CRITICAL THINKING IN NURSING: EXPERIENCE VS. EDUCATION

By

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ABSTRACT

Critical thinking is an essential component to competent nursing practice. Although critical thinking has been widely studied among student nurses, little research has been done to evaluate the level of critical thinking among experienced nurses. The purpose of this correlational quantitative research study was to determine the relationships among education, experience, and critical thinking ability, measured through scores achieved on the California Critical Thinking Skills Test (CCTST), and results of a demographic survey, among 44 experienced RNs in the Las Vegas, Nevada area. Results of the data demonstrated an increase in critical thinking ability as education increased. The implications for nursing leadership were discussed. Based on the findings, recommendations were made for nursing education, nursing leadership, and nursing practice.
DEDICATION

I would like to dedicate this dissertation to my husband, my parents, and my sisters. I would like to thank them for their love and support during the course of my studies. Rollin, you have truly changed my life and I thank God everyday that you found me. Mom and dad, you have kept me on the right path and have always had faith in me. I am forever grateful that I was blessed with parents like you. Lynn and Ingrid, you have served as good role models and your wisdom has always been admired.
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CHAPTER 1: INTRODUCTION

Facione (1990) defined critical thinking as the process of purposeful, self-regulatory judgment. Critical thinking is an essential component of modern nursing practice. Whether nurses practice in pediatrics, obstetrics, or in critical care areas, critical thinking skills are used to arrive at competent clinical decisions. Critical thinking “is the cognitive engine which drives problem-solving and decision-making” (Facione, Facione, Blohm & Giancarlo, 2002, p. 2).

According to Scheffer and Rubenfeld (2000):

Critical thinking in nursing is an essential component of professional accountability and quality care. Critical thinkers in nursing exhibit these habits of the mind: confidence, contextual perspective, creativity, flexibility, inquisitiveness, intellectual integrity, intuition, open-mindedness, perseverance, and reflection. Critical thinkers in nursing practice the cognitive skills of analyzing, applying standards, discriminating, information seeking, logical reasoning, predicting and transforming knowledge (cited in Fesler-Birch, 2005, p. 60).

Alfaro-LeFevre (2004) identified critical thinking as potentially the single most important factor that determines whether nurses succeed or fail. The author further argues the relevance of critical thinking in nursing, including the fact that nurses in multiple settings are expected to accept more responsibilities, collaborate with diverse individuals, and increasingly have to make independent decisions.
In order to succeed in the workplace, nurses have to engage in independent and group problem-solving skills, use resources, take ownership and responsibility, use technology, and acquire and evaluate information (Alfaro-LeFevre, 2004). In order to accomplish these tasks, nurses are required to possess basic skills, which include reading, writing, and listening, and personal qualities, such as self-esteem, self-confidence, and integrity, and finally one needs thinking skills, including knowing how to learn, reason, generate ideas, and how to solve problems (Alfaro-LeFevre, 2004).

This chapter will examine the emergence of critical thinking in both nursing education and clinical nursing practice. The significance of critical thinking has led to many research studies on the topic. Some relevant studies include that of Miller (1992), Beckie, Lowry, and Barnett (2001), Brown, Alverson, and Pepa (2001), Duchscher (2003), Hicks, Merritt, and Elstein (2003), Martin (2002) and Howenstein, Bilodeau, Brogna, and Good (1996). However, few recent studies exist that examine the significance of critical thinking in clinical practice and the studies that do exist have produced inconsistent results (Brunt, 2005). This chapter will ultimately present the problem statement for this research and the purpose statement. The significance of the study is presented to explain the uniqueness of the approach to examining critical thinking in clinical nursing practice. The remaining components of the chapter, the nature of the study, the research questions, theoretical framework, definitions, assumptions, and limitations of the study, are presented to establish the framework for the study and to assist the reader in understanding the scope of the research itself.
Background of the Problem

The nursing profession has evolved from the simple practice of nurturing to the art and science of performing complex procedures. “As nursing has evolved from an occupation to a profession requiring cognitive and relational skills nurses have progressed from task oriented to skilled professional based on well-developed knowledge” (Martin, 2002, ¶ 1). Today’s registered nurse (RN) must be able to analyze complex situations. Nurses must develop critical thinking skills to solve complex problems. “Decisions made by nurses often involve complex problems concerning the physical and psychosocial well-being of clients and interaction with other disciplines” (Martin, 2002, ¶ 1). According to Fesler-Birch (2005), critical thinking is an essential component to reaching desired patient outcomes. Critical thinking is utilized in the identification of patient problems, the planning of care, and the administration of care. Without the careful examination of all aspects of patient care, the outcome reached may inflict more harm than good on the patient (Fesler-Birch, 2005).

With the rapid changes in healthcare and the influx of new technology nurses must be able to use critical thinking skills to make decisions that provide optimal patient care (Thurmond, 2001). Critical thinking is viewed as more than a skill that can be used to enhance nursing practice; it is a skill that is necessary for providing quality nursing care. “Nurses must be able to engage in critical thinking to handle the onslaught of continuous procedural and technological changes in the current healthcare environment” (Thurmond, 2001, p. 375-376).
Alfaro-LeFevre (1999) described critical thinking as a necessity, not only to exist but also to grow and develop. “Without the ability to think critically, nurses cannot solve problems and therefore become absorbed by the problems” (Thurmond, 2001, p. 378). As nurses develop and gain experience, their critical thinking abilities will be enhanced. Benner, Tanner, and Chesla (1997) described this evolution as gradual. As nurses evolve through an experience continuum, their ways of thinking and acting are shifted and their performance is improved.

The need for nurses to be able to think critically has increased by the escalating patient acuity and the increased demands placed on nurses (Mottola & Murphy, 2001). The nursing shortage has resulted in fewer nurses at the bedside at a time when more patients with higher acuity levels are accessing healthcare facilities (Wieck, Oehler, Green, & Jordan, 2004).

The American Association of Colleges of Nursing (AACN) published a document entitled *The Essentials of College and University Education for Professional Nursing Practice* in 1986. The guide was the first national effort to define the essential values, knowledge, and professional behaviors expected of a baccalaureate prepared nurse (American Association of Colleges of Nursing, 1998). The authors of the document recognized the development of critical thinking skills as a necessity for success, not only in nursing education, but in the practice of nursing, in general. In 1991, the National League for Nursing (NLN), an accrediting body for nursing education, declared critical thinking as an essential outcome criterion for baccalaureate nursing programs (O'Sullivan, Blevins-Stephens, Smith, & Vaughan-Wrobel, 1997). In 1995, the AACN Board
of Directors appointed a task force to review the earlier *Essentials* document.

Critical thinking was established as one of four core competencies necessary for professional nursing. The current document, developed in 1998, serves as a guide for many colleges and universities (American Association of Colleges of Nursing, 1998).

As a result of the expectations established by the AACN and NLN, there have been many studies developed to measure and enhance critical thinking skills amongst students. Angel, Duffey, and Belya (2000) conducted one such study with the purpose of their research being to measure the acquisition of knowledge and the development of critical thinking skills using structured versus unstructured approaches. The study found that both groups had an increase in knowledge and an increase in critical thinking scores after the intervention. However, there were no significant differences in outcomes based on the approaches used.

Other studies examining students include Beckie, Lowry, and Barnett (2001), which evaluated the critical thinking skills before and after the program curriculum was revised. The revised curriculum emphasized critical reflection. An additional purpose of the study was to determine the changes of critical thinking skills between entry and exit from the program. The study consisted of 183 nursing students divided into 3 cohorts. Each of the cohort groups were administered a pretest and a posttest. The first cohort to receive the revised curriculum, cohort 2, achieved significantly higher critical thinking scores than the baseline cohort, whose scores remained unchanged over time. However, the
second class to experience the revised curriculum did not demonstrate improved
critical thinking scores over time.

Profetto-McGrath (2003) examined the critical thinking skills of nursing
students from all four years of a baccalaureate nursing program. The study found
an increase in critical thinking scores from year one to year four, but there was no
statistically significant difference among the four student groups. The study
suggested that critical thinking does indeed increase with education.

The premise of many studies is that baccalaureate education encourages
the development of critical thinking ability (Beckie et al., 2001; Brown et al.,
To what degree that ability is enhanced has not been fully substantiated.
Furthermore, the continued affect of education on critical thinking ability and its
application to clinical practice among nurses has not been thoroughly established.

Critical thinking has been established as an essential component to both
nursing education and nursing practice. Measuring these abilities in clinical
practice has not been well documented and the limited documentation has
presented mixed results. More specifically, the differences in critical thinking
abilities among nurses of similar experience, with varying educational levels,
have not been fully explored. This has led to the conclusion that this topic needs
to be further examined. Only through thoroughly examining the connection
between the amount of experience, level of education, and critical thinking ability
can the existence of a relationship be identified or denied.
Statement of the Problem

Critical thinking has become a major concept of interest in both nursing education and nursing practice. This interest has led to including critical thinking as an outcome criterion for baccalaureate nursing education. In addition, many clinical institutions have strived to enhance critical thinking abilities among their registered nurses. Research exists to support the finding that an RN’s level of education impacts his or her critical thinking ability (Gross et al., 1987; Pardue, 1987; Brooks & Shepherd, 1990; Howenstein et al., 1996; Stevens, 2002). Yet many studies of RNs have yielded mixed results (Hicks et al., 2003; Howenstein et al., 1996; Martin, 2002; Stevens, 2002). There also have been various methods used to measure critical thinking. Hicks et al. (2003) used the Decision Analytic Questionnaire, the California Critical Thinking Skills Test, and the California Critical Thinking Disposition Inventory to measure critical thinking. Howenstein et al. (1996) measured critical thinking by using the Watson-Glaser Critical Thinking Appraisal. Martin (2002) used the Elements of Thought Instrument and videotaped vignettes to investigate the relationship between critical thinking, decision making and clinical nursing expertise in simulations. Stevens (2002) measured critical thinking abilities by administering the California Critical Thinking Skills Test.

The data that exist on nurses and critical thinking primarily has been obtained through studying nursing students and not experienced nurses. A need exists to validate quantitatively the relationship between critical thinking ability of RNs and educational level, in addition, the need to determine the relationship
between critical thinking ability and level of nursing experience also exists. Previous studies which yielded mixed results have failed to establish a relationship between the variables. Hicks et al. (2003) found no significant association of education and experience to critical thinking, whereas Howenstein et al. (1996) demonstrated a positive correlation between educational level and critical thinking. However, Howenstein et al. (1996) showed a negative correlation with critical thinking and experience. In contrast, Martin (2002) found that critical thinking scores increased as the level of expertise increases, yet there was no significant differences based on level of education. By establishing that a relationship does exist, nursing leadership can then utilize this information to develop mentorship programs, pairing experienced nurses and new nurses in order to draw on the nurses’ experience, education, and critical thinking skills in order to maximize the potential of the new nurse.

Purpose of the Study

The purpose of this correlational quantitative research study was to determine the relationships among education, experience, and critical thinking ability, measured through the scores achieved on the California Critical Thinking Skills Test (CCTST) and the results of a demographic survey, among 44 experienced RNs in the Las Vegas, Nevada area. The researcher assessed if a correlation exists between critical thinking ability scores and number of years of experience. In addition, the researcher examined the relationship between level of education (diploma, Associate’s degree, and baccalaureate degree) and CCTST scores.
Critical thinking in nursing uses both logic and intuition (Alfero-Lefevre, 2004). Furthermore, critical thinking is based on knowledge, skills, and experience (Alfero-Lefevre, 2004). In addition, the acquisition and application of critical thinking skills are progressive and evolve out of lifelong learning and experience. Developing these skills through higher education is important to the learning process (Lemire, 2002). The purpose of this study was to examine the relationship of both critical thinking and experience and critical thinking and education.

Significance of the Problem

Critical thinking abilities are relevant to clinical nursing practice. The analysis of critical thinking abilities among RNs can be valuable to both continuing education and educational programs in a hospital setting (Stevens, 2002). Examining the relationship of critical thinking and education outside of the collegiate experience will establish the relevance of the level of nursing education among experienced RNs and their critical thinking ability.

The outcomes of the study can be relevant to the continuing education policies of healthcare agencies. By determining the presence of a positive relationship between educational level and critical thinking, employers are encouraged to use more highly educated nurses in areas that require critical thinking abilities. The results of this study are, therefore, significant to both nursing leadership in clinical practice and leadership in nursing education. Furthermore, by establishing the significance, education may extend beyond the field of nursing and serve as a model for other disciplines.
Nature of the Study

The study was a correlational quantitative study in which an attempt to establish an association between two variables was present (Polit & Beck, 2004). The relationship between critical thinking and experience and the relationship between education and critical thinking ability can be established by comparing the results on the California Critical Thinking Skills Test (CCTST) and the demographic data of the participants, including level of education and years of experience. Nurses in the Las Vegas area were randomly selected and sent letters explaining the study, requesting their participation in the study. These nurses were sent demographic surveys that include questions related to entry-level of nursing education and number of years of experience. Nurses with Master’s degrees or higher were excluded from the study.

The sample group was chosen from those nurses who indicated that they had at least five years of nursing experience and were diploma, Associate’s, or baccalaureate prepared. These nurses were mailed the California Critical Thinking Skills Test; they took the test at their convenience, and mailed it back to the researcher. Their scores and demographic data were then analyzed.

A quantitative method was best suited to yield results for the purpose of this study. The quantitative method is employed when the researcher is studying a research problem in which a need to explain relationships between variables exists (Creswell, 2002). This study sought to determine the existence of a relationship between the variables of critical thinking and education and critical thinking and experience.
The study’s design, which was a correlational research design, was also appropriate for the goal of the study. “In correlational research design, investigators use a correlation statistical technique to describe and measure the degree of association (or relationship) between two or more variables or sets of scores” (Creswell, 2002, p. 361). The association between the variables was measured based on the scores of the CCTST and the responses on the demographic survey. This design differs from other similar studies because in these studies more variables were compared, different instruments were used, or only new nurses were evaluated (Hicks et al., 2003; Howenstein et al., 1996; Martin, 2002; Stevens, 2002). The instruments used in other studies will be further discussed in a later chapter.

Research Questions

1. What is the relationship between critical thinking ability and level of experience in registered nurses?

2. What is the relationship between critical thinking ability and educational level in experienced registered nurses?

Question one examined the relationship between critical thinking ability and the level of experience in registered nurses. The sample group was administered the CCTST, which measures critical thinking ability. The sample group also completed a demographic survey that asked each participant to document the number of years of experience as a registered nurse. The score of each participant on the CCTST was paired with each participant’s demographic data. The premise is that as the number of years of experience increases, so shall
the critical thinking scores. Once a nurse has reached the proficient or expert level in Benner’s (1984) experience continuum does his or her critical thinking abilities continue to increase? Does a nurse with twelve years of experience score higher on the CCTST than a nurse with seven years of experience?

The second question sought to examine the relationship between critical thinking ability and the educational level of registered nurses. The sample group was composed of registered nurses with three types of entry-level nursing education, a diploma, an Associate’s degree, and a Bachelor of Science degree. The Bachelor of Science degree group was composed of those from two groups, those whose initial degree was a Bachelor of Science in Nursing and those whose initial degree was either a diploma or an Associate’s degree but continued their education and now hold a Bachelor of Science in Nursing degree (RN to BSN). The score of each participant on the CCTST was paired with each participant’s demographic data.

Hypotheses

1. \( H_1 \)- There is no significant relationship between CCTST scores and level of nursing experience.

2. \( H_2 \)- There is no significant relationship between CCTST scores and level of nursing education.

Theoretical Framework

Benner’s (1984) theory, *Novice to Expert Theory* postulates that nurses have the potential, over time, to progress through five levels of expertise. The theory seeks to explain the phenomena of how experience relates to critical
thinking ability. As nurses gain experience, they become more confident and proficient in their critical thinking and decision-making processes. Theoretical and practical knowledge blends together with one another. The theory describes how nurses progress through five stages of nursing practice. In the initial phase, the novice has little to no prior experience. They have no background understanding of the situation. Context-free rules and attributes are necessary for safe performance of skills at this level.

The second phase, the advanced beginner, is more at the level of a new graduate nurse. Enough experience is present, usually obtained through formal education and hands-on learning experiences, to grasp aspects of the situation. With experience, the nurse should be able to progress to the competent stage. In this stage, the nurse is able to decipher which aspects of the situation are important. Care is delivered through conscious and deliberate planning. Nurses at this stage have generally been on the job for two to three years. They demonstrate an increased level of efficiency (Benner, 1984).

The fourth stage is that of the proficient nurse. The nurse is able to view the situation as a whole, rather than aspects of the situation. This level is a qualitative leap beyond competent (Benner, 1984). At this stage higher levels of critical thinking skills are used. Inductive and deductive reasoning is used in the decision-making process. These are the more experienced nurses with greater than three years of experience.

The final stage is that of the expert nurse. Judgment is based on paradigms. According to Benner (1984), the expert nurse has an intuitive grasp of
the situation and is able to focus on the accurate region of the problem due to the understanding of the paradigms. Critical thinking again is at higher levels. These nurses have a minimum of five years of experience. Yet not all nurses reach the expert level. The sample group was chosen using this theory. Nurses with at least five years of experience theoretically have minimally reached the proficient stage and should be able to demonstrate higher levels of critical thinking.

Martin (2002) developed a theory of critical thinking based on Paul’s (1993) definition of critical thinking and Benner’s (1984) novice to expert theory. “As persons develop clinical nursing expertise from novice to expert through the use of knowledge and experience, they also develop critical thinking and use it consistently to make objective and appropriate clinical decisions” (Martin, 2002, ¶ 4). Based on Benner (1984), Facione (1990) and Martin (2002), the author believes that proficient and expert nurses may possess high-level critical thinking skills. Those skills are influenced by both education and experience. The intent of this study was to ascertain which variable had the greatest affect on critical thinking skills, education or experience. This study further examined the relationship between clinical experience and critical thinking ability and the relationship between education and critical thinking ability.

Definition of Terms

The definition of critical thinking chosen for this study is:

[We] understand critical thinking to be purposeful, self-regulatory judgment which results in interpretation, analysis, evaluation, and inference, as well as explanation of the evidential, conceptual,
methodological, criteriological, and contextual consideration upon which that judgment is based. Critical thinking is essential as a tool of inquiry. As such, critical thinking is a liberating force in education and a powerful resource in one’s personal and civic life (Facione, 1990, p. 2).

*Registered Nurse* - An individual licensed by the Nevada Board of Nursing to practice as a professional nurse. All registered nurses must pass a licensure exam (Nevada State Board of Nursing, n.d.).

*Diploma* - An individual can qualify to take the licensure exam to become a registered nurse by completing a hospital-based diploma program which can be completed in about three years (All Nursing Schools, 2001).

*Associate’s Degree in Nursing* (ADN) - An individual can qualify to take the licensure exam to become a registered nurse by completing an Associate’s degree awarding program, usually offered at a community college. The program takes approximately two years to complete (All Nursing Schools, 2001).

*Bachelor of Science in Nursing Degree* (BSN) - An individual can qualify to take the licensure exam to become a registered nurse by completing a Bachelor of Science degree awarding program offered at a college or university. Program length is usually about four years (All Nursing Schools, 2001).

*Novice Nurses* - A nurse with little or no experience. According to Benner (1984) “beginners have had no experience of the situation in which they are expected to perform” (p. 20). Student nurses would be in this category. However, this category is not only unique to student nurses, but any nurse entering a clinical setting in which he or she has not had prior experience (Benner, 1984).
**Advanced Beginner**- A nurse “who can demonstrate marginally acceptable performance, ones who have coped with enough real life situations to note…” (Benner, 1984, p. 22). Nurses at this stage range from the entry-level into practice to about two years of experience.

**Competent Nurses**- “Competence, typified by the nurse who has been on the job in the same or similar situations two or three years, develops when the nurse begins to see his or her actions in terms of long-range goals or plans of which he or she is consciously aware” (Benner, 1984, p. 25-26).

**Experienced Nurses**- A nurse with a minimum of five years of experience. Based on Benner’s (1984) theory, nurses with a minimum of five years of experience should be at the proficient or expert level in the experience continuum. Benner (1984) further suggested that at around five years of nursing experience, nurses begin to transform from being inexperienced to being experienced. Nurses at these levels should have higher level critical thinking skills than do novice, advanced beginner, and competent nurses.

**Analysis**- “To comprehend and express the meaning or significance of a wide variety of experiences, situations, data, events, judgments, conventions, beliefs, rules, procedures or criteria” (Insight Assessment, 2006b, ¶ 6). In addition, it also means, “to identify the intended and actual inferential relationships among statements, questions, concepts, descriptions or other forms of representation intended to express beliefs, judgments, experiences, reasons, information or opinions” (Insight Assessment, 2006b, ¶ 6).
Evaluation- “To assess the credibility of statements or other representations which are accounts or descriptions of a person’s perception, experience, situation, judgment, belief or opinion; and to assess the logical strength of the actual or intended inferential relationships among statements, descriptions, questions, or other forms of representations” (Insight Assessment, 2006b, ¶ 7). On the California Critical Thinking Skills Test (CCTST) evaluation also means “to state the results of one’s reasoning; to justify that reasoning in terms of evidential, conceptual, methodological, criteriological and contextual considerations upon which one’s results were based; and to present one’s reasoning in the form of cogent arguments” (Insight Assessment, 2006b, ¶ 7).

Inference- “To identify and secure elements needed to draw reasonable conclusions; to form conjecture and hypotheses, to consider relevant information and to educe the consequences flowing from data, statements, principles, evidence, judgments, beliefs, opinions, concepts, descriptions, questions, or other forms of representation” (Insight Assessment, 2006b, ¶ 8).

Deductive Reasoning- “The assumed truth of the premises purportedly necessitates the truth of conclusion” (Insight Assessment, 2006b, ¶ 9).

Inductive Reasoning- “An argument’s conclusion is purportedly warranted, but not necessitated, by the assumed truth of its premises” (Insight Assessment, 2006b, ¶ 10).

Assumptions

The initial assumption was that nurses with a minimum of five years of experience were better at critical thinking than nurses with less experience. An
additional assumption was that the results produced by the study would be useful for the purpose of advancing nursing education and continuing education in the hospital setting.

Other assumptions included the assumption that critical thinking can be measured. By using specific tests, critical thinking ability can be quantified. Another assumption was that the participants were the ones completing the test. The researcher was not present when the test was administered. Finally, the assumption was made that the reliability and validity levels of the CCTST reported by the authors were accurate.

Limitations

The sample was obtained only from nurses living in the Las Vegas area and licensed in Nevada. The data was obtained from a convenient sample of nurses, those who volunteered to participate; therefore, data collection inferences could only apply to the sample examined.

The nurses who volunteered for the study may have been more reflective of nurses who were confident in their ability to score well on the critical thinking skills test. This had the potential to bias the study. The sample may not be completely reflective of the nurses in the Las Vegas area. The nurses who declined to participate in the study may have done so because of a lack of willingness to be subjected to the testing.

Delimitations

This study was confined to surveying experienced nurses in the Las Vegas area. This study was focused on critical thinking. Only nurses who had not
exceeded their education beyond the Bachelor’s degree practice were included in the study.

Summary

Critical thinking is an essential component of clinical nursing practice. Due to its growing relevance to sound, safe clinical practice, accrediting bodies have established critical thinking as a core competency skill necessary for the completion of baccalaureate nursing education. Other levels of nursing education also recognize the importance of critical thinking development and implement enhancement exercises into their curriculum. Beyond the collegiate experience, the development and enhancement of critical thinking skills remain a necessity in nursing practice. Researchers and clinical educators have attempted to establish techniques that will enhance critical thinking among practicing nurses (Alfaro-Lefevre, 2004; Bennett & Dune, 2002; Ferrario, 2004; Ignatavicius, 2001; Oermann, 1999; Price, 2004). However, little recent data exists that substantiates a correlation between education and critical thinking or experience and critical thinking abilities.

The researcher examined the relationship between critical thinking and educational level as well as the relationship between critical thinking and years of experience among registered nurses. The review of the literature that follows examines several components of nursing, including the history of nursing and the history of nursing education, studies examining critical thinking in nursing students, and the techniques that have been useful in the enhancement of critical thinking ability. Other relevant topics, including current issues in nursing, will be
examined in an attempt to establish the complexity of the problems faced by the nursing profession and the relevance of critical thinking skills in the profession.
CHAPTER 2: REVIEW OF THE LITERATURE

Critical thinking is an essential component to the nursing profession. This review of the literature will examine several facets of critical thinking and how critical thinking relates to nursing practice. Furthermore, the review of relevant literature will examine prior studies that have targeted critical thinking in both nursing students and nurses in clinical practice. Prior to examining this phenomenon, brief histories of critical thinking, nursing, and nursing education are explored. The intent of the review of the literature is to establish a foundation for the rationale of the research study. The information provided will establish both the relationship between critical thinking and education and critical thinking and experience. The study intended to examine the extent of the relationship between these variables. In addition, information has been provided explaining other issues relevant to nursing, such as the impact of the nursing shortage.

Nurses must be able to interpret, analyze, and synthesize data. In addition, the technological environment in today’s healthcare settings makes critical thinking ability essential to providing quality care. Currently, the development of critical thinking skills has become an essential outcome expectation of many nursing programs across the U.S. The American Association of Colleges of Nursing (1998) specifically identified critical thinking as a core competency necessary for successful completion of baccalaureate education. “This competency underlies independent and interdependent decision-making critical for effective clinical judgment” (Beckie, Lowery, & Barnett, 2001, ¶ 1).
Critical thinking, although frequently measured at the collegiate level (Simpson & Courtney, 2002), has been sparsely studied in clinical practice. The intent of this study was to aid in the development of a body of knowledge that will assist in the evaluation of critical thinking skills in experienced nurses and to evaluate if educational level affects critical thinking skills beyond the novice level.

Documentation

The literature reviewed for the purpose of this study was obtained from two primary sources, EBSCO host database and the CINAHL database. Other sources included books written by germinal theorists. The key words used to search the database were critical thinking, history of critical thinking, and nursing. A vast amount of literature was available on critical thinking in general and there did not appear to be any gaps in the literature in that area. A total of 139 sources were found and 106 were used (see Table 1). The majority of the information was obtained from journal articles, many from the Internet.
Table 1

*Scholarly Books, Research, Dissertation, Article and Journal Review*

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Relevance of the Review of the Literature

Multiple studies have examined the critical thinking ability of nursing students, yet very little research has been conducted on nurses in clinical practice (Beckie et al., 2001). Critical thinking ability has been utilized as an outcome measurement of nursing education, but not as a measure of quality nursing practice in the clinical setting. Studies have supported the existence of a correlation between critical thinking ability and educational level (Brooks & Shepard, 1990; Girot, 2000; Howenstein, Bilodeau, Brogna, & Good, 1996; Miller, 1992). However, these studies were conducted on nursing students, although Girot (2000) and Miller (1992) both studied samples of students who were RNs in a continuing education process.

The intent of the review of the literature is to examine the definitions and historical perspective of critical thinking to establish a theoretical framework for the measurement of critical thinking in this study. In addition, a brief historical background of the nursing educational levels will be explored to provide a foundation for the sample group examined. Further offered is a review of the literature related to critical thinking in nursing practice to establish the need for critical thinking in nursing practice, as well as to explore the various tools used to measure critical thinking ability. A review of nursing clinical practice specifically related to Benner’s (1984) *Novice to Expert Theory* is also provided to establish the foundation for examining experienced nurses versus new or novice nurses for the purpose of this study. In addition, current issues in nursing, including the current nursing shortage, and nursing in Nevada, are explored.
The establishment of a fundamental understanding of critical thinking is essential to this study. The review of the literature first examines the historical perspective of critical thinking and explores multiple definitions of critical thinking. From these definitions, one definition, which evolved as a result of critically thinking about critical thinking, provides the theoretical foundation for this study. Critical thinking was established as the dependent variable in this study, because the study sought to determine if critical thinking was enhanced more by education or by work experience.

*Historical Perspective of Nursing*

Nursing has an extensive history and has long served as a profession of caring, nurturing, comforting, and supporting (Kozier, Erb, Berman, & Snyder, 2004). Its development was entrenched in these principles and continues to guide the modern fundamentals of the profession.

*Religion and Nursing*

Religion played a paramount role in the development of Western nursing. During the third and fourth centuries, Fabiola, who had recently converted to Christianity, used her wealth to provide houses of care and healing for the poor, the sick, and the homeless (New Advent, 2005). These were the precursors for hospitals. Women were granted the status of deaconess and traveled to distant lands to care for the sick (Burke, 2004).

During the Middle Ages, there was a strong connection between the Catholic Church and those providing healthcare (Burke, 2004). Monks cared for male patients and nuns cared for female patients. These individuals were viewed
as having high status in the community. As these orders flourished, the deaconesses became extinct (Burke, 2004).

*Birth of Urban Hospitals*

After the Crusades, the monastic nurses began to disappear (Burke, 2004). Hospitals began to appear in cities and male and female nurses began to care for the sick in these facilities. “Nurses of inferior quality and character were recruited to staff overcrowded and understaffed secular hospitals. These lower class women of questionable character settled for hospital employment when they were unable to find employment elsewhere” (Burke, 2004, p. 3).

*Nursing in the 19th Century*

In the nineteenth century, nursing evolved as a result of war more than as a religious duty. During the Crimean War (1854-1856), Florence Nightingale adamantly campaigned for improvement in the standards of care for wounded soldiers (Pulliam, 2002). Not only was she acclaimed for her diligent work to reform hospitals, she championed the causes of implementing public health policy (Pulliam, 2002). In addition, she established a training school for nurses (Pulliam, 2002). Florence Nightingale was an innovator in the collection, tabulation, interpretation, and graphical display of descriptive statistics (Audain, 2005).

*The Civil War and Nursing*

The American Civil War also played a pivotal role in the development of modern nursing. Sojourner Truth was a nurse during and after the Civil War (Bullough, 2002). In 1865, she was appointed to work with a physician in
Washington D.C. For more than two years, she nursed wounded African-American soldiers and trained newly recruited nurses (Bullough, 2002). She would also become an advocate for nurses by lobbying the U.S. Congress to provide additional funding to train nurses (Bullough, 2002). Harriet Tubman also served as a nurse, an educator, a scout, and a spy during the Civil War (Lewis, 2005). Approximately two thousand women volunteered as nurses for military hospitals during the Civil War. Clara Barton and Dorothea Dix were leaders in a national effort to organize a nursing corps to care for wounded and sick soldiers (Brumgardt, 2003).

**Nursing in the 20th Century**

Nursing in the 20th century took on many new forms. Nurses extended care beyond hospitals, the battlefield and private homes. During World War I, nearly 23,000 nurses served in Army and Navy cantonments and hospitals ("Nursing Reflections: A Century of Caring", 2000). Nurses also provided care throughout the community. Health promotion and disease prevention were a growing essential component to nursing care during this time. During the later 19th and early 20th centuries, public health nursing, community health nursing, school nursing, the Rural Nursing Service, established by the American Red Cross in 1912, and occupational nursing all had their inceptions during this quickly changing time in America (Clark, 2003; Stanhope & Lancaster, 2004).

The U.S. Congress understood the importance of financially supporting nursing education, and in 1943, the U.S. Congress passed the Nurse Training Act, which appropriated $60 million for accelerated, expanded nursing programs in
approved schools. This led to the creation of the U.S. Cadet Nurse Corps
who desired nursing training to attend a 36-month training program. The program
paid for tuition, fees, uniforms and a stipend given to the students. During the
course of World War II, 179,000 women joined the U.S. Cadet Nurse Corps.
Nurses were stationed in more than 50 countries (“Nursing Reflections: A
Century of Caring”, 2000).

In 1946, after World War II, Congress passed the Hill-Burton Act of 1946,
which created funding for the expansion and improvement of hospital services.
This expansion created an enormous demand for hospital nurses (Tone, 1999).

The Kennedy administration appointed the Consultative Group on Nursing
in the 1960s (Tone, 1999). This group’s recommendations led to the Nursing
Training Act of 1964 that channeled nearly $300 million into nursing education.
In addition, the group stressed the need for an increase in baccalaureate and
graduate prepared nurses (Tone, 1999).

From World War II until the present-day, the nursing profession has
continued to evolve. Not only have the roles of the nurse evolved so have the
educational opportunities for nurses. Nurses are no longer lay women and men
trained in the care of the sick but now form a profession that ranges from
hospital-based trained diploma nurses to doctoral prepared clinicians, educators
and researchers (Tone, 1999).
History of Nursing Education

The earliest form of nursing education was primarily that of apprenticeships (Pulliam, 2005). With little formal classroom instruction, learning occurred through hands-on experiences in a hospital setting. Formal nursing education began in the mid-1800s (Pulliam, 2005). Florence Nightingale established the Nightingale Training School for Nurses in England in 1860 (Pulliam, 2005). In the U.S., the first training programs began in the 1860s at the New England Hospital for Women and Children in Boston, at Women’s Hospital in Philadelphia, at Johns Hopkins Hospital in Baltimore, and at Bellevue Hospital in New York City (Kozier et al., 2004).

Since the inception of formalized training for nurses, the profession and routes to the profession have taken many turns. Today, there are three predominant entry-levels into nursing practice, the two to three-year diploma, a two-year Associate’s degree, and a four-year baccalaureate degree (Nursing Schools.com, 2005). All programs qualify the prospective RN to take the nursing licensure exam, National Council Licensure Examination for Registered Nurses (NCLEX-RN). Currently, there are over 2000 nursing programs in the U.S. (Nursing Schools.com, 2005).

The three-year diploma programs were the primary route to professional nursing from the late 1800s until the mid-1960s (Kozier et al., 2004). The diploma in nursing has seen a steady decline, as many hospital-based programs have merged with community college and university programs. Today, less than
10 percent of all basic nursing education programs are diploma granting programs (AACN, 2004).

Associate’s degree nursing (ADN) programs evolved as a result of the nursing shortage after World War II (Beck, 2000). Montag (1951) initially envisioned both a technical and a professional nurse. The technical nurses would possess an Associate’s degree and provide care in acute settings under the supervision of the professional nurse. The technical nurse would be “able to perform nursing functions broader than those of the practical nurse and smaller in scope than those of the professional nurse” (Kozier et al., 2004, p. 23).

Associate’s degree nursing programs are primarily offered in the community college setting, although some four-year colleges do have Associate’s degree granting programs (Kozier et al., 2004).

The first school of nursing in a university setting was established at the University of Minnesota in 1909 (University of Minnesota, 2002). This program was primarily a university-based diploma program. In 1919, the university established a baccalaureate awarding nursing program (University of Minnesota, 2002). Today, there are almost 674 Bachelor of Science in Nursing (BSN) programs in the U.S. (Amos, 2005).

In 1965, in alignment with Montag’s (1951) vision of nursing, the American Nurses Association declared that the “Associate’s degree education in nursing should be the minimum preparation for beginning technical nursing”, in addition, “minimal preparation for beginning professional nursing practice at the present time should be the baccalaureate degree education in nursing” (ANA, 1965, p.
In 1996, the National Advisory Council on Nurse Education and Practice (NACNEP) found:

That nursing's role for the future calls for registered nurses to manage care along a continuum, to work as peers in interdisciplinary teams, and to integrate clinical expertise with knowledge of community resources. The increased complexity of the scope of practice for RNs requires a workforce that has the capacity to adapt to change. It requires critical thinking and problem solving skills; a sound foundation in a broad range of basic sciences; knowledge of behavioral, social and management sciences; and the ability to analyze and communicate data.

Among the three types of entry-level nursing education programs, the NACNEP found that baccalaureate education with its broader and stronger scientific curriculum best fulfills these requirements and provides a sound foundation for addressing the complex healthcare needs of today in a variety of nursing positions (American Association of Colleges of Nursing, 2003, ¶ 6-7).

Not surprisingly, the National Organization for Associate’s Degree Nursing adamantly disagrees with the NACNEPs’ statement. The organization strongly believes that ADN prepared nurses are adequately trained in the skills necessary for safe, competent clinical practice (National Organization for Associate’s Degree Nursing, 2005).

Despite the mandates and policy statements of leading nursing organizations, all three forms of nursing education continue to be accepted as the
minimum entry-level into clinical nursing practice. Associate’s degree prepared nurses remain the largest group of those initially entering nursing. In a national survey of the registered nurse population, of those currently practicing in the field of nursing, 43.3 percent initially were educated in an Associate’s degree program, 25.7 percent in diploma programs and 30.3 percent were educated in baccalaureate programs (Spratley, Johnson, Sochalski, Fritz, & Spencer, 2000).

The controversy regarding educational levels of registered nurses has recently gained much debate due to the Aiken, Clarke, Cheung, Sloane, and Silber (2003) study findings. The article reported that in hospitals with higher proportions of Bachelor’s or higher prepared nurses, surgical patients experienced a lower mortality and failure-to-rescue rate.

The National Council of State Boards of Nursing (NCSBN) periodically conducts surveys of newly licensed registered nurses every three years. These nurses are within the first six months of practice. They are asked to rate the frequency of performance and the priority of the activities. The average frequencies are compared based on educational level (Smith, 2002). However, few studies which examine experienced nurses exist.

Research that supports or negates differences demonstrated in clinical practice based on one’s educational level is warranted. The intent of this study was to evaluate critical thinking, an essential component to safe competent clinical nursing practice, in nurses of differing educational levels and amounts of experience.
There is little to no difference in pay scale based on the educational level among registered nurses (Mee, 2005a). The National Advisory Council on Nurse Education and Practice has urged that a least two-thirds of the RN workforce hold a baccalaureate or higher degree in nursing by 2010 (Dorsman, 2002). Understanding the history of nursing is a central component to understanding the problems that currently exist in the profession.

*Current Issues in Nursing*

Nursing is a challenging, yet rewarding occupation. Understanding the complexity of the problems faced by the nursing profession, one of which is the nursing shortage and its impact on healthcare delivery is important. The growing demands placed on nurses because of increases in technology and increases in work responsibilities have had a direct affect on nurses’ ability to critically think.

Many factors contribute to the nursing shortage. It is important to explore literature that relates to some of the causes of this problem, the impact it has on healthcare, and some proposed solutions to the nursing shortage. In addition, this section will provide an examination of the literature related to nurses in the U.S. and the specific environment of the sample group.

*The Nursing Shortage*

Nursing is the nation’s largest healthcare profession. More than 2.7 million registered nurses are licensed in the U.S. (American Association of Colleges of Nursing, 2004). According to the U.S. Bureau of Labor Statistics, registered nursing is the profession with the largest projected growth from 2002 to 2012 (Hecker, 2004). The U.S. Census Bureau (2005) projects that there will be
an increase of 623,000 nurses during this time period. Yet a severe shortage of nurses exists. The prediction has been made that the shortage will reach crisis level within the next 10 to 15 years (Albaugh, 2004). This seemingly contradiction can be attributed to the fact that although the numbers of RNs in the workforce is increasing, most of the growth is owed to older nurses entering and reentering the workforce and a rise of foreign-born nurses. In 2002, hospital nurses over the age of 50 increased by 15.8 percent and foreign-born nurses rose by 13.8 percent (“Gazing into the Future”, 2005; Gorgos, 2004).

The nursing population is aging. It has been predicted that within the next 10 years the average age of RNs will be 45.4 years, and that more than 40 percent of the working population will be over the age of 50 (Goodin, 2003). A recent study showed that two-thirds of the surge in hospital RN employment which occurred between 2002 and 2004, was due to RNs over the age of 50 (Buerhaus, Donelan, Ulrich, Norman, & Dittus, 2006). Over the next several years, the most experienced nurses will reach retirement age and will leave the profession.

There has also been an increase in baccalaureate and Associate’s degree nursing programs. Yet, the American Association of Colleges of Nursing (AACN) (2003) found that over 11,000 qualified applicants were denied admittance into baccalaureate nursing programs. Similarly, 52 percent of applicants were turned away from Associate’s degree programs (Rodts, 2004). Woods (2005) pointed out, “Although nursing school enrollment grew 16.6 percent in 2003, a lack of qualified faculty, and therefore a limited number of slots, hampers these students’ education” (¶ 5). The dominant reasons are lack of faculty to teach perspective
nursing students, not enough clinical sites and a lack of classroom space (Rodts, 2004). Not only are hospital nurses aging, so are the faculty who teach nursing students. Fewer nurses with advanced degrees are entering academia; one reason is due to the vast differences in pay (Rodts, 2004). According to Mee (2005a), the average salary for an RN ranges from $57,200-$61,600. The average salary for an advanced practice nurse is $73,200, whereas the average salary for nursing faculty is $53,900. This is compounded with the fact that those nurses with advanced degrees who enter academia tend to be older because nurses usually attend graduate school later in their careers (Hinshaw, 2001). The scarcity of nursing faculty limits the number of applicants who can be accepted into a nursing program, thus reducing the ability to adequately meet the demand for nurses in the workplace, and further contributing to the dwindling supply of nurses in the hospital setting (Rodts, 2004).

In addition, a shortage of minority nurses exists. Though African Americans, Hispanic Americans, and Native Americans make up almost 25 percent of the population in the U.S., they only comprise 9 percent of the nurse workforce (Mee, 2005b).

Other factors contributing to the nursing shortage include the increasing demands of the job itself, high burnout rates, and the decreased status of the nursing profession (Goodin, 2003). The nursing profession continues to struggle with multiple facets that create and or contribute to the growing shortage of qualified nurses.
Impact of Nursing Shortage

When examining components of the nursing profession, one cannot ignore the relevance of the nursing shortage. The nursing shortage directly impacts nursing education; the availability of qualified nurses; and the nurses’ ability to perform their jobs on a daily basis. The impact of the nursing shortage can be detrimental. Research does demonstrate a correlation between patient outcomes and staffing levels (Heinz, 2004). Aiken, Clarke, Sloane and Silber (2002), for example, found that in hospitals with high patient to nurse ratios, surgical patients experience higher risk-adjusted 30-day mortality and failure-to-rescue rates. Needleman, Buerhaus, Mattke, Stewart, and Zelevinsky (2002) consistently found a strong relationship between nurse staffing variables and urinary tract infection rates, incidences of hospital acquired pneumonia, length-of-stay, upper gastrointestinal bleeding, and shock in medical patients. Dang (2002) found a decrease in nurse staffing significantly associated with an increased risk of respiratory and cardiac complications.

The nursing shortage leads to an increased workload and decline in work satisfaction among practicing RNs (Goodin, 2003). In essence, the nursing shortage greatly impacts those nurses who remain in practice, adding to their stress, and potentially forcing more nurses to leave the profession.

Potential Solutions

The recent growth in the nursing workforce has been attributed to a temporary solution. One clear potential path to a long-term resolution is legislative action. In 2004, the Quality Nursing Care Act was introduced in the
U.S. House of Representatives as a measure of government intervention to ensure safe staffing ratios and quality nursing care (American Nurses Association, 2004). “This legislation would mandate the development of staffing systems that are created with direct caregiver input, be based in patient acuity, account for the environment in which care is delivered, and ensure that only properly prepared nurses give care to a particular population of patients” (Albaugh, 2004, p. 214).

Even more relevant to addressing the issues that have caused the nursing shortage, the U.S. Senate and the U.S. House of Representatives approved the funding of a budget for nursing education, recruitment, and retention, a total of $142 million. A recent initiative was presented that would increase funding to $205 million for the Title VIII Nurse Education Funding, which would assist both entry-level and higher-level students, addressing the nursing faculty issue (Albaugh, 2004).

Other means to combat the nursing shortage include efforts to enhance recruitment and retention. These strategies include flexible scheduling, advancement in education opportunities, incentive pay, promotional ladders, salary differentials for experienced nurses, and an increase in inclusion in the multidisciplinary approach to healthcare (Goodin, 2003; Heinz, 2004).

Buerhaus et al. (2006) offered several strategies to strengthen the nursing workforce in the U.S. These strategies included fixing the problems associated with a negative workplace climate, measuring and improving the contributions of nursing in patient quality and safety initiatives, and the focusing on long-term solutions. In addition, fixing the problems that restrict the capacity of nursing
education programs, the promotion of a balanced and professional image of nursing, improving diversity of the workforce, and the recognition of the fact that positive changes in the workforce are possible, were all identified as strategies necessary to strengthen the nursing profession.

The American Nurses Association (ANA) is attempting to combat the nursing shortage through federal lobbying and the development of a strategic plan, in conjunction with other leading nursing organizations, and with the support of initiatives that promote a safe work environment for nurses. The ANA is a recognized voice in the U.S. Congress for nurses (American Nurses Association, 2005).

The Johnson and Johnson corporation launched a campaign in 2003 aimed at improving the image of nursing in an effort to combat the nursing shortage. The campaign has been successful in raising money for scholarships, fellowships, and grants. The company established a web site in which viewers can explore nursing and developed a media campaign that show nurses in a positive light (Johnson & Johnson Campaign Helping to Reduce Nursing Shortage, 2004). According to Buerhaus et al. (2006), the Johnson and Johnson campaign has been perceived to convey a positive image of nurses to the public. The campaign has increased the number of applicants to nursing schools, and has also brought about positive feelings among nurses about being a nurse.

Nursing in Nevada

The sample for the study was chosen from nurses in the Las Vegas, Nevada area. An enormous population growth is currently prevalent in the state of
Nevada, yet in 2001, Nevada ranked last in the country for the nurse to population ratio. The national nurse to population average is 7.82 nurses per 1000, and in Nevada, there are 5.2 nurses per 1000, while Nevada does rank ninth in pay (Nurse by State, 2001).

The total population of Nevada is projected to grow 11 percent between 2000 and 2020 (HRSA, n.d.). As of June 2004, there were 20,185 registered nurses who actively hold a license in the state of Nevada (Nevada State Board of Nursing, 2004). The largest concentration of registered nurses is in Clark County, which includes the Las Vegas area. As of June 2005, there were 10,549 registered nurses with active licensure in Clark County, NV (Nevada State Board of Nursing, 2005). As of June 2006, 11,054 registered nurses were licensed in Clark County, NV (Nevada State Board of Nursing, 2006). There are ten nursing programs in the state of Nevada (Nevada State Board of Nursing, 2007). In 2004, 312 nursing students graduated from Associate’s and baccalaureate nursing programs (Nevada State Board of Nursing, 2004). The population growth has warranted the need for an increase in qualified nurses.

In 2001 and 2003, the Nevada state legislature mandated the University and Community College System of Nevada to double its nursing enrollment in an attempt to meet the critical nursing shortage in Nevada. Schools within the system have seen steady increases in enrollment. The difficulties in increasing enrollment have been due to lack of funding and lack of teachers (Littlefield, 2005).

Limited literature is available on nurses in Nevada. The state only has three public institutions which offer baccalaureate or higher degrees in nursing.
The amount of faculty actively conducting research at the academic level is scarce. Cline, Reilly, and Moore (2003) examined RNs’ perceptions of the factors contributing to the departure from employment in two of Nevada’s largest acute care facilities. Moseley and Jones (2003) examined nurse staffing and Omnibus Budget Reconciliation Act (OBRA) deficiencies in Nevada nursing facilities. The researchers found that by increasing staffing, and with better utilization of the RNs, such deficiencies would decline.

The nursing shortage can greatly impact healthcare. The aging nursing and nursing faculty populations have added, and will continue to add, to the nursing shortage. Clear proactive measures must be taken to combat and reduce the future side effects of the existing nursing shortage. Legislative actions are an important step in increasing the numbers of nursing students, nursing faculty, and safe nursing clinical practice.

In Nevada, specifically, the Las Vegas area, the problem is magnified due to the rapidly increasing population and low nurse to population ratio. In addition, there are few nursing schools and an even smaller number that offer a baccalaureate degree or higher. Research in multiple areas of nursing and nursing education in Nevada is warranted that will add to the small body of literature that is presently available.

_Historical Perspective of Critical Thinking_

Critical thinking, in its earliest form, has been traced as far back as to the teachings of Socrates and Plato. Plato recorded Socrates’ speeches, and together, they laid the foundation for modern Western thought (Skeptic, 2001). Socrates
emphasized the need for thinking with clarity and logical consistency. Socrates “tried to teach people to improve their thinking by challenging their views” (¶ 2). Socrates was the ultimate critical thinker. The process of inquiry and teaching methods that Socrates used, such as his emphasis on the learner, continue to serve as an important teaching methodology (Henson, 2003).

Yet modern critical thinking has been accredited to the writings of John Dewey (1933). Whitaker (2002/2003) noted:

As early as the 1930s, educators influenced by Dewey were championing critical thinking as key to developing children's sense of independence; as the main function of a teacher who would have students undertake their own reasoning and scientific investigations; and as the antidote to such timeworn practices as entrance requirements, prerequisites, tests, and generally the imposition upon young minds of masses of unserviceable information (¶ 8).

Like Socrates, Dewey also placed emphasis on the learner and shaped the existing learner-centered education into modern constructivism (Henson, 2003). Dewey (1933) differentiated the process of critical thinking from the end product. His germinal work ultimately led to reform in education and impacted multiple levels of education.

Definition of Critical Thinking

Multiple definitions of critical thinking have emerged in the literature. Though similarities do exist, their differences do contribute to the uniqueness of
the definitions. For the purpose of this study, many definitions were explored. The exploration of the definitions is necessary in order to gain a fuller understanding of critical thinking, its components and ways to measure it as an outcome.

Glaser (1941) explored the rationale for critical thinking as an educational objective. Glaser defined critical thinking as involving three components, which include an attitude of exploring problems and subjects which are encountered, possessing knowledge of the methods required for logical inquiry and reasoning, and the ability to apply these methods. Later, Glaser teamed up with Watson and more definitions emerged. Watson and Glaser (1980) defined critical thinking as more than a specific set of cognitive skills; critical thinking is also a combination of skills, knowledge, and attitudes, and comprises an understanding of making inferences and generalizations. In addition, the authors note the relevance of possessing critical thinking skills in order to be fully functional in modern society (Simpson & Courtney, 2001). From these beliefs, an assessment tool, the Watson-Glaser Critical Thinking Appraisal (WGCTA), was created. This tool is the most widely used test for the measurement of critical thinking in nursing (Oermann & Gaberson, 1998).

Ennis (1962) initially identified twelve aspects and three dimensions of critical thinking. Ennis (1985) later defined critical thinking as “reflective and reasonable thinking that is focused on deciding what to believe or do” (p. 45). Ennis declared that critical thinking was comprised of four general sets of abilities, which include “clarity-related ability… inference-related ability, abilities related to establishing a sound basis for inference, and abilities involved in going
about decision making in an orderly and useful way, often called problem solving” (p. 48). Ennis’ works have influenced others’ definition and perception of critical thinking. Ennis also created the Ennis-Weir Critical Thinking Essay Test (EWCTET). This test uses essay items as a means to measure critical thinking (Oermann & Gaberson, 1998).

Brookfield (1987) took a slightly different approach to critical thinking. Brookfield shifted from Dewey’s (1933) approach that was primarily adapted to elementary and secondary education, to that of adults. According to Brookfield (1987), critical thinking involves recognizing the assumptions that underlie beliefs and behaviors. This gives justification for ideas and actions. In his opinion, perhaps most importantly, it means that individuals try to judge the rationality of these justifications.

According to Brookfield (1987), critical thinkers view their thinking as a process instead of an outcome. Emotions play a pivotal role in this process. The critical thinker becomes conscious of the affect that their emotions have on their thought processes. “Brookfield suggests that critical thinkers are typically individuals that engage in productive and positive activity, in that they are actively involved with life, and perceive themselves as creative and being recreative in aspects of their personal, professional and political lives” (Simpson & Courtney, 2002, p. 91). However, this study did not intend to examine critical thinking from an emotional perspective.

Brookfield (1987) specifically identified four key components to critical thinking. These include the ability to identify and challenge assumptions, the
importance of context, exploring and imagining alternatives, and reflective skepticism (Boychuk Duchscher, 1999). Each element builds on the next and each component is essential for a thorough critical thinking thought process.

Paul (1993) offered another definition of critical thinking:

Critical thinking is a systematic way to form and shape one’s thinking. It functions purposefully and exactly. It is thought that it is disciplined, comprehensive, based on intellectual standards, and, as a result, well reasoned. Critical thinking is distinguishable from other thinking because the thinker is thinking with the awareness of the systematic nature of high quality thought, and is continuously checking up on himself or herself, striving to improve quality of thinking (p. 20).

Paul (1993) took a similar approach to critical thinking, as did Ennis (1985), with critical thinking being viewed as an interrelated process requiring reflection, which Dewey (1933) also emphasized. The critical thinker must possess the ability to assess his or her own thinking as a component of the critical thinking process.

Scriven and Paul (1992) defined critical thinking as the “intellectually disciplined process of actively and skillfully conceptualizing, applying, analyzing, synthesizing, and/or evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief and action” (¶ 1). This definition has the markings of the evolution of
critical thinking. The definition came to light after the Delphi Report, which appears to have influenced this practical definition.

The final definition offered is the statement presented by the Delphi Report. This report was generated following a first of its kind, 2-year research project sponsored by the American Philosophical Association. The 46 participatory panelists from the U.S. and Canada included experts from the disciplines of philosophy, education, the social sciences, and the physical sciences, including Robert Ennis and Richard Paul (Facione, 1990). The goal of the project was to develop a consensus of the definition of critical thinking for the purpose of evaluating educational assessment and instruction at the college freshman and sophomore level. The consensus statement regarding critical thinking is:

We understand critical thinking to be purposeful, self-regulatory judgment which results in interpretation, analysis, evaluation, and inference, as well as explanation of the evidential, conceptual, methodological, criteriological, and contextual consideration upon which that judgment is based. Critical thinking is essential as a tool of inquiry. As such, critical thinking is a liberating force in education and a powerful resource in one’s personal and civic life (p. 2).

The statement further defines the ideal critical thinker:

The ideal critical thinker is habitually inquisitive, well-informed, trustful of reason, open-minded, flexible, fair-minded in evaluation, honest in facing personal biases, prudent in making judgments, willing to reconsider, clear about issues, orderly in complex matters, diligent in seeking relevant
information, reasonable in the selection of criteria, focused in inquiry, and
persistent in seeking results which are as precise as the subject and the
circumstances of inquiry permit (p. 2).

Other definitions include that of Facione, Facione, and Sanchez (1994) who
defined critical thinking as the process of purposeful, self-regulatory judgment …
the cognitive engine that derives problem-solving and decision-making. One of
the more recent definitions of critical thinking is that of Alfaro-LeFevre (2004),
critical thinking entails informed, purposeful, outcome-focused thinking that
requires careful identification of problems, issues, and risk involved.

The definition presented by Facione (1990) serves as the working definition
of critical thinking in the context of this study. This definition is reflective of a
consensus following the lengthy process of deliberation on critical thinking by
experts in various disciplines. The relevance of this particular definition is
significant because the definition is based on a consensus after reviewing several
definitions of critical thinking.

A consensus that emerges from the definitions presented is that critical
thinking extends beyond a set of skills (Brookfield, 1987; Facione, 1990; Paul,
1993; Watson & Glaser, 1980). Critical thinking involves the application of these
skills in a logical, rational manner. Argumentation then becomes the focal point of
critical thinking. Critical thinking is a reflective process, from which the outcome
may be more thinking. The critical thinker is continually challenging him or
herself, as prescribed by Socrates and many more philosophers and educators who
followed.
Based on the findings in the *Delphi Report*, Facione developed the California Critical Thinking Skills Test (CCTST). The tool measures interpretation, analysis, evaluation, inference, and explanation, all of which have been identified as key components of critical thinking (Facione, 1990; Pike, 1997; Scriven & Paul, 1992). The CCTST was used as the assessment tool for the measurement of critical thinking skills in this study.

**Importance of Critical Thinking in Nursing Practice**

Critical thinking is an essential component to clinical nursing practice. “Critical thinking enables nurses to: analyze complex data about patients, make decisions about patient’s problems and alternate possibilities, evaluate each problem to decide which applies, and decide on the most appropriate interventions for the situation” (Oermann, 1999, p. 40C). The possession of these skills is paramount to providing competent nursing care. As nurses become more experienced, their critical thinking skills are enhanced.

Hader (2005) emphasized the importance of critical thinking for nursing leaders:

Effective leadership involves the ability to evaluate complex situations. For [us] to successfully solve issues, [we] must actively evaluate all of the problem’s aspects, which [we] can only accomplish through much practice and a real commitment to carving out time for thinking and planning ahead (p. 4).

As stated, the purpose of this literature review is to document previous studies and findings related to critical thinking in nursing, including both in
nursing education and in clinical practice. An explanation of the entry-levels into nursing practice precedes the exploration of this topic to assist in the development of the foundation of nursing clinical practice. In addition, a review of Benner’s (1984) *Novice to Expert Theory* establishes the importance of gaining experience, which is relevant to nursing clinical practice.

Recent relevant studies that demonstrate a connection between critical thinking and level of formal education are limited, thus producing gaps in the literature. Although research exists to support the finding that an RN’s level of education impacts his or her critical thinking ability, these studies have primarily focused on nursing students (Beckie et al., 2001). Furthermore, the majority of studies on this topic have produced mixed findings. When reviewing the literature, the author also found limited studies that demonstrated a correlation between a nurse’s level of college education, clinical nursing experience, and critical thinking ability. There is a need to assess the critical thinking ability of experienced RNs to evaluate its relationship to experience and education in this population.

Hicks, Merritt, and Elstein (2003) examined the relationship between educational levels, years of critical care experience, and critical thinking ability. The study found no significant association of education and experience to critical thinking disposition. However, in a study conducted by Howenstein, Bilodeau, Brogna, and Good (1996) in which age, education, years of experience, and area of expertise were explored, the level of education showed a positive correlation with critical thinking, while age and years of experience showed a negative
correlation with critical thinking. Martin (2002) investigated the relationship between critical thinking, clinical nursing expertise, and decision-making. The study demonstrated an increase in critical thinking scores as levels of expertise increased. Yet, no significant differences were found in the critical thinking scores of Associate’s degree and baccalaureate degree prepared experienced nurses. Stevens (2002) also examined the relationship between the variables of age, educational level, clinical expertise, and gender. The study found higher mean critical thinking scores for nurses with advanced nursing degrees than for nurses with a diploma or an Associate’s degree. Some early studies suggested a significant relationship correlation between education level and critical thinking (Gross, Takazawa, & Rose, 1987; Pardue, 1987; Brooks & Shepherd, 1990).

“Critical thinking is the cognitive engine that drives the process of knowledge development and critical judgment in nursing. The skills and dispositional attributes of critical thinking are central to nursing in that they embody a search for best knowledge in a given context” (Beckie et al., 2001, p. 19). According to Daly (1998), the relationship between nursing clinical practice and critical thinking is relatively new to nursing literature. It has emerged due to the growing complexity of healthcare and the organizational and cultural changes in nursing education.

Critical thinking is the foundation for sound clinical judgment (Alfaro-LeFevre, 2004; Facione & Facione, 1994; Locsin, 2001). Upon these judgments, decisions are made in clinical practice that affects patient outcomes. Alfaro-LeFevre (2004) noted that critical thinking and clinical judgment in nursing are
based on knowledge, skills, and experience. Yet several studies have been conducted exploring the relationship between critical thinking and clinical judgment, and mixed findings have been produced (Boychuk Duchscher, 1999; Follman, 2003). As with the definition of critical thinking, multiple perspectives have emerged as to evaluating critical thinking and the development of correlations between critical thinking and other variables. The body of knowledge that exists must be expanded in order to add clarity to the impact of critical thinking on nursing practice.

This section will further examine the research that has been conducted related to critical thinking and nursing. The research has primarily focused on nursing students. The literature that examines critical thinking in nursing practice has been concentrated on how to enhance critical thinking and measuring critical thinking ability has been limited. The mixed results of those studies which have attempted to measure critical thinking ability among experienced nurses have prompted the need to further examine the phenomena of critical thinking among this population.

*Critical Thinking and Nursing Students*

Over the past 15 years, critical thinking has been widely studied when evaluating nursing students. This can be directly attributed to the National League of Nursing (NLN) inclusion of critical thinking criteria in their requirements for accreditation of baccalaureate nursing education in 1991 (Simpson & Courtney, 2002). Notably, most of studies have been conducted on baccalaureate nursing students. Associate’s degree and diploma nursing students have virtually been
excluded from the research. However, Chen and Lin (2003) evaluated the effect of a nursing literature course in enhancing critical thinking among Associate’s degree nursing students. They found an increase in critical thinking scores after the interventions.

Again, the studies have produced mixed results related to the effectiveness of interventions to enhance critical thinking skills. Beckie et al. (2001) found mixed improvement in critical thinking scores among the cohorts studied, after completion of a course with critical thinking being a central concept integrated into the nursing program.

Brown, Alverson, and Pepa (2001), measured the critical thinking skills of 123 nursing students in three various types of nursing programs. The programs included a traditional Bachelor of Science in Nursing (BSN) program, a Bachelor’s degree-granting program for registered nurses (RN to BSN) who held an Associate’s degree in nursing, and an accelerated baccalaureate nursing program. The study measured the critical thinking scores of all students at the beginning and end of the nursing program. The study found a significant difference between pretest and posttest scores amongst traditional students and those in the RN to BSN program. However, there was no significant difference between the pre- and post-test in the accelerated group.

Spelic, Parsons, Hercinger, Andrews, Parks, and Norris (2001) also examined nursing students upon entry and exit of a nursing program. As was done in the Brown et al. (2001) study, Spelic et al. (2001) compared traditional, RN to BSN, and accelerated nursing students. Their study consisted of 136 students. The
results revealed a significant increase in scores amongst all groups. However, the RN to BSN group had the smallest increase among all three groups.


There exists a wide variety of findings in older comparative studies where students of varying educational levels were compared. Diploma prepared nurses had a greater improvement in critical thinking scores than Associate’s degree nurses in a RN to BSN completion program (Miller, 1992). BSN students scored higher than other nursing students (Brooks & Shepherd, 1990; Frederickson & Mayer, 1977; Lynch, 1988). Adams’ (1999) review of the literature found in the studies conducted from 1984 to 1992, posits that seven studies found an increase
in critical thinking during students nursing education, five studies demonstrated no significant change, and two produced mixed results.

More recent studies include that of Shin, Lee, Ha, and Kim (2006) who did a longitudinal study of 32 students at the University of Korea. The students were administered the California Critical Thinking Disposition Inventory four times during their academic studies at the university. The results were that there was a statistically significant improvement in critical thinking disposition scores by academic year.

**Critical Thinking in Clinical Practice**

As previously stated, the widest gap in the literature pertains to the lack of research studies that examine critical thinking ability in clinical practice. The majority of the literature available relates more to how to enhance critical thinking in the clinical setting, rather than an evaluation of the level of critical thinking ability in nurses. Far fewer studies exist that attempt to establish a correlation between critical thinking and other variables deemed relevant in clinical practice.

However, Oermann (1999) did provide methods that can be useful in both the assessment and enhancement of critical thinking skills in clinical practice. Ignatavicius (2001) explained the six essential cognitive skills used by expert critical thinkers, which include interpretation, analysis, evaluation, inference, explanation, and self-regulation. Both Alfaro-LeFevre (2004) and Ignatavicius (2001) described the characteristics of an expert critical thinker or critical thinking indicators.
Alfaro-LeFevre’s (2004) critical thinking indicators are as follows: one who is alert to context, analytical and insightful, autonomous and responsible, careful and prudent, confident and resilient, courageous, creative, curious and inquisitive, empathic, flexible, genuine, honest and upright, improvement-oriented, logical and intuitive, open and fair-minded, patient and persistent, proactive, realistic and practical, reflective and self-corrective, self-aware, self-disciplined, and sensitive to diversity. These characteristics are necessary for the development into a nurse who is an ideal critical thinker.


Lunney (2003) emphasized the application of seven cognitive skills. These skills include analyzing, applying standards, discriminating, information seeking, logical reasoning, predicting, and transforming knowledge. The transforming of knowing is a means to arrive at accurate nursing diagnoses, thus applying relevant critical thinking skills to clinical nursing practice to achieve the ultimate outcome.

Girot (2000) found no relationship between critical thinking and confidence in decision-making, though the study examined nursing students, some of which were practicing nurses returning to college for a Bachelor’s degree. In contrast, Hoffman and Elwin (2004) found a negative correlation between critical thinking and confidence in decision-making. As the critical
Thinking scores of new graduate nurses increased their decision-making scores decreased and conversely. Both studies used the Watson and Glaser Critical Thinking Assessment tool (WGCTA) and the Confidence in Decision-Making in Nursing Scale (CDMNS).

Beyea (2007) detailed a residency program for new graduates that uses simulations to promote critical thinking, and for the development of nursing skills. Structured evaluations demonstrated that the use of simulations was a highly effective strategy, and clinical skills and the ability to apply critical thinking were enhanced.

Theoretical Framework

According to Ferrario (2003), “with clinical knowledge, experienced nurses (a) grasp an unfamiliar and complex patient encounter as a gestalt rather than as discrete fragments of information, (b) distinguish relevant from irrelevant information, and (c) make decisions almost intuitively and mostly unconsciously without deliberate scanning of multiple solution options” (p. 44). Experienced nurses’ critical thinking ability was the focus of this study.

Cooper (2001) interpreted Benner’s (1984) model as follows: The novice nurse has little hands-on experience and relies heavily on rules and protocols. The novice nurses’ critical thinking is often narrowly focused. The challenge for the novice nurse is prioritizing which situation requires immediate attention.

The nurse at the advanced beginner level has gained some experience, but continues to have a narrowly focused critical thinking ability. The nurse has
gained some knowledge from experience, but can only focus on one or two aspects of a situation (Cooper, 2001).

The competent nurse has gained about two or three years of experience and is able to prioritize patient needs and is not easily distracted from the task. The nurse can coordinate multiple and complex duties. In addition, the competent nurse has gained organizational skills necessary to navigate the multiple responsibilities of the job (Cooper, 2001). The competent nurse has a higher level of critical thinking skills than the novice or advanced beginner.

According to Cooper (2001), the proficient nurse has gained more experience and is able to recognize when things do not look normal. The proficient nurse is able to view the whole situation and views things from multiple perspectives. Nursing practice is efficient and decision-making is less labored.

The fifth and final level is that of the expert nurse. The expert nurse has highly developed perceptions and is able to absorb all relevant information necessary for sound clinical judgment. At this level, the nurse is able to immediately understand what is important and is able to set a plan into action based on this data (Cooper, 2001). The expert nurse is able to demonstrate high levels of critical thinking and uses several sources to draw conclusions and take actions. Intuition also plays a vital role in the decisions that the expert nurse makes (Benner, 1984). According to Smith (2007), “intuition is a complex concept that is defined as a valuable source of knowing and recognized primarily through various feelings, emotions, and connections” (p. 17). Both critical thinking and intuition develop with time and experience.
Alfaro-Levre (2004) compared novice thinking to expert thinking. For the novice nurse, knowledge is organized into separate facts, whereas with the expert nurse, knowledge is highly organized and structured. The novice nurse focuses on actions and the expert nurse is able to critically assess situations and think thoroughly before acting. The novice nurse adheres to clear-cut rules. In contrast, the expert nurse knows when the rules need to be bent. The novice nurse is often unaware of resources and the expert nurse has knowledge of resources and how to use them. The two levels in nursing also differ in self-confidence and level of anxiety. Novice nurses often lack self-confidence and are highly anxious. The expert nurse is confident in his or her abilities and experiences far less anxiety.

Summary

Critical thinking is an essential component to the arriving at sound judgment and is necessary for effective decision making. The concept of critical thinking has produced many definitions. The definitions of critical thinking have driven the understanding of the concepts of critical thinking. Only through the understanding of the definitions, and subsequent principles of critical thinking, can an individual measure critical thinking. Therefore, an initial endeavor necessary to undertake, prior to measuring critical thinking, is to explore multiple definitions and arrive at a clear, concise definition that will serve as the foundation for the subsequent measurement of critical thinking. Upon a review of the literature of existing definitions, the definition developed as a result of the Delphi Report, appears most appropriate to serve as the foundation for this study (Facione, 1990).
The review of the literature also provided an exploration of the history of critical thinking, nursing, and nursing education in order to broaden the understanding of the variables that were tested. Again, these were essential components necessary to develop a stable foundation for the research.

A theoretical foundation for the study is that of Benner’s (1984) *Novice to Expert Theory*. This theory aided in the development of expectations related to the critical thinking abilities of experienced nurses. Based on their years of experience, the assumption develops that those nurses with five years or more of experience will have higher level critical thinking skills.

An exploration of the literature was necessary to gain a fuller understanding of critical thinking in clinical nursing practice. A probe into the literature that examined critical thinking and its relationship to experience and education was paramount. The relationships previously studied developed a basis upon which the researcher could build. A gap in the literature, as that which was discovered during this review of the literature, also creates the foundation for future research. The gap that exists is the lack of studies that examine the relationship between critical thinking and level of entry-level into nursing practice. In addition, a gap exists in the literature when attempting to establish a relationship between increasing years of experience and critical thinking ability. Further still, few recent studies have examined the relationship between all three variables, critical thinking, education, and experience, which was the intent of this study.

Careful examination of the literature has revealed the gaps that exist in the literature and the mixed findings of several studies regarding the relationship of
critical thinking, nursing expertise, and the educational level of nurses (Adams, 1999; Beckie et al., 2001; Girot, 2000). Although critical thinking in nursing has been widely studied since the early 1990s, the primary focus has been on nursing students as a means to evaluate program effectiveness (Simpson & Courtney, 2002). Few studies have attempted to measure critical thinking in nursing practice. Of those that have examined this relationship, mixed results have been produced (Duchscher, 2003; Hicks et al., 2003; Howenstein et al., 1996). Few studies have sought to evaluate the existence of a correlation between critical thinking and other variables, namely, years of experience and type of initial nursing education, which was the intent of this study. Most of the literature seeks to provide a means to enhance critical thinking in clinical practice. While this continues to be important, measuring critical thinking ability among experienced nurses is also essential (Ferraria, 2004; Ignatavicius, 2001; Lunney, 2003; Oermann, 1999). The researcher sought to determine if critical thinking ability increases as experience does. In addition, because of the multiple entry-levels into the nursing profession, the impact of nursing education on critical thinking ability is also a relationship that the study intended to define.

Conclusion

The nursing profession faces the difficult task of combating a near crisis level shortage. Research that measures various aspects of nursing practice is continually needed. Research that explores both the causes and solutions to the problems that exist in nursing can not only strengthen the profession, but also provide long-term solutions to assist in the prevention of future problems. This
research can also direct the leaders of the profession in both the clinical and academic environments. It is highly important that leaders embrace the importance of critical thinking to clinical practice. “Considering the profession’s opportunity and desire to impact the future of healthcare, a commitment to CT [critical thinking] skills is essential” (Lemire, 2002, p. 69). In addition, research is needed in multiple areas to increase the existing body of knowledge.

The intent of this study was to not only add to the exiting body of knowledge, but to assist leaders in both the academic and clinical environments. By answering the posed research questions:

1. What is the relationship between critical thinking ability and level of experience in registered nurses?
2. What is the significant relationship between critical thinking ability and educational level in experienced registered nurses?

Nursing leaders can utilize this information as a basis for the development of programs to enhance critical thinking abilities of all nurses.

The intent of the next chapter, Chapter 3, is to provide detailed information about the methodology that was used to collect data for the study. The population and sample for the study will be identified. Details, such as explanation of the instrument and the reliability of the instrument, will also be provided.
The purpose of this study was to identify the relationship between critical thinking ability among registered nurses and two variables, experience and education. Through examining quantitative data, obtained through the administration of the California Critical Thinking Skills Test (CCTST) and demographic information, the researcher has explored the degree to which the relationships exist.

Described in this chapter are the research method and research design used for this study. The information in this chapter is presented to provide relevant information related to the population studied, and how sampling and data collection was conducted. In addition, both internal and external validity and the data analysis process are discussed.

Research Design

The study was quantitative. The researcher sought to determine the relationship between variables. The research questions were descriptive and explanation-oriented. The researcher sought to determine whether one or more variables influenced another variable (Creswell, 2002). All variables were measured quantitatively. The purpose of the study was to measure critical thinking in a specific manner, unlike qualitative data in which the purpose is general and broad. More specifically, the study has an explanatory research design. In a qualitative study, “An exploration means that little is known in the literature about the phenomenon of study and the researcher needs to learn from the participants” (p. 52). If the study was qualitative or mixed, the researcher’s
interest would be more directed toward the participants’ feelings about critical thinking, or how they measure their own critical thinking ability and how the variables relate to their ability. By using tests that have proven to measure critical thinking ability, the level of critical thinking ability can be supported by quantitative data. The study is correlational because “the researcher is interested in the extent to which two variables (or more) co-vary- where variance or changes in one variable is reflected in variance or changes in the other” (p. 363).

By using instruments that have proven to measure critical thinking ability, the level of critical thinking ability can be supported by quantitative data. The California Critical Thinking Skills Test has been proven to be a valid and reliable method of measuring core critical thinking skills and has been used successfully to assess individuals with post-secondary education (Facione, Facione, Blohm, & Giancarlo, 2002). The demographic data was correlated with critical thinking ability scores of each participant to yield the results of the study.

The research design yielded data that was used to assess the existence of a relationship between critical thinking, education, and experience. As described, the CCTST provided data to assess critical thinking ability. The demographic survey was the best method to ascertain information related to educational level and the amount of nursing experience.

Research Questions

1. What is the relationship between critical thinking ability and level of experience in registered nurses?
2. What is the relationship between critical thinking ability and the educational level of experienced registered nurses?

Hypotheses

1. H₁- There is no relationship between CCTST scores and level of nursing experience.

2. H₂- There is no relationship between CCTST scores and level of nursing education.

Population

The population consisted of 11,054 registered nurses in the Las Vegas area (Clark County) (Nevada State Board of Nursing, 2006). The Las Vegas area is one of the fastest growing areas in the country. In 2004, the population in the Las Vegas area grew by 4.1 percent to 2.3 million people, greatly contributing to population growth of the state and making Nevada the fastest growing state for the 18th consecutive year (Boone, Ritter, & Cooke, 2004). Due to the population growth, Nevada needs about 670 new nurses annually to fulfill the healthcare requirements (UNLV, 2001). In 2004, the nursing programs in the state only produced 312 graduates (Nevada State Board of Nursing, 2004). In 2005, the nursing programs in the state produced 450 graduates (Nevada State Board of Nursing, 2005). The 2006-2007 school year showed great improvement in the production rate of new nurses, producing 658 graduates in the state of Nevada (Nevada State Board of Nursing, 2007). A large number of the registered nurses coming from other states. According to the Nevada State Board of Nursing’s (2007) most recent annual report, during the 2006-2007 fiscal year, 3,190 nurses
received their license by endorsement. Obtaining licensure by endorsement is a process in which nurses, who currently hold a license in one U.S. state, can apply for licensure in another state. Specific requirements for the endorsing state must be met, such as license in good standing without suspension or pending litigation (Nevada State Board of Nursing, 2006). However, Nevada’s nursing population is aging, the average age is 49.1 years-old and they are also an experienced group with 3 out of 5 nurses having at least 15 years of nursing experience (Packham, Griswold, Burkey, & Lake, 2005).

Informed Consent

The informed consent form stated that the researcher guarantees the participants certain rights, and that by completing the demographic survey they are agreeing to participate in the study. All study participants were provided an informed consent form. The consent form included the title of the study and the fact that their participation was voluntary; participants had the right to withdraw from the study if they so desired. The form also included the study’s purpose and procedure, the fact that the participants had the right to ask questions; in addition, the consent form addressed that fact that there were no known risks for participating in the study, the benefits of the study were also listed (Creswell, 2002). Provisions were made in the design of the study for anonymity purposes.

Sampling Frame

A master list of registered nurses in the state of Nevada was purchased from the state board of nursing. The list can be purchased for $150. Mailing lists consist of only the name and address of record of the license/certificate holder. No
further demographic information was provided, such as degree or years of nursing practice. The application for the list requires that the applicant state his or her organization and for what purpose the list will be used (Nevada State Board of Nursing, n.d.).

Systematic sampling was used to obtain the sample. This is done by choosing every \textit{nth} person from the list (Creswell, 2002). From the list, every twentieth person living in the Las Vegas area was chosen. A total of 1,000 subjects were selected from the list. Creative Research Systems’ (2003) sample size calculator was used to determine appropriate sample size. For a population of 11,054 registered nurses, it was determined that the needed sample size, with the confidence level being 95 percent, was 371. To account for non-responses and those who may not qualify for the study, oversampling was done. Participants were then sent information regarding the study and a demographic survey.

The registered nurses in the study were employed in various areas of nursing. There were no study restrictions on the occupational setting for the study participants. The nurses were from various work settings and lived in the Las Vegas area. All participants worked as a nurse for a minimum of five years and their educational level was less than a Master’s degree, exclusion criterion delineated that participants could not have obtained a Master’s degree or higher. The information provided in the returned demographic surveys was used to determine if a subject met the qualifications of the study.
Confidentiality

Confidentiality of the subjects was maintained by assigning a number to all subjects selected to receive the demographic survey. The assigned number was placed on the master mailing list. The participants’ personal information, such as name and address, was available through the master mailing list only. That assigned number was placed on both the demographic data and the CCTST. The names of the participants was not shared with anyone outside of the researcher.

Instrumentation

There were four tools considered for measuring critical thinking in this study. They were the California Critical Thinking Skills Test (2000), the Watson-Glaser Thinking Appraisal (1980), the Ennis-Weir Critical Thinking Essay Test (1985), and the Cornell Critical Thinking Test Levels Z (1985), and of these tests the researcher determined that the CCTST was most appropriate for the study. The CCTST was the instrument selected because the test is based on the definition of critical thinking developed by the Delphi panel in 1990 (Insight Assessment, 2002). This definition served as the definition of critical thinking for this study. According to Facione, Facione, and Giancarlo (2000) additional rationale for the use of this instrument includes the following:

1. The instrument’s accepted reliability.
2. Purported lack of gender bias.
3. Contemporary language and situations.
4. Extensive use with nursing populations.
5. Relative ease of scoring.
The CCTST consists of three 34-item multiple choice examinations, Form A, Form B, and Form 2000. Each test measures analysis, evaluation, inference, and inductive and deductive reasoning. Each of the tests is composed of test items that present informational context in diagrammatic and text-based formats. The test items supply the content and contexts for applying an individual’s thinking skills (Insight Assessment, 2002). Form 2000 “enriches the contexts for the application of critical thinking skills by including questions which present information in charts and graphs as well as using text. Form 2000 is, therefore, regarded as an important advancement over Forms A and B” (Insight Assessment, 2006 a, ¶9). The participants of the study were tested using Form 2000 of the CCTST.

The test is a paper and pencil test which can be completed in 45 minutes. Each correctly answered test item is worth one point, therefore, the scores for each test range from 0-34. The higher the score, the stronger the critical thinking skill. Multiple scores are produced when taking the CCTST. A total score and five subsequent subscale scores which measure analysis, evaluation, inference, and inductive and deductive reasoning are produced (Profetto-McGrath, 2003). The participants’ total score on the CCTST and the subscale scores was used for comparison.

Data Collection

The data for this study was collected through the use of a demographic survey and the administration of the CCTST. “In quantitative research, the investigator uses an instrument to measure the variables in the study” (Creswell,
The demographic survey assesses the personal characteristics of participants in the study (Creswell, 2002). In this case, the demographic survey inquired about the respondents’ years of nursing experience and level of education. In addition, the demographic survey inquired about other basic demographic data, such as age and sex. The subjects were asked if they had advanced their education beyond their entry-level into practice. Those nurses who had a minimum of five years of practice in nursing and had not obtained a Master’s degree or higher were asked to participate in the study. A description of the procedure that was used in data collections follows:

1. A list of registered nurses in the state of Nevada was obtained from the state board of nursing.

2. From the list of nurses, every twentieth person on the list from the Las Vegas area was selected. From that list, 1,000 nurses from the Las Vegas area were selected.

3. A number was assigned to all potential candidates to maintain confidentiality. The researcher kept a master list of participants and their assigned numbers. The same number was assigned to both the CCTST and the participants’ demographic survey.

4. Those selected were mailed an introductory letter explaining the study; the significance of their participation; and a request of the participants to complete their attached demographic survey.

5. Participants were asked to return their survey within 14 days, and a self-addressed stamped envelope was provided.
6. Participants who returned the survey were then screened for their ability to meet the study requirements, registered nurses with a minimum of five years experience and who had not received a Master’s degree or higher. Because the mailing list did not provide this information, the demographic survey and the screening process which followed, was the best way to eliminate those subjects who did not qualify for the study.

7. The CCTST was then ordered from Insight Assessment.

8. Prior to mailing the CCTST to the participants the test was reviewed by the researcher.

9. Participants who met the study requirements were mailed the CCTST. They were asked to return the CCTST form within 14 days. Again, a self-addressed stamped envelope was provided for the participants’ convenience.

10. Non-responders were sent a reminder card and asked to respond in seven days.

11. After the another seven days, all received CCTST and answer sheets were sent to Insight Assessment for scoring and the analysis of data. The returned surveys were kept on file.

12. Insight Assessment then scored the CCTST.

13. CapScore then conducted an analysis; the total critical thinking score and subscores were provided to the researcher.

14. All demographic data and CCTST scores were placed on an Excel spreadsheet.
15. Statistics Solutions were then hired to do a more specific analysis of the data, comparing the separate groups using the Spearman rho correlation to determine the magnitude of association between the dependent and independent variables (Creswell, 2002).

Insight Assessment (2002) was established as the California Academic Press by Facione (1986). The California Academic Press is the publisher of the CCTST. Insight Assessment now offers the administration, scoring and analysis of several critical thinking skills exams and other services such as consulting, performance evaluations, and assistance with custom designed tools and validation of surveys and questionnaires. CapScore is the scoring and analysis component of Insight Assessment. The basic services that were used in this study include the scanning, scoring, and analysis of the CCTST. The initial cost for 100 tests was $525. Basic descriptive statistics for the entire group of test-takers is a part of the service. The results are then mailed or e-mailed to the researcher in the form of a spreadsheet, statistical-package file or ASC II file of the data. The analysis process can be customized for further analysis of data at an additional fee (Insight Assessment, 2002).

The data that was collected directly related to the research questions. Question one: What is the relationship between critical thinking ability and level of experience in registered nurses? This was assessed by comparing the scores on the CCTST and the level of experience of the participants. The researcher sought to determine if there is a direct correlation between critical thinking skills and the number of years of experience of registered nurses. The second research question:
What is the relationship between critical thinking ability and educational level in experienced registered nurses? By examining the CCTST scores and then comparing critical thinking scores to educational levels, the researcher assessed if there is a relationship between educational level and critical thinking ability. The researcher sought to determine if registered nurses with higher levels of education would score higher than registered nurses with less education.

Data Analysis

According to Creswell (2002), when doing quantitative research data analysis consists of statistical analysis and in the case of this study, the statistical analysis will consist of comparing group differences. Because the goal of the study was to determine if a relationship exists between the dependent and the independent variables, the Spearman rho correlation was used to determine the degree of association between the variables. This method was deemed most appropriate because of the goals of the study. In contrast, other quantitative and qualitative methods have been determined to be less appropriate or inappropriate, such as t-test or a chi-square test, which are quantitative methods for one independent and one dependent variable, but do not attempt to establish a correlation between the variables (Creswell, 2002). In addition, a text analysis or an examination of material for reoccurring themes, are also not appropriate because they are qualitative research analysis methods (Creswell, 2002).

CapScore analyzed basic data provided from the CCTST scores and the demographic surveys. The researcher analyzed all descriptive data obtained from the demographic survey. CapScore and the researcher determined the minimum,
maximum, mean and standard deviation for the total critical thinking score and subscales for both variable groups.

The results from the CCTST and demographic surveys were recorded on a Microsoft Excel spreadsheet. The spreadsheet contained the identification numbers of the registered nurses, their total critical thinking scores and subscale scores, the level of basic nursing education, and number of years of experience in nursing. Statistics Solutions then conducted further analysis, this analysis was done by comparing the identified groups, three groups based on education and six groups based on experience (see Appendix A). The Spearman rho correlation was used to describe and measure the association between the variables. The critical thinking total scores and the demographic data entered by Statistics Solutions were randomly spot checked by the researcher for accuracy.

Validity and Reliability

According to Facione and Facione (1994), content validity rests on the association of the CCTST with the National Expert Consensus Statement on Critical Thinking, also known as the Delphi Report. The CCTST has also been shown to have concurrent validity with Graduate Record Examination (GRE) quantitative, analytic, and verbal scores, the Watson-Glaser Critical Thinking Appraisal, the Scholastic Achievement Test (SAT) verbal and math scores, Nelson-Denny Reading Test, college GPA, and English and mathematics college placement scores (Pike, 1997; Insight Assessment, 2002; Profetto-McGrath, 2003). “Twenty-two of the thirty-four items on Form 2000 appear on Form A of
the CCTST. This integral relationship between the two instruments provides strong evidence of the validity of form 2000” (Insight Assessment, 2006a, ¶ 4).

**Face Validity**

The demographic survey was validated using face validity. According to Neuman (2003), face validity is a judgment by the scientific community that the indicators truly measure the construct. Five doctoral prepared nurses examined the demographic survey and reached a consensus related to the survey’s validity.

**Internal Validity**

According to Neuman (2003), internal validity means that there are no errors to the design of the research study. The threat to internal validity was explored to assure that few errors were present in the study. The information that follows relates to the measures that were taken to institute prevent such errors in the study therein.

Creswell (2002) discussed several problems that can pose a threat to internal validity. History, maturation, regression, selection, and mortality, are all potential threats related to the participants. Testing and instrumentation relate to threats to the procedure.

In order to control for history and maturation, very little time passed between induction of the study to the participants and administration of the test. Only one test was given to each participant, there was no pre and post-test. This assisted in controlling for regression. Participants were selected randomly. The study was conducted over a short time span and the initial sample size was large, thus controlling for mortality. There was one test administered and the
participants were given a short deadline to return the scored test to the researcher. The same instrument, the CCTST, was administered to all of the participants and did not change over the course of the study.

**External Validity**

For this study, the goal was to assess critical thinking in a small group of nurses and to generalize the findings to the nursing population as a whole. In order to generalize for a larger population, threats to the external validity must also be examined. “By ruling out extraneous factors and assuming that the treatment influences an outcome, researchers make claims about the generalizability of the results” (Creswell, 2002, p. 327). The potential threats to the external validity include interaction of selection and treatment, interaction of setting and treatment, and interaction of history and treatment (Creswell, 2002).

Creswell (2002) further suggested that researchers make participation in the experiment as convenient as possible for all individuals in a population in order to increase the generalizability. In an attempt to control the interaction of selection and treatment all nurses who completed the initial surveys and met the requirements of the study were asked to participate. Participation in the study was voluntary and was at no cost to the participants. Self-addressed stamped envelopes were also provided for the participants. To control for threat of interaction of setting and treatment, nurses were selected from a large area, Clark County, NV.

As it relates to the interaction of history and treatment, the generalizations formed were specific to the population being studied. The generalizations cannot
be applied to future situations. Creswell (2002) also suggested replicating a study at a later time to assist in making generalizations.

**Reliability**

The internal reliability of the CCTST, using the Kuder Richardson-20 (KR-20) statistics for dichotomously scored items has been reported at 0.68 to 0.70 (Facione, 1997; Bowles 2000). Form 2000 has a KR-20 between 0.78-0.84. “Internal consistency measures provide evidence that Form 2000 is slightly more reliable than form A” (Insight Assessment, 2006a, ¶ 4). Therefore, the instrument does have reliability.

**Summary**

The information in this chapter has outlined the data collection process for the research study. Quantitative methods were deemed most appropriate to yield the results of the study. The reliability of the instrument has been established. Careful consideration was applied toward maintaining both the internal and external validity of the study as well as in establishing the validity of the demographic survey itself. Measures outlined were implemented to assure that the results of the study were valid and applicable to a wider body of registered nurses.

The careful outlining of these measures was essential for the successful implementation of the study and the appropriate analysis of the data. The researcher considered several factors when developing the plan for the study, including time and cost. The researcher believes that the research study has yielded accurate results, and adds to the existing body of knowledge related to clinical nursing practice, critical thinking, and nursing education.
Chapter 4 will discuss the results of the study. The results of the statistical procedures presented were gained from analyzing the results of the CCTST and comparing the groups based on the demographic data. The intent of the chapter is not to interpret the data, but to present the information as evidence of the research findings.

CHAPTER 4: RESULTS
The purpose of this chapter is to report the results of the statistical procedures used for this study. This chapter presents the results of the study in the following sections: a review of the data collection procedures, the characteristics of the study’s sample, review of the research questions and hypotheses, the findings, and a summary.

The purpose of this study was to identify the relationship between critical thinking ability among registered nurses and two variables, experience and education. This chapter will present the results of the study gathered through examining the demographic surveys returned and the scores achieved on the California Critical Thinking Skills Test- Form 2000 (CCTST- Form 2000).

Data Collection Procedures

A list of Registered Nurses (RNs) licensed in the state of Nevada was obtained and 1,000 nurses were randomly selected. Prior to forwarding any information to the potential participants of the study, a face validity of the demographic survey (see Appendix B) was conducted. The survey was determined to be valid, and the researcher proceeded to mail information to those selected. These nurses were sent a cover letter (see Appendix B) and a demographic survey (see Appendix A). They were asked to complete their survey and return it within two weeks. The mailing and return process for all of the surveys took six weeks to complete. A total of 165 (16.5%) surveys were returned. Of the 165 surveys, 94 (56.9%) respondents qualified for the study. There were 71 respondents that were excluded from the study. Exclusions were
due to 48 (67.6%) of them holding a Master’s degree or higher and 23 (32.3%) of the respondents had less than 5 years of nursing experience.

Insight Assessment was then contacted, and 100 CCTST-Form 2000 booklets and answer sheets were ordered for the price of $485. The test can be ordered in bundles of 25, 50, or 100 (Insight Assessment, 2006a). In addition, a 15 percent discount was given to the researcher for being a doctoral student.

Once the booklets and answer sheets were received, each participant was mailed a booklet, answer sheet, test instructions, and a self-addressed stamped envelope. The participants were asked to mail the test back within two weeks. After three weeks a reminder postcard was mailed to those participants that had not returned the materials. After another two weeks, all of the collected answer sheets were mailed to Insight Assessment for scoring. An additional fee ($50) was paid to Insight Assessment for a rush delivery of the test scores via email.

**Characteristics of the Sample**

A total of 44 (47%) answer sheets were returned and forwarded for scoring. The sample was comprised of 42 women (95.4%) and 2 men (4.5%). The age of the participants ranged from 30-69, with the mean age being 49.9. The average age of nurses in southern Nevada, where Las Vegas is located, is 48.5 and the average age of nurses for the state of Nevada is 49.1 (Packham et al., 2005).

In order to examine the research questions posed, certain demographic data was needed. This included the number of years of nursing experience and the entry-level and current level of nursing education. The number of years of
experience was divided into six groups, these included 5-7 years, 8-10 years, 11-
13 years, 14-17 years, 18-20 years, and 20 + years of nursing experience. The
sample was composed of five nurses with 5-7 years of experience (11.4%), three
nurses with 8-10 years (6.8%), five nurses with 11-13 years (11.4%), three nurses
with 14-17 years (6.8%), four nurses with 18-20 years (9.1%), and 24 nurses with
greater than 20 years of nursing experience (54.5%) (see Table 2).

Table 2

Frequency and Percent of Years of Experience.

<table>
<thead>
<tr>
<th>Years</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
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<td>18-20</td>
<td>4</td>
<td>9.1</td>
</tr>
<tr>
<td>20+</td>
<td>24</td>
<td>54.5</td>
</tr>
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</table>

Education level was also assessed. The sample was composed of nurses
with the following current education level (see Table 3): Eight nurses (18.2%) were
diploma prepared nurses, 14 nurses (31.8%) held Associate’s degrees in
nursing, 13 nurses’ (29.5%) initial and current education level at the time of the
study was that of a Bachelor’s degree, and nine nurses (20.5%) were initially
diploma or Associate’s degree prepared nurses, but continued their education and
now held a Bachelor’s degree in nursing (RN to BSN).
Table 3

Frequency and Percent of Education Level

<table>
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<th>Frequency</th>
<th>Percent</th>
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</thead>
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</tr>
<tr>
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<tr>
<td>BSN</td>
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<td>29.5</td>
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<tr>
<td>RN to BSN</td>
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<td>20.5</td>
</tr>
<tr>
<td>Total</td>
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<td>100.0</td>
</tr>
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</table>

Research Questions

1. What is the relationship between critical thinking ability and level of experience in registered nurses?

2. What is the relationship between critical thinking ability and the educational level of experienced registered nurses?

Hypotheses

1. $H_1$: There is no relationship between CCTST scores and level of nursing experience.

2. $H_2$: There is no relationship between CCTST scores and level of nursing education.

Findings

There was a careful examination of the critical thinking scores, including the total critical thinking score and the subscales analysis, evaluation, inference, and deductive and inductive reasoning. The total critical thinking score was
achieved by adding the analysis, inference, and evaluation scores. The inductive and deductive scales overlap with the analysis, inference, and evaluation scales. The total critical thinking score can also be obtained by combining the inductive and deductive scores (Insight Assessment, 2006b).

**Critical Thinking Scores**

The total critical thinking scores ranged from 11.00 to 32.00 (see Table 4). The subscale scores ranged from 0.00 to 16.00. The highest total score that can be achieved on the CCTST is 34.00. The highest scores that can be achieved on the subscales are as follows: analysis 7.00, inference 16.00, evaluation 11.00, induction 17.00, and deduction 17.00.

When the critical thinking scores were grouped and reviewed by variables (experience and education) a pattern emerged in the education group (see Table 5 and Table 6). Further analysis was conducted to answer the research questions and to test the hypotheses.
Table 4

Descriptive Statistics on Critical Thinking Scores

<table>
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<th>M</th>
<th>SD</th>
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<td>8.43</td>
<td>3.31</td>
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</table>

Note. N=44

Nursing Experience Level

Results of the data were examined to determine findings related to Research Question 1: What is the relationship between critical thinking ability and level of experience in registered nurses?

Table 5 demonstrates great variability among the critical thinking skills total and subscale scores when assessed by dividing the sample based on experience level. The least variability occurred in the 8-10 years group with scores ranging from 18.00 to 21.00. This pattern was primarily consistent throughout all the subscales. The subscale of analysis demonstrated no variability with the standard deviation (SD) being 0.00. The greatest range in total critical thinking scores occurred in the 20+ years group, the lowest score was 11.00 and
greatest score was 27.00. Based on the data, a graph was created to assist the reader in visualizing the range in total critical thinking skill scores (see Figure 1).

Table 5

*Descriptive Statistics by Group-Experience*

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Hypothesis 1

Hypothesis 1 (H₁) for the study was that there is no relationship between CCTST scores and level of nursing experience. The hypotheses were written as null hypotheses. The total critical thinking skill score, as well as the five subscales of analysis, evaluation, inference, deductive reasoning, and inductive reasoning were determined from answers provided by the participants when they answered the questions on the CCTST. Years of experience was divided into six groups. Years of experience groups were rank ordered. Six Spearman rho correlations were conducted. None of the Spearman correlations were statistically significant (see Table 7).
Table 7 demonstrates that the Spearman rho correlation coefficients ranged from -0.073 to -0.179 for the total critical thinking score and all subscale scores and years of experience. There was no positive correlation noted nor were the scores statically significant. No relationship was demonstrated between the groups. As the years of experience increased the critical thinking scores did not increase or decrease significantly.

**Nursing Education Level**

Results of the data were examined to determine findings related to Research Question 2: What is the relationship between critical thinking ability and the educational level of experienced registered nurses? The CCTST and subscales scores were more consistent and demonstrated patterns that were viewed as relevant. Table 6 shown below demonstrates the range in critical thinking total scores and subscale scores. The minimum total critical thinking scores and the minimum subscale scores showed little to no variability, except for the inference and evaluation subscales. However, the pattern of maximum scores appeared to demonstrate an increase as the educational level increased. The maximum total critical thinking scores ranged from 26.00 to 32.00, with the highest score being achieved by an RN to BSN participant. Further analysis was conducted to determine if a statistically significant correlation existed among the variables. An additional graph of the minimum and maximum scores has also been provided (see Figure 2).
Table 6

*Descriptive Statistics by Group-Education*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Group</th>
<th>Min</th>
<th>Max</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>Diploma</td>
<td>11.00</td>
<td>26.00</td>
<td>16.00</td>
<td>4.99</td>
</tr>
<tr>
<td></td>
<td>ADN</td>
<td>12.00</td>
<td>27.00</td>
<td>19.50</td>
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<td></td>
<td>BSN/R2B</td>
<td>12.00</td>
<td>32.00</td>
<td>21.09</td>
<td>5.06</td>
</tr>
<tr>
<td>Analysis</td>
<td>Diploma</td>
<td>3.00</td>
<td>6.00</td>
<td>4.750</td>
<td>1.04</td>
</tr>
<tr>
<td></td>
<td>ADN</td>
<td>3.00</td>
<td>7.00</td>
<td>5.21</td>
<td>1.05</td>
</tr>
<tr>
<td></td>
<td>BSN/R2B</td>
<td>3.00</td>
<td>7.00</td>
<td>5.09</td>
<td>1.15</td>
</tr>
<tr>
<td>Inference</td>
<td>Diploma</td>
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<td>12.00</td>
<td>6.38</td>
<td>2.97</td>
</tr>
<tr>
<td></td>
<td>ADN</td>
<td>6.00</td>
<td>13.00</td>
<td>8.43</td>
<td>2.38</td>
</tr>
<tr>
<td></td>
<td>BSN/R2B</td>
<td>5.00</td>
<td>15.00</td>
<td>9.77</td>
<td>2.74</td>
</tr>
<tr>
<td>Evaluation</td>
<td>Diploma</td>
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<td>8.00</td>
<td>4.88</td>
<td>1.36</td>
</tr>
<tr>
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<td>10.00</td>
<td>5.86</td>
<td>2.71</td>
</tr>
<tr>
<td></td>
<td>BSN/R2B</td>
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<td>11.00</td>
<td>6.23</td>
<td>2.02</td>
</tr>
<tr>
<td>Induction</td>
<td>Diploma</td>
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<td>14.00</td>
<td>9.75</td>
<td>2.32</td>
</tr>
<tr>
<td></td>
<td>ADN</td>
<td>6.00</td>
<td>16.00</td>
<td>11.64</td>
<td>2.71</td>
</tr>
<tr>
<td></td>
<td>BSN/R2B</td>
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<td>16.00</td>
<td>11.05</td>
<td>2.57</td>
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<tr>
<td>Deduction</td>
<td>Diploma</td>
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<td>12.00</td>
<td>6.25</td>
<td>3.15</td>
</tr>
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<td></td>
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<td>13.00</td>
<td>7.86</td>
<td>2.80</td>
</tr>
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<td>BSN/R2B</td>
<td>4.00</td>
<td>16.00</td>
<td>9.59</td>
<td>3.29</td>
</tr>
</tbody>
</table>

R2B= RN to BSN
Hypothesis 2

Hypothesis 2 examined the relationship between education and critical thinking (the total score and the five subscale scores). Education was rank ordered (Diploma, ADN, and BSN/RN to BSN). The BSN and RN to BSN groups were combined. Six Spearman rho correlations were conducted. Evaluation and induction were both statistically, positively correlated to education (see Table 7). As education increased, evaluation and induction increased. No other correlations were statistically significant.

Table 7 shows the Spearman rho correlation range from 0.131 to 0.366 for total critical thinking score and all subscale scores as it relates to education level. The $p$ for both evaluation and induction are $< .05$ and are, therefore, statistically
significant. The correlation coefficient supports the existence of a positive relationship between critical thinking and education level.

Table 7  
*Spearman's Rho Correlations between Years of Experience and Education Level with Research Variables*

<table>
<thead>
<tr>
<th>Variables</th>
<th>Experience</th>
<th>Education</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>-0.125</td>
<td>0.285</td>
</tr>
<tr>
<td>Analysis</td>
<td>-0.077</td>
<td>0.131</td>
</tr>
<tr>
<td>Inference</td>
<td>-0.145</td>
<td>0.220</td>
</tr>
<tr>
<td>Evaluation</td>
<td>-0.073</td>
<td>0.366*</td>
</tr>
<tr>
<td>Induction</td>
<td>-0.038</td>
<td>0.364*</td>
</tr>
<tr>
<td>Deduction</td>
<td>-0.179</td>
<td>0.218</td>
</tr>
</tbody>
</table>

*Note. N=44. *p< .05.*

**Summary**

Data was collected and analyzed over a three month period. The sample was randomly selected from the 11,054 registered nurses licensed in the Las Vegas area (Clark County, NV). The sample was comprised of mostly females (95.4%). All the nurses had greater than 5 years of nursing experience, and their ages ranged from 30-69 years-old. The majority of the nurses had greater than 20 years of nursing experience (54.5%). The 44 nurses in the study were administered the California Critical Thinking Skills Test (CCTST-Form 2000). The results of the test yielded a total score and five subscale scores. These scores were then correlated with the demographic data to determine if a relationship existed between critical thinking ability and the variables.
The first null hypothesis that there was no relationship between CCTST scores and experience was not rejected. None of the Spearman rho correlations were statistically significant. The second null hypothesis that there was no relationship between CCTST and education level was partially rejected. Evaluation and induction were both statistically, positively correlated to education. As education increased, evaluation and induction scores increased.

Chapter 5 will further examine the findings discussed in this chapter. The results will be interpreted and inferences will be made regarding these findings. Furthermore, recommendations will be made based on the results of this study.
CHAPTER 5: CONCLUSIONS AND RECOMMENDATIONS

The intent of this chapter is to form larger meaning about the data presented in Chapter 4. The information presented in this chapter will serve as an interpretation of the data, and inferences will be made about the important findings. The results of the analysis will be connected to leadership primarily through the recommendations that will be made to nursing leadership at the hospital or institutional level, the state and the national regulatory levels. Recommendations related to future research will also be presented.

The research problem presented examined the fact that critical thinking has been established as an essential component to both nursing education and nursing practice. However, the level of critical thinking has not been thoroughly researched at the clinical practice level. A need exists to validate quantitatively the relationship between critical thinking ability of RNs and educational level, in addition, the need to determine the relationship between critical thinking ability and level of nursing experience also exists.

The purpose of the study was to examine both critical thinking and level of nursing experience and critical thinking and level of nursing education to determine if a relationship existed between the variables. By determining if a correlation existed among the variables, administrators in both nursing practice and nursing education will have quantitative data for justifying programmatic changes toward enhancing nurses’ and student nurses’ critical thinking skills.
The research methods used in this study were quantitative. A demographic survey was used to determine both qualification for the study and the demographic make-up of the sample. The sample did possess similarities to the nursing population in the Las Vegas area and the state of Nevada. The sample was then administered the CCTST. The scores were then analyzed using Spearman rho correlation to determine the magnitude and direction of the association between the variables.

There were limitations to the study. Because the sample was a convenient sample and the sample size was small, the sample may not be truly reflective of experienced nurses in the Las Vegas area. The inferences made are limited to the sample. The study’s sample may be more reflective of nurses who were confident in their critical thinking abilities. In addition, the sample may be more reflective of the nurses who had the time to complete the testing.

There were also assumptions that were made prior to implementing the study. These included the assumption that the person intended to take the test was the actual test-taker. Another assumption was that each participant followed the test-taking directions as instructed. It was also assumed that the time that the participants took to complete the test would not impact the results of the study.

The information presented in this chapter is organized in the following manner. Conclusions about the data are presented. Both hypotheses are discussed. The implications of the findings for nursing are discussed. Based on the information gathered in the review of the literature and from the conclusions and
implications formulated from the results of the study, recommendations are made for key stakeholders and for future researchers.

Conclusions

Examining the level of critical thinking among experienced nurses can have a great impact on nursing leadership. First, evaluating the level of critical thinking to determine where strengths and weaknesses exist can lead to the development of national, state, and institutional level policies related to educational curriculums, and the hiring and training of registered nurses. Furthermore, this information can be used to assist in the development of nursing unit level educational programs, hiring practices, and continuing education requirements. The research presented can lead to further research for expanding nursing leadership’s understanding and appreciation for the value of nursing education in clinical practice.

Hypothesis 1

Research Question 1: What is the relationship between critical thinking ability and level of experience in registered nurses?

The first null hypothesis was that there was no relationship between the CCTST scores and the level of nursing experience was not rejected. There was no correlation between critical thinking and experience found in the sample. As experience increased in the sample the critical thinking scores did not increase. Because there was no statistically significant relationship, positive or negative, the determination is that the relationship demonstrated in the sample occurred by chance. Because of the lack of a pattern observed in the scores the assumption
that nurses with five years or more of experience are better critical thinkers cannot be supported or refuted.

Mee (2007) asserted that critical thinking is not easily learned in the classroom but critical thinking is perfected at the bedside through experience. The results of the study cannot support this assumption. In addition, the results do not support Benner’s (1984) theory of novice to expert, beyond five years of experience or the reaching of the expert level. In the theory, nurses progress through a continuum. As nurses gain experience, they become more confident and proficient in their critical thinking and decision-making processes. Nurses progress through five stages, from novice to expert. According to Benner’s (1984) theory, the expert level is reached at around five years of experience. Benner (1984) was used as the theoretical framework for this study. The hypothesis for this study was derived from Benner’s (1984) theory, thus as nurses gain more experience beyond five years, critical thinking skills would continue to increase as experience increased. Martin (2002) supported this assumption. In that study, critical thinking increased as the level of experience increased. However, that study’s sample was comprised of nursing students, new graduates, and nurses with greater than five years of experience. Howenstein et al. (1996), found a significantly negative correlation between experience and critical thinking, although in that study, the Watson Glaser Critical Thinking Appraisal Tool (WGCTA) was used, instead of the CCTST.

Critical thinking is a skill that needs to be continuously developed over time. Experience alone is not enough to ensure its progressive development.
Ignatavicius (2001) stated that critical thinking among nurses is a “long-term development process that must be practiced, nurtured, and reinforced over time” (p. 38).

_hypothesis 2_

Research Question 2: What is the relationship between critical thinking ability and the educational level of experienced registered nurses?

The second null hypothesis was that there was no significant relationship between the CCTST scores and the level of nursing education was partially rejected. Analysis of the data revealed a statistically significant positive correlation between the critical thinking subscales of evaluation and induction and the level of nursing education. As education increased, so did evaluation and induction scores on the CCTST. Results of the Spearman rho correlation indicated that a positive relationship existed. Therefore, the relationships did not occur by chance. This study quantitatively establishes that there is a relationship between evaluative and inductive critical thinking and education level. The results of this study support other research findings (Gross et al., 1987; Pardue, 1987; Brooks & Shepherd, 1990; Howenstein et al., 1996; Stevens, 2002) which concluded that the educational preparation of the baccalaureate prepared registered nurse makes him or her a better critical thinker.

Implications

The following section will explore the implications of the results of the study. The intent of this information is that nursing leadership can use the results of this study and subsequent recommendations to develop policies and practices
that will help in the enhancement of critical thinking in clinical practice and the advancement of the profession of nursing as a whole.

**Hypothesis 1**

The results of the study do not support the assumption that critical thinking continues to increase as experience increases. Although Oermann (1999) stated that nurses build their critical thinking skills over time through experience, the results of this study do not support this belief. However, Oermann (1999) did go on to say that critical care leaders need to integrate strategies to foster critical care development in nurses during their orientation, through continuing education programs and with ongoing interactions with staff. Ignatavicius (2001) supported the belief that in addition to new nurses, experienced nurses also need assistance with critical thinking development.

The assumption cannot be made by nursing leadership that critical thinking will continue to increase with experience alone. Nursing leadership needs to take an active role in the continued development of critical thinking in clinical nursing practice. Both Oermann (1999) and Ignatavicius (2001) made several suggestions as to how critical thinking can be enhanced in experienced nurses. Some of these suggestions will be discussed in the recommendations section.

**Hypothesis 2**

Currently, nursing is the only profession that offers multiple entry levels (diploma, Associate’s degree, or Bachelor’s degree), which mandates that all graduates pass the same licensing examination, initially compensates them on the
exact same salary scale, and expects them all to practice at the same competence level (Greipp, 2003). The same title of registered nurse is granted to all individuals who meet the criteria of passing the National Council Licensure Examination for Registered Nurses (NCLEX-RN) exam. The candidates for licensure as a registered nurse must have graduated from an accredited registered nursing program, regardless of the level of the credential earned.

Critical thinking is essential to clinical nursing practice (Fesler-Birch, 2005). The increased complexity of the scope of practice for RNs requires critical thinking, problem-solving skills, a sound foundation in a broad range of basic sciences, knowledge of behavioral, social and management sciences, and the ability to analyze and communicate data. Among the three types of entry level nursing programs, the National Advisory Council on Nurse Education and Practice (NACNEP) found that baccalaureate education best fulfills these requirements and “provides a sound foundation for addressing the complex healthcare needs of today in a variety of nursing positions” (American Association of Colleges of Nursing, 2003, ¶ 7). The results of this study support that viewpoint. Baccalaureate prepared nurses are better prepared, through their educational process, to work in areas that require more in-depth critical thinking (evaluation and induction) such as critical care, emergency room, and management. The American Association of Colleges of Nursing’s (1998) *Essentials of Baccalaureate Education* contends that it is the liberal education that provides professional nurses (BSN prepared) with the ability to develop and use critical thinking skills. Aiken et al. (2003) found a correlation between nurses’
education level and patient outcomes. Fagin (2001) found that nursing education level was a factor in patient safety and quality of care. Studies have shown that BSN prepared nurses are better critical thinkers, produce better patient outcomes, practice safer and deliver a better quality of care.

Although state nursing boards and many hospitals and healthcare institutions do not make any distinctions between nurses with diplomas, Associate’s degrees or Bachelor’s degrees when it comes to title, pay, work assignments or promotions, this study and others (Gross et al., 1987; Pardue, 1987; Brooks & Shepherd, 1990; Howenstein et al., 1996; Stevens, 2002) continue to support the finding that nurses’ education levels impact their critical thinking abilities.

**Recommendations**

There are several recommendations that stem from the results of the study. The first are recommendations that can be adopted by key stakeholders -- administrators at the hospital level and administrators at the state and national levels, such as state nursing boards and national regulatory organizations. The second type of recommendations are for future research.

**Recommendations for Stakeholders**

The enhancement of critical thinking in experienced nurses should be an ongoing endeavor. Oermann (1999) suggested the use of clinical scenarios, questioning staff, conducting conferences, and context-dependent exercises that use open-ended short answer and essay questions. The usages of such methods have been instrumental in the enhancement of critical thinking skills among
experienced nurses. Ignatavicius (2001) suggested using staff meetings to reflect on patient situations, ensure that nurses participate in interdisciplinary rounds, and help nurses learn to be better thinkers by being role models. These methods should be used to continue the development of critical thinking skills among nurses practicing in clinical areas.

Assessment of critical thinking ability should be considered as a factor in hiring, orienting, and evaluating staff nurses. Again, the development of critical thinking cannot be assumed, it must be nurtured, reinforced and evaluated. Nurses should be provided easy access to educational materials that will enhance their critical thinking skills. Pravikoff, Pierce, and Tanner (2003) found that fewer than 35 percent of hospitals provide access to the Internet or computerized references in clinical units and that 66 percent provide only nursing practice journals. Nurses need access to journals that provide clinical scenarios, such as the Critical Care Thinking Problem (CCCTP) presented by Suddaby and Mowery (2007) in Pediatric Nursing, which provides clinical scenarios designed to test problem solving and analysis abilities. These scenarios require learners to list assessment and management strategies and compare their rationale and decision to that of the author. Leaders in both nursing administration and nursing education who wish to assess and enhance critical thinking can use such critical thinking exercises.

Research has further shown that baccalaureate prepared nurses are better critical thinkers than diploma prepared and Associate’s degree prepared nurses (Gross et al., 1987; Pardue, 1987; Brooks & Shepherd, 1990; Howenstein et al.,
The fact that level of education impacts quality of care, as well as critical thinking ability, should compel leaders in healthcare facilities to consider a nurse’s educational level when developing and implementing healthcare organizations’ hiring and training policies. In addition, hospitals and healthcare institutions should consider requiring their non-BSN nurses to obtain a BSN within a certain period of time and provide the needed financial assistance to nurses to meet that employment requirement.

The Associate’s degree was initially designed with the intent that graduates would be registered nurses who practiced as technicians only (Montag, 1951). The American Nurses Association has been recommending since 1965 that the Bachelor’s degree be the minimal entry level into practice (ANA, 1965). This mandate continues to meet opposition. Coupled with the current nursing shortage, it is difficult to exclude a large body of potential registered nurses. State nursing boards and national regulatory organizations should mandate the level of nursing education that can be required to work in certain areas. Only BSN-prepared nurses should staff the areas that require a higher level of critical thinking, such as intensive care units and emergency rooms. Another option that can be implemented is instituting the diploma/Associate’s to BSN relationship, as originally envisioned by Montag (1951), whereas BSN prepared nurses would supervise diploma/Associate’s degree prepared nurses.

Another option is lengthening the Associate’s degree programs to three years, instead of two years, and developing a greater emphasis on critical thinking skills through more Liberal Arts education requirements and a greater
emphasis on critical thinking in the nursing curriculum. Many hospital-based diploma programs are currently being integrated into community college programs, and less than 10 percent of all basic nursing education programs are diploma granting programs (AACN, 2004). Therefore, by addressing Associate’s degree education, diploma level education will also be addressed.

Recommendations for Future Studies

Replicating the study with a larger sample size is recommended. It was difficult to obtain a large sample size due to the fact that the initial response rate and the required length of time to complete the CCTST may have deterred the completion of the test by non-respondents. Oversampling is recommended, as was done in this study. The study can be replicated in other populations at the state, city, or institutional level. At the institutional level, the participants may be more accessible and the initial demographic survey information may be more easily obtained.

Considerable expense was incurred in conducting this research. Grant or institutional funding support is preferable for the support of this type of study. Having additional funds may provide a resource for providing the participants an incentive for completing the test.

The CCTST only measures general critical thinking ability. It is recommended, therefore, that a study could be developed to assess nursing-specific critical thinking. Currently, there is no critical thinking skills test that is specifically designed to evaluate experienced nurses using nursing scenarios. Two tests exists that could be used for similar purposes. The Health Sciences
Reasoning Test (HSRT) is used to assess the critical thinking skills of undergraduate and graduate students majoring in Health Sciences. The Professional Judgment Rating Form (PJRF) can be used by nursing leaders to assess novice professionals on the quality of their judgment in workplace situations requiring critical thinking (Insight Assessment, 2006). There is a need to research, validate, and implement a critical thinking skills test to quantitatively evaluate the critical thinking ability of experienced nurses. The development of a critical thinking skills test to measure the critical thinking ability of experienced nurses for hiring, orientation, and periodic evaluation would be a great asset to the nursing profession.

Summary

Critical thinking remains a key ingredient to nursing practice. This study has examined the critical thinking skills of experienced nurses and has sought to determine if there is a relationship between critical thinking ability, and experience and critical thinking ability and education. No relationship, positive or negative, could be statistically validated for experience in nurses. Although experts in nursing contend that experience relates to the development of critical thinking ability the results of this study do not support the assumption that experience alone will enhance an RN’s critical thinking ability. Critical thinking must be continuously developed, and nursing leaders have the responsibility to provide opportunities for nurses to do so, whether through formal education at the college level, staff in-service training, professional conferences, or continuing education opportunities.
The results of this study have supported the hypothesis that education impacts critical thinking ability. The changes recommended in the study can greatly enhance critical thinking skills among experienced nurses and will ultimately improve patient outcomes. The hiring of BSN prepared nurses in clinical areas that require intensive use of critical thinking skills will continue to improve the profession. The ongoing development of critical thinking skills among all nurses will assist the nurses in better decision making, also impacting patient outcomes. Requiring diploma and ADN prepared nurses to acquire a BSN, and the lengthening of ADN programs to include more Liberal Arts courses, will augment the level of critical thinking skills of nurses practicing in clinical areas. Nursing leadership, whether at the national, state or institutional level, needs to take an active role in the further development of critical thinking skills of nursing students, new nurses, and experienced nurses in order to develop, enhance, and nurture critical thinking ability and to improve the quality of patient care.
REFERENCES


APPENDIX A: DEMOGRAPHIC SURVEY
DEMOGRAPHIC SURVEY

Please provide the following information about yourself. Leave blank those items that do not apply. *Providing this information is entirely voluntary and will be used to determine if you meet the criteria for the study. Return of this completed form constitutes your consent to participate. The information contained in this form will be held in strict confidence.*

1. How many years have you been employed as a registered nurse:
   - _____ 0-5 years
   - _____ 5-7 years
   - _____ 8-10 years
   - _____ 11-13 years
   - _____ 14-17 years
   - _____ 18-20 years
   - _____ 20+ years

2. Highest level of completed educational preparation:
   - ______ Doctorate (specify focus):
   - ______ Master’s in Nursing
   - ______ Master’s in other field
   - ______ Bachelor’s in Nursing
   - ______ Bachelor’s in other field
   - ______ Associate’s Degree in Nursing
   - ______ Diploma in Nursing

3. Initial nursing education:
   - ______ Diploma of Nursing
   - ______ Associate’s Degree in Nursing
   - ______ Bachelor’s in Nursing

4. After completing your initial nursing education, have taken or are you currently taking college level nursing courses?
   - ______ Yes
   - ______ No
   
   If yes, please specify how many courses and your current school status:
   ________________________________________________________
   ________________________________________________________

5. Age: __________

6. Gender:
   - _____ Male
   - _____ Female

Thank you for taking the time to complete this survey!
APPENDIX B: INFORMED CONSENT FORM
Dear Registered Nurse,

I am a student at the University of Phoenix working on a doctorate in Educational Leadership. I am conducting a research study entitled Critical Thinking in Nursing: Experience vs. Education. The purpose of the research study is to assess if there is a relationship between critical thinking and experience and critical thinking and level of education.

Your participation will involve completing a short demographic survey. If you qualify for the study you will be asked to complete a 34-item critical thinking skills test. Your participation in this study is voluntary. If you choose not to participate or to withdraw from the study at any time, you can do so without penalty or loss of benefit to yourself. The results of the research study may be published but your name will not be used and your results will be maintained in confidence.

In this research, there are no foreseeable risks to you.

Although there may be no direct benefit to you, the possible benefit of your participation is increase the body of nursing knowledge, validation of nursing experience and/or nursing education.

If you have any questions concerning the research study, please call me at (702) 265-7535.

The completion and return of the demographic survey constitutes your consent to participate in the study.

Sincerely,

Michelle Ingram

Michelle Ingram, MS, RN, CPNP
APPENDIX C: PERMISSION TO USE AN EXISTING SURVEY
UNIVERSITY OF PHOENIX

PERMISSION TO USE AN EXISTING SURVEY

Date 07/14/06

Ms. Michelle Ingram
6331 Lorne Green Ave. #102
Henderson, NV 89015

Thank you for your request for permission to use the California Critical Thinking Skills Test in your research study. We are willing to allow you to purchase the instrument at a rate of $525/100. A 50% discount is available to doctoral students. Purchase and use of the instrument is allowed with the following understanding:

• You will use this instrument only for your research study and will not sell or use it with any compensated management/curriculum development activities.
• You will include the copyright statement on all copies of the instrument.
• You will send your research study and one copy of reports, articles, and the like that make use of this survey data promptly to our attention.

If there are acceptable terms and conditions, please indicate so by signing one copy of this letter and returning it to us.

Best wishes with your study.

Sincerely,

[Signature]

I understand these conditions and agree to abide by these terms and conditions.

Signed  [Michelle Ingram] Date  07/22/06

Expected date of completion
12/18/06
Sample Questions from the California Critical Thinking Skills Test

1. The teams in the city’s youth recreational soccer program are meant to be evenly matched. Yet some teams are a little better than others. Suppose that last Saturday a team called the Sparklers defeated one called the Wildflowers. Suppose that the previous Saturday the Wildflowers had defeated a team called the Mustangs. What is likely to happen next Saturday when the Sparklers play against the Mustangs?

   A. The Sparklers will certainly win.
   B. The Sparklers will probably win, but might lose.
   C. The Sparklers will probably lose, but might win.
   D. The Sparklers will certainly lose.
   E. The soccer game will end in a tie.

2. Suppose “Only those seeking challenge and adventure should join the Army” were true. Which of the following would express the same idea?

   A. If you seek challenge and adventure, you should join the Army.
   B. If you join the Army, you should seek challenge and adventure.
   C. You shouldn’t seek challenge and adventure except by joining the Army.
   D. You shouldn’t join the Army unless you seek challenge and adventure.

3. “Ezerinians tell lies,” means the same thing as:

   A. If anyone is Ezerinian, then that person is a liar.
B. If anyone is a liar, then that person is an Ezerinian.

C. There is at least one person who is an Ezerinian who lies.

D. People don’t lie unless they are Ezerinian

E. All of the above mean the same thing.

4. “Not all candidates are qualified to serve”, expresses the same idea as:

A. None of the candidates are qualified to serve.

B. Some candidate is not qualified to serve.

C. Someone qualified to serve is not a candidate.

D. All candidates are not qualified to serve.

5. Consider the argument: “Person L is shorter than person X. Person Y is shorter than person L, but person M is shorter than Y. Therefore, person Y must be shorter than J.” What information must be added to require that the conclusion be true, assuming all the premises are true?

A. Person L is taller than J.

B. Person X is taller than J.

C. Person J is taller than L.

D. D. Person J is taller than M.