FACTORS THAT INFLUENCE THE DEVELOPMENT OF CRITICAL THINKING SKILLS IN ASSOCIATE DEGREE NURSING STUDENTS

by

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(Under the Direction of Sharan B. Merriam)

ABSTRACT

The purpose of this study was to identify factors that influence the development of critical thinking skills of student nurses from entrance to exit in an associate degree in nursing program. Three research questions guided this study: (1) What pedagogical factors influence the development of critical thinking skills from entrance to exit for students in an associate degree in nursing program? (2) What personal factors influence the development of critical thinking skills? (3) What other factors influence the development of critical thinking skills? A qualitative research approach was implemented with a purposive sampling of ten graduates from an associate degree in nursing program who had increased their critical thinking skills substantially, as measured by the Critical Thinking Assessment developed by Assessment Technologies Incorporated. In-depth, semi-structured interviews were done with the ten graduates looking at their perceptions of the factors that increased their critical thinking skills during the nursing program.

This study found that the pedagogical factors that influenced the development of critical thinking skills were curriculum design and integrative learning activities. Curriculum design was further broken down into acquiring foundational concepts, progressing from simple to complex concepts, and applying learning in the clinical area. The subcategories of integrative learning

activities included tests, case studies, simulations, and care maps. The biggest surprise in this area was that all of the participants mentioned testing as a factor that improved their critical thinking skills. Personal factors identified were curiosity, confidence, and perseverance. Other factors included faculty support and reinforcement in and out of the nursing program.

Three conclusions were drawn from this study. First, curriculum design is a key factor in promoting critical thinking. Second, personal characteristics promote the development of critical thinking. Finally, reinforcement promotes the development of critical thinking. Practice implications and recommendations for future research were also provided.

INDEX WORDS: Critical thinking, Nursing Education, Adult Education, Adult learners, Qualitative research

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DEDICATION

I dedicate this work to my family, who has stood by me so much in this enterprise. I particularly want to thank my sister Karen and her family for taking my daughter on many trips with them and allowing her to stay at their house numerous weekends while I was working on course work and the dissertation. I thank my daughter, Kelly, for being so understanding about the time I had to spend on this study and all the course work prior to completing the study. She has truly had to put up with a lot, and I am sure that she is glad that it is over and we can spend more time together and do some of the things we have talked about but never had the time to do.

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CHAPTER 1

INTRODUCTION

Introduction to Study

Knowledge, achievement, and competence are valued outcomes of any educational endeavor. These outcomes are an explicit expectation of the learner, as well as everyone vested in the educational process. The academic setting is expected to provide learners with the knowledge, job-related skills, and critical thinking ability to help them succeed in chosen fields. Although the sentiment of some scholars is that the term "critical thinking" has become a buzzword in education, many associations and panels have promoted the ability to think critically as an important goal of higher education. The emphasis on critical thinking in education reflects the expectation that a college education promotes how to think, rather than instructs the learner on what to think. The necessity for fostering critical thinking is compounded by the technological explosion and globalization. Facts learned in college today will most likely become extinct or modified significantly in the future. To keep pace with these changes, critical thinking is an essential outcome in higher education for all disciplines (Facione, Sanchez, Facione, & Gainen, 1995; Stewart & Dempsey, 2005).

One area where critical thinking is an established educational outcome criterion is nursing. Nurses are continually confronted with a growing body of knowledge and are expected to integrate sophisticated technological advances into client care while concomitantly adapting to the constantly evolving complexity of the health care system (Myrick, 2002). The delivery of safe, effective, and efficient care is the underlying goal of good nursing care, and critical thinking is necessary for reaching that goal. Clinicians who employ critical thinking skills are

more confident in their reasoning, advocate for their clients, identify potential errors, make appropriate contributions to team meetings, and provide solid rationales for their reasoning (Rubenfeld & Scheffer, 2006).

Nursing students must begin learning critical thinking skills from their first day in an educational program. Nursing education is challenged to provide students with the resources, curriculum, teaching strategies, and opportunities that expose students at all levels of the program to develop and practice the critical thinking skills needed by competent nurses (Daly, 1998). Alfaro-LeFevre (2004) stated that the evolving changes in professional expectations have been accompanied by a need to modify the manner in which nurses are taught in basic nursing programs. Instead of training nurses how to perform a procedure, there is an increased focus on teaching them how to use the nursing process, think critically, and implement clinical skills.

History and Background of Critical Thinking

The intellectual roots of critical thinking can be traced to the teaching, practice, and vision of Socrates, who established the importance of asking probing questions rather than just accepting ideas as worthy of belief. He set the basic constructs of critical thinking, including such actions as reflectively questioning common beliefs and explanations and carefully distinguishing those beliefs that are reasonable and logical from those that lack adequate evidence or a rational foundation (Paul, Elder, & Bartell, 1997).

In the 20th Century, Dewey recognized the deep need for critical thinking in life and in education (Ennis, 1993). Dewey, an educator, proposed that thinking arises from a situation of ambiguity. He believed that education should allow for reflection and should be student centered and realistic in order to create critical thinkers. From his work came an increased sense of the

pragmatic basis of human thought and its grounding in actual human purposes, goals, and objectives (Paul, Elder, & Bartell, 1997).

American educational institutions were slow to embrace and encourage critical thinking in the classroom because behavioral education had been the established mode of education for decades (Bevis & Watson, 1989; Pond, Bradshaw, & Turner, 1991). Behavioral education focused almost exclusively on producing workers capable of task-oriented skills. As early as 1947, the President's Commission on Higher Education suggested that a primary aspiration of general education is to foster critical thinking skills; however, it wasn't until 1983 that the National Commission on Excellence in Education identified a critical deficiency in the higher-level thinking skills in education (National Commission on Excellence in Education, 1983). Subsequently, *Goals 2000: Educate America Act* mandated a significant improvement in the proportion of college graduates who could demonstrate an advanced ability to think critically, communicate effectively, and solve problems by the year 2000 (United States Department of Education, 1993). Curriculum reform was encouraged in higher education, to include incorporating critical thinking objectives into core and program courses; however, the mandate provided no specific guidelines about what level of student was considered a college graduate (i.e. Associate degree or Baccalaureate degree), what constituted significant improvement, or how that improvement might be demonstrated (Facione, 1997).

Throughout the evolution of critical thinking, there has been much inconsistency in the conceptual definition of critical thinking (Facione, 1990a). Many writers have contributed to the abundance of definitions and interpretations (Brookfield, 1987; Ennis, 1996; McPeck, 1990; Paul, 1990; Perry, 1970; Watson & Glaser, 1964), but some commonalities are evident in these definitions. All definitions suggest a link between critical thinking and a base knowledge level,

cognitive skills, complex reasoning, argumentation, beliefs, action, and problem identification (Daly, 1998).

Brookfield (1987) equates critical thinking with the development of logical reasoning abilities; the application of reflective judgment; assumption hunting; and the creation, use, and testing of meaning. He further identifies critical thinking as a productive and positive activity; a process, not an outcome; influenced by context; triggered by both positive and negative events; and regarded as both emotive and rational. In later writings, Brookfield expanded and clarified his concept of critical thinking, bringing it up to a more critically reflective level.

Another prolific writer about critical thinking is Paul, a leader in the philosophical group of critical thinking theorists. Paul and Elder (2008) defined critical thinking as the "art of analyzing and evaluating thinking with a view of improving it" (p. 4). Paul, Elder, and Bartell (1997) identified interrelated and interdependent components of critical thinking, to include the ability to engage in a reasoned discourse that operates in the context of intellectual standards, to use analytic inferential skills, and to commit to a fundamental value orientation that incorporates certain traits and dispositions.

Whereas Brookfield takes a more radical political and affective stance toward critical thinking, Paul espouses a more rational model that does not acknowledge the ambiguity associated with many of the situations in which decisions are made. Rational models have been criticized by proponents of contextually-situated models of critical thinking because of the that the thinker is able to develop sufficient discipline to overcome environmental distractions and to be completely in tune with personal values and biases.

After analyzing contextually situated models, Forneris (2004) generated four core attributes of critical thinking in practice. The attributes include context, reflection, dialogue, and

time. Context is the foundation upon which knowledge is built. Reflection illuminates the reason for what is done and how to critically discriminate what is relevant. Dialogue shapes the context of the situation, and time involves recalling prior learning experiences and how these may affect the interpretation and understanding of the context of the present situation which, in turn, will impact future action.

Critical thinking skills and reflective practice are in many ways entwined. One of the key ideas and features of all aspects of learning from experience is that of reflection. Reflective practice is the use of judgment in complex and inconsistent situations based on the practitioner's experience and prior knowledge. All reflective learning theories share the central belief that learners construct, through reflection, a personal understanding of relevant structures of meaning derived from the learner's actions in the world (Fenwick & Tennant, 2004).

Schön's basic hypothesis for reflection-in-action is that there has been a growing discontent with the nature of professionalism and with the nature of professional practice and that the origin of this discontent lays in the technical rational approach inherent in most professional education, research, and supervision (Redmond, 2004). As a practitioner experiences many variations of a situation, a repertoire of expectations, images, and techniques develop. This knowing-in-practice tends to become increasingly tacit, spontaneous, and automatic. Reflection-in-action is central to the way practitioners sometimes cope with the troublesome divergent situations of practice. The practitioner who reflects in action becomes a researcher in the practice context who is able to construct a new theory of a unique case. The problem is considered solved when the result fits with the interpretation (Schön, 1987, 1991).

Critical thinking and reflective practice have some common features particularly in the areas of self-monitoring, self-evaluating, and self-reinforcing goal-directed behaviors; however,

reflective practice takes critical thinking to a different level. Schön moved the ideas of critical thinking beyond the realms of education and developed a model of reflection that is applicable to professional practice.

Turner (2005) identifies twenty-six terms and phrases as surrogate terms for critical thinking by nursing authors. These terms are used interchangeably by many of the authors and include both critical thinking and reflective thinking. Wilkinson (2001) defines reflection as a type of critical thinking that considers a broad array of possibilities and reflects on the merits of each in a given situation. Reflection is essential when a problem is complex and has no simple, correct solution. Reflection is an important parameter of critical thinking (Lauder & James, 2001), and failure to reflect can have a detrimental effect on the process and development of critical thinking (Kuiper & Pesut, 2004).

Critical Thinking in Nursing

Nurse scholars have studied and written a plethora of information about the concept and application of critical thinking. Critical thinking became an expectation in nursing education in the 1970s and 1980s with an explosion of literature relating to the topic (Ennis, 1985; Facione, 1984; Richards, 1977). Since 1993, the *Journal of Nursing Education* has published six issues focusing on critical thinking in nursing, a total of more than 50 articles (Turner, 2005). Commentators within the field of nursing unreservedly advocate the need for nurses to be critical thinkers. Critical thinking has been identified as a need in nursing because it is needed to practice sound clinical judgment (Alfaro-Fevre, 2004; Facione & Facione, 1994) and is essential in dealing effectively with the vast range of situations encountered in the healthcare field (Glen, 1995; Paul & Heaslip, 1995).

Both the National League for Nursing Accreditation Commission (NLNAC) (2005) and the American Association of Colleges (1998) have emphasized the importance of critical thinking as an educational outcome for undergraduate nursing programs. The NLNAC initially required the use of a critical thinking tool as the basis for measuring critical thinking in the curriculum but did not provide guidance to schools on how to accomplish this mandate. There was so much confusion and turmoil in the nursing education community associated with this requirement, the NLNAC later decided to drop the tool requirement as an outcome for all nursing programs but maintained the need for critical thinking development in the curriculum (Jackson, 2004).

