using these tools are inconsistent regarding whether growth has occurred in students’ critical thinking abilities. Therefore, a variety of non-standardized methods are being developed, as identified in the literature, to assess critical thinking abilities.

Although a great deal of information exists in the literature regarding assessment, measurement, and change in nursing students’ critical thinking abilities, whenever populations have been identified in the past according to accreditation affiliation, samples have been obtained from programs associated with NLN. With the emergence of CCNE as an accrediting body, more emphasis should be placed on identifying differences between the two accrediting bodies in regard to philosophy and reasons for program selection of one
agency over another. These findings will assist nursing programs in making informed decisions related to selection of accrediting agency based on a variety of factors.
CHAPTER 3. RESEARCH METHODOLOGY

The purpose of this study was to explore the relationship of definitions of critical thinking and the use of critical thinking measurement tools with accreditation affiliation in baccalaureate nursing programs. In this chapter, the research methods are discussed. Specific areas include research design, sample selection, procedures for human subject protection, and data collection procedures.

Research Design

This study was conducted using a quantitative, nonexperimental, correlational design. A survey approach was used for data collection. The dependent variables in this study are congruency of program's definition of critical thinking with selected definitions of critical thinking, type of assessment tools used to assess students' critical thinking abilities, growth in critical thinking abilities, and characteristics of the program. Demographic attributes include the type of baccalaureate nursing program (generic or RN to BSN), additional types of nursing degrees offered by the institution (beyond a baccalaureate degree), public or private status, membership in professional nursing organizations that accredit the program, geographical accrediting region in the United States, and contributing factors used to describe the selection of accrediting agency. The independent variable in this study is accreditation affiliation (CCNE or NLNAC).
Sample Selection

The population for this study consists of baccalaureate nursing programs in the United States that are accredited by CCNE or NLNAC (from their respective 2001 accreditation directories). The total number of CCNE programs is 153 and the total number of NLNAC programs is 509. Lists used to acquire the sample population were taken from the directories of the accrediting agencies (CCNE, 2001; NLNAC, 2001). The sample was obtained through a proportional, stratified random sample process. It was comprised of 50% of the baccalaureate nursing programs from each of the two accrediting agencies. Seventy-six baccalaureate programs from the CCNE list and 254 programs from the NLNAC list were selected using the following process. Names of each program were listed alphabetically by state. A random starting point was selected on each list as determined by a random numbers table, and every other name was selected from the list. Due to the small numbers selected from some states, findings are reported as aggregates by geographical accrediting region. This procedure assured anonymity for respondents and highlighted patterns across regions. Appendix C depicts the geographical distribution of nursing programs in the sample by regional accrediting agency and includes individual states in each region.

Although the original sample included 50% of nursing programs from each accrediting agency, it was noted that between the timeframe of when the names were obtained from the 2001 directory and the time when respondents returned the survey in Spring 2002, a shift in respondents from one accrediting agency to another had occurred. These agency shifts will be identified and discussed further.
Protection of Human Rights

Permission to conduct the study was obtained from the Institutional Review Board at Iowa State University. The researcher also completed a required training course on the protection of human subjects in research.

A cover letter was sent with a survey to each of the nursing programs in the sample (see Appendix D). The cover letter included an explanation of the procedures and their purposes, an offer to answer any questions or clarify information, and assurance of confidentiality of information provided. Modified informed consent was implied by the respondents’ completion and return of the survey instrument. Participants were offered an opportunity to obtain results of the study in aggregate form at the completion of the study.

Survey Tool

The survey tool used in this study was developed by the author of the study and is found in Appendix E. Questions on the survey address program characteristics, affiliation with professional nursing organizations, comparison of selected definitions of critical thinking to program definition, methods used to assess critical thinking abilities, and whether change was noted in critical thinking abilities over time.

More specifically, demographic data requested on the survey included: (a) type of baccalaureate nursing program, (b) other nursing degrees offered at the institution, and (c) whether the institution has public or private status. Questions that address affiliation with professional nursing organizations included: (a) membership in professional nursing organizations, (b) affiliation of current accrediting agency; and (c) factors that contributed to the selection of the accrediting agency(ies), including the most important factor.
The next section of the survey addressed congruency of selected definitions of critical thinking with the baccalaureate nursing program’s definition of critical thinking. Survey recipients were provided eleven frequently used definitions of critical thinking found in the literature, which included both nursing and non-nursing definitions. They were asked to determine on a Likert scale their program’s agreement (strongly congruent, congruent, incongruent, or strongly incongruent) with each of the selected definitions.

The next questions on the survey addressed methods used to assess critical thinking abilities. Five commonly used standardized tools to assess critical thinking abilities were identified from nursing literature. Respondents were asked to identify if their baccalaureate nursing program used any of the five tools or other standardized tools to assess critical thinking abilities. They also were asked to identify if no standardized tool was used.

In addition to standardized tools, respondents were asked to indicate whether their baccalaureate nursing program used any non-standardized tools to assess critical thinking. Five commonly used non-standardized tools were selected from the nursing literature. Respondents could also select “No non-standardized tool is used,” or they could identify other non-standardized tools used that were not listed.

The last portion of the survey addressed reports of change over time in critical thinking abilities measured by standardized tests or non-standardized methods. In this part of the survey, respondents were asked to identify whether their baccalaureate nursing program assessed change in critical thinking abilities. If change was assessed, they were asked whether change was assessed at time of entry into and exit from the nursing program, and, if it were assessed, whether the same or a different tool was used to assess change. Also, respondents were given an option to identify any other method used to assess change.
Furthermore, respondents were asked to identify whether standardized or non-standardized tools were used to assess change, and which specific tools were used. Finally, respondents were asked to identify whether a significant difference (either higher or lower) was assessed in critical thinking abilities using the tools, or if no change occurred.

Participants were invited to obtain results of the study by including their e-mail address on the appropriate portion of the survey. They were informed in the cover letter that results of the study would be sent as an abstract by e-mail.

**Discussion of Validity and Reliability of Survey Tool**

The survey tool was reviewed by faculty members familiar with CCNE and/or NLNAC criteria to assess face validity of the tool. A pilot study was conducted by sending the survey tool to four baccalaureate nursing programs accredited by CCNE, NLNAC, or both. The survey tool was revised based on the results of the pilot study. Changes included wording for clarification.

**Data Collection Procedures**

The survey tools were sent to program chairs of the selected nursing programs in the study sample along with cover letters and stamped, self-addressed envelopes. The cover letter invited participants to complete the enclosed survey and return it in the enclosed envelope within two weeks. If the survey was not received in three weeks, a follow-up e-mail was sent to the program chair. E-mail addresses were obtained from accreditation agency directories.
CHAPTER 4. RESEARCH FINDINGS

Overview of Statistical Procedures

The purpose of this study was to explore the relationship of definitions of critical thinking and the use of critical thinking measurement tools with accreditation affiliation in baccalaureate nursing programs. Selected aspects of the programs were investigated to determine if certain characteristics are associated with programs' selection of accrediting agencies. This chapter describes respondents in the study and provides a demographic profile of respondents' programs. Findings related to each hypothesis are discussed.

Data in this study were analyzed using the Statistical Package for the Social Sciences (SPSS). An alpha level of 0.05 was established to assess significance.

Respondents

One hundred and fifty-four surveys were returned. For one survey that was returned, the respondent requested the results not be used in the study. Some of the returned surveys were completed only partially and contained missing data. The missing data appeared on different parts of the various surveys; therefore, data were used from each survey as reported by respondents. The total number of usable surveys in the study was 153 (a 46% response rate).

Four programs in the original study sample were duplicates, as their program names appeared on both the NLNAC and CCNE 2001 directories. Three of these programs completed and returned surveys.
Profile Results

A profile of respondents’ program characteristics is shown in Table 3. A summary of the responses follows.

Baccalaureate program type

Respondents were asked to identify whether their baccalaureate nursing program type was generic or RN-BSN. Generic programs offer a 4-year degree, and are usually offered at colleges and universities. RN-BSN programs offer baccalaureate degrees for nurses who have already attained a diploma (3-year) or associate degree (2-year). Most institutions overall offer both generic and RN-BSN baccalaureate nursing programs (74%), rather than just one or the other (18% only RN-BSN and 5% only generic BSN), with NLNAC-accredited programs almost twice as likely to offer an RN-BSN program (23%) as CCNE-accredited programs (12%). Overall, more institutions offer RN-BSN programs (95%) than generic programs (83%), with NLNAC-accredited programs offering just slightly more RN-BSN types (93%) than CCNE-accredited programs (88%), and CCNE-accredited programs offering more generic BSN type baccalaureate programs (89%) than NLNAC-accredited programs (75%).

Other degrees offered in addition to a baccalaureate degree

In addition to a baccalaureate nursing program, two-thirds of all respondents offer a master’s nursing program (66%); CCNE-accredited programs are more likely to offer master’s programs (74%) than are NLNAC-accredited programs (60%). A far smaller percentage of CCNE-accredited programs offer an associate degree (5%) or both a master's
Table 3. Profile of program institutions

<table>
<thead>
<tr>
<th>Program type</th>
<th>Accrediting agency</th>
<th>All respondents&lt;sup&gt;a&lt;/sup&gt;</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>All</td>
<td>CCNE</td>
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<td></td>
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<td>4%</td>
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<td>RN-BSN only</td>
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</tr>
<tr>
<td>Offer both generic BSN and RN-BSN</td>
<td>77%</td>
<td>70%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Nursing degrees offered (in addition to a baccalaureate)</th>
<th>Accrediting agency</th>
<th>All respondents&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All</td>
<td>CCNE</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Doctorate</td>
<td>16%</td>
<td>6%</td>
</tr>
<tr>
<td>Master’s</td>
<td>74%</td>
<td>60%</td>
</tr>
<tr>
<td>Associate</td>
<td>5%</td>
<td>19%</td>
</tr>
<tr>
<td>Offer both doctorate and master’s</td>
<td>18%</td>
<td>6%</td>
</tr>
<tr>
<td>Offer both master’s and associate</td>
<td>1%</td>
<td>13%</td>
</tr>
<tr>
<td>No other degree offered</td>
<td>20%</td>
<td>34%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Public or private status</th>
<th>Accrediting agency</th>
<th>All respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All</td>
<td>CCNE</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public</td>
<td>53%</td>
<td>48%</td>
</tr>
<tr>
<td>Private</td>
<td>46%</td>
<td>52%</td>
</tr>
</tbody>
</table>

<sup>a</sup> Total percentages may not equal 100% because categories are not mutually exclusive.
Table 3. Continued

<table>
<thead>
<tr>
<th>Membership in professional nursing organizations</th>
<th>Accrediting agency&lt;sup&gt;a&lt;/sup&gt;</th>
<th>All respondents&lt;sup&gt;a&lt;/sup&gt; (n = 149)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All CCNE</td>
<td>All NLNAC</td>
</tr>
<tr>
<td>AACN (only membership)</td>
<td>43%</td>
<td>2%</td>
</tr>
<tr>
<td>NLN (only membership)</td>
<td>0%</td>
<td>15%</td>
</tr>
<tr>
<td>Both AACN and NLN membership</td>
<td>51%</td>
<td>80%</td>
</tr>
<tr>
<td>AACN (total respondents with membership)</td>
<td>99%</td>
<td>82%</td>
</tr>
<tr>
<td>NLN (total respondents with membership)</td>
<td>50%</td>
<td>94%</td>
</tr>
<tr>
<td>Membership with other professional organizations</td>
<td>7%</td>
<td>8%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Accrediting agency</th>
<th>Original sample&lt;sup&gt;a&lt;/sup&gt; (n=330)</th>
<th>All respondents&lt;sup&gt;a&lt;/sup&gt; (n=153)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CCNE only</td>
<td>22%</td>
<td>31%</td>
</tr>
<tr>
<td>NLNAC only</td>
<td>76%</td>
<td>52%</td>
</tr>
<tr>
<td>CCNE total</td>
<td>23%</td>
<td>48%</td>
</tr>
<tr>
<td>NLNAC total</td>
<td>77%</td>
<td>69%</td>
</tr>
<tr>
<td>Both NLNAC and CCNE</td>
<td>2%</td>
<td>18%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Geographic distribution by regional accrediting agency</th>
<th>All CCNE</th>
<th>All NLNAC</th>
<th>Original sample (n=330)</th>
<th>All respondents (n=153)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Middle States</td>
<td>23%</td>
<td>19%</td>
<td>19%</td>
<td>18%</td>
</tr>
<tr>
<td>New England</td>
<td>5%</td>
<td>7%</td>
<td>7%</td>
<td>7%</td>
</tr>
<tr>
<td>North Central</td>
<td>30%</td>
<td>42%</td>
<td>38%</td>
<td>39%</td>
</tr>
<tr>
<td>Northwestern</td>
<td>4%</td>
<td>1%</td>
<td>4%</td>
<td>3%</td>
</tr>
<tr>
<td>Southern</td>
<td>30%</td>
<td>28%</td>
<td>26%</td>
<td>28%</td>
</tr>
<tr>
<td>Western</td>
<td>8%</td>
<td>3%</td>
<td>6%</td>
<td>5%</td>
</tr>
</tbody>
</table>
and associate degree (1%) compared to NLNAC-accredited programs (19% and 13%, respectively). It was noted that all CCNE-accredited programs with associate programs were also NLNAC-accredited. CCNE programs are more likely to offer doctoral programs (16%) and both doctoral and master’s programs (18%) than are NLNAC programs (6% and 6%, respectively). Roughly one-third (30%) of all respondents do not offer degrees other than a baccalaureate degree, with NLNAC-accredited programs less likely to offer another degree (34%) than CCNE-accredited programs (20%).

Public or private status

The percentage of respondents from private institutions was roughly equal to that of public institutions. CCNE-accredited programs reported slightly more public institutions (53%) than private, and NLNAC reported slightly more private institutions (52%) than public.

Membership in professional organizations

Overall, nearly twice as many institutions maintain professional membership with both AACN and NLN (59%) as those institutions that maintain separate membership with either just AACN (22%) or just NLN (11%). Although 43% of CCNE-accredited programs hold a sole membership with AACN (CCNE’s agency affiliate), only 15% of NLNAC-accredited programs are solely accredited by their agency’s affiliate, NLN. More NLNAC-accredited programs hold a membership (80%) with both AACN and NLN than CCNE-accredited programs (51%). More programs hold AACN memberships (87%) than NLN memberships (72%).
Accreditation affiliation

The percentage of respondents who reported accreditation affiliation with just NLNAC (52%) is less than the number reported by the 2001 NLNAC Directory in the original sample (76%), and the percentage of respondents who reported accreditation affiliation with just CCNE (31%) was more than that of the original sample percentage (22%). While four programs from the original sample were accredited by both NLNAC and CCNE, survey respondents show an increase in the number of programs currently accredited by both agencies (18%). While just 23% of the original sample was from the CCNE group, the number of respondents who now indicate CCNE affiliation has more than doubled (48%) from 2001; and although 77% of the sample originally had NLNAC status, one year later that incidence has decreased to 69%.

An additional finding was noted in regard to future intentions of respondents to seek a change in accreditation status. Although the survey did not address future intention to remain with or change accreditation affiliation, 37 programs indicated that they were in the process of switching to CCNE accreditation, or had intentions of switching to CCNE accreditation when their current NLNAC accreditation expired.

Geographical distribution by regional accreditation region

The distribution of respondents by accreditation regions was very similar to the distribution of the regions in the sample overall. CCNE- and NLNAC-accredited programs were similar to the whole sample in distribution by accrediting region. A greater percentage of CCNE programs than NLNAC programs responded from the Middle States, Northwestern,
Southern, and Western regions, and a greater percentage of NLNAC than CCNE programs responded from New England and North Central.

Hypothesis Testing

Hypothesis 1: There is no relationship between accreditation affiliation and whether the baccalaureate nursing program is a generic BSN program or an RN-BSN program.

Crosstabulation analysis was conducted relating current accreditation affiliation (CCNE, NLNAC, or both) and the type of baccalaureate program (generic BSN, RN-BSN, combination of BSN and RN-BSN, or others). The Pearson Chi-Square value indicated no significant association between these two variables ($\chi^2 = 10.218, p = .116$). This finding indicates there is no difference between the proportions of baccalaureate nursing programs accredited by CCNE, NLNAC, or both agencies based on the type of baccalaureate nursing program they choose to offer. An additional finding indicated that fewer CCNE-accredited programs were RN-BSN program types than expected by chance alone (Adjusted Residual = -2.5). Adjusted residual results that are equal to or greater than the absolute value of two identify relationships that occur more frequently than by chance alone. The formula for calculating adjusted residuals is found in Appendix F.

Hypothesis 2: There is no relationship between accreditation affiliation and whether other nursing degrees are offered at the institution.

Crosstabulation analysis was conducted relating current accreditation affiliation (CCNE, NLNAC, or both) and whether other degrees were offered or not offered at the institution. The Pearson chi-square value indicated no significant association ($\chi^2 = 5.110$,
p=0.078). An additional finding indicated that significantly more NLNAC-accredited programs were likely to offer just a baccalaureate nursing degree with no additional degrees at their institution than expected by chance alone (Adjusted Residual = 2.3).

**Hypothesis 3:** There is no relationship between accreditation affiliation and whether the institution is public or private.

Crosstabulation analysis was conducted relating accreditation affiliation (CCNE, NLNAC, or both) and institutional status (public or private). The Pearson chi-square value was not significant ($\chi^2=1.030, p=0.597$). This finding indicates respondents from baccalaureate nursing programs accredited by CCNE, NLNAC, or both are just as likely to be public as private in status.

**Hypothesis 4:** Baccalaureate nursing programs are no more likely to be members of the professional nursing organization that accredits them than to be members of other organizations.

Crosstabulation analysis was conducted relating accreditation affiliation (CCNE, NLNAC, or both) and membership in accrediting organization (only AACN, only NLN, both AACN and NLN, or any other combination). The Pearson chi-square value indicates a significant difference ($\chi^2=90.860, p<0.001$) among the groups. This finding indicates that baccalaureate nursing programs are more likely to be members of the professional nursing organization that accredits them than to be members of other professional nursing organizations.
In addition, specific differences follow. CCNE programs are more likely to have sole membership with AACN and less likely to be members of NLN or to have a combined membership of AACN and NLN than expected by chance alone. Those programs accredited by NLNAC are more likely to have a sole membership with NLNAC or a combination of AACN and NLN, and less likely to have a sole membership with CCNE. Also, programs with a combined accreditation (CCNE and NLNAC) are more likely to maintain a membership with both AACN and NLN, and less likely to be sole members of either organization. These findings show a strong indication that baccalaureate nursing programs are more likely to be members of the professional nursing organization that accredits them than to be members of other professional nursing organizations.

Hypothesis 5: There is no relationship between the geographical region in which the program is located and the program's accreditation affiliation.

Crosstabulation analysis relating accreditation affiliation (CCNE, NLNAC, or both) and geographical accrediting region (Middle States, New England, North Central, Northwestern, Southern, or Western) was conducted. Pearson chi-square analysis indicated a finding nearing significance ($\chi^2 = 18.026, p = .055$). This finding indicates further research is needed to verify this relationship. Differences were noted between accreditation affiliation and regions. There were more CCNE respondents in the Western region than one might expect by chance alone (Adjusted Residual = 2.0), there were significantly more NLNAC respondents in the North Central region than one might expect by chance alone (Adjusted Residual = 2.3), and there were more respondents from the combined group in the Middle region (Adjusted
Residual = 2.9) and fewer in the North Central region (Adjusted Residual = -2.0) than one might expect by chance alone.

An additional analysis was completed to discover whether there was a difference by region between those programs that did respond to the survey and those that did not respond to the survey. Pearson chi-square analysis indicated there was no difference ($\chi^2 = 2.041$, $p = .844$) by region between those that did or did not respond. In addition, the distribution of the respondent group was very similar to the sample group.

**Hypothesis 6: There is no difference among main factors that contribute to selection of an accrediting agency.**

The main contributing factors were structured into five main categories with similar components. The process for categorizing contributing factors follows. Original survey data included 42 different main contributing factors for selection of accrediting agency. These contributing factors were divided into categories that contained related items. The total number of categories was reduced to five and included: desire to be accredited by an agency that accredits only baccalaureate and higher degree programs, consumer-friendly, focus/methods of accreditation process, reputation of agency, and cost. Main categories and other descriptors are depicted in Table 4.

A chi-square goodness-of-fit analysis was conducted comparing the five main categories of contributing factors to determine whether there were significant differences among the categories in relative frequency of occurrence, compared to hypothesized equal proportions. The results of the chi-square analysis indicated there was a significant difference in main reasons for selecting an accrediting agency among the five main contributing factors
Table 4. Main contributing factors for selection of accrediting agency

<table>
<thead>
<tr>
<th>Category</th>
<th>Other descriptors included</th>
<th>Accrediting affiliation</th>
<th>All respondents (percent selected) (n=92)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Desire to be accredited by an agency that accredits only baccalaureate and higher degree programs</td>
<td></td>
<td>All CCNE</td>
<td>All NLnAC</td>
</tr>
<tr>
<td>Consumer-friendly</td>
<td><em>CCNE:</em> Collegial, easier to work with, helpful, flexible, cooperative, respectful, access to many resources, ease and timeliness of communication, staff support, customer service. <em>NLnAC:</em> Difficult to communicate with, becoming more user-friendly, excellent resources.</td>
<td>13%</td>
<td>2%</td>
</tr>
<tr>
<td>Focus/methods of accreditation process</td>
<td><em>CCNE:</em> Is not prescriptive, allows for creativity, accreditation focus on improvement, continuous quality improvement focus, emphasizes faculty growth, vision for the future, future-oriented, reflects standards of the profession, outcome-focused, asks for input into standards and outcomes, focus on critical thinking, ease/efficiency of accreditation process, clarity of self-study criteria, uses <em>Essentials</em> as guide, not a punitive process, organized process of accreditation, shorter accreditation document. <em>NLnAC:</em> Familiarity with accrediting process. <em>Both agencies:</em> Agency philosophy matches our program, values match our program.</td>
<td>28%</td>
<td>13%</td>
</tr>
<tr>
<td>Reputation of agency</td>
<td><em>CCNE:</em> Prestige of accrediting body, status of agency, seen as a good marketing tool, new organization, dissatisfied with NLnAC. <em>NLnAC:</em> Uncertainty regarding status of accreditation, problems with Department of Education, established</td>
<td>17%</td>
<td>55%</td>
</tr>
</tbody>
</table>
Table 4. Continued

<table>
<thead>
<tr>
<th>Category</th>
<th>Other descriptors included</th>
<th>Accrediting affiliation</th>
<th>All respondents (percent selected)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>All</td>
<td>CCNE</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2%</td>
<td>13%</td>
</tr>
</tbody>
</table>

accrediting body, was already an established organization so stayed with it, faculty felt a loyalty to agency, good reputation, only accrediting agency available when we became accredited, having 2\textsuperscript{nd} agency is divisive to nursing, CCNE seems elitist. 

*Both*: Quality of organization, integrity, professionalism of organization, trust.

Cost

*NLNAC*: Couldn’t afford two accreditations, can accredit all nursing programs.
Two of the five main contributing factors were identified more frequently than expected by chance alone. One of these related to a desire to be accredited by an agency that accredits only baccalaureate and higher degree programs (27%); the second contributing factor identified most often related to the reputation of the accrediting agency (38%). Also, two of the five categories of responses were identified less frequently than one might expect by chance alone. These categories included “consumer friendliness” (7%) and cost (9%).

**Hypothesis 7: There is no relationship between reasons for selecting an accrediting agency and agency affiliation.**

Crosstabulation analysis relating accreditation affiliation (CCNE, NLNAC, or both) and main contributing factor for selection of accrediting agency was conducted. (Table 4 depicts the five main contributing factor categories.) The results of the Pearson chi-square analysis indicated a significant difference between accreditation affiliation and reasons for selection of accrediting agency ($\chi^2 = 37.087, p < .001$). Findings indicate that programs identified as only CCNE or only NLNAC selected the accrediting agencies for different reasons. All findings for the groups that were only CCNE or only NLNAC were significantly different than one might expect by chance alone and are depicted in Table 5. Programs accredited only by CCNE identified the main reasons for agency selection as “Desire to be accredited by an agency that accredits only baccalaureate and higher degree programs,” the consumer friendliness of the agency, and focus/methods of accreditation process. Programs accredited only by CCNE were less likely to select the agency based on the reputation of the agency or issues related to cost. Inversely, programs accredited only by NLNAC were more likely to
Table 5. Reasons for selection of accrediting agency

<table>
<thead>
<tr>
<th>Contributing factor</th>
<th>CCNE (only)</th>
<th>NLNAC (only)</th>
<th>Combined NLNAC and CCNE (only)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Desire to be accredited by an agency that accredits only baccalaureate and higher degree programs</td>
<td>3.1 (47%)</td>
<td>-2.6 (15%)</td>
<td>-0.5 (21%)</td>
</tr>
<tr>
<td>Consumer-friendliness</td>
<td>2.6 (16%)</td>
<td>-2.5 (0%)</td>
<td>0.1 (7%)</td>
</tr>
<tr>
<td>Focus/methods of accreditation process</td>
<td>2.1 (31%)</td>
<td>-2.1 (11%)</td>
<td>0.2 (21%)</td>
</tr>
<tr>
<td>Reputation of agency</td>
<td>-4.6 (6%)</td>
<td>4.1 (59%)</td>
<td>0.4 (43%)</td>
</tr>
<tr>
<td>Cost</td>
<td>-2.2 (0%)</td>
<td>2.2 (15%)</td>
<td>-0.2 (7%)</td>
</tr>
</tbody>
</table>

select their agency based on the agency’s reputation and issues related to cost, and were much less likely to select the agency based on “Desire to be accredited by an agency that accredits only baccalaureate and higher degree programs,” the consumer friendliness of the agency, or based on focus/methods of accreditation process.

*Hypothesis 8: There is no relationship between the extent of agreement with selected definitions of critical thinking used by baccalaureate nursing programs and their accreditation affiliation.*

Crosstabulations between each of the 11 definitions identified on the survey (categorized according to extent of congruency with the definition) and accreditation affiliation...
affiliation (CCNE, NLNAC, or both) were conducted. The Pearson chi-square values indicate there were no significant findings. Table 6 identifies separate chi-square findings for each definition. Although no differences were noted overall between the extent of agreement with selected definitions of critical thinking used by baccalaureate nursing programs and their accreditation affiliation, there were significant differences noted within the specific accreditation groups regarding congruency with their programs’ definitions. These differences follow:

1. Definition 2 findings indicate more respondents from the NLNAC group believed this definition was incongruent than one might expect from chance alone (Adjusted Residual = 2.0).

2. Definition 4 findings indicate more respondents from the CCNE group believed this definition was strongly congruent with their own programs’ definitions (Adjusted Residual = 2.3) than one might expect by chance alone.

3. Definition 5 findings indicate more respondents from the CCNE group believed this definition was strongly congruent with their own programs’ definitions (Adjusted Residual = 2.0) than one might expect by chance alone.

4. Definition 6 findings indicate two differences among respondents. More respondents from the CCNE group indicated congruence between this definition and their programs’ definitions (Adjusted Residual = 2.0), and fewer respondents from the NLNAC group indicated congruence between this definition and their programs’ definitions (Adjusted Residual = -2.0) than one might expect by chance alone.
Table 6. Extent of agreement among definitions of critical thinking by accreditation affiliation

<table>
<thead>
<tr>
<th>Definition</th>
<th>Pearson chi-square (level of significance)</th>
<th>Pairwise comparison mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Reflective and reasonable thinking that is focused on deciding what to believe or do (Ennis, 1993)</td>
<td>1.885 ((p=.757))</td>
<td>1.581</td>
</tr>
<tr>
<td>2. An investigation whose purpose is to explore a situation, phenomenon, question, or problem to arrive at a hypothesis or conclusion about it that integrates all available information and that, therefore, can be convincingly justified (Kurfiss, 1988)</td>
<td>8.500 ((p=0.75))</td>
<td>1.713</td>
</tr>
<tr>
<td>3. The propensity and skill to engage in an activity with reflective-skepticism (McPeck, 1981)</td>
<td>1.440 ((p=.837))</td>
<td>2.008</td>
</tr>
<tr>
<td>4. The art of thinking about your thinking while you are thinking in order to make your thinking better: more clear, more accurate, or more defensible (Paul, 1992)</td>
<td>5.422 ((p=.247))</td>
<td>2.008</td>
</tr>
<tr>
<td>5. A composite of attitudes, knowledge, and skills (Watson &amp; Glaser, 1964)</td>
<td>5.430 ((p=.246))</td>
<td>1.938</td>
</tr>
<tr>
<td>6. The rational explanation of ideas, inferences, assumptions, principles, arguments, conclusions, issues, statements, beliefs, and actions (Bandman &amp; Bandman, 1988)</td>
<td>4.839 ((p=.304))</td>
<td>1.736</td>
</tr>
<tr>
<td>7. Purposeful, goal-directed thinking that aims to make judgments based on evidence (fact), rather than conjecture (guesswork) (Alfar-LeFevre, 1995)</td>
<td>3.039 ((p=.551))</td>
<td>1.380</td>
</tr>
</tbody>
</table>
Table 6. Continued

<table>
<thead>
<tr>
<th>Definition</th>
<th>Pearson chi-square (level of significance)</th>
<th>Pairwise comparison mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>8. An inherent cognitive activity in the process of forming clinical judgments (Miller &amp; Malcolm, 1990)</td>
<td>3.460 ($p=.484$)</td>
<td>1.705</td>
</tr>
<tr>
<td>9. Goal-oriented, purposeful thinking that involves a number of mental skills, such as determining what data is relevant, evaluating the credibility of sources, and making inferences (Wilkinson, 1996)</td>
<td>5.644 ($p=.227$)</td>
<td>1.434</td>
</tr>
<tr>
<td>10. Underlies independent and interdependent decision making. Includes questioning, analysis, synthesis, interpretation, inference, inductive and deductive reasoning, intuition, application, and creativity (AACN, 1998)</td>
<td>4.505 ($p=.342$)</td>
<td>1.426</td>
</tr>
<tr>
<td>11. The deliberative nonlinear process of collecting, interpreting, analyzing, drawing conclusions about, presenting, and evaluating information that is both factually and belief based. In nursing this is demonstrated by clinical judgment, which includes: ethical, diagnostic and therapeutic dimensions; and research (NLNAC, 2000b)</td>
<td>4.578 ($p=.333$)</td>
<td>1.674</td>
</tr>
</tbody>
</table>
5. Definition 9 findings indicate a greater number of respondents from the NLNAC group found this definition incongruent with their own definition of critical thinking (Adjusted Residual = 2) than one might expect by chance alone.

6. Definition 11 findings indicate more respondents in the combined group found this definition strongly congruent with their own programs' definitions than one might expect by chance alone (Adjusted Residual = 2.0).

_Hypothesis 9: There is agreement (that is, no difference) across baccalaureate nursing programs regarding definitions of critical thinking._

A one-sample t-test was used to test for any difference in mean level of agreement (how likely they were to strongly agree) between the definitions. Findings indicate a significant difference in mean strength of agreement between the definitions ($p \leq .001$), indicating there is no agreement across baccalaureate nursing programs. In addition, a pairwise comparison was completed to discover overall extent of agreement between individual definitions. Individual means may be found in Table 6. Means are listed on a scale where 1.0 = strongly congruent and 3 = incongruent. Findings indicated that the strongest agreement among all respondents existed for Definition 7 (Alfaro-LeFevre, 1995), with a mean of 1.38, followed by Definition 10 (AACN, 1998), with a mean of 1.426, and Definition 9 (Wilkinson, 1996), with a mean of 1.434. The greatest mean difference (−.628) occurred between Definition 7 (Alfaro-LeFevre, 1995) and Definitions 3 (McPeck, 1981) and 4 (Paul, 1992).
Hypothesis 10: There is no relationship between the extent of agreement with
definitions used by a baccalaureate nursing program to define critical thinking and the types
of tools used to assess critical thinking.

Crosstabulation analysis relating each of the 11 definitions identified on the survey
(according to extent of congruency with the definition) and types of tools used to assess
critical thinking (standardized, non-standardized, or both types) were conducted. Pearson chi-
square values for each definition are listed in Table 7. The chi-square outcome for Definition
7 (Alfaro-LeFevre, 1995) was the only significant finding ($\chi^2 = 11.837$, $p = .019$). This finding
indicated there was a difference between respondents' extent of agreement with Definition 7
based on the types of tools used to assess critical thinking. Two specific areas of difference
between agreement with Definition 7 and tools used to assess critical thinking were
identified. Respondents who used only standardized tools to assess critical thinking were
more likely to disagree with the definition (Adjusted Residual = 2.4), and those respondents
who used both standardized and non-standardized tools were less likely to disagree with the
definition (Adjusted Residual = 2.9). It should be noted that, while the statistical finding for
Definition 7 was significant, data were sparse in some cells of the contingency table; further
research is needed to verify this relationship.

In addition, the following findings indicate differences that occurred more frequently
than one might expect by chance alone:

1. For Definition 1 (Ennis, 1993), respondents who used only standardized tools to
   assess critical thinking abilities were less likely to respond strongly congruent
   (Adjusted Residual = −2.3), and more likely to respond that their program's
definition was incongruent with the definition (Adjusted Residual = 2.4).
Table 7. Relationship between definitions of critical thinking and tool type

<table>
<thead>
<tr>
<th>Definition</th>
<th>Pearson chi-square (level of significance)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Reflective and reasonable thinking that is focused on deciding what to believe or do (Ennis, 1993)</td>
<td>9.455 ($p = .051$)</td>
</tr>
<tr>
<td>2. An investigation whose purpose is to explore a situation, phenomenon, question, or problem to arrive at a hypothesis or conclusion about it that integrates all available information and that, therefore, can be convincingly justified (Kurfiss, 1988)</td>
<td>9.298 ($p = .054$)</td>
</tr>
<tr>
<td>3. The propensity and skill to engage in an activity with reflective skepticism (McPeck, 1981)</td>
<td>2.066 ($p = .724$)</td>
</tr>
<tr>
<td>4. The art of thinking about your thinking while you are thinking in order to make your thinking better: more clear, more accurate, or more defensible (Paul, 1992)</td>
<td>2.650 ($p = .618$)</td>
</tr>
<tr>
<td>5. A composite of attitudes, knowledge, and skills (Watson &amp; Glaser, 1964)</td>
<td>4.492 ($p = .344$)</td>
</tr>
<tr>
<td>6. The rational explanation of ideas, inferences, assumptions, principles, arguments, conclusions, issues, statements, beliefs, and actions (Bandman &amp; Bandman, 1988)</td>
<td>3.415 ($p = .491$)</td>
</tr>
<tr>
<td>7. Purposeful, goal-directed thinking that aims to make judgments based on evidence (fact), rather than conjecture (guesswork) (Alfaro-LeFevre, 1995)</td>
<td>11.837 ($p = .019$)</td>
</tr>
<tr>
<td>9. Goal-oriented, purposeful thinking that involves a number of mental skills, such as determining what data are relevant, evaluating the credibility of sources, and making inferences (Wilkinson, 1996)</td>
<td>1.317 ($p = .859$)</td>
</tr>
<tr>
<td>10. Underlies independent and interdependent decision making. Includes questioning, analysis, synthesis, interpretation, inference, inductive and deductive reasoning, intuition, application, and creativity (AACN, 1998)</td>
<td>5.404 ($p = .248$)</td>
</tr>
<tr>
<td>Definition</td>
<td>Pearson chi-square (level of significance)</td>
</tr>
<tr>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>--------------------------------------------</td>
</tr>
<tr>
<td>11. The deliberative nonlinear process of collecting, interpreting, analyzing, drawing conclusions about, presenting, and evaluating information that is both factually and belief based. In nursing this is demonstrated by clinical judgment which includes: ethical, diagnostic and therapeutic dimensions, and research (NLNAC, 200b)</td>
<td>7.841 ($p=0.098$)</td>
</tr>
</tbody>
</table>
2. For Definition 2 (Kurfiss, 1988), respondents who used only standardized tools to assess critical thinking abilities were more likely to respond that the definition was incongruent with their program's definition (Adjusted Residual = 2.3), and respondents who used both standardized and non-standardized tools to assess critical thinking were less likely to respond that the definition was incongruent with their program's definition (Adjusted Residual = -2.3).

3. For Definition 10 (AACN, 1998), respondents who used only non-standardized tools were more likely to find their program's definition of critical thinking incongruent with the definition (Adjusted Residual = 2.3).

4. For Definition 11 (NLNAC, 2000b), respondents who used only standardized tools were less likely to find the definition congruent with their own program's definition of critical thinking (Adjusted Residual = -2.3).

Hypothesis 11: There is no relationship between the types of tools used by baccalaureate nursing programs to assess critical thinking and their accreditation affiliation.

Crosstabulation analysis relating types of tools used to assess critical thinking abilities (standardized, non-standardized, or both) and accreditation affiliation (CCNE, NLNAC, or both) was conducted. The Pearson chi-square ($\chi^2 = 4.085, p = .395$) indicates there is no difference between types of tools used to assess critical thinking skills and accreditation affiliation.

Table 8 depicts standardized tools currently used by nursing programs to assess students' critical thinking abilities. Overall, 72% of respondents used standardized tools to
Table 8. Tools used to measure critical thinking skills

<table>
<thead>
<tr>
<th></th>
<th>Percentage of programs that use tool</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CCNE (all)</td>
</tr>
<tr>
<td></td>
<td>NLNAC (all)</td>
</tr>
<tr>
<td></td>
<td>All respondents</td>
</tr>
<tr>
<td><strong>Standardized tool:</strong></td>
<td></td>
</tr>
<tr>
<td>Standardized tools (any standardized tool)</td>
<td>65%</td>
</tr>
<tr>
<td>California Critical Thinking Skills Test</td>
<td>22%</td>
</tr>
<tr>
<td>California Critical Thinking Dispositions Inventory</td>
<td>10%</td>
</tr>
<tr>
<td>Watson-Glaser Critical Thinking Appraisal</td>
<td>10%</td>
</tr>
<tr>
<td>Educational Resources, Inc.</td>
<td>23%</td>
</tr>
<tr>
<td>HESI</td>
<td>3%</td>
</tr>
<tr>
<td>Assessment Technology, Inc.</td>
<td>5%</td>
</tr>
<tr>
<td>No standardized tool used</td>
<td>36%</td>
</tr>
<tr>
<td><strong>Non-standardized tool:</strong></td>
<td></td>
</tr>
<tr>
<td>Non-standardized tools (any tool used)</td>
<td>90%</td>
</tr>
<tr>
<td>Rubric</td>
<td>14%</td>
</tr>
<tr>
<td>Portfolio</td>
<td>38%</td>
</tr>
<tr>
<td>Testing methods</td>
<td></td>
</tr>
<tr>
<td>1. Scenario</td>
<td>51%</td>
</tr>
<tr>
<td>2. Case study</td>
<td>65%</td>
</tr>
<tr>
<td>3. Essay</td>
<td>51%</td>
</tr>
<tr>
<td>4. Faculty-made tests</td>
<td>6%</td>
</tr>
<tr>
<td>Journals</td>
<td>4%</td>
</tr>
<tr>
<td>Nursing care plans</td>
<td>7%</td>
</tr>
<tr>
<td>No non-standardized tool is used</td>
<td>10%</td>
</tr>
</tbody>
</table>
assess critical thinking abilities and 89% used non-standardized tools, while 61% used a combination of standardized and non-standardized methods. The most frequent response for CCNE-accredited programs was that no standardized tool is used to measure critical thinking abilities (36%), followed by the Educational Resources Inc. tool (23%), and California Critical Thinking Skills Test (22%). The most frequent response from NLNAC-accredited programs was California Critical Thinking Skills Test (33%), no standardized tools (23%), California Critical Thinking Dispositions Inventory (18%), and the Educational Resources, Inc. tool (14%). Other tests mentioned (by less than 5% of either group) were Cornell Critical Thinking Test, Arnett Critical Thinking Test, Assessment Technology Test, Total Testing Critical Thinking Test, Critical Thinking Process Test, Inter-ed, NLN Critical Thinking Survey, NLN Baccalaureate Achievement Test, and Nurse Net.

Survey responses to non-standardized tools used to measure critical thinking skills also are listed in Table 8. Findings show that non-standardized tools used most frequently by CCNE respondents are case studies (65%), scenarios (51%), essays (51%), portfolios (38%), and rubrics (14%). The most frequently used non-standardized test to measure critical thinking skills reported by NLNAC respondents are case studies (62%), portfolios (45%), scenarios (41%), essays (41%), and rubrics (19%). These findings indicate that CCNE respondents more frequently used scenarios (by 10%) and essays (by 10%) than NLNAC respondents. NLNAC respondents more frequently used portfolios (by 7%) and rubrics (by 5%) than CCNE respondents. Both CCNE and NLNAC respondents used case studies most frequently, and nearly equally as often. Few respondents indicated they used no method of non-standardized tools (CCNE 10% and NLNAC 5%).
Hypothesis 12: There is agreement (that is, no difference) across baccalaureate nursing programs regarding types of tools used to assess critical thinking.

A chi-square goodness-of-fit analysis was conducted comparing the three categories of tools (use of standardized, non-standardized, or both) to discover whether there were significant differences among the categories in relative frequency of occurrence, compared to hypothesized equal proportions. There was a significant difference ($\chi^2 = 56.122, p < .001$), indicating no agreement across baccalaureate nursing programs regarding tool types.

Hypothesis 13: There is no relationship between the types of tools used to assess critical thinking abilities and reports of growth by nursing programs in critical thinking abilities.

Crosstabulation analysis was conducted relating types of tools used to assess critical thinking abilities (standardized, non-standardized, or both) and whether the program reported growth in critical thinking abilities (growth, no growth, or other—defined as either reported both growth and no growth, or the program reported it was still in the process of deciding whether growth had occurred). The Pearson chi-square value shows a significant result ($\chi^2 = 10.728, p = .030$). This finding indicates there is a relationship between the types of tools used to assess critical thinking abilities and reports of growth in critical thinking abilities. Two specific differences were noted. Those programs that used standardized tools to measure critical thinking were more likely to report no growth (Adjusted Residual = 3.1) than one might expect by chance alone, and those programs that used both standardized and non-standardized tools were less likely to report no growth than one might expect by chance alone (Adjusted Residual = −3.1). It should be noted that, although the statistical finding for
this hypothesis was significant, data were sparse in some cells of the contingency table; further research is warranted to verify this relationship.

Table 9 depicts findings of reported growth in critical thinking abilities relative to type of tool and accreditation affiliation. More NLNAC-accredited programs reported growth in critical thinking abilities using standardized tools (31%) than CCNE-accredited programs (23%); also, more NLNAC-accredited programs reported no growth in critical thinking abilities using standardized tools (34%) than CCNE-accredited programs (26%). Nearly half (46%) of the CCNE-accredited programs reported “other” for growth using standardized tools, versus NLNAC (29%); also, more CCNE-accredited programs (23%) reported “other” using non-standardized tools than NLNAC programs (12%). The “other” category included programs that reported both growth and no growth, or the program reported it was still in the process of determining whether growth had occurred. Frequent comments in the “other” category related to programs being in the process of making a decision about whether growth had occurred as a new type of tool was being assessed.

Table 9. Reports of growth in critical thinking abilities in relation to accreditation affiliation

<table>
<thead>
<tr>
<th>Reported growth</th>
<th>All CCNE (n=35)</th>
<th>All NLNAC (n=59)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Standardized tool</td>
<td>Non-standardized tool</td>
</tr>
<tr>
<td>Growth</td>
<td>23%</td>
<td>17%</td>
</tr>
<tr>
<td>No growth</td>
<td>26%</td>
<td>0%</td>
</tr>
<tr>
<td>Other</td>
<td>46%</td>
<td>23%</td>
</tr>
</tbody>
</table>
Hypothesis 14: There is no reported growth in critical thinking abilities over time among baccalaureate nursing programs.

A chi-square goodness-of-fit analysis was conducted comparing the three categories of growth (growth, no growth, or other—defined as either reported both growth and no growth, or the program reported it was still in the process of determining whether growth had occurred) to determine whether there were significant differences among the categories in relative frequency of occurrence, compared to hypothesized equal proportions. The results of the chi-square analysis indicated there was no differences noted among the groups ($\chi^2 = .325$, $p = .850$). This finding supports the hypothesis, indicating that no significant growth in critical thinking abilities was reported over time among baccalaureate nursing programs.
CHAPTER 5. SUMMARY, DISCUSSION, AND IMPLICATIONS

Summary

Critical thinking is an expected learning outcome for baccalaureate nursing students. Studies in the past regarding critical thinking have shown mixed results related to growth over time in critical thinking abilities, and a lack of consensus among nurse educators regarding the definition of critical thinking. Also, in the past, NLNAC has been the sole accreditor of baccalaureate nursing programs; therefore, no previous studies have related aspects of critical thinking to accreditation affiliation.

This study was conducted just six years after a second accrediting agency (CCNE) was formed in 1996 and just four years after CCNE began to accredit programs in 1998. In a relatively short period of time, since 1996, many baccalaureate nursing programs have shifted or are in the process of shifting their accrediting affiliation from NLNAC to CCNE indicating change is underway regarding accreditation affiliation. It is important for nursing educators to understand reasons and implications for the change.

The purpose of this study was to explore the relationship of definitions of critical thinking and the use of critical thinking measurement tools with accreditation affiliation in baccalaureate nursing programs. In addition, other aspects of the programs, including program type, other nursing degrees offered, public versus private status, membership in professional nursing organizations, contributing factors towards selection of an accrediting agency, and geographical accreditation region of the program were investigated to determine which characteristics are associated with their selection of accrediting agencies.
A sample of 330 baccalaureate nursing programs accredited by the Commission on Collegiate Nursing Education (CCNE), the National League for Nursing Accrediting Commission (NLNAC), or both was sent a survey prepared and piloted by the researcher. One hundred fifty-four surveys were returned; 153 were usable surveys, for a response rate of 46%. A summary of results and interpretation of results follows.

**Interpretation of Results**

**Program characteristics**

A study completed in 1999 by Bellack et al. focused on patterns of choice of nursing accreditation agencies. The study included responses from 480 baccalaureate and higher degree nursing programs. It was noted that 98% of the respondents reported having a baccalaureate nursing program at their institution; therefore, the study has value for comparative purposes. This study will be used to note similarities and differences in demographics of the respondents then (1999) and now (2002).

**Baccalaureate program type**

Respondents were asked to identify whether their baccalaureate nursing program type was generic or RN-BSN. In 2001 there were 570 generic BSN programs and 609 RN-BSN programs (Cherry & Jacobs, 2002). Results of this study indicate that most baccalaureate nursing programs are a combination of generic and RN-BSN types (74%) versus just generic (5%) or just RN-BSN (18%). The total number of generic and RN-BSN programs are similar to those reported by Cherry and Jacobs (2002).
While either generic or RN-BSN baccalaureate programs may exist as separate programs, many times as prerequisites to master’s programs, it is common for an institution to offer both. Offered together, generic and RN-BSN baccalaureate nursing programs may serve more students’ needs, increase marketability of the program, and be a cost-effective way to increase student numbers in the program. With 42,665 associate degree nurses in the United States (National Organization for Associate Degree Nursing, 2001), some of whom will choose to complete their baccalaureate degree at some time in the future, the RN-BSN programs provide a lucrative draw. Programs that offer a generic baccalaureate nursing program with an RN-BSN option serve the comprehensive needs of students seeking a baccalaureate nursing degree.

Other degrees offered in addition to a baccalaureate degree

Bellack et al. (1999) found results similar to the demographic findings of this study. They found a similar mix of master’s (57%), doctoral (13%), and associate degree (16%) programs compared to respondents of this study with master’s (66%), doctorate (13%), and associate (13%). Slightly more programs reported offering a master’s program with a baccalaureate program in this study (a 9% increase). It was noted that more CCNE respondents offered master’s programs (74%) than NLNAC programs (60%). The increase noted between the 1999 study and current data could indicate a trend related to an increase in master’s programs at CCNE-accredited programs; further research is indicated to verify this finding.

Of the 5% of CCNE programs that offer an associate degree and 1% that reported offering an associated program and master’s combination, all programs were also NLNAC-
accredited. Since CCNE does not accredit associate degree programs, if CCNE is chosen for baccalaureate and higher degree accreditation, it will mean that to maintain accreditation for all programs, dual accreditation will be a necessity. This choice may prove to be costly for some programs in the future, causing them to choose between switching to just NLNAC to accredit all programs or choosing not to accredit the associate degree programs.

**Public or private status**

Respondents in this study represented roughly equal numbers of public and private institutions. This finding is consistent with Boyer’s (1994) findings regarding colleges and universities in general, as well as findings reported by Bellack et al. (1999), who found that of the 480 nursing programs, 52% were public and 48% were private.

**Membership in professional organizations**

Results of this study indicate a majority of programs hold dual membership in both AACN and NLN organizations (59%), as opposed to carrying membership with just one organization. The professional nursing organizations (AACN and NLN) are affiliated with their respective accrediting bodies (CCNE and NLNAC), so it appears that the change by some nursing programs towards CCNE accreditation also is being followed by a change in membership to the affiliated professional nursing organization. This shift is not unusual because NLNAC offers members of NLN more reasonable accreditation fees than if they are not members (NLNAC, 2000a). There is no wording relative to reduced fees in CCNE’s fee structure for AACN members.
Also, membership in professional nursing organizations offers access to information and resources that will help guide curriculum development and that assist programs to meet accreditation criteria. Although it is costly to maintain dual membership in professional nursing organizations, it is an advantage for nursing programs, if they have the resources, so they are able to stay abreast with changes in the profession of nursing.

Bellack et al. (1999) indicated that at the time of their study, one year after CCNE began accrediting programs, 96% of the respondents held a membership with NLN, 82% with AACN, 77% with both AACN and NLNAC, 18% with NLN only, and 5% with AACN only. Current data suggest that changes have occurred related to professional agency membership from the previous study. Results of this study indicate a decrease in the total number of NLNAC members from 96% to 72%, an increase in AACN membership from 82% to 87%, a decrease in membership with both AACN and NLNAC from 77% to 59%, a decrease in just NLN membership from 18% to 11%, and an increase in just AACN membership from 5% to 22%. These results indicate an increase in AACN agency membership overall, and a decrease in NLN and dual-agency membership.

**Accreditation affiliation**

The sample for this study was obtained from 2001 directories of each agency. At that time, there were 153 CCNE-accredited programs and 509 NLNAC-accredited programs, or over three times as many NLNAC programs as CCNE listed in the directories. Based on the original sample, the number of programs with only CCNE accreditation has increased from 22% in the 2001 sample to 31% in the respondent group, and the number of NLNAC only
accredited programs decreased from 76% in the original sample to 52% of the total respondent group.

Although a decrease in NLNAC-accredited programs is not an unexpected occurrence over time, as there was previously no other choice for accrediting agencies, what is important to note is that between the three-year span when CCNE began to accredit programs in 1998 and 2001, there was a 22% shift toward CCNE, followed by an additional 9% the following year (2002), for a current total of 31%. These changes could represent a response to the emergence of choice provided by a second accrediting agency, or it could indicate a trend towards baccalaureate program accreditation by CCNE. Further research is needed to verify this trend.

At the time Bellack et al. (1999) completed their study, they noted that one-fourth of the respondents indicated they would move to CCNE, which after just one year in existence was yet a new and untested accrediting agency. The authors noted that “This shows substantial dissatisfaction with the status quo” (p. 59). Another one-quarter of respondents indicated they wished to be accredited by both accrediting agencies until they decided which agency would best meet their needs. It was also noted that one factor that might force a final decision would be the cost of maintaining two memberships. In the current study, 37 respondents noted that they are in the process of, or would consider a switch to CCNE when their current accreditation expired. Although this indicates a trend by baccalaureate nursing programs towards CCNE accreditation, further research is needed to verify this finding.
Geographic distribution by regional accrediting agency

Geographic distribution by regional accrediting agency of the respondent group was very similar to the entire sample group. Also, respondents of this study were very similar to those in the Bellack et al. (1999) study. Geographic distribution by regional accrediting agency is also found to be similar in general colleges and universities in the United States (Boyer, 1994).

Discussion of Hypotheses Findings

Hypothesis 1. Findings for Hypothesis 1 indicated that no differences were noted between accreditation affiliation and the type of baccalaureate program (generic BSN, RN-BSN, combination of BSN and RN-BSN, or others). One additional finding was that fewer programs accredited only by CCNE offer just RN-BSN program types at their institutions than expected by chance alone. More CCNE-accredited programs (89%) than NLNAC-accredited programs (75%) offer generic BSN programs overall. The reason for the high rate of generic and RN-BSN programs could be related to the mission of the CCNE organization and programs that select CCNE to accredit their programs. Since CCNE accredits only BSN and higher degree nursing programs, these programs may prefer to offer generic baccalaureate nursing programs as the minimal nursing degree for their programs.

Hypothesis 2. Results of Hypothesis 2 indicated there was no significant relationship between accreditation affiliation and whether nursing degrees other than a baccalaureate were offered at the institutions. Overall, institutions are just as likely to offer or not to offer other degrees without regard to accreditation affiliation.
Additional findings indicate that of the respondents, in addition to baccalaureate nursing programs, CCNE-accredited programs were nearly three times more likely to offer doctorates (16%, versus 6% for NLNAC-accredited programs), more likely to offer master’s programs (74%, versus 60% for NLNAC), and also nearly three times more likely to offer both doctoral and master’s programs (18%, versus 6% for NLNAC). On the other hand, NLNAC-accredited programs are almost four times as likely to offer associate degrees (19%, versus 5% for CCNE), and more likely to offer an associate and master’s degree along with the baccalaureate degree (13%, versus 1% for CCNE). At this time, based on respondents of this study, it appears that institutions offering baccalaureate programs accredited by CCNE also offer a greater percentage of higher-level education programs than NLNAC-accredited programs. In part, these findings may reflect the philosophy of CCNE regarding recognition of professional-level nursing at the baccalaureate level (CCNE, 1998). They also may reflect the eligibility requirements of CCNE and NLNAC. CCNE accredits only baccalaureate and higher-level nursing programs, while NLNAC accredits these as well as associate-level programs. If the associate degree programs are being accredited in CCNE-accredited institutions, it would be necessary to have a combination of NLNAC and CCNE accreditations. This dual accreditation may prove costly for the institution, forcing them to select NLNAC as their sole accreditor. Further studies should be conducted to track these changes and determine if there will be movement toward accreditation affiliation based on the type of degrees offered at the institution.

Hypothesis 3. Findings indicated there was no relationship between respondents’ accreditation affiliation and whether they were public or private status. Although no studies were found that directly related public or private status to accreditation affiliation, this
finding was consistent with the study by Bellack et al. (1999) regarding baccalaureate and higher education programs, and with Boyer's (1994) findings regarding colleges and universities in the United States.

Hypothesis 4. Results indicate that baccalaureate nursing programs are more likely to be members of the professional nursing organization that accredits them than to be members of other professional nursing organizations. Respondents who were accredited by CCNE or NLNAC only were more likely to be members of the professional nursing organization affiliated with their accrediting body; also, about 18% of the respondents who indicated they were accredited by both CCNE and NLNAC were significantly more likely to be accredited by both professional nursing organizations affiliated with their accrediting agency. One reason for this finding may be that constituents may choose to align themselves with the organization that they believe most closely matches their beliefs and values and will provide information that will be valuable to them to become accredited successfully. Another reason that constituents choose membership in one professional nursing organization over another is cost. With limited resources, choices become necessary, and cost-benefit analysis points to the membership that will provide the most benefits—many times, as these findings indicate. membership with the professional nursing organization affiliated with their accrediting agency.

Hypothesis 5. Results for Hypothesis 5 indicated that, although there was no significant relationship between accreditation affiliation and geographical accrediting region, the finding was approaching a level of significance ($\chi^2 = 18.026, p=.055$). Some of the observed frequencies in the chi-square contingency tables were less than the expected minimum count of 5; therefore, additional observations from these regions may indicate a relationship exists
between accreditation affiliation and geographical accrediting region. Further research is indicated to verify this relationship.

One significant difference noted between accreditation affiliation and accrediting region that occurred more often than one might expect by chance alone was that there were more respondents from the combined group in the Middle region (Adjusted Residual = 2.9). One point to consider with this result is location of the organizations' headquarters and influence this might have on recruitment by a certain agency in a given area. CCNE headquarters are located in Washington, DC, and NLNAC headquarters are located in New York. Both New York and Washington, DC are located in the Middle states region. Their location may account for the more than expected numbers of combined CCNE and NLNAC programs in the Middle region.

Hypotheses 6 and 7. Results from Hypothesis 6 pointed out that there were significant differences between important contributing factors that influenced respondents' decisions to select accrediting agencies. Two contributing factors that occurred more frequently than one might expect by chance alone were "desire to be accredited by an agency that accredits only baccalaureate and higher degree programs," and the reputation of the agency. In addition, findings for Hypothesis 7 indicated that there was a relationship between main reasons for selecting an accrediting agency and accreditation affiliation—CCNE and NLNAC programs selected the accrediting agencies for different reasons.

One of the main reasons for selection of an accrediting agency was the reputation of the agency (38%). NLNAC-accredited programs selected this factor over three times as often (55%) as CCNE-accredited programs (17%). Many of the comments added by respondents who chose this reason reflected loyalty to NLNAC by faculty and program directors, as well
as desire to remain accredited by an organization that has an established history in nursing as an accrediting body.

A common theme in the Bellack et al. study (1999) related to agency reputation and intended accreditation selection was NLN’s issues with the United States Department of Education (DOE). Thirty-one percent of respondents in the Bellack et al. study identified this factor as a contributing factor in their intended selection of CCNE as an accrediting agency. While reputation was a major contributing factor in the current study, only a couple comments actually related to NLN’s past issues with the DOE, which were resolved in 1999 with NLNAC receiving full recognition by the DOE as an accrediting agency. Even though the event occurred in the past between NLNAC and the DOE, it continues to be an issue in the present, having an effect on some programs’ decisions to select CCNE as an accrediting organization.

Another major contributing factor was the “desire to be accredited by an agency that accredits only baccalaureate and higher degree programs.” This factor was selected most frequently by CCNE-accredited programs (39%) versus those programs accredited by NLNAC (17%). This factor is more significant to CCNE-accredited programs because it is the agency that accredits only baccalaureate and higher degree programs.

One contributing factor identified as a major reason for selection of an accrediting agency was the “consumer-friendly” aspect. More CCNE respondents selected this reason (13%) than NLNAC respondents (2%). Frequent additional comments by respondents who selected this reason indicated that they believed CCNE was easier to work with, more supportive, and helpful, as well as more timely in returning their communications. This aspect was significantly less important to NLNAC respondents (2%), and one comment
indicated, "NLNAC is becoming more user-friendly," which could indicate that this respondent has not always believed this comment to be true.

Another response selected more frequently by CCNE respondents (28%) and less frequently by NLNAC respondents (13%) than one might expect by chance alone was the focus/methods of process for accreditation. The few times this response was selected by NLNAC respondents, additional responses pointed to the respondents' familiarity with the organization or matching of the agency's philosophy or values with their own. Additional responses by CCNE respondents frequently pointed out that CCNE was more outcome-focused, encouraged faculty input on standards and outcomes, and encouraged more overall growth of faculty and the program. Also, CCNE frequently was viewed as less prescriptive throughout the accreditation process, allowing for creativity in the accreditation process. Under this topic, one respondent also remarked on the length of the document for CCNE being shorter (limited to 75 pages), although limited length was not viewed by the respondent as a main factor in selection of agencies.

Cost was viewed as a factor that influenced accreditation selection. Several additional comments by NLNAC-accredited respondents indicated they could not afford two different accreditation visits, and that NLNAC was selected because it could accredit all of their nursing programs. Since 19% of the NLNAC respondents indicated they offered an associate degree program, cost would be more of a factor in selection of a single agency that accredits all nursing programs than for the 5% of CCNE respondents who indicated they offer an associate degree program at their institution. Also, although CCNE's (CCNE, 2002) Goals for Accrediting Nursing Education state that the agency recognizes the need to establish and implement an accreditation process that is efficient, cost-effective, and cost-accountable for
the institution and students, the respondents of this survey did not indicate it was a major contributing factor in the selection of accrediting agencies.

*Hypothesis 8.* Hypothesis 8 findings indicated there was no relationship found between the extent of agreement with selected definitions of critical thinking used by baccalaureate nursing programs and their accreditation affiliation. No previous studies have been found regarding differences among baccalaureate nursing programs’ use of definitions of critical thinking based on their accreditation affiliation. Although this relationship was not found to be significant overall, some of the specific differences noted may be useful for future studies that compare critical thinking definitions to accreditation affiliation.

One difference noted appeared in Definition 2 (Kurfiss, 1988). Respondents who were only NLNAC-affiliated indicated that this definition was incongruent with their own programs’ definitions of critical thinking more frequently than one might expect by chance alone. One possible rationale for this finding is that the definition discusses critical thinking in terms of an investigation that explores a situation to arrive at a hypothesis or conclusion about it that integrates all available information to justify the conclusion. Nursing is a practice-based discipline and decisions most commonly occur in a clinical setting. The terminology in this definition is scientifically based (e.g., investigation, hypothesis) and results in a hypothesis or conclusion. In practice-based settings such as nurses may encounter, the conclusion of the critical thinking process must result in quick actions; therefore, this definition may be used less by some nursing programs to describe the actual thinking process that results in nursing action.

CCNE respondents may have found Kurfiss’s definition less incongruent with their own programs’ definitions because of the contextual differences inherent in the AACN and
NLNAC agency definitions of critical thinking. NLNAC's definition of critical thinking includes terminology related to practice aspects of nursing (e.g., clinical judgment, diagnostic and therapeutic dimensions), whereas AACN terminology infers clinical practice, but it is not explicitly stated in their definition. Further research is indicated to ascertain whether there are differences in contextual attributes of programs' definitions of critical thinking and whether differences are related to accreditation affiliation.

More CCNE-accredited programs selected Definition 4 (Paul, 1992) than one might expect by chance alone. This definition describes critical thinking as the art of "thinking about your thinking while you are thinking in order to make your thinking better . . ." (p. 643). Many times nursing is described as an art and a science. Paul's definition points out the art of critical thinking. Several responses by CCNE respondents identified the positive aspect of the CCNE accreditation process that not only allows, but encourages, creativity in the assessment process. Programs with CCNE affiliation may value this aspect and therefore identify more strongly with this definition. Paul also asserted that critical thinking involves not just thinking, but thinking that involves self-improvement. Again, comments by CCNE-affiliated respondents related to their selection of the accrediting agency indicated that the CCNE accreditation process focused on continuous quality improvement. This definition is consistent with the aspect of improvement.

Watson and Glaser's (1964) definition of critical thinking was identified as being strongly congruent with program definitions of more CCNE respondents than one might expect by chance alone. This definition describes critical thinking as a composite of attitudes, knowledge, and skills. The Watson-Glaser Critical Thinking Appraisal has been a commonly used tool in nursing in the past (Adams, 1999; Adams et al., 1996; Hicks, 2001). Adams
(1999) found that the WGCTA was used most frequently (18 of the 20 studies) to measure students' critical thinking abilities. Rane-Szostak and Robertson (1996) noted that at times nurse educators adopt definitions of critical thinking based on the definition of the instruments' authors. Because the Watson-Glaser tool has been used most frequently in the past to assess critical thinking abilities among nursing students, perhaps this definition is still being used, or identified with by nursing programs. Findings in this study indicate that 10% of CCNE-accredited respondents use the Watson-Glaser as a tool to assess their students' critical thinking abilities, and this may be a reason for the higher endorsement by CCNE-accredited respondents.

Definition 6 (Bandman & Bandman, 1988) described critical thinking as a "rational explanation of ideas, inferences, assumptions, principles, arguments, conclusions, issues, statements, beliefs, and actions" (p. 5). More CCNE- and fewer NLNAC-accredited respondents indicated agreement between this definition and their programs’ definitions. Because nursing is a practice discipline that focuses on interventions focused on human behaviors, several of the attributes of critical thinking listed by Bandman and Bandman involve ways in which to explain human behaviors. The AACN definition of critical thinking (1998) includes the attribute of inferences; this wording may have caused some CCNE respondents to link the two definitions.

Definition 9 was Wilkinson's (1996) definition of critical thinking. Although no CCNE respondents disagreed with this definition, a greater number of NLNAC respondents found this definition incongruent with their own programs’ definitions of critical thinking than might be expected by chance alone. This definition includes the attributes of making inferences and evaluating the credibility of sources. The AACN definition of critical thinking
includes the term "inferences" and the phrase "questioning information." CCNEA respondents may have found these portions of the AACN definition similar to Wilkinson’s definition, which includes “making inferences” and “evaluating the credibility of sources.” Therefore, CCNE respondents may have been more likely than NLNAC respondents to indicate congruency with Wilkinson’s definition.

Hypothesis 9. Hypothesis 9 findings indicated there was no general agreement across baccalaureate nursing programs regarding definitions of critical thinking. This finding is consistent with findings in the literature (Adams, 1999; Ennis, 1991; Hicks, 2001; Kennedy et al., 1996; Videbeck, 1997) regarding the lack of consensus in nursing programs among either nursing or non-nursing definitions of critical thinking.

In a pairwise comparison of definitions, respondents were more likely to indicate congruency with Alfaro-LeFevre’s definition of critical thinking and less likely to agree with the definitions of Paul and McPeck. One reason for the greater endorsement of Alfaro-LeFevre’s definition of critical thinking may be related to nursing faculty’s familiarity with Alfaro-LeFevre’s views related to critical thinking, as the author has published nursing texts related to critical thinking and the nursing process, which are commonly used in nursing curricula (Alfaro-LeFevre, 1995, 2002). One reason for less endorsement of Paul (1992) and McPeck’s (1981) definitions of critical thinking may be related to the absence of terminology that nursing faculty believe relates to a practice discipline such as nursing (e.g., clinical judgment, diagnostic and therapeutic dimensions) or lack of familiarity with the definition or author. Further study is indicated to discover if there actually is a greater congruency between Alfaro-LeFevre’s definition and nursing programs’ beliefs overall related to critical thinking.
Hypothesis 10. Results of this analysis indicated that of the eleven critical thinking definitions presented in the survey, there was a significant relationship identified between extent of agreement with Alfaro-LeFevre's (1995) definition and the type of tool used to assess critical thinking. Respondents who used only standardized tools to assess critical thinking were more likely to disagree with the definition, and respondents who used both standardized and non-standardized tools were less likely to disagree with the definition. One possible reason for this relationship may be that respondents who are more likely to use only standardized tools may choose the definition most consistent with the tool, which is consistent with Rane-Szostak and Robertson's (1996) finding that at times nurse educators adopt definitions of critical thinking based on the definition of the instruments' authors. There is no specific tool associated with Alfaro-LeFevre's definition; therefore, in some cases, as definitions for critical thinking have been developed, nurse educators may not feel a strong congruency with this definition. It should be noted that, whereas the statistical finding for definition seven was significant, data were sparse in some cells of the contingency table; further research is needed to verify this relationship.

Hypotheses 11 and 12. Results indicate there was no relationship found between accreditation affiliation and types of tools used to assess critical thinking, nor was there agreement across baccalaureate nursing programs regarding types of tools used to assess critical thinking. It was noted, however, that more respondents overall used non-standardized tools (93%) than standardized tools (72%) to assess critical thinking abilities. NLNAC respondents used non-standardized tools more often (95%) than CCNE respondents (90%). Although both percentages are rather high for using non-standardized tools, one might think that the CCNE response would have been higher because one of the main reasons they
selected that accreditation affiliation was based on the focus of the accreditation process and the belief that CCNE allowed for more creativity and less prescriptive practice. However, CCNE respondents did respond more frequently that they did not use standardized tools to assess critical thinking skills (36%), versus NLNAC-accredited programs (23%). Additional research in this area would be useful to discover whether assessment methods are different from one another in relation to accreditation affiliation.

Additional findings regarding types of tools used to assess critical thinking indicate that the most frequent response for CCNE-accredited programs was that no standardized tool is used to measure critical thinking abilities (36%), followed by the Educational Resources tool (23%), and California Critical Thinking Skills Test (22%). The most frequent response from NLNAC-accredited programs was California Critical Thinking Skills Test (33%), no standardized tools (23%), California Critical Thinking Dispositions Inventory (18%), and Education Resources tool (14%).

These findings show some similarities and some changes from previous findings (Adams et al., 1996; Hicks, 2001) that indicated the most commonly used instruments to measure critical thinking were the Watson-Glaser Critical Thinking Appraisal, the California Critical Thinking Skills Test, the California Critical Thinking Dispositions Inventory, the Ennis-Weir Critical Thinking Essay Test, and the Cornell Critical Thinking Test. Although the Watson-Glaser Critical Thinking Appraisal is still being used by respondents of this study, only 10% of CCNE and 8% of NLNAC respondents use this tool. The California Critical Thinking Skills Test continues to be used as the most predominant standardized tool by NLNAC respondents (33%), and less often by the CCNE respondents (22%).
California Critical Thinking Dispositions Inventory continues to be used by both groups, with the NLNAC group using it more (18%) than the CCNE group (10%).

Changes related to the specific standardized tools in nursing programs may be related to the availability and refinement of new tools used to assess critical thinking. Now more than any time in history, educators are held accountable for student learning outcomes. Along with the responsibility of teaching a curriculum that empowers students to develop life skills, faculty are challenged to develop and use assessment tools that accurately reflect learning outcomes. These changes also may include disregarding tools that they believe are no longer effective.

The greatest use of non-standardized tools to assess critical thinking occurred with case studies (64%), scenarios (47%), and essays (43%). In each case, CCNE-accredited programs were more likely to use these methods than NLNAC-accredited programs. Comments by both accreditation affiliate groups indicated that non-standardized tools were being assessed and data gathered to discover whether growth was apparent, as measured by these tools over time. Since CCNE programs view their accrediting agency as less prescriptive, allowing for more creative measures for assessing learning outcomes, perhaps these testing methods will be used by CCNE programs to assess whether growth in critical thinking occurs over time for their graduates.

Respondents reported using non-standardized types of tools more (89%) than standardized tools (72%), and 61% reported they used both types to assess critical thinking abilities. From these results, it appears that, although standardized tools for assessing critical thinking are still a very frequently used method for assessment, non-standardized tool use is growing and is currently the major method reported by respondents for assessing critical
thinking in baccalaureate nursing programs. These findings concur with the literature
(Facione & Facione, 1996; Huba & Freed, 2000; Malek, 1986) that reports a variety of
methods that go beyond standardized tests are currently being used to assess students’ critical
thinking abilities. A majority of respondents (61%) reported using a combination of
standardized and non-standardized tools to assess critical thinking abilities. This practice was
supported by Facione and Facione (1996) and by Dexter et al. (1997) as providing a more
accurate assessment. Further research is indicated to determine if there is an overall trend in
nursing towards non-standardized methods of assessing critical thinking, and if these
methods are related to accreditation affiliation.

Hypotheses 13 and 14. Results of analysis for Hypothesis 13 indicated there is a
relationship between the types of tools used to assess critical thinking abilities and reports of
growth (or lack thereof) in critical thinking abilities. The greatest area of difference noted
was that more respondents identified no growth associated with standardized tools than one
might expect by chance alone. In addition, analysis of results for Hypothesis 14 indicated no
growth over time was reported among baccalaureate nursing programs. These findings are
consistent with findings in the literature (Adams et al., 1999; Frye et al., 1999; Hicks, 2001;
Saucier, 1995) that noted inconsistent or no growth in critical thinking skills over time when
using standardized tools as a measure; however, findings are inconsistent with some studies
that showed growth in critical thinking abilities using standardized tools when measured at
entrance into and exit from nursing programs (Berger, 1984; Pepa et al., 1997).

Although no growth overall was reported over time using either standardized or non-
standardized methods, it should be noted that several comments referred to current program
changes from one standardized tool to another and changes from standardized to non-
standardized tools. These comments also noted that because data were currently being collected (or analyzed) at the time of the survey, no final results were available. In added comments, users of non-standardized tests were more likely to report no quantitative growth had occurred; however, they reported growth was noted over time using qualitative methods. This result indicates that additional research should be completed focusing on methods used to measure growth particularly using non-standardized tools that assess critical thinking abilities.

Limitations of the Study

This study was conducted using a survey format to collect data, and some returned surveys contained missing data; therefore, not all returned surveys could be used for every statistical test. In addition, the total number of respondents differs from one statistical test to another. These variations in overall usable data could have an effect on overall results; therefore, further research is indicated to verify these results.

Due to the nature of chi-square analysis, data are distributed among cells of a contingency table; in some tests the number of items per cell fell below the minimum expected count (five items per cell). When this occurred and significant findings were noted, it was recommended that further research be conducted to verify the results.

Because of the recent emergence of CCNE as an accreditation agency, no previous studies found in the literature compared learning outcome data based on accreditation affiliation. This study used a sample of CCNE-accredited programs in addition to NLNAC-accredited programs; therefore, the ability to compare results of this study with those obtained in other studies is limited. In addition, not all nursing programs are accredited by
NLNAC or CCNE; therefore, generalization must be limited to baccalaureate nursing programs accredited by these two agencies.

In the sampling frame, a small number of baccalaureate nursing programs appeared in both NLNAC and CCNE directories used for sample selection. This affects randomization of the sample.

**Implications of the Study**

This study addresses two major topics: governance and critical thinking. The first topic relates to nursing governance that exists in the form of accrediting agencies. The second topic relates to aspects of critical thinking and how it is taught and assessed in nursing programs. Findings and discussion have addressed relationships that exist between certain aspects of critical thinking reported by nursing programs and the accrediting agency selected by the nursing program. Implications related to each topic now will be addressed separately.

**Governance**

Until 1996, governance of nursing in the form of accrediting agencies was limited to one agency. With the emergence of CCNE as a second accrediting agency, issues arise regarding the need and reasons behind the development of a second agency. The future of nursing accreditation is also a point to consider.

AACN has an established history concerning their beliefs supporting professional nursing at the baccalaureate and graduate level. Establishing a sound educational background for nurses and encouraging higher education only serves to further strengthen the profession (Chitty, 2001). Establishing nursing at the baccalaureate level is not a new issue to nursing;
since the Brown Report (Brown, 1948) there has been a continual debate in nursing regarding the need to establish programs of nursing in college and university settings.

This study indicates that a significant number of respondents believe that it is important to be accredited by an agency that only accredits baccalaureate and higher nursing programs. The desire to be accredited by an agency that accredits only baccalaureate and higher degree programs was identified most frequently as the major contributing factor for selection of an accrediting agency. Respondents of this study have voiced a strong message that should be heeded by the nursing community. The debate initiated by the Brown Report (Brown, 1948) should be reestablished using findings from this study. A concerted effort must be made toward addressing current and future desires for development of the nursing profession, which includes establishment of professional-level nursing at the baccalaureate degree.

Future discussions by professional nursing organizations, nursing faculty, and individual nurses should include exploring the purpose of each of these two accrediting agencies. Discussions should focus on discovering the unique needs these agencies serve and, in addition, how these separate agencies could best serve the profession without duplication of services.

**Critical thinking**

Both nursing and non-nursing educators unanimously agree that critical thinking is a desired learning outcome for all graduates of higher education. The problem in the past, and according to findings in this study, continues to be the lack of clear definition and effective methods used to assess whether actual learning has occurred as a result of the nursing curriculum.
Concerted efforts must be made by the nursing faculty to define critical thinking in their own programs. Faculty should determine whether current definitions of critical thinking are available that express their views on critical thinking. They should use the literature and their professional organizations to guide their decisions.

In addition, the literature indicates the definition of critical thinking selected by faculty is sometimes affected by the standardized tool used to assess critical thinking. Faculty should review their assessment tools and related definitions, if one is available, to determine consistency with their definition of critical thinking. This study indicates that non-standardized tests are being used more frequently than in the past, and more frequently than standardized tools. Faculty should investigate a variety of definitions in addition to those associated with standardized tools to assess which definition of critical thinking most closely matches their own faculty's definition.

Findings from this study indicated that relationships occurred between certain authors' definitions of critical thinking and accreditation affiliation more frequently than could be expected by chance alone. These definitions should be used by faculty as a starting point in their own curricula. Furthermore, faculty should investigate their beliefs regarding definitions supported by their accrediting agency. If their own definitions vary significantly, they should discuss these differences with their accrediting and professional organizations. Through this process, organizations will become more involved with the definitions that may lead to a consensus among their constituents related to the definition of critical thinking. Discussions also may result in changes of agency definitions that more accurately reflect the beliefs of their constituents.
Future research studies should use findings from this study related to relationships between definitions and accreditation affiliation to determine if there is agreement by faculty in general among certain aspects of the definitions. The issue of finding a consensus among definitions has been ongoing in nursing education. Nursing faculty should decide if coming to a consensus regarding the definition of critical thinking truly is crucial to teaching and assessing critical thinking abilities. Too much valuable time and energy have already been spent on trying to reach a consensus regarding the definition of critical thinking. If nursing educators decide there is no benefit in striving to reach a consensus, then the issue should be identified as a nonsignificant issue. However, if through these discussions, faculty conclude there is a benefit, as the literature review for this study has indicated, then a concerted effort must be made by nursing educators to resolve the issue, come to a consensus, and move on to the heart of the matter, which is developing effective methods to teach and assess critical thinking. Once nurse educators agree upon beliefs regarding the definition of critical thinking, they should, in the same manner, collaboratively deal with how to teach and assess critical thinking most effectively.

**Recommendations for Future Research**

Findings in this study indicate that trends are emerging in relation to specific characteristics of the baccalaureate nursing program (e.g., type of baccalaureate program, other degrees offered by the institution, membership in professional nursing organizations, and geographical accrediting region) and selection of accrediting agency. Tracking program characteristics over time would be helpful in understanding these relationships and in
determining whether certain aspects of nursing programs influence their selection of accrediting agencies.

Further studies regarding contributing factors that influence selection of an accrediting agency will be useful to accrediting agencies in assessing whether they are effectively meeting the needs of the nursing community in a manner consistent with their philosophy. As changes occur in the proportions of nursing programs that align with a particular accrediting agency, the changes may influence services provided to constituents and encourage accrediting agencies to elicit more input from their constituents regarding constituents’ needs and expectations. These changes will encourage collegiality, self-improvement, and autonomy in nursing.

Further research should be conducted that more fully explores the reasons for the emergence of a second accrediting agency. In addition, what are the implications of a second accrediting agency to the future of nursing? Studies should be conducted to explore the need for two accrediting organizations and possible duplication of services that result.

Findings from this study indicate that some nursing programs affiliated with a certain accrediting agency were more likely than other nursing programs with different agency affiliation to indicate a stronger congruency with certain definitions of critical thinking. This finding should be explored in future studies to verify differences in definitions of critical thinking based on accreditation affiliation.

Findings from this study indicate a growing number of baccalaureate nursing programs are using non-standardized methods to assess critical thinking. Further studies would be useful to verify this as a trend.
The learning outcome explored in this study is critical thinking. In the future, it may be useful to determine relationships that exist in nursing programs between accreditation affiliation and other learning outcomes. With limited resources available to nursing programs, this information may be one additional means to use in comparing accrediting agencies before selection.

This study could be replicated using other levels of nursing (licensed practical nurses, associate, master's, and doctoral) to determine differences in emphasis of critical thinking and definitions used by these nursing programs, and to clarify appropriate learning outcomes at each level. These results will assist programs to design their curricula to meet learning outcomes of diverse groups more effectively.

Although there was no significant relationship found between accreditation affiliation and geographical accrediting region, the finding from this study was approaching the level of significance. Further research should be conducted using a sufficient sample size to identify if a relationship exists.

With the emergence of a second accrediting agency for baccalaureate nursing programs, future research studies have the ability to include participants from both agencies to show comparative data. In the future, studies could be used to show whether graduates from programs with a specific accreditation affiliation are more successful at developing critical thinking skills than graduates of programs with a different accreditation affiliation. In addition, student learning outcomes other than critical thinking could be assessed for comparative purposes.

Findings from this study indicate that baccalaureate nursing programs are showing that no growth in critical thinking has occurred as a result of the nursing curricula using the
current assessment methods, or that data currently are being collected using different tools to measure critical thinking. Faculty should examine their curricula to assess which learning strategies are effective and which are ineffective to enhance critical thinking. Further studies could focus on determining effective and ineffective methods of assessing critical thinking abilities in nursing curricula.

Finally, findings of “no growth” may mean that either no growth in critical thinking skills has occurred as a result of the curriculum, or that the tool used to measure growth is not effective. More studies need to be conducted to evaluate the validity and reliability of assessment tools.

**Recommendations for Practice**

Information obtained from this study may be used by baccalaureate nursing programs to determine if their definitions and methods used to assess critical thinking are consistent with that of their accrediting agency. It also will allow nursing programs to utilize their limited and valuable resources to select an accrediting agency that more closely matches their own philosophy regarding critical thinking learning outcomes.

Results of this study may encourage nursing organizations to develop task forces to explore definitions of critical thinking that accurately reflect beliefs of the organization. Task force findings may be used by nursing programs as guidelines to develop their own definitions for critical thinking, thus encouraging consensus among nursing faculty regarding definitions of critical thinking. Results from this study and past studies indicate there is a lack of agreement among nursing programs in defining critical thinking; serious consideration should be given to how critical thinking is defined and taught. If there is ambiguity in nursing
regarding the definition of critical thinking, it is impossible to have a clear understanding of how to teach or assess the skill. If definitions among nursing programs differ widely, comparative results cannot be determined. Serious efforts should be made in nursing to develop a common definition of critical thinking so that effective methods can be developed to teach and assess the skill.

Findings from this study indicated that a significant number of baccalaureate nursing programs reported a lack of growth in students' critical thinking abilities using the current standardized tools. Nurse educators have a responsibility to explore the reasons for these findings. Faculty should raise questions within their own institutions to determine if the curriculum is adequately preparing students to develop critical thinking skills, and whether the current tools are adequately assessing critical thinking skills. In addition to standardized methods of assessing critical thinking skills, nurse educators should explore non-standardized methods to assess critical thinking abilities.

At the organizational level, nursing task forces could be developed to examine various assessment tools currently used, including standardized and non-standardized tools, to determine which tools most accurately reflect assessment of student nurses' critical thinking abilities. Baccalaureate nursing programs could use task force findings to assess appropriateness for their own programs. Findings may encourage some programs to more carefully select tools that assess nursing students' critical thinking abilities and to explore a variety of methods to determine their usefulness. Finally, nursing programs need to explicitly define critical thinking and how it is to be taught in their curricula; then, faculty need to ensure that their assessment methods truly assess critical thinking as it is defined.
Conclusions

Now, more than ever before in nursing education, it is essential that educators become involved with the accrediting process. As educators become more involved with the selection of accrediting agencies, a strong message will be sent to accrediting agencies that selection is based upon core beliefs and values of nursing education.

Comparing learning outcomes assessments of graduates from programs accredited by a specific accrediting agency should be one method used to make agency selection. Accrediting agencies and professional nursing organizations are viewed as resources to assist in curriculum development of nursing programs, and they provide valuable information to their constituents. Through the accreditation process, agencies have an opportunity to compile valuable information regarding best practice from their constituents. These methods should be disseminated to constituents so educational practices will improve and learning outcomes, including critical thinking, will be enhanced.

In addition, an excessive amount of resources have been spent by educators on exploration of definitions of critical thinking and methods used to assess growth in critical thinking over time. It is time for nursing educators to decide if a consensus is essential regarding a definition of critical thinking, or if program-developed definitions are adequate. Then, faculty must use the selected definitions as a base in the development of more effective methods to teach and assess critical thinking as part of an overall goal of education—preparing students for the practice of nursing.
APPENDIX A. ACCREDITING AGENCY DOCUMENTS
CCNE Mission, Purpose, and Goal Statement (CCNE, 2002)

Mission and Purposes
The Commission on Collegiate Nursing Education (CCNE) is an autonomous accrediting agency, contributing to the improvement of the public’s health. CCNE ensures the quality and integrity of baccalaureate and graduate education programs preparing effective nurses. CCNE serves the public interest by assessing and identifying programs that engage in effective educational practices. As a voluntary, self-regulatory process, CCNE accreditation supports and encourages continuing self-assessment by nursing education programs and supports continuing growth and improvement of collegiate professional education.

CCNE accreditation is a nongovernmental peer review process that operates in accordance with nationally recognized standards established for the practice of accreditation in the United States. Accreditation by CCNE is intended to accomplish at least five general purposes:

1. To hold nursing education programs accountable to the community of interest—the nursing profession, consumers, employers, higher education, students and their families—and to one another by ensuring that these programs have mission statements, goals, and outcomes that are appropriate for programs preparing individuals to enter the field of nursing.

2. To evaluate the success of a nursing education program in achieving its mission, goals, and outcomes.

3. To assess the extent to which a nursing education program meets accreditation standards.

4. To inform the public of the purposes and values of accreditation and to identify nursing education programs that meet accreditation standards.

5. To foster continuing improvement in nursing education programs—and thereby in professional practice.

Goals for Accrediting Nursing Education Programs
In developing the educational standards for determining accreditation of baccalaureate and graduate nursing education programs, CCNE has formulated specific premises or goals on which the standards are based. These goals include the following:

- develop and implement accreditation standards that foster continuing improvement within nursing education programs;
• enable the community of interest to participate in significant ways in the review, formulation, and validation of accreditation standards and policies and in determining the reliability of the conduct of the accreditation process;

• establish and implement an evaluation and recognition process that is efficient, cost effective, and cost-accountable with respect to the institution and student;

• assess whether nursing education programs consistently fulfill their stated missions, goals, and purposes;

• assure that nursing education program outcomes are in accordance with the expectations of the nursing profession to adequately prepare individuals for professional practice, lifelong learning, and graduate education;

• encourage nursing education programs to pursue academic excellence through improved teaching/learning and assessment practices and in scholarship and public service in accordance with the unique mission of the institution;

• assure that nursing education programs engage in self-evaluation of personnel, procedures, and services and that they facilitate continuous improvement through planning and resource development;

• acknowledge and respect the autonomy of institutions and the diversity of programs involved in nursing education;

• ensure consistency, peer review, agency self-assessment, due process, identification and avoidance of conflict of interest, and an assurance of appropriate confidentiality in accreditation practices;

• enhance public understanding of the functions and values inherent in nursing education accreditation;

• provide the public an accounting of nursing education programs that are accredited and which merit public approbation and support; and

• work cooperatively with other agencies to minimize duplication of review processes.
NLNAC Mission, Purpose, and Goal Statement (NLNAC, 2000a)

Mission

NLNAC supports the interests of nursing education, nursing practice, and the public by the functions of accreditation. Accreditation is a voluntary, self-regulatory process by which non-governmental associations recognize educational institutions or programs that have been found to meet or exceed standards and stated criteria for educational quality. Accreditation also assists in the further improvement of the institutions or programs as related to resources invested, processes followed, and results achieved. The monitoring of certificate, diploma, and degree offerings is tied closely to state examination and licensing rules, and to the oversight of preparation for work in the profession.

Purposes

NLNAC is the entity that is presently responsible for the specialized accreditation of all types of nursing education schools and programs, both post-secondary and higher degree, which offer either a certificate, a diploma, or a recognized professional degree (Master’s, Baccalaureate, Associate Degree, Diploma, and Practical Nursing).

The Commission has sole authority and accountability inherent in the application of standards and criteria, accreditation processes, and the affairs, management, policy making, and general administration of the NLNAC.

Goals

- Promulgate a common core of standards and criteria for the accreditation of nursing programs found to meet those standards and appropriate criteria.

- Strengthen educational quality through assistance to associated schools and programs, and evaluation processes, functions, publications, and research.

- Advocate self-regulation in nursing education.

- Promote peer review.

- Foster educational equity, access, opportunity and mobility, and preparation for employment based upon type of nursing education.

- Serve as gatekeeper to Title IV-HEA programs for which NLNAC is the accrediting agency. These include some practical nursing and all hospital diploma programs eligible to participate in programs administered by the U.S. Department of Education or other federal agencies.
APPENDIX B. COMPARISON OF ACCREDITATION COMMISSIONS
Comparison of Accreditation Commissions  
(Excerpts taken from Overbay & Aaltonen, 2001)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Commission on Collegiate Nursing Education</th>
<th>National League for Nursing Accrediting Commission</th>
</tr>
</thead>
<tbody>
<tr>
<td>Philosophy</td>
<td>Standards are broad statements that are not meant to be prescriptive and allow for innovations. Programs can be in the midst of change at the time of accreditation. Congruence with parent institution is examined.</td>
<td>Emphasis is placed upon the total nursing program and its compliance with established standards and criteria. The organization supports peer evaluation, self-assessment, and consultation as means of strengthening accreditation.</td>
</tr>
<tr>
<td>Accreditation process: Self-study</td>
<td>Length: &lt;75 pages + supplementary materials</td>
<td>Length: as needed</td>
</tr>
<tr>
<td>Accreditation process: Site visit</td>
<td>For baccalaureate program: 3 days, 3 site visitors</td>
<td>3 days</td>
</tr>
</tbody>
</table>
| Fees                    | Effective 1/2000  
For new applicants: $3,500 for BS or MS programs, $5,500 for BS and MS programs  
Travel and living expenses for site visitors  
Cost of any planning meetings  
Cost for team leader to attend meeting of Accreditation Review Committee  
Annual fee for accredited programs: $1,700 for 1 program, $2,100 for 2 programs | Effective 1/2001  
For initial accreditation: $1,000 for NLN members. $1,500 for non-NLN members  
For continuing accreditation: $1,000 $835 per day, per visitor |
| Annual membership fee    | AACN, $2,320 | NLN, $1,900 |
APPENDIX C. GEOGRAPHICAL DISTRIBUTION OF SAMPLE
BY REGIONAL ACCREDITING AGENCY
### Geographical Distribution of Sample by Regional Accrediting Agency

<table>
<thead>
<tr>
<th>Region</th>
<th>CCNE [n(%)]</th>
<th>NLNAC [n(%)]</th>
<th>Total [n(%)]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Middle States: Delaware, District of Columbia, Maryland, New Jersey, New York, Pennsylvania,</td>
<td>12 (15.8)</td>
<td>50 (19.7)</td>
<td>62 (18.8)</td>
</tr>
<tr>
<td>New England: Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont</td>
<td>5 (6.6)</td>
<td>18 (7.1)</td>
<td>23 (7)</td>
</tr>
<tr>
<td>North Central: Arizona, Arkansas, Colorado, Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, New Mexico, North Dakota, Ohio, Oklahoma, South Dakota, West Virginia, Wisconsin, Wyoming</td>
<td>31 (40.8)</td>
<td>95 (37.4)</td>
<td>126 (38.2)</td>
</tr>
<tr>
<td>Northwestern: Alaska, Idaho, Montana, Nevada, Oregon, Utah, Washington</td>
<td>3 (3.9)</td>
<td>9 (3.5)</td>
<td>12 (3.6)</td>
</tr>
<tr>
<td>Southern: Alabama, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Texas, Virginia</td>
<td>19 (25)</td>
<td>68 (26.8)</td>
<td>87 (26.4)</td>
</tr>
<tr>
<td>Western: California, Hawaii</td>
<td>6 (7.9)</td>
<td>14 (5.5)</td>
<td>20 (6.1)</td>
</tr>
<tr>
<td>Total</td>
<td>76</td>
<td>254</td>
<td>330</td>
</tr>
</tbody>
</table>

*Total percent does not equal 100 due to rounding.*
APPENDIX D. COVER PAGE/CONSENT FORM
Dear [Name of Program Chair],

The attached survey concerned with learning more about definitions and methods used to assess critical thinking abilities among accredited baccalaureate nursing programs in the United States is part of a dissertation study I am conducting for my doctoral research at Iowa State University. The results of the study will identify critical thinking definitions and tools used by baccalaureate nursing programs in the United States and their relationship to accreditation affiliation.

As a Program Chair of a CCNE [or NLNAC] accredited program, results of your survey will be particularly helpful in contributing to the success of this study and adding to current knowledge in the area of definitions and tools used to assess critical thinking and their relationship to accrediting agencies. The enclosed survey has been piloted with a sampling of Program Chairs from accredited baccalaureate nursing programs and has been revised to make it possible to obtain all necessary data while requiring a minimum of your time. The average time to complete the survey during the pilot study was x minutes.

I would appreciate it if you would complete the enclosed survey prior to [date] and return it in the stamped, self-addressed envelope enclosed. Your responses will be held in strictest confidence. Returning the survey indicates your agreement to participate in the study and the data you have submitted to be used in the study. Surveys have been coded for follow-up purposes; identifiers will be removed from the surveys one month after completion of the study.

I will be pleased to send you a summary of the survey results if you desire. Results will be sent by e-mail in aggregate form to maintain confidentiality. Please be sure to include an e-mail address on the survey, as indicated, if you wish to receive a summary of survey results. If you have any questions regarding the survey, you may contact me at mccleish@msn.com.

Sincerely,
Joan McCleish, MSN, RN

Enclosure
APPENDIX E. SURVEY
SURVEY OF RELATIONSHIPS BETWEEN CRITICAL THINKING AND BACCALAUREATE NURSING ACCREDITATION

Please complete the following information as it relates to your baccalaureate nursing program. Questions 1 through 6 relate to your institution and its accreditation affiliation and questions 7 through 10 relate to critical thinking as a learning outcome.

1. Type of baccalaureate nursing program:

<table>
<thead>
<tr>
<th>Program Type</th>
<th>Mark an &quot;X&quot; in each box that applies.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generic BSN</td>
<td></td>
</tr>
<tr>
<td>RN-BSN</td>
<td></td>
</tr>
<tr>
<td>Other, please specify</td>
<td></td>
</tr>
</tbody>
</table>

2. Other nursing degrees offered at your institution:

<table>
<thead>
<tr>
<th>Nursing Degree</th>
<th>Mark an &quot;X&quot; in each box that applies.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doctorate</td>
<td></td>
</tr>
<tr>
<td>Master's</td>
<td></td>
</tr>
<tr>
<td>Associate</td>
<td></td>
</tr>
<tr>
<td>Other, please specify</td>
<td></td>
</tr>
</tbody>
</table>

3. Indicate whether your institution is public or private:

<table>
<thead>
<tr>
<th>Status</th>
<th>Mark an &quot;X&quot; in one box.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public</td>
<td></td>
</tr>
<tr>
<td>Private</td>
<td></td>
</tr>
</tbody>
</table>

4. Please indicate if your baccalaureate program is a member of each of the following professional nursing organizations:

<table>
<thead>
<tr>
<th>Nursing Organization</th>
<th>Mark an &quot;X&quot; in each box that applies.</th>
</tr>
</thead>
<tbody>
<tr>
<td>AACN</td>
<td></td>
</tr>
<tr>
<td>NLN</td>
<td></td>
</tr>
<tr>
<td>Other, please specify</td>
<td></td>
</tr>
</tbody>
</table>

5. The baccalaureate nursing program at your institution is currently accredited by:

<table>
<thead>
<tr>
<th>Accrediting Agency</th>
<th>Mark an &quot;X&quot; in each box that applies.</th>
</tr>
</thead>
<tbody>
<tr>
<td>NLNAC</td>
<td></td>
</tr>
<tr>
<td>CCNE</td>
<td></td>
</tr>
<tr>
<td>Other, please specify</td>
<td></td>
</tr>
</tbody>
</table>

6. List factors that contributed to the selection of each accrediting agency identified in question #5. Identify the most important contributing factor by placing a "*" next to the item. (Please use the top of page 2 to complete your list.)
7. Indicate to what extent your nursing program's definition of critical thinking reflects congruency with the following definitions of critical thinking, by marking an "X" in the appropriate box next to each definition. Definitions reflect direct quotes from critical thinking experts.

<table>
<thead>
<tr>
<th>Definition</th>
<th>Strongly Congruent</th>
<th>Congruent</th>
<th>Incongruent</th>
<th>Strongly Incongruent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reflective and reasonable thinking that is focused on deciding what to believe or do.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>An investigation whose purpose is to explore a situation, phenomenon, question, or problem to arrive at a hypothesis or conclusion about it that integrates all available information and that, therefore, can be convincingly justified.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The propensity and skill to engage in an activity with reflective skepticism.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The art of thinking about your thinking while you are thinking in order to make your thinking better: more clear, more accurate, or more defensible.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A composite of attitudes, knowledge, and skills.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The rational explanation of ideas, inferences, assumptions, principles, arguments, conclusions, issues, statements, beliefs, and actions.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Purposeful, goal-directed thinking that aims to make judgments based on evidence (fact), rather than conjecture (guesswork).</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Definition</td>
<td>Strongly Congruent</td>
<td>Congruent</td>
<td>Incongruent</td>
<td>Strongly Incongruent</td>
</tr>
<tr>
<td>---------------------------------------------------------------------------</td>
<td>--------------------</td>
<td>-----------</td>
<td>-------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>An inherent cognitive activity in the process of forming clinical judgments.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Goal-oriented, purposeful thinking that involves a number of mental skills, such as determining what data is relevant, evaluating the credibility of sources, and making inferences.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Underlies independent and interdependent decision making. Includes questioning, analysis, synthesis, interpretation, inference, inductive and deductive reasoning, intuition, application, and creativity.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The deliberative non-linear process of collecting, interpreting, analyzing, drawing conclusions about, presenting, and evaluating information that is both factually and belief based. In nursing this is demonstrated by clinical judgment which includes: ethical, diagnostic and therapeutic dimensions; and research.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No definition for critical thinking has been identified by my program.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

8. Which of the following standardized tools is/are used by your baccalaureate program to determine if critical thinking as a learning outcome has been achieved?

<table>
<thead>
<tr>
<th>Standardized Tool</th>
<th>Mark an “x” in each of the appropriate boxes below.</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. California Critical Thinking Skills Test</td>
<td></td>
</tr>
<tr>
<td>b. California Critical Thinking Dispositions Inventory</td>
<td></td>
</tr>
<tr>
<td>c. Cornell Critical Thinking Test</td>
<td></td>
</tr>
<tr>
<td>d. Ennis-Weir Critical Thinking Essay Test</td>
<td></td>
</tr>
<tr>
<td>e. Watson-Glaser Critical Thinking Appraisal</td>
<td></td>
</tr>
<tr>
<td>f. Other, please specify:</td>
<td></td>
</tr>
<tr>
<td>g. No standardized tool is used.</td>
<td></td>
</tr>
</tbody>
</table>
9. Which of the following non-standardized tools are used by your baccalaureate program to determine if critical thinking as a learning outcome has been achieved?

<table>
<thead>
<tr>
<th>Non-standardized Tool</th>
<th>Mark an “x” in each of the appropriate boxes below.</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Critical thinking rubric</td>
<td></td>
</tr>
<tr>
<td>b. Portfolio</td>
<td></td>
</tr>
<tr>
<td>c. Testing methods (listed below)</td>
<td></td>
</tr>
<tr>
<td>i. scenario</td>
<td></td>
</tr>
<tr>
<td>ii. case study</td>
<td></td>
</tr>
<tr>
<td>iii. essay</td>
<td></td>
</tr>
<tr>
<td>iv. other testing method, please specify:</td>
<td></td>
</tr>
<tr>
<td>d. Other non-standardized tool, please specify:</td>
<td></td>
</tr>
<tr>
<td>e. No non-standardized tool is used.</td>
<td></td>
</tr>
</tbody>
</table>

10. Does your baccalaureate nursing program assess change in critical thinking abilities? (check one)  
Yes  No

If you answered “No,” you have completed this question and may proceed to the end of the survey. If you answered “Yes,” please continue.

a. Identify how change in critical thinking abilities is assessed.

<table>
<thead>
<tr>
<th>Method(s) Used to Assess Change</th>
<th>Mark an “x” in each of the appropriate boxes below.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessed upon entry into and exit from the nursing program using the same tool.</td>
<td></td>
</tr>
<tr>
<td>Assessed upon entry into and exit from the nursing program using a different tool.</td>
<td></td>
</tr>
<tr>
<td>Other, please specify:</td>
<td></td>
</tr>
</tbody>
</table>

b. Which standardized tool(s) was/were used to assess change in critical thinking abilities?  
(Please list below)

Was a statistically significant difference assessed in critical thinking abilities? (check one)  
_____ Yes, significantly higher  _____ No significant change  _____ Yes, significantly lower

c. Which nonstandardized tool(s) was/were used to assess change in critical thinking abilities?  
(Please list below)

Was a statistically significant difference assessed in critical thinking abilities? (check one)  
_____ Yes, significantly higher  _____ No significant change  _____ Yes, significantly lower

Thank you for completing this survey. To obtain a summary of survey results please enclose your e-mail address: ____________________________
APPENDIX F. FORMULA FOR CALCULATING ADJUSTED RESIDUAL
Formula for calculating adjusted residual (Agresti & Finlay, 1997):

\[ AR_{ij} = \frac{R_{ij}}{\sqrt{E_{ij}(1 - \frac{r_i}{W})(1 - \frac{c_j}{W})}} \]

Notations:

- \( f_{ij} \): sum of cell weights for cases in cell \((i, j)\)
- \( c_j \): \( \sum_{i=1}^{R} f_{ij} \), the jth column subtotal
- \( r_i \): \( \sum_{j=1}^{C} f_{ij} \), the ith row subtotal
- \( W \): \( \sum_{j=1}^{C} c_j = \sum_{i=1}^{R} r_i \), the grand total

Marginal and cell statistics:

- Count
  \[ \text{count} = f_{ij} \]
- Expected count
  \[ E_{ij} = \frac{r_i c_j}{W} \]
- Residual
  \[ R_{ij} = f_{ij} - E_{ij} \]
REFERENCES