Traditionally, undergraduate nursing curricula focused on content and competencies required of new graduates upon entry into professional practice, usually in a hospital setting. Today, new graduates begin their professional careers in diverse settings, ranging from outpatient clinics to intensive care units, all requiring very different skill sets and knowledge. Nurse educators can no longer provide a sufficient knowledge base of facts because there is too much information available and because that information becomes outdated in a short period of time (Cook, 2001). As a result, more emphasis is being given to learning how to think as the primary focus of nursing education (Billings & Halstead, 1998).

There is an evolving paradigm shift in nursing away from reasoning strategies that are positivistic, task-oriented, and rule-driven to those that are more holistic and reflect consideration of individualized physical, cognitive, contextual and affective variables. Sound nursing judgment requires that the nurse reason in a manner that utilizes generic nursing knowledge contextually adjusted to match clients' unique cases (Daly, 1998).

When nursing education moved from the hospital-based setting to an academic program within universities, the need to incorporate critical thinking in the classroom became apparent (Vinson, 2000). With the hospital setting no longer being the most prevalent educational setting for nursing education, nursing students had a difficult time conceptualizing and synthesizing plans or treatments of care for the actual client. The clinical component had served as a major educational tool in preparing the student for practice (Brooks & Shepard, 1991; Toliver, 1988). When students started spending less time in the clinical arena, it was necessary to develop nursing education models that reflected the change so that the students would continue to be sufficiently prepared for the nursing profession (Linderman, 1989; Tolliver, 1988; Vinson, 2000).

Nurse educators embraced the concepts of critical thinking as an adjunct to the university academic setting. They began to use techniques ascribed to foster critical thinking in the classroom so that students would have the opportunity to develop thinking skills in relation to the practice of nursing (Bandman & Bandman, 1995). Classroom instruction changed radically from the lecture format to teaching methodologies that were thought to stimulate critical thinking. The ultimate goal was that theory from the classroom would be translated into practice in the clinical setting. Strategies that have been incorporated in the classroom and clinical settings include questioning (Greenwood, 2000; Ikuenobe, 2001; Missildine, 2004; Savage 1998; Sellappah, Hussey, Blackmore, & McMurray, 1998); modeling (Brookfield, 1997; Mamchur & Myrick, 2003; Myrick & Yonge, 2004; Paul & Elder, 2008; Rush, Peel, & McCracken, 2004); small group work (Garside, 1996); case studies (Allen & Razvi, 2006; Mayo, 2004); nursing process, a linear problem-solving model specific to nursing (Abel & Freeze, 2006; Benner, Tanner, &

Chesla, 1996; Facione, Facione, & Sanchez, 1994; Kataoka-Yahiro & Saylor, 1994); and simulations (Decker, 2007; Hovancsek, 2007; Rauen, 2001; Wrobel, 2005).

Nursing has used clinical decision making, nursing process, clinical problem solving, clinical judgment, and critical thinking as interchangeable terms that basically refer to the same phenomena. Practical experiences, combined with academic experiences, build nursing knowledge and enhance individual and collective nursing intelligence. This intelligence is enhanced every time nurses talk with themselves and others in a reflective way about client care situations (Pesut & Herman, 1999).

New graduates often require at least a mental checklist to know what to watch for in particular client situations. The more experienced nurse has a sense of salience, where important aspects of the case stand out because of prior knowledge of the particular situation and because of experience in similar situations. Expert nurses use a kind of deliberative rationality to check out their intuitions (Benner, Tanner, & Chesla, 1996). All of this indicates that nursing judgment and critical thinking develop over time as the nursing student and graduate gains more tacit knowledge and experience.

Associate Degree in Nursing Programs and Critical Thinking

The concept of preparing associate degree nursing graduates was developed at the end of World War II to address the decreased supply and increased demand for nursing care. Several factors served as catalysts for the development of associate degree nursing education programs, including interest and growth of junior colleges, federal involvement in funding and spending, consumer concern and support, and professional responsibility and accountability (Mahaffey, 2002).

Associate degree nursing (ADN) education was based on a research project carried out by Dr. Mildred Montag in the 1950s. The project was created to meet the needs of society by preparing registered nurses in less time than was required in diploma (hospital-based programs) and university based baccalaureate programs. The focus of this type of program was education rather than the service emphasis of hospital-based programs (Taylor, LeMone, Lillis, & Lynn, 2008).

Associate degree nursing education remains a relevant choice for students entering the nursing profession. In 2004, 42.2% of all registered nurses had an associate degree, as compared to 25.2% with diplomas and 30.5% with a baccalaureate, as initial preparation (National Association of Associate Degree Nursing). Associate degree nursing has a higher representation of minorities (21.3%) and males (10.7%) than the 12.3% minority and 5.4% male representation in the total registered nursing population (Mahaffey, 2002).

Regardless of the practice setting or role, the associate degree nurse is expected to have the core knowledge essential for nursing and the critical thinking skills essential to encompass the health care continuum from wellness to acute and devastating illnesses and rehabilitation (Educational Competencies for Graduates of Associate Degree Nursing Programs, 2000). Associate degree programs graduated 43,665 students in the United States eligible for the National Council Licensure Exam for Registered Nurses (NCLEX-RN) exam in 2000 (National Council of State Boards of Nursing, 2001).

The National League for Nursing and individual State Boards of Nursing measure the effectiveness of all registered nursing programs by first time pass rates on the NCLEX-RN. Based on Bloom's taxonomy of cognitive objectives, success on the exam is contingent upon correctly answering questions at the application and analysis level. Critical thinking is required

to correctly answer these higher-level questions (Burkhardt & Irwin, 2004). All registered nurses are expected to be prepared to pass the NCLEX-RN and there is no difference between the exam for a BSN graduate and an ADN graduate. Graduates of associate degree nursing programs represent almost 60% of the registered nurse candidate pool (National Council of State Boards of Nursing, 2000). Associate Degree in Nursing (ADN) graduates have continued to hold their own in first time pass rates for the NCLEX-RN. In 2005, there was a national first-time pass rate of 87.5% with 60,053 ADN graduates, compared to 90.3% with 3,540 graduates from diploma schools and 86.7% with 35,496 graduates from BSN programs (National Council of State Boards of Nursing, 2005). In 2007, this comparison was slightly altered with ADN programs having a 85.5% first-time pass rate with 64,319 graduates, BSN programs demonstrating a 86.9% first-time pass rate with 42,022 graduates, and diploma programs dropping slightly to 88.6% first-time pass rates with 3,222 graduates (National Council of State Boards of Nursing, 2007).

Given that the National League for Nursing and the National Council for State Boards of Nursing have endorsed the importance of nursing students acquiring critical thinking skills, it is important to understand how to effectively accomplish these goals. Several studies have investigated teaching methodologies that increase critical thinking skills in nursing students. Most of these studies have been quantitative and focused on BSN programs. The studies have also been limited to assessing the effectiveness of teaching methodologies and have ignored personal and other influences on critical thinking. Consequently, the body of knowledge is limited regarding student perceptions of what factors influence the development of critical thinking skills and on the development of these skills in ADN students, in particular.

Problem Statement

Although critical thinking is one of the most highly esteemed goals in education (Candy, 1991), many educators remain concerned about the critical thinking skills and abilities demonstrated by students in higher education (McBride, Xiang, & Wittenburg, 2002). These same concerns have been discussed in nursing. The ability to analyze evidence and respond flexibly is considered a prerequisite to competent and reflective nursing practice (Greenwood, 2000).

With professional and credentialing mandates to incorporate and measure critical thinking in nursing programs, curriculum changes had to be made. The traditional nursing curriculum was already under siege to change to meet the requirements for nurses in the complex and ever-changing healthcare environment. Higher level thinking abilities, or critical thinking, was promoted as a necessary component in preparing nurses to provide safe, competent, and skilled nursing care. Since Associate Degree in Nursing programs continue to produce the highest number of registered nursing graduates in the United States, a better understanding of the development of critical thinking in associate degree nursing programs is needed. Further, the NLN *Educational Competencies for Graduates of Associate Degree Nursing Programs* (2000) has stated that evidence based practice and critical thinking provide the foundation for appropriate clinical decision making.

The purpose of this study was to identify factors that influence the development of critical thinking skills in student nurses from entrance to exit in an associate degree program. The following research questions guided this inquiry:

1. What pedagogical factors influence the development of critical thinking skills from entrance to exit for students in an associate degree in nursing program?

2. What personal factors influence the development of critical thinking skills?
3. What other factors influence the development of critical thinking skills?

Significance

The results of this study expanded the critical thinking and adult education literature in that it looked at pedagogical, personal, and other factors that affect the critical thinking skills of adult students from entrance to exit in an associate degree in nursing program.

Kasworm, Polson, and Fishback (2002) asserted that adults seek out, enter, and participate in college because of their needs and their key life roles and because they value collegiate knowledge for their future. Many adult students go to community colleges and specialized professional institutions that provide short-term learning experiences, such as certificate or degree-completion programs. Adult students typically have major family responsibilities, are more likely to combine full-time work with their collegiate studies, are more likely to be first-generation college attendees, more likely come from lower socioeconomic backgrounds, are more likely to be reentry students, and report their highest issue and most stressful concern is their financial situation. Many of these characteristics are inherent in associate degree student nurses, who are more ethnically diverse, older, and more likely to have their own families than students in baccalaureate programs. Many students enrolled in associate degree nursing programs do not have the means, mobility, and time to pursue a baccalaureate program (American Association of Community Colleges, 2007). Many studies have looked at a specific instructional factor's impact on critical thinking, but the majority of these studies has been quantitative and has not investigated the participants' perspectives of factors that impacted the development of their critical thinking abilities. Nor have most of these studies captured the perspectives of associate degree nursing students about factors that impact the development of their critical

thinking skills, which could be very different from the perspectives of students in baccalaureate programs just based on their life stories.

The results also impacted nursing education, particularly associate degree nursing education, as this study investigated the development of critical thinking skills in students in an associate degree nursing program. Nursing educators are not only tasked with preparing students to become future nurses in a changing, demanding environment, but of also ensuring that these future nurses are competent and knowledgeable. The evolution of critical thinking is important in that possessing the skill can determine whether or not nurses will correctly determine a course of action in the varied and complex situations they face in the clinical arena.

The ability to think critically is first fostered in the classroom through the use of many instructional strategies. This tacit knowledge should then be used and transferred into the delivery and provision of expert nursing care in the clinical area as the novice nurse gains more experience and becomes more competent in translating theory into practice. In order to survive and adapt in the workplace environment, nursing graduates must be prepared to utilize the attributes of a critical thinker so that the best possible decisions about client care can be made. This study identified what the graduates of an associate degree nursing program perceived as influential in developing the critical thinking skills that are required for them to function effectively in the nursing profession.

Definitions

Critical thinking. Critical thinking is a dynamic, purposeful, analytic process that results in reasoned decisions and judgment. This process incorporates the competencies of interpretation, analysis, evaluation, inference, explanation, and self-regulation. Interpretation is defined as the ability to understand and identify problems. Analysis is the ability to examine,

organize, classify, categorize, differentiate and prioritize variables. Evaluation incorporates assessing the credibility, significance, and applicability of sources of information necessary to support conclusions. Inference implies an ability to explain the assumptions that lead to the conclusions reached. Finally, self-regulation indicates the ability of self-examination and self-correction (Assessment Technologies Incorporated, 2001).

Associate Degee Nurse. An associate degreed nurse is a person who has successfully passed the NCLEX-RN exam after attending a two year school of nursing program. The associate degreed nurse has courses in an academic setting that focus approximately half in nursing and half in liberal arts and science. The associate degree nurse has the skills, techniques, and theory that prepare the graduate to care for individuals in both the acute care and long-term care settings.

CHAPTER 2

REVIEW OF THE LITERATURE

Introduction

This chapter provided a detailed review of the literature related to critical thinking. The purpose of the study was to identify factors that influenced the development of critical thinking skills of student nurses from entrance to exit in an associate degree program. The research questions associated with the study were: (1) What pedagogical factors influence the development of critical thinking skills from entrance to exit for students in an associate degree in nursing program? (2) What personal factors influence the development of critical thinking skills? and (3) What other factors influence the development of critical thinking skills?

Four areas were identified as having merit in the review of the literature. The first section provided an overview of critical thinking, including a historical perspective of the development of critical thinking and definitions of critical thinking. The next section addressed the major contributors to the critical thinking literature in adult education, along with the related models of reflective practice. The third section addressed critical thinking as it relates specifically to nursing. Within this section, an overview of critical thinking in nursing, along with historical development and definitions, were presented, followed by subsections related to the importance of critical thinking in nursing, characteristics of critical thinkers, instructional techniques for developing critical thinking, and variables that influence critical thinking in nursing. The fourth section expounded on the tools and methodologies used to evaluate critical thinking in nursing. A summary was provided that outlined the rationale for this qualitative research endeavor.

Overview of Critical Thinking

Although the concept of critical thinking has only been prevalent in the educational literature for the last 40 to 50 years, the roots of critical thinking extend much further back in history. In order to get a better grasp of how critical thinking has evolved over time, a short historical perspective was provided.

Historical Development

The intellectual roots of critical thinking can be traced to the teaching, practice and vision of Socrates, who established the importance of asking probing questions rather than just accepting ideas as worthy of belief. He set the basic constructs of critical thinking, including such actions as questioning common beliefs and explanations and carefully distinguishing those beliefs that are reasonable and logical from those that lack adequate evidence or rational foundation (Paul, Elder, & Bartell, 1997).

Socrates' practice was followed by the critical thinking of Plato and Aristotle, who emphasized that things are often very different from what they appear and that only the trained mind is prepared to see through the way things look on the surface to what they really are. The Socratic method was extended to principles of logic and deductive reasoning (Paul, Elder, & Bartell, 1997).

In the middle ages, Thomas Aquinas illustrated that those who think critically do not always reject established beliefs, only those that lack reasonable foundations. In about the same period, Francis Bacon, in *Advancement of Learning*, laid the foundation for modern science with his emphasis on the information-gathering processes. His book could be considered one of the earliest texts on critical thinking (Paul, Elder, & Bartell, 1997).

Fifty years later, Descartes wrote what has been called the second text in critical thinking. Descartes argued that human knowledge must be based on necessary, universally valid truths that are in no circumstance false. These *a priori* truths are accessible to the intellect rather than to the senses. As a mathematician, his assertions became the foundation for the paradigm of logical positivism, in which knowledge was based on analytical truths (Paul, Elder, & Bartell, 1997).

In the 20th century, Dewey recognized the deep need for critical thinking in life and in education. Dewey was recognized as the modern-day founder of the critical thinking movement (Ennis, 1993). From his work came an increased sense of the pragmatic basis of human thought and its grounding in actual human purposes, goals, and objectives (Paul, Elder, & Bartell, 1997). Dewey used the term reflective thinking in his writings but most educators and researchers regard his concept of reflective thinking as being consistent with that of critical thinking (Garrison, 1991).

The origins of the critical thinking movement in the United States were established in an era in which the behavioral mode used in the American educational system was questioned. The Cooperative Study of Evaluation in General Education sponsored by the American Council of Education offered one of the earliest descriptions of critical thinking. Dressel and Mayhew (1954) directed this comprehensive research program. In this study, critical thinking was defined as an "ability to (a) define a problem, (b) select pertinent information for the solution of a problem, (c) recognize stated and unstated assumptions, (d) formulate and select relevant and promising hypotheses, and (e) draw valid conclusions and judge the validity of inferences" (p. 179). These steps were consistent with the problem-solving steps used in previous conceptions of critical thinking. They were also based more on an intellectual view of the problem, with little indication of emotional involvement in the process.

Glaser's research on teaching critical thinking was impacted by both Dewey and Dressel and Mayhew's work (Fisher & Scriven, 1997). Glaser (1941) identified critical thinking as being dependent on one's notion of what it means to think critically and on one's view of the reasons behind those critical thoughts. Beginning with Glaser, the concept of critical thinking was extended beyond the classical concepts of critical analysis and logical, sequential thought. The concept has developed into a multifaceted body of knowledge concerned with the application, measurement, and teaching of highly integrated, dialectical thought (Bleedorn, 1993).

Bloom's Taxonomy was created in the 1950's as a guide for teachers to create educational objectives. The purpose of the taxonomy was to provide a hierarchy for the cognitive domain learning objectives. The six categories included in the taxonomy are knowledge, comprehension, application, analysis, synthesis, and evaluation (Bloom, 1956). The last four of the categories require the higher order thinking processes associated with critical thought (Paul, 1990). Although Bloom's taxonomy is considered indicative of critical thinking, there are critics who believe it to be limited in understanding the essence of critical thinking (Paul, 1985).

Ennis, one of the most prominent contributors to the development of critical thinking since the early 1960's, further conceptualized critical thinking as a process in which reasonable, reflective thinking is focused on deciding what to believe or do (Ennis, 1996). He adds to the definitions used by Dewey and Glaser by including decision making as a component of critical thinking (Norris & Ennis, 1989), but his definition remains consistent with Dewey's idea of reflective thinking.

In contrast to the previous theorists, McPeck (1981, 1990) views critical thinking as a knowledge-based skill that always involves a particular thing or subject. Because of this assumption, in this model the criteria for applying critical thinking vary across fields. McPeck

uses the term “reflective scepticism” to capture the essence of the concept. Scepticism advances progress toward the resolution of a problem, and reflection indicates a level of deliberation that offers a plausible alternative. Critical thinking is both a task and an achievement and, as such, is associated with degrees of skill. Merely meeting the logical requirements of consistency does not make an individual skillful; in actuality, skills are dependent upon knowledge of, and experience in, associated fields. An individual might have the disposition to think critically in all areas but is not, in fact, a critical thinker unless an understanding of the specific area or field being evaluated is achieved (McPeck, 1981).

The acknowledgement that critical thinking is an important educational goal has also been recognized by government officials. Governor Bill Clinton of Arkansas was one of the first to propose critical thinking as a national educational goal. He led the way to including critical thinking into the National Governors’ Association’s recommendation for national educational goals in the 1980s (Facione, 1995). In 1990, six goals for education were identified by the President of the United States and state governors to be achieved by the year 2000. One of these goals recommends that “the proportion of college graduates who demonstrate an advanced ability to think critically, communicate effectively, and solve problems will increase substantially” (U. S. Department of Education, 1995, p. 1).

Throughout the evolution of critical thinking in the United States, there was much inconsistency in the conceptual definition of critical thinking. The need for a clear understanding of the construct led a committee of the American Philosophical Association (APA) to undertake a project in 1987 to achieve a consensus definition of critical thinking. The committee’s Delphi Report on critical thinking was published in 1990. The APA Delphi Report focused on the conceptualization of critical thinking established by a consensus of 46 experts, composed of

theorists, educators, and specialists in critical thinking assessment, over a 22-month timeframe (Facione, 1990a).

The consensus definition of critical thinking, as defined by the APA Delphi report, was confirmed in 1994 by a replication study commissioned by the U.S. Department of Education Office of Educational Research and Instruction and conducted by Pennsylvania State University's National Center on Post-Secondary Teaching, Learning and Assessment. The expert consensus definition was strongly endorsed in terms of its descriptions of both the skills and disposition of critical thinkers (Jones & Radcliff, 1994).

One of the problems with the mandates from professional and governmental agencies to improve the critical thinking skills of college graduates is that the definition of critical thinking across the spectrum of the development of critical thinking has been inconsistent. The APA Delphi consensus definition, along with the U.S. Department of Education Office of Educational Research and Instruction replication study, has at least established some agreement on a definition of critical thinking. A consensus needed to be achieved in order to adequately identify the constructs of the term and to develop appropriate measures for evaluating the constructs in the educational arena.

Definition of Critical Thinking

A consensus definition of critical thinking has remained elusive for many years. Katoaka-Yahiro and Saylor (1994), Daly (1998) and Petress (2004) assert that critical thinking is a pervasive term that is seldom clearly or comprehensively defined. Many writers have contributed to the abundance of definitions and interpretations of critical thinking (Brookfield, 1987; Ennis, 1996; McPeck, 1981; Paul, 1990; Perry, 1970; Watson & Glaser, 1964). It has been viewed as an examination of assumptions (Brookfield, 1987; Meyers, 1986); as a composite of knowledge,

attitudes, and application skills (Meyers, 1986; Paul, 1993; Watson & Glaser, 1980); as a reflective thinking process (Dewey, 1933; Ennis, 1996; Mezirow, 1991); and as cognitive skills and dispositions (Facione, 1991).

Although the various definitions reflect some unique elements, there were also commonalities. The definitions established the connectivity between critical thinking and knowledge, cognitive skills, complex reasoning, argumentation, beliefs, action, problem identification, and evidence and the recognition of alternative frames of reference and possibilities (Daly, 1998). Early conceptions of critical thinking reflected a skills perspective with associated lists of cognitive skills. Opponents to the skills perspective advocated a skills plus dispositions approach (Brookfield, 1987; Paul 1993). The exception to this approach was McPeck (1990) who claimed that critical thinking was not transferable across domains and was associated with appropriate knowledge about the field along with disposition toward critical thinking.

The definition of critical thinking, as defined by the APA Delphi Report, established a degree on consensus. This definition was:

> 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, or contextual consideration upon which that judgment is based. CT is essential as a tool of inquiry. As such, CT is a liberating force in education and a powerful resource in one's personal and civic life. While not synonymous with good thinking, CT is a pervasive and self-rectifying human phenomenon. 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 selection of criteria, focused in inquiry, and persistent in seeking results which are as precise as the subject and the circumstances of inquiry permit. Thus, educating good critical thinkers means working toward this ideal. It combines developing CT skills with nurturing those dispositions which consistently yield useful insights and which are the basis of a rational and democratic society. (Facione, 1990a, p. 2)

An individual did not need to be competent in all areas to be labeled a good critical thinker. Similar to Dewey's and Ennis's conceptions, the skills of critical thinking were thought to operate "interactively in the reflective reasoning process of making a judgment about what to believe or do" (Facione, Facione, & Giancarlo, 1998, p. 3).

In addition to the consensus definition of critical thinking, the panel of experts involved in the Delphi study identified what they believed to be the key to the process of conceptualizing critical thinking. They identified two dimensions: cognitive skills and affective dispositions. Panel members were virtually unanimous in their inclusion of analysis, evaluation, and inference as central elements of critical thinking; in addition, 87% of the members reached consensus that interpretation, explanation, and self-regulation are also essential elements of the concept. The experts also came to a consensus on sub-skills that were related to each core skill (Facione, 1990a).

Associated with each of the skills and sub-skills identified by the Delphi Study were criteria by which acquisition of the skills could be evaluated. The panel believed that the

teaching of critical thinking needed to be guided by a holistic conception of what it means to be a good thinker. Critical thinking was not a separate body of knowledge to be delivered to students but was to be infused into all areas of life and learning (Facione, 1990a).

Establishing a consensus definition for critical thinking was necessary in order to establish a foundation for the discussion of critical thinking in adult and nursing education. Discussion can now proceed to establishing the basis for critical thinking in adult education.

Critical Thinking Models

Historically, scholars have compared critical thinking to unreflective thinking. Critical thinking has been considered a skillful activity that can be accomplished at varying degrees of success, and good critical thinking has been equated with various intellectual standards. Numerous theories of critical thinking are evident in the literature. The earlier models focus on logic and problem-solving techniques. The later models have incorporated the practical and reflective aspects of critical thinking that are evident in the writings of Dewey.

General Critical Thinking Models

Dewey is generally considered one of the earliest proponents of critical thinking in the United States (Ennis, 1993). Dewey (1933) defined reflective thinking as "a state of doubt, hesitation, perplexity, and mental difficulty in which thinking originates and an act of searching, hunting, and inquiring to find materials that will resolve the doubt, settle and dispose of the perplexity" (p. 12).

The reflective thinking introduced by Dewey in the early part of the 20th century is similar to and contains many of the components associated with the critical thinking process. He claimed that reflective thinking included efficient and thorough consideration of the origination and logic of thoughts, ideas, or forms of knowledge, as well as an awareness of the subsequent

conclusions. Reflective thought involves a perplexity, doubt, or mental difficulty and a search for resolution of the perplexity. In this process, there are five phases. The first phase, suggestion, involves gathering information about the problem and generating suggestions for problem resolution. The second phase is intellectualization, which includes intellectual refinement of the problem and further development of problem resolutions. The third phase, hypothesis, incorporates further scrutiny of the problem and recognition that developing solutions may need to be modified. The fourth phase is reasoning in a narrow sense and involves analyzing and synthesizing the various components of the problem and the potential solutions. The final phase, testing the hypothesis by action, seeks to identify if the solutions selected during the fourth phase actually work (Dewey, 1933).

Glaser (1941) built upon Dewey's ideas and defined critical thinking as:

> (1) an attitude of being disposed to consider in a thoughtful way the problems and subjects that come within the range of one's experience; (2) knowledge of the methods of logical inquiry and reasoning; and (3) some skill in applying these methods. Critical thinking calls for a persistent effort to examine any belief of supposed form of knowledge in the light of the evidence that supports it and the further conclusions to which it tends. (p. 5)

Glaser (1941) also produced a list of abilities or skills that underlie the basic tenants of critical thinking:

> (a) to recognize problems; (b) to find workable means for meeting those problems, (c) to gather and marshal pertinent information, (d) to recognize unstated assumptions and values, (e) to comprehend and use language with accuracy, clarity, and discrimination, (f) to interpret data, (g) to appraise evidence and evaluate statements, (h) to recognize the

> existence of logical relationships between propositions, (i) to draw warranted conclusions and generalizations, (j) to put to test the generalizations and conclusions at which one arrives, (k) to reconstruct one's patterns of beliefs on the basis of wider experience, and (l) to render accurate judgments about specific things and qualities in everyday life. (p. 6)

The principal elements of critical thinking included a thoughtful, perceptive manner of considering problems and subjects; knowledge of the methods of logical inquiry and reasoning; and skill in applying these methods (Ennis, 1993). Watson and Glaser (1964) identified six critical thinking abilities, specifying that critical thinkers define a problem, select pertinent information for the solution, recognize assumptions, formulate hypotheses, draw conclusions and judge the validity of inferences. Watson and Glaser considered critical thinking to be a general ability that can be assessed independent of context and subject matter. The Watson-Glaser Critical Thinking Appraisal (WGCTA) was the predominant instrument used to assess critical thinking across several academic disciplines for many years.

Both Dewey and Glaser characterized critical thinking as a matter of adeptly thinking in certain skilled steps. Ennis (1996) expanded this concept to include decision making as a component of critical thinking. He defined critical thinking as "reasonable reflective thinking that is focused on deciding what to believe or do" (Ennis, 1987, p. 10). He suggested that critical thinking is a process, the goal of which is to make reasonable decisions about what to believe and what to do. Ennis further identified six basic elements in critical thinking: (1) focus on the issue; (2) analyze arguments and ask appropriate clarifying questions; (3) determine how strongly the arguments support the conclusions reached based on the situation; (4) ensure the reasoning and conclusions are clear; and (5) overview what has been inferred and determine if it

is credible (Ennis, 1987, 1996). In agreement with Watson and Glaser, Ennis views critical thinking as a general ability that can be assessed independent of context and subject matter. The Ennis-Weir Critical Thinking Essay Test is a general essay test of critical thinking ability (1985).

Ennis (1991) identifies four competencies that characterize an ideal critical thinker. These competencies include clarification, basis, inference, and metacognitive. The competencies are further delineated as:

(1) Clarification – Identify the focus, analyze arguments, ask and answer questions of clarification, define terms, judge definitions, deal with equivocation, and identify unstated assumptions.

(2) Basis – Judge the credibility of a source, make and judge observations.

(3) Inference – Deduce, judge deductions, induce, judge inductions, make and judge value judgments.

(4) Metacognitive – Reason from premises, assumptions, and positions with which one disagrees or doubts without interfering with one's thinking, integrate the other abilities in making and defending a decision. (p. 9)

McPeck (1981) denoted that critical thinking requires the judicious use of skepticism, tempered by experience, so that a more satisfactory solution can be reached about the problem at hand. Learning to think critically is essentially knowing when to question something and what to ask. To the extent that critical thinking is a skill, it is teachable. However, critical thinking is not a generalized skill; it is tied more closely to the specific knowledge and understanding of a particular field than to any specific set of allegedly transferable skills. Meyers (1986) would agree with this assertion that critical thinking "must necessarily vary among disciplines because the core ingredient of critical thinking is the foundational, or epistemic, knowledge of a given

discipline" (p. 6). This was in opposition to Ennis (1962) and Kurfiss (1988), who asserted that critical thinking is best taught as a separate subject.

Another prolific writer about critical thinking is Paul, a leader in the philosophical group of critical thinking theorists, who is associated with the Center for Critical Thinking in California. Paul and Elder (2008) defined critical thinking as the "art of analyzing and evaluating thinking with a view of improving it" (p. 4). They asserted that to think critically, individuals must utilize seven intellectual standards. These standards included (a) clarity, determining whether a statement is clear; (b) accuracy, determining whether the statement was accurate or relevant; (c) precision, determining the specificity of the statement; (d) relevance, determining connection to the problem or issue; (e) depth, determining the complexities of the situation; (f) breadth, considering multiple points of view; and (g) logic, determining if a statement makes sense.

Paul, Elder, and Bartell (1997) identified interrelated and interdependent components of critical thinking. These components include the ability to engage in a reasoned discourse that operates in the context of intellectual standards, involve analytic inferential skills, and are committed to a fundamental value orientation that includes certain traits and dispositions. Their concept of critical thinking is multi-dimensional, including intellectual, psychological, sociological, ethical, and philosophical realms.

Critical thinking is a "mode of thinking –about any subject, content, or problem – in which the thinker improves the quality of his or her thinking by skillfully taking charge of the structures inherent in thinking and imposing intellectual standards upon them" (Paul, Fisher, and Nosich, 1993, p. 4). This definition draws attention to the concept of thinking about one's own thinking, which is an essential component of critical thinking.

There are three hierarchical levels of thought associated with critical thinking. Level 1, lower order thinking, is unreflective and frequently relies on gut intuition. Level 2, higher order thinking, involves selective reflectivity and is a high skill level, but individuals at this level lack a consistent critical thinking vocabulary. The individual at the highest level is explicitly reflective, has the highest skill level, and routinely uses critical thinking tools in analyzing and assessing thinking. The stages of critical thinking development range from unreflective thinker to master thinker. The six stages move from thinkers who are unaware of significant problems in their thinking to the ultimate level, where the good habits of thought become second nature (Paul & Elder, 2008).

In early writings, Paul (1990) discussed weak sense and strong sense critical thinking. Paul regards the conception of weak sense critical thinking as skills related to logic and problem solving that can be applied to other learning, but that remain extrinsic to the character of the person. Strong sense critical thinking is thinking that is integrated within the individual and includes insight into the thinking and feeling processes. Strong sense critical thinking is essential to the free, rational, and autonomous mind and extends logic to the rational examination of controversial social, ethical, political, economic, and religious issues.

Individuals who can think critically in the strong sense have overcome egocentrical and sociocentrical reasoning to demonstrate:

(1) skilled thinking which meets epistemological demands regardless of the vested interests or ideological commitments of the thinker,

(2) skilled thinking characterized by empathy into diverse and opposing points of view,

(3) skilled thinking that is consistent in the application of intellectual standards, holding one's self to the same rigorous standards of evidence and proof to which one holds one's antagonist, and

(4) skilled thinking that demonstrates the commitment to entertain all view-points sympathetically and to assess them with the same intellectual standards, without reference to one's feelings or vested interests of one's friends, community or nation. (Paul, 1990, p. 32)

Facione (2007), who was an integral member of the American Philosophical Association's Delphi report on critical thinking, defines critical thinking as "the process of purposeful, self-regulatory judgment. This process gives reasoned consideration to evidence, context, conceptualizations, methods, and criteria" (p. 19). Critical thinking skills include interpretation, analysis, evaluation, inference, explanation, and self-regulation. Interpretation involves comprehending and expressing the meaning or significance of the experience, including the sub-skills of categorization, decoding significance, and clarifying meaning. Analysis incorporates examining ideas and detecting and analyzing arguments. Evaluation is assessing the credibility of statements, as well as determining the logical strength of the actual intended inferential relationships among the statements. Inference consists of identifying and securing data needed to draw reasonable conclusions, forming hypotheses, and determining consequences. Explanation is defined as the ability to present in a logical and coherent way the reasoning used in reaching the conclusions. Finally, self-regulation means "self-consciously to monitor one's cognitive activities, the elements used in those activities, and the results educed, particularly by applying skills in analysis, and evaluation to one's own inferential judgments with a view toward

questioning, confirming, validating, or correcting either one's reasoning or one's results" (Facione, 2007, p. 7).

Facione (1990a) and Paul (1995) elevated the concept of critical thinking to involve the notion of reflection of one's own thinking and decision-making, or metacognition. This step required individuals to utilize reflection to analyze their own decision-making processes, and then to make revisions as needed. Having extensively studied the development of critical thinkers, Facione and Facione (1990a, 1994) agreed with the Delphi panel that educating good critical thinkers comprised more than developing critical thinking skills. They believed that valuing critical thinking was crucial to its development.

Critical Thinking Models in Adult Education

The importance of critical thinking in adult education is well documented. The most prominent adult educator writing about critical thinking is Brookfield (Merriam & Caffarella, 1999). Brookfield (1987) establishes the rationale for the importance of critical thinking and how adults become critical thinkers. He calls for teaching that fosters critical thinking because adult educators should help learners to enhance their understanding and sensitivity to the ways others anticipate, perceive, think, feel and act. As a concept, critical thinking has been equated with the development of logical reasoning abilities; the application of reflective judgment; assumption hunting; and the creation, use, and testing of meaning. Critical thinking holds the promise of constituting a universal theory of adult learning and, by implication, a template for adult education practice. It can be analyzed in terms of both process and purpose (Brookfield, 1997).

As a process, critical thinking involves adults in recognizing and researching the assumptions that support their thoughts and actions (Brookfield, 1987). Assumptions are the taken-for-granted beliefs about the world and an individual's place in it. When critical thinking is

being used, these assumptions are evaluated for the evidence and experiences that influence them (Brookfield, 1997).

The purpose of critical thinking is to scrutinize two sets of assumptions that are interrelated. The first assumptions are those that frame how an individual views personal power relationships. The second assumptions are those that are accepted because they are thought to be in an individual's best interest (Brookfield, 1997).

Critical thinking is a productive and positive activity; a process, not an outcome; manifested differently according to the context in which it occurs; triggered by both positive and negative events; and regarded as both emotive and rational. Components of critical thinking include identifying and challenging assumptions, challenging the importance of context, imagining and exploring options, and exhibiting reflective skepticism (Brookfield, 1987).

The model consists of five identifiable and commonly experienced phases. The first phase is the trigger event. In this phase, a sense of inner discomfort and perplexity is prompted by an unexpected happening. The second phase is appraisal, which is a period of self-scrutiny and appraisal of the situation in which the concern is identified and clarified. The individual also begins to look for others confronting a similar concern. In the third phase of exploration, new ways of explaining or accommodating the experiences that cause the inner discomfort are sought. The fourth phase, developing alternative perspectives, provides a time to test and become comfortable with a new perspective. The last phase, integration, occurs when these new ways of thinking become incorporated into "the fabric of our lives" (Brookfield, 1987, p. 27). This integration may take the form of transforming attitudes and assumptions, confirming existing stances, and/or reconciling conflicting feelings and ideas.

Brookfield (1987) uses the term "reflective skepticism" for the ability to think critically and identifies it as one of the most significant activities of adult life and the primary purpose of adult education. Reflective skepticism involves the careful scrutiny of and readiness to test assumptions and truths against one's own experience and knowledge of the world. This concept correlates with that of McPeck (1981), who also referred to "reflective scepticism" in his writings about critical thinking. Brookfield agrees with McPeck (1981) and Meyers (1986) that critical thinking is a field-specific concept.

Mezirow (1991), although known best for transformational learning, also discusses critical thinking under the auspices of critical reflection. He suggests that the process by which problems are defined and solved become the context for most learning. An individual's meaning perspective is uncritically acquired in childhood through the process of socialization. New experiences are assimilated and transformed by past experiences through the process of interpretation. An application of habits of expectation to objects or events helps to form the interpretation. Experience strengthens, extends, and refines these structures of meaning by reinforcing expectations about how things are supposed to be.

Two types of learning are instrumental and communicative. Instrumental learning is task-oriented problem solving. Reflection is involved when the content or procedural assumptions guiding the problem-solving process is reflected upon to reassess the efficacy of the strategies and tactics used. Communicative learning focuses on achieving coherence. Partial insights into unfamiliar information directs the way additional data is collected; incidents, key concepts, or words are compared; and meaning perspectives are related to emergent patterns in the data. If the experience does not fit existing schema, an individual creates new meaning schemes to integrate the new experience. Interpreting the unfamiliar is one major way meaning is constructed. Frames

of reference are transformed through critical reflection on the assumptions upon which our interpretations, beliefs, and habits of mind or points of view are based. There are four processes of learning, elaboration of an existing point of view, establishing a new point of view, transforming points of view, or becoming aware and critically reflective of biases about the way others are viewed (Mezirow, 1991).

Both Mezirow (1991) and Brookfield (1987) advocate establishing critical thinking as the basis of all adult education since the end result of adult education is to provide an atmosphere for the examination of assumptions in order to develop more meaningful perspectives in all aspects of everyday life. The characteristics of strong sense critical thinking outlined by Paul (1990) are similar to what Mezirow and Brookfield describe as the ultimate goals of adult education. Mezirow (1990) and Brookfield (1987) advocate for teaching that fosters critical thinking because adult educators should help learners to enhance their understanding and sensitivity to the ways others anticipate, perceive, think, feel, and act. Adult educators have the opportunity to assist learners to take on the roles of others and develop empathy through critical reflectivity, a major component of critical thinking.

To summarize this section, several models of critical thinking have been presented. These models have several things in common. Critical thinking is considered a skillful activity that meets various intellectual standards. In addition, critical thinking requires interpretation and evaluation of observations and requires skills in thinking about assumptions, in asking pertinent questions, and in determining implications of the solutions generated. One factor involved in critical thinking that is brought out in many of the models is that of reflection (Dewey, 1933, Ennis, 1996; Facione, 1990; McPeck, 1981; & Paul 1995). These models espouse the importance of reflection in critical thinking for making reasoned decisions and for learning from experience.

Reflective Practice

Critical thinking involves a reflective dimension. Both Mezirow (1991) and Brookfield (1987) espouse reflective practice as an essential component of critical thinking. According to Mezirow (1991), there is an implicit ordering in the modes of reflectivity. At the narrowest level, there is a simple awareness of a specific behavior or habit. At the higher levels of reflectivity, there is awareness of one's biases and how they affect the interpretation of experiences. Mezirow claims that the primary reason for facilitating critical thinking is to enhance learners' abilities to be critically reflective. The process of reflecting back on prior learning to determine whether what has been learned is justified under present circumstances is central to adult learning. Reflection on presuppositions is what constitutes critical reflection (Mezirow, 1991). The greatest assurance of objectivity comes from exposing ideas to reflective and rational discourse, which not only requires critical thinking but, through the use of this discourse, enhances critical thinking.

Brookfield (1987) also strongly emphasizes the reflective dimension of critical thinking. Four components of critical thinking help learners acquire and entrench critical thinking. These are: (a) identifying and challenging assumptions, (b) becoming aware of the importance of context in creating meaning, (c) imagining and exploring alternatives, and (d) cultivating reflective skepticism.

One of the key ideas and features of all aspects of learning from experience is that of reflection. Reflection is a form of response of the learner to experience and is one dimension of critical thinking. Boud, Keogh, and Walker (1985) identified two main components of reflection as being the experience and the reflective activity based on the experience. In reflection, the experience is recaptured, thought about, mulled over, and evaluated, with the end-result of the

process being personal synthesis, integration and appropriation of knowledge, validation of personal knowledge, a new affective state, or the decision to engage in some further activity.

Reflective practice is the use of judgment in complex and inconsistent situations based on the practitioner's experience and prior knowledge. The three major assumptions associated with reflective practice are that the practitioner will commit to both problem finding and problem solving as part of the process, make judgments about what actions will be taken in a particular situation, and complete the process with some form of action (Merriam & Caffarella, 1999). Moon (1999) summarizes the characteristics of reflective practice as: (a) involving a mental process of reflection, (b) pertaining to the practitioner's own practice or the conditions that shape that practice, (c) occurring as an ongoing process or as a reaction to a specific event or unexpected problem, (d) responding to an externally posed or internal question or task with no immediate solution, (e) resulting in resolution or the attainment of better understanding of an issue, (f)`involving thinking that may be aided by articulation of that thinking, (g) using review and reconstruction of ideas to understand or resolve the issue within the context of improving practice, (h) including an emotional involvement, (i) relating in some way to the process of intuition, and (j) sharing the reflection with others to enhance the process.

All reflective learning theories share the central belief that learners construct, through reflection, a personal understanding of relevant structures of meaning derived from the learner's actions in the world (Fenwick & Tennant, 2004). A person's reflection is the key to unlocking meaning and building knowledge from experience. Reflective practice is considered foundational to building professional expertise.

Reflection-on-action involves thinking through a situation after it has occurred. It is primarily an analytical process that results in new perspectives on experiences, changes in

behavior, and commitments to change. Kolb's model is the one most often used in practice. Kolb (1984) asserted that reflection is all about cognitive processes of conceptual analysis and eventual understanding. The new principle developed by the cyclical process of experience, reflective observation, abstract conceptualization, and active experimentation, is tested out in similar and different situations and is revised and reshaped based on what happens as a result of this experimentation. Learning only occurs when there is reflective thought and internal processing of the experience in a way that actively makes sense of the experience, that links the experience to previous learning, and that transforms previous knowledge (Fenwick, 2003).

Boud and Walker (1993) took Kolb's model of reflection and developed it into a more detailed and comprehensive overview of the reflection process, adding two main enrichments to the model. First, they acknowledged that specific contexts shape an individual's experience in different ways. Second, they identified how differences among individuals, particularly their past histories, learning strategies, and emotions, influenced how people interact with the environment. Reflection is an act of each individual and can only be known to others if the individual wishes to review it; is purposeful, goal-directed, and critical; and is a complex activity composed of both thoughts and emotions (Boud & Walker, 1993).

One of the most important ways to enhance learning is to strengthen the link between the learning experience and the reflective activity that follows it (Boud, Keogh, & Walker, 1985). The three key factors in reflecting on experience are to return to the experience so that learners recall the experience in a descriptive way but do not ascribe judgment or evaluation of the experience; attend to the feelings that arise from the return to the experience, including fostering supportive feelings and downplaying obstructive feelings; and reevaluate the experience so that it can be linked with elements of past experience (association), integrated with existing learning

(integration), tested in some way (validation), and made their own (appropriation) (Boud & Walker, 1993).

In contrast to reflection-on-action, Schön (1983) places greater emphasis on reflection-in-action, which occurs in the midst of action when a difference can still be made to the situation. Schön's research on uncertainty and professional practice led to his theories on the reflective practitioner, known as reflection-in-action (Schön, 1983). This model acknowledges the pivotal contributions of experience, social settings, and reflection to the critical thinking process. Through reflection, practitioners add understanding of the practical and social aspects of their work to their knowledge base. He chronicled the transition of professional practice from technical rationality to reflection-in-action, where the expert practitioners became aware of their own reactions to complicated professional situations. Reflection-in-action begins with identifying the problem and the appropriate role of practitioner in engaging with the problem and progresses to data collection and reframing the problem based on this information. The practitioner draws from past experience to view the new phenomenon, reflects on similarities, formulates new hypotheses, and tests these hypotheses. These steps are very much within the context of the steps for critical thinking.

Reflection tends to focus interactively on the outcomes of action, the action itself, and the intuitive knowing implicit in the action. Professional practice also includes an element of repetition, where certain types of situations occur again and again. As a practitioner experiences many variations of a situation, a repertoire of expectations, images, and techniques develop. This knowing-in-practice tends to become increasingly tacit, spontaneous, and automatic. Reflection-in-action is central to the way practitioners sometimes cope with the troublesome divergent situations of practice (Schön, 1991).

Schön discusses practice constants, or practitioner attributes, brought to reflection-in-action. These are: (a) language, which are the media, language, and repertoires needed for reflective conversation with the situation; (b) appreciative systems, which are the values, such as coherent design, aesthetics, and safety, that help frame the situation for assessment; (c) overarching theories, which supply the language from which to construct particular descriptions and themes from which to develop particular interpretations; and (d) role frames, which are institutional, cultural, and professional definitions of the roles and boundaries of practice. The problem is considered solved when the result fits with the overarching theory (Schön, 1983).

Professionals must be able to reflect on their practice (Schön, 1983, 1987). "Reflection involves the practical, communicative, and experiential aspects of critical thinking in adults' professional practice" (Mishoe, 1995, p. 20). Reflection elevates the importance of critical thinking because adult learners are examining their assumptions and beliefs to develop new ways of thinking and acting in their professional practice. Both reflection-on-action and reflection-in-action are encouraged and vetted in nursing, but this study focused on reflection-on-action as the purpose of the study was to have graduates of an Associate Degree in Nursing program reflect back on the program to identify factors that they perceived were instrumental in developing their critical thinking skills from entrance to exit in the program.

Critical Thinking Instruments

As was indicated in the section concerning critical thinking models, there are several commercial tools available for assessing critical thinking skills and/or dispositions. A brief description of the most widely used instruments, as well as the instrument used in this study, follows.

Watson-Glaser Critical Thinking Appraisal (WGCTA)

The oldest the most widely used critical thinking test is the WGCTA. It is an 80-item multiple-choice test that assesses the areas of inference, recognition of assumptions, deduction, interpretation, and evaluation of arguments. It is discipline-neutral and has a target audience of ninth grade and upward (Adams, Whitlow, Stover, & Johnson, 1996).

Ennis-Weir Critical Thinking Essay Test (EWCTET)

The EWCTET is an essay format test developed to measure critical thinking skills. The areas of assessment are stating the point succinctly, seeing reasons and assumptions, stating one's point of view, offering good reasons, seeing other possibilities, and responding appropriately. The test is discipline-neutral and is appropriate for high school and college-aged individuals (Adams, Whitlow, Stover, & Johnson, 1996; Ennis & Weir, 1985).

California Critical Thinking Skills Test (CCTST)

The CCTST is available in two forms and is currently one of the most frequently used tools to measure the critical thinking skills in nursing students (Staib, 2003). The CCTST is based on the definition of critical thinking from the APA Delphi Report of 1990. It is a 34-item, multiple-choice test developed to measure critical thinking skills. The areas of assessment are analysis, evaluation, inference, and inductive and deductive reasoning. The test is discipline-neutral and has a target audience of college-aged individuals (Facione & Facione, 1994).

California Critical Thinking Disposition Inventory (CCTDI)

The CCTDI is a companion to the CCTST. It is a 75-item, Likert-scale tool developed to assess whether an individual possesses the dispositions and attitudes of the ideal critical thinker. The areas of assessment are inquisitiveness, systematicity, analyticity, truth-seeking, open-mindedness, self-confidence, and maturity. Responses are based on levels of agreement, ranging

from strongly disagree to strongly agree. It is discipline-neutral and appropriate for college undergraduates, graduate students, and professionals (Facione, Facione, & Sanchez, 1994).

Assessment Technologies Institute Critical Thinking Assessment (CTA)

The CTA, published by Assessment Technologies Incorporated (ATI), is a 40-item multiple-choice test that measures the cognitive skills of analysis, evaluation, explanation, inference, interpretation, and self-regulation. It provides a composite score, as well as a score for each of the six cognitive skills. This test was designed by experts in the field of critical thinking in nursing to specifically test the critical thinking skills of nursing students (ATI, 2001).

The CTA is the test used to identify the purposive sample for this study. The CTA was given to nursing students on entrance to and, again, on exit from the nursing program used in the study. The composite scores on entrance and exit were used to identify improvement in critical thinking skills of the students during the duration of the program.

Critical Thinking in Nursing

Overview

The definition of critical thinking, as used in the nursing literature, has changed over the last decade, with a majority of the most recent literature referencing the 1990 APA Delphi Research Project (Turner, 2005). Facione, Facione, and Sanchez (1994) reported that the Delphi project resulted in the first consensus definition related to critical thinking among experts in the field. The California Critical Thinking Disposition Inventory (CCTDI) was developed to measure the aspects of critical thinking outlined in the Delphi report.

Critical thinking is prevalent in nursing literature. The ability to sift or analyze evidence and respond flexibly is considered a prerequisite to competent and reflective nursing practice (Greenwood, 2000). During the 1990's critical thinking became a focus in nursing education.

The National League for Nursing Accrediting Committee (NLN-AC) cited critical thinking as an expected program outcome for nursing programs. All nursing programs accredited by NLN-AC are expected to include and assess critical thinking in their curricula (NLN-AC, 2005). The NLN *Educational Competencies for Graduates of Associate Degree Nursing Programs* (2000) stated that evidence based practice and the use of critical thinking provide the foundation for appropriate clinical decision making. The American Nurses' Association (ANA) also emphasizes critical thinking in its standards of practice (2003). It is difficult to read accreditation materials or to pick up a nursing textbook without finding some reference to critical thinking as an essential component of healthcare.

Importance of Critical Thinking in Nursing

Ennis (1996) maintained that critical thinking is important in personal, vocational, and civic aspects of life. It is a public responsibility to make reasonable civic decisions.
In the nursing profession, it is vital that nurses master the skills of thinking and reasoning in order to constructively critique the value and application of new knowledge. Nurses are continuously confronted with a growing body of nursing knowledge. They are expected to integrate sophisticated technological methods into client care while concomitantly adapting to the ever-changing complexity of the health care system (Myrick, 2002).

The delivery of safe, effective, and efficient care is the underlying goal of good nursing care, and critical thinking is essential to reaching this goal. Clinicians who employ critical thinking skills are more confident in their reasoning. Nurses with more confidence speak their minds, identify potential errors, contribute to team meetings, and provide solid rationales for their decisions. Job satisfaction is promoted because thinking is actively engaged and the job is done to the best of the nurse's ability (Rubenfeld & Scheffer, 2006).

Definition of Critical Thinking in Nursing

The literature contains many definitions for critical thinking, as well as numerous synonyms, such as critical decision making, critical analysis, critical awareness, critical reflection, and clinical reasoning (Turner, 2005). According to Riddell (2007), descriptions of critical thinking developed by writers both in nursing and in disciplines outside nursing have several commonalities, all of which result in a change in belief or course of action. These commonalities include: (a) reflection (Bandman & Bandman, 1995; Brookfield, 1987; Kataoka-Yahiro & Saylor, 1994; Paul, 2004; Watson & Glaser, 1980); (b) identification and appraisal of assumptions (Brookfield, 1987; Kataoka-Yahiro & Saylor, 1994; Mezirow, 1991); (c) inquiry, interpretation and analysis, and reasoning and judgment (Bandman & Bandman, 1995; Brookfield, 1987; Mezirow, 1991; Paul, 2004); and (d) consideration of context (Brookfield, 1987, Mezirow, 1991).

Critical thinking definitions, when applied to the practice of nursing, often focus on the need for critical thinking ability in decision making, problem solving, and clinical judgment (Adams, 1999; Bandman & Bandman, 1995). Critical thinking is also associated with processes in nursing. The NLNAC defines critical thinking as "the deliberate nonlinear process of collecting, interpreting, analyzing, drawing conclusions about, presenting, and evaluating information that is both factually and belief based. In nursing this is demonstrated by clinical judgment, which includes ethical, diagnostic, and therapeutic dimensions and research" (NLNAC, 2005, p. 8).

Ford and Profetto-McGrath (1994) identified knowledge, critical reflection, and action as key concepts of critical thinking. They purported that critical thinking skills go beyond the level

of problem solving to a process of critical reflection and postulated a reciprocal relationship between knowledge and action, which is mediated by critical reflection.

Brunt (2005) defined critical thinking as the process of purposeful thinking and reflective reasoning where practitioners examine ideas, assumptions, principles, conclusions, beliefs, and actions in the context of nursing practice. In addition, this process is associated with a spirit of inquiry, discrimination, logical reasoning, and application of standards.

Videbeck (1997) described the prevailing practices of 55 baccalaureate nursing programs regarding the definition, evaluation, and measurement of critical thinking and found that 43 programs included both affective qualities and cognitive abilities in their definitions of critical thinking. However, there was little other consensus among the definitions of critical thinking. Another study found that nurse educators were more likely than non-nursing critical thinking experts to identify researching, empathizing, sensing, problem-solving, decision-making, and planning as key components of critical thinking. They were less likely to consider skills associated with interpretation, explanation, and self-regulation (Gordon, 2000).

Walthew (2004) used semi-structured interviews on 12 nurse educators in a baccalaureate program to gain an understanding of their conception of critical thinking. These educators considered critical thinking a complex process that included rational, logical thinking, reflective of traditional theories of critical thinking, and incorporated areas of affective domains. The participants particularly emphasized listening to other people's points of view, empathizing, and sensing, all of which concur with Gordon's study.

These studies identified the importance of nursing educators possessing at least baseline knowledge about the concept of critical thinking. The importance of establishing a definition, along with skills, characteristics, and evaluation in each discipline was also illustrated. The

definition of critical thinking used in this study was one that flowed out of the APA Delphi study. This theoretical framework was used by Assessment Technologies Institute (ATI) (2001) in developing the Critical Thinking Assessment (CTA) used to identify the purposive sample for this study. In this framework, critical thinking was defined as a dynamic, purposeful, analytic process that results in reasoned decisions and judgments. This process incorporates the competencies of:

(1) Interpretation - the ability to understand and identify problems;

(2) Analysis - the ability to examine, organize, classify, categorize, differentiate and prioritize variables;

(3) Evaluation – the ability to assess the credibility, significance and applicability of sources of information necessary to support conclusions;

(4) Inference – the ability to formulate hypotheses or draw conclusions based on the evidence;

(5) Explanation – the ability to explain the assumptions that lead to the conclusions reached; and

(6) Self-regulation – the ability for self-examination and self-correction. (pp.1-2)

Characteristics of Critical Thinkers in Nursing

Several authors have identified characteristics of critical thinkers in nursing. Scheffer and Rubenfeld (2000) employed a Delphi method to gain consensus from a geographically disperse group of expert nurses to identify ten habits of the mind and seven cognitive skills of critical thinking in nursing. The habits of the mind included 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.

Other nursing educators have added to the list of characteristics to include self-informed, trustful of reason, fair-minded in evaluation, prudent in making judgments, clear about issues, (Alfaro-LeFevre, 2004; Turner, 2005), maturity, self-regulation, and skepticism (Turner, 2005). Many of these characteristics are consistent with the skills and dispositions identified in the APA Delphi study on critical thinking. The skills outlined in that study included a combination of analysis, interpretation, inference, explanation, evaluation, fair-minded self-correction. Dispositions identified were courageous truth-seeking, open-mindedness, persistence, thoroughness, intellectual integrity, confidence in reasoned decision-making, and maturity of judgment (Facione & Facione, 2007).

Critical Thinking Models in Nursing

Benner (1984) provided the first insight into the critical thinking skills of nurses in nursing. She defined a five stage model of skill acquisition, based on the Dreyfuss model of skills acquisition (Dreyfuss & Dreyfuss, 1980, as cited in Benner, 1984), which included the stages of novice, advanced beginner, competent, proficient, and expert. The various levels of nursing proficiency are differentiated by their thought processes and ability to think critically. The levels range from the novice, who demonstrates context-free, rule-governed behavior to the expert, who intuitively grasps situations. The expert nurse perceives the situation as a whole, uses past concrete situations as paradigms, zeros in on relevant issues, and allows for maximal variety and flexibility of available interventions.

Benner, Tanner, and Chesla (1996) described the six components of the intuitive judgment utilized by expert nurses as pattern recognition, similarity recognition, commonsense

understandings, skilled know how, sense of salience, and deliberative rationality. This model has been criticized for being a linear model that does not explain how expert nurses analyze perplexing situations when intuition fails (Navedo, 2006).

Kataoka-Yahiro and Saylor (1994) asserted that their Critical Thinking Model for Nursing Judgment would help connect critical thinking to clinical nursing judgment. The model was adapted from Glaser (1941), Miller and Malcolm (1990), Paul (1993), and Perry (1970). The five components included in the model overlap and provide reinforcement for critical thinking.

The first component, specific knowledge, was based on Glaser's belief that knowledge was necessary for critical thinking. They maintained that "the urgent need for critical thinking processes within schools and clinical settings must not obscure the basic requirement that nurses be able to access the necessary knowledge base on which to build critical thinking" (Kataoka-Yahiro & Saylor, 1994, p. 353). Nurses must have a knowledge base on which to build their critical thinking skills.

The second component is experience. Kurfiss (1988) emphasized the value of experience in enhancing critical thinking skills. Kataoka-Yahiro and Saylor (1994) cited the work of Tanner, Benner, and Chelsa on the "importance of experiential knowledge, as separate from formalized knowledge, as the know-how that allows for instantaneous recognition of patterns and intuitive responses in expert judgment" (p. 353).

The third component is competencies. Three types of competencies are outlined in the model. General critical thinking competences are related to the scientific process, hypothesis generation, problem solving, and decision-making. These skills are interdisciplinary and important to the application of critical thinking in all academic domains. The second type, critical thinking competencies in clinical situations, includes diagnostic reasoning, clinical

inferences and clinical decision-making. The last type of competency is the critical thinking competency in nursing, which is linked to use of the nursing process. It was suggested that "the nursing process provides a systematic, rational method of planning, providing, and evaluating nursing care using higher order thinking processes (Kataoka-Yahiro & Saylor, 1994, p. 354). However, other nurse researchers have asserted that the nursing process impedes the ability to critically think (Miller & Malcolm, 1990; Jones & Brown, 1991).

The last two components of this model are attitudes, including confidence, independence, fairness, responsibility, risk taking, discipline, perseverance, creativity, curiosity, integrity, and humility; and intellectual standards, including clarity, precision, specificity, accuracy, relevance, plausibility, consistency, logicality, depth, broadness, competence, significance, adequacy, and fairness (Kataoka-Yahiro & Saylor, 1994; Paul, 1993). Professional standards were added to the last component of the model to accentuate safe, competent nursing practice.

Three levels of critical thinking were identified in the model. Kataoka-Yahiro and Saylor (1994) cited Perry's stages when describing their model. The initial level in developing critical thinking skills in a particular area of nursing is identified as basic. This level very much fits into Perry's dualistic stage of intellectual development. At this level, answers to complex problems are right or wrong and there is only one right answer. The second level was the complex level. Nurses at this level recognized options and alternatives but did not make a commitment to any one solution. This level corresponds to the multiplicity level in Perry's scheme. The final level, and ultimate goal, of the model was commitment. At this level, nurses were noted to choose an action or belief based on the options identified at the complex level. Critical thinking ability moves up and down the hierarchy of levels depending on the nurse, but commitment is the ultimate goal.

Reflective practice and nursing.

Research on reflective practice as it relates to nursing began in the United Kingdom. Reflection was first explored by Powell (1989), Jarvis (1992), Atkins and Murphy (1993), and Reid (1993). Reid (1993) explored the prevalence of reflective practice techniques in nurses in the United Kingdom through interviews and found that many nurses claimed to use some form of self assessment that resembled Schön's model of reflective practice.

Some of the seminal work on the skills needed for reflective practice was undertaken by Atkins and Murphy (1993). Through a literature review, they found that the skills needed for reflection included: (a) self-awareness, or the ability to analyze feelings and affective responses; (b) descriptive skills, or the cognitive ability to recognize and recall salient events of the experience and learn from it; (c) critical analysis, or breaking down the situation into its component parts, identifying existing knowledge, challenging assumptions, and exploring alternative solutions; (d) synthesis, which involves integration of new knowledge, creation of new possibilities and solutions, identification of patterns, and prediction of outcomes from the actions taken; and (e) evaluation of the efficacy or value of something, which is critical to the development of new perspectives.

Atkins and Murphy (1993) also identified stages of reflection that were shared by the authors used in the literature review. The first stage is stimulated by a situation, which triggers curiosity, surprise, puzzlement, or an awareness of uncomfortable feelings. The second stage involves a critical analysis of the situation, the knowledge brought to the situation, and previous experience. This stage also involves an examination of assumptions, perceptions, thoughts and feelings, as well as what new knowledge might be required or new strategies employed. In the

third stage the development of new perspectives, learning, and meaning, along with the creation and application of new knowledge, solutions, and actions create a new sense of balance.

Ruth-Sahd (2003) identified the positive outcomes of the reflective process through a data-based literature review. The positive outcomes included integration of theoretical concepts to practice, enhanced self-esteem through learning, acceptance of professional responsibility, enhanced critical thinking and judgment making in complex and uncertain situations, empowerment of practitioners, improvements in practice by promoting greater self-awareness, and helping students develop their clinical knowledge and skills.

Forneris and Peden-McAlpine (2006) analyzed the works of Freire, Schön, Argyris, Mezirow, Brookfield, and Tennyson to develop contextual learning as an educational reflective learning intervention. Following the analysis of the theorists' works, common themes were generated demonstrating four core attributes of critical thinking in practice. Context is the foundation upon which knowledge is built. Context is the nature of the world in a given moment. Making relevant connections to meaning within the context of a situation requires reflection. Reflection illuminates the why and reason for what is done and how to critically discriminate what is relevant. Through reflection, the underlying assumptions are sought within the context. Reflection requires dialogue, through which the context of the situation is shaped. The dialogue is an interactive process of evaluating perspectives and assumptions within context, in order to achieve situational understanding. The fourth attribute is time. Time involves recalling prior learning experiences and identifying how they affect the interpretation and understanding of the context of the present situation, which will impact future action.

In this model, contextual learning encompasses four interrelated components: narrative reflective journaling, individual interviews, preceptor coaching, and leader-facilitator discussion

groups. Contextual learning was implemented over the course of a 6-month period as part of a new nursing graduate orientation program to operationalize critical thinking in practice. After the experience, the authors noted several factors that could be refined to enhance the intervention in nursing education. One suggestion was to provide nursing students time to process their experiences to create new learning. The second consideration related to the timing of narrative reflective journaling. Reducing the frequency of journaling to provide students more time to prepare for dialogue may create more meaningful journals and help nurse educators guide them in more reflective dialogue. The third consideration involved providing students with specific guided reflection questions to assist them in thinking and reflection as they write about their experiences. The final consideration has to do with fostering dialogue. For nursing students, encouraging them to ask questions in a reflective and critical manner turns the dialogue into a critical conversation in which the students integrate their prior learning and practical experiences. Many of these same instructional techniques are those used in developing critical thinking, both in the classroom and in the clinical arena.

Instructional Techniques for Developing Critical Thinking in Nursing

Applying critical thinking strategies in the classroom is a much studied but poorly evaluated technique of teaching. According to Paul, Brinker, Martin and Adamson (1995):

> To teach for critical thinking is, first of all, to create an environment in the class and in the school that is conducive to critical thinking. It is to help make the classroom and school environment a mini-critical society, a place where the values of critical thinking (truth, open-mindedness, empathy, autonomy, rationality, and self-criticism) are encouraged and rewarded. In such an environment, students learn to believe in the power of their own minds to identify and solve problems. They learn to believe in the efficacy

> of their own thinking. Thinking for themselves is not something they fear. Authorities are not those who tell them the "right" answers, but those who encourage and help them figure out answers for themselves, who encourage them to discover the powerful resources of their own minds. (p. 21)

Many studies have sought to determine the impact of a nursing curriculum on the development of critical thinking in nursing students, with inconsistent results regarding the assessment and development of critical thinking skills. The studies have examined a variety of curricular approaches within different types of programs: associate degree, hospital-based diploma, and baccalaureate degree, as well as at all program levels. All studies indicate the need for further research in the area of the assessment of critical thinking and nursing education.

Nursing Curriculum Studies Demonstrating an Increase in Critical Thinking Skills

Adams (1999) conducted an integrated review of studies which examined change in critical thinking abilities of nursing students from 1977 to 1995. Of the studies included, 10 showed a positive change in critical thinking scores, with a statistically significant increase in critical thinking abilities, six found no significant change in critical thinking abilities, and two reported mixed results. The WGCTA was used in 18 studies. The author concluded that "there was no consistent evidence that nursing education contributes to increasing the critical thinking abilities of nursing students" (Adams, 1999, p. 115).

Several studies in the Adams' (1999) review tested for change in critical thinking over time using a pretest/post-test format. Ten of these studies showed a statistically significant increase in critical thinking using the WGCTA as an assessment tool. Frederickson (1979) conducted a pilot study, consisting of 14 baccalaureate nursing students, to measure critical thinking development over the course of a nursing program. A significant difference between

entry and program completion critical thinking scores at a .01 level was discovered. Berger (1984) also found a statistically significant increase in scores when she compared the sophomore and senior scores of 137 generic baccalaureate nursing students.

Gross, Takazawa, and Rose (1987) studied entry-level and exit-level critical thinking abilities of 108 associate and baccalaureate nursing students. The associate degree nursing students were given the initial assessment upon admission; the baccalaureate students were given the examination during their junior year. Attrition during the program resulted in only 37 associate degree students and 34 baccalaureate students completing the exit exam. Findings revealed a significant improvement ($p < .01$) in mean scores for both sets of students in critical thinking skills.

Forty-nine baccalaureate nursing students were studied by Kokinda (1989) at the sophomore, junior, and senior year. A stratified random sample of each class was given the WGCTA at the beginning of each year and, again, immediately prior to graduation. The results indicated a statistically significant difference in critical thinking skills at different levels in the educational program.

Miller (1992) examined the impact of a baccalaureate registered nursing program on the critical thinking skills of 137 students who already had a nursing diploma or an associate degree and who were returning for a baccalaureate degree. The findings demonstrated significantly improved critical thinking skills ($p < .05$) from entrance to exit from the program. An interesting finding in this study was that graduates of the associate degree program experienced a slight regression in scores, while the diploma program graduates experienced a substantial increase.

Other studies, since the Adams' review, have also shown a statistically significant increase in critical thinking skills from entrance to exit using the California Critical Thinking

Skills Test (CCTST) to measure critical thinking abilities. Facione and Facione (1997) analyzed an aggregate data set consisting of 7926 nursing students from 50 educational programs. In the pre/post-test longitudinal portions of the study, a statistically significant difference ($p < .001$) was noted in the CCTST overall score. Thompson and Rebeschi (1999) and McCarthy, Schuster, Zehr, and McDougal (1999) also found statistically significant increases in critical thinking scores when evaluating the scores of 38 and 241 baccalaureate nursing students, respectively.

Baker (2002) conducted an ex post facto four-year longitudinal study with a pretest/post-test design using the CCTST to determine if the critical thinking skills of full-time baccalaureate nursing students would change from entrance into the program to exit. A paired t test analysis showed a statistically significant difference in the scores.

Nursing Curriculum Studies Not Demonstrating an Increase in Critical Thinking Skills

Other studies have been less positive about the impact of nursing programs, indicating no statistically significant differences in critical thinking abilities throughout students' enrollment in nursing programs. Richards (1977); Sullivan (1987); Bauwens and Gerhard (1987); Brigham (1989); Maynard (1996); and Vaughan-Wrobel, O'Sullivan, and Smith (1997) evaluated the critical thinking skills of baccalaureate nursing students and found no statistically significant increase in critical thinking skills from the beginning of the programs to the exit.

L'Eplattenier (2001) conducted a repeated measures study examining changes in critical thinking at four junctures in a baccalaureate nursing program: at program entry prior to taking nursing courses, at the beginning of the second semester of the second year in the nursing program, at the beginning of the first semester of the third year in the nursing program, and upon completion of the nursing program. A total of 83 baccalaureate nursing students participated. The results of the WGCTA did not show improvement through the nursing curriculum. Although

some students did demonstrate an improvement after the first year, these students had lower pretest scores and their scores did not continue to improve during the study.

Jones (2005) used a convenience sample of 60 associate degree nursing students to examine changes in critical thinking from entry to program completion. This study was of particular interest because Jones used the Critical Thinking Assessment (CTA) published by Assessment Technologies Institute (ATI) to assess the critical thinking abilities of these students. Matched pair t-tests were used to determine if differences existed between the two testing periods. There was no significant difference in the CTA composite test scores or in the six subset scores. Jones concluded that the findings of this study were consistent with the body of literature revealing an absence of educational impact on critical thinking scores using standardized assessment tools.

Student Perception of Strategies for Developing Critical Thinking Skills

Gardner (2004) examined nurse graduates' perception of teaching methodologies or techniques in nursing school that contributed to their critical thinking abilities in order for them to successfully master the National Examination for Registered Nurses. Two hundred questionnaires identifying the demographic and self-reporting information, along with a critical thinking survey was delivered to area hospitals. There was a 45% return rate for the questionnaires. Respondents were asked which techniques in the nursing school classroom helped them to become critical thinkers. Seven techniques, including lecture, case studies, reading, multiple choice questions, classmates, papers, and study groups, were listed and respondents rated on a Likert-like scale the frequency each technique helped them become critical thinkers while in their nursing program. This study reported lecture, case studies, reading, and multiple choice questions as techniques that nurse graduates indicated as helping them

become critical thinkers. There was no statistically significant differences ($p>.05$) between the frequency of helpful critical teaching strategies in ADN and BSN programs. Both groups had a tendency to believe that study groups, papers, and classmates did not improve their ability to think critically. Lecture and case studies were rated highest as techniques for critical thinking.

Methodologies Used by Nursing Educators to Increase Critical Thinking Skills

Elliott (2003) surveyed nursing educators in associate or baccalaureate degree nursing programs to identify methodologies used to improve the critical thinking skills in students. Six hundred and thirty-nine nurse educators from Arkansas, Louisiana, and Mississippi completed and returned the surveys for a 67.48% return rate. The sample demographics were consistent with national demographics for nursing instructors. Participants were asked to indicate how frequently, on a scale of 0 to 10, ten teaching methodologies were used. The ten methodologies included case study, concept mapping, formal instruction in critical thinking theory, group discussion/activities, journal article critique, journaling, mind mapping, reflection, self assessments, and team teaching. The top three methodologies selected were group discussions/activities (96.7%), case studies (94.1%), and self-assessments (80.9%).

Specific Methodologies Used to Promote Critical Thinking

It was interesting to note that students asked to identify methodologies that they perceived as improving their critical thinking scores and educators asked to identify methodologies that they used to improve students' critical thinking skills selected several different strategies. The really interesting difference was in the methodologies included in the surveys. The survey to the graduates included several behavioral types of strategies, such as lectures and multiple choice questions, that were not included on the educator survey. It would

have been interesting to see any correlation between the two surveys if the methodologies had been the same. Several instructional strategies were discussed separately in this section.

Questioning. Ikuenobe (2001) promotes the process of questioning, for the purpose of eliciting information and adequate justifications, as an epistemic attitude necessary for critical thinking. He concluded that instructors must create an environment that allows students to express themselves and to be active participants in their own learning.

Many instructors use Bloom's taxonomy as a means of increasing critical thinking skills in nursing students, assuming that questions at the analysis, synthesis, and evaluation levels are necessary to foster these skills. Paul (1990) strongly disagreed with this assumption. His argument was that if teachers were convinced that the ability to generate higher level questions within the taxonomy was all that was needed to teach critical thinking skills, they would not have to make fundamental shifts in their educational philosophy to include instructional strategies that foster critical thinking in their teaching repertoires.

Savage (1998) indicated that the greatest majority of instructional time was spent in asking students questions; however, 70 to 80 percent of the questions asked require only factual recall in spite of the fact that higher level questions elicit higher cognitive processes and are usually retained. The implication was that higher level questions are needed to foster the development of critical thinking skills. Chin (2004) agreed that questions needed to extend beyond factual recall and suggested six ways to foster deeper and more reflective thinking through questioning, particularly emphasizing how, why, what if questions, as well as questions that link this experience to previous learning.

Schroeder (2007) evaluated improvement of critical thinking skills in first semester nursing students after taking multiple choice tests with questions written at higher levels of

Bloom's Taxonomy. The study also compared the improvement of critical thinking skills of students who attended a test taking skills workshop as compared to those who did not attend. A pretest/posttest format was utilized through analysis of scores of the critical thinking variables on the Nurse Entrance Test for the pretest and the analysis of three critical thinking variables on the Critical Thinking Process Test as the posttest. A convenience sample of 37 students was used in the study. Twenty-one of the students attended the test taking skills workshop and were included in the experimental group. Results indicated no significant improvement in critical thinking between the pretest scores and posttest scores in the group of first semester nursing students after being exposed to multiple choice test questions at the higher spectrum of Bloom's Taxonomy. There was a statistically significant relationship ($p \leq .05$) between attendance at a test taking skills workshop and mean critical thinking skills.

Greenwood (2000) asserted that questioning skills need to be extended to the clinical area. Sellappah, Hussey, Blackmore, and McMurray (1998) evaluated the level of questions asked by 26 clinical instructors in two post-clinical conferences. The clinical instructors in this study asked more low level questions (90%), particularly knowledge questions. The suggestion was that the limited use of high level questions by clinical instructions may limit the extent to which critical thinking skills are facilitated.

Phillips and Duke (2001) used a comparative descriptive design to explore, describe, and compare the levels of questions utilized by clinical instructors and preceptors. Results indicated that both groups asked a much higher proportion of lower level questions. In the clinical instructor group, 65.1 percent of questions were low level, knowledge and comprehension questions. In comparison, 87.4 percent of the preceptors' questions were lower level ones, most of which were knowledge questions.

Modeling. Critical thinking is also fostered by modeling (Paul & Elder, 2002; Brookfield, 1995). Brookfield asserts that modeling critical thinking gives learners a model, scaffold, and point of access to the process and also builds trust between learners and teachers. Modeling can be done in lecture by ending each lecture with a series of questions that has been raised or left unanswered, by deliberately introducing alternative perspectives, and by introducing periods of assumption hunting.

Baker (2002) also discussed modeling of critical thinking skills as a teaching strategy. The nursing faculty serves in the role of expert in both the classroom and the clinical arena. The faculty has the responsibility to model critical thinking skills to the students in the clinical area, demonstrating the use of critical thinking skills in daily decision making processes.

One modeling method used in nursing is a preceptorship, which is designed to ensure that learners acquire experience through contact on a one-to-one basis with role models and resource persons (Myrick & Yonge, 2004). Myrick and Yonge used a grounded theory approach to examine the preceptorship experience and its role in the enhancement of critical thinking in graduate nursing education. The key factors identified in nurturing critical thinking were respect, flexibility, openness, safety/trust, and a true spirit of encouraging skepticism on the part of the preceptor. The trust developed between the preceptor and student ultimately led to the student's ability to question and be questioned and to develop confidence in their ability to think critically.

Rush, Peel, and McCracken (2004) conducted a multiphasic qualitative study to gain an in-depth understanding of how nursing students experienced a non-terminal summer externship program. The central process underlying the externship experience was found to be "Empowered Learning on the Inside." The students thought that they were incorporated into the culture of the

unit, which allowed them to experience the real world of nursing and to assume the full scope of practice of a professional nurse.

In contrast, Mamchur and Myrick (2003) in a qualitative/quantitative study looking at conflict between preceptors and preceptees found that approximately 17 percent of the nursing student preceptees experienced some form of conflict with their preceptor. In addition, preceptors and students perceived factors that precipitated conflict differently.

Small group work. Another strategy for fostering critical thinking has been small group work. Slavin (as cited in Garside, 1996) reviewed 63 studies measuring academic achievement with cooperative learning strategies and found that 36 studies demonstrated significantly greater achievement in classes that utilized cooperative learning techniques while 27 studies showed no significant differences. Garside investigated differences between lecture and group discussion instructional methods with regard to the facilitation of critical thinking and found no significant difference in how these methods affected learning.

Khosravani, Manoochehri, and Memarian (2005) conducted a quasi-experimental study to determine the effects of holding group-dynamic sessions in clinical training on the critical thinking skills of baccalaureate nursing students. A paired t-test showed a significant difference ($p < .01$) between the mean scores of critical thinking skills used in preparing clinical report forms between the group that were exposed to group-dynamic sessions and the control group.

Case studies. Case studies or case-based instruction has been used to facilitate critical thinking skills. Mayo (2004) randomly assigned intact classes to receive case-based instruction (CBI) or traditional instruction to compare the academic performance of students who participated in (CBI) with those students who did not receive this intervention in a higher level psychology course. Based on students' numerical averages over three unit exams and a

comprehensive final examination, student performance in the CBI condition (M = 84.69) differed significantly from that in the control group (M = 75.07). Students' perceptions of CBI were predominantly positive with a mean rating of 4.08 on a 1-5 scale.

Allen and Razvi (2006) investigated teacher-education students' perspectives and critical thinking dispositions related to their exposure to case study pedagogy in an educational psychology course. The data indicated that there was little relationship between students' score on the California Critical Thinking Disposition Inventory and the level of epistemological understanding exhibited during case study discussions. Several limitations to the study were listed, including the time limitation associated with videotaping the sessions, the level of instructor questions varied in each session, the incongruity of case complexity and of time spent on instruction and explanation in the different sessions, and the small number (19) of participants.

Lecture. Because there is significant pressure for nursing faculty to cover didactic content in a limited time frame, lecture is the most often used strategy for teaching in the classroom setting. This format limits discussions and the associated use of logic, problem solving, and creativity. Faculty set the pace and tone for the class and may communicate that questions and discussion are impediments to covering the material. Students are reluctant to respond to faculty questions unless class participation is a factor in the course grade (Walsh & Seldomridge, 2006).

Brookfield (1990) asserted that lectures can provide opportunities for faculty to model the forms of critical analysis encouraged in students. The lecture can be ended with a series of questions raised during or left unanswered after the lecture. The faculty member can also introduce alternative perspectives about the topic discussed. A third strategy identified by Brookfield is the introduction of periods of assumption hunting. This can be done in actual time

by compiling the assumptions that underlie beliefs and pondering how these might be investigated. Di Leonardi (2007) agreed that the lecture can facilitate learning effectively when it is reframed from strictly one-way communication to ways that engage learners and force them to interact with the subject matter.

Garside (1996) compared the effectiveness of traditional lecture methods of instruction to group discussion methods of instruction in developing critical thinking skills, using 118 students enrolled in an introductory interpersonal communication class. The study did not demonstrate that the group discussion method was more effective than the lecture method in facilitating the use of critical thinking. Three comparisons achieved statistical significance; the lecture condition produced more learning with regard to total score, lower-level test items, and higher level items.

Lecture and case studies were rated highest as techniques for critical thinking in a study conducted by Gardner (2004). Gardner examined BSN and ADN graduates' perception of teaching methodologies or techniques in nursing school that contributed to their critical thinking abilities in order for them to successfully master the National Examination for Registered Nurses. The majority (82%) of participants in this study were ADN graduates. This was a study that included a survey sent to graduates in their workplace. The study did not identify what aspects of the lecture strategy the graduates attributed to an increase in critical thinking abilities. That is a gap that this study filled by encouraging the graduates from an ADN nursing program to identify their perspective about strategies that influenced their critical thinking skills and by probing those responses to identify how and why these strategies were perceived as influencing critical thinking skills.

Concept mapping. Nurse educators have found that concept mapping is a successful instructional strategy to teach and evaluate critical thinking (Daley, Shaw, Balistrieri, Glasenapp,

& Piacentine, 1999). Irvine (1995) described concept maps as representations of an individual's own interpretation of ideas in a diagrammatic form. General concepts are placed at the top of the map and progressively more specific concepts are placed under one another to form a hierarchy. Major concepts are circled or boxed, and lines show relationships between the concepts with arrows illustrating the direction of the thought processes.

Daley *et al*. (1999) used concept mapping to teach and evaluate critical thinking in senior baccalaureate nursing students who created three concept maps during a semester. The study suggested a statistically significant difference between the first and third map scores, which the researchers considered as demonstrating an improvement in students' critical thinking abilities. Abel and Freeze (2006) conducted a partial replication of this study with an additional emphasis on nursing process and inclusion of nursing care to meet clients' physiological and psychosocial needs. This one-year project included 28 ADN students who completed four concept maps during this time period. There was a steady increase in mean scores and the number of cross-links identified in the time interval from the second semester through the fifth semester, with a statistically significant difference ($p=0.05$) between the scores for the first and last maps.

In contrast, Samawi (2006) used a quasi-experimental, non-equivalent control group, pretest-posttest design to explore the effect of concept mapping on critical thinking disposition and critical thinking skills. A convenience sample of 32 junior and senior level baccalaureate nursing students in the experimental group and 45 in the control group was used in the study. The students in the experimental group developed two concept maps over the course of a full academic semester. The CCTST and CCTDI were used to measure critical thinking disposition and critical thinking skills. There was no difference in the CCTST or CCTDI scores of the two

groups on the pretest. Nursing students who used concept mapping showed no increase in their CCTST and CCTDI on posttest scores, and the two groups did not differ on posttest scores.

In this section, various instructional strategies were evaluated for their influence in developing critical thinking skills in students in higher education, and more specifically in nursing education. The ability of these strategies to produce statistically significant improvement in critical thinking skills was equivocal. The results of some studies were limited by small sample sizes. Several researchers mentioned the inadequacy of the general critical thinking measures, such as the WGCTA and the CCTST, in measuring critical thinking skills in nursing students and called for the need for a nursing-specific measurement tool (Brunt, 2005b). Most of the studies used baccalaureate nursing students and were quantitative studies. The only study found that investigated student perceptions of instructional strategies that improved critical thinking skills was a quantitative study that involved both ADN and BSN graduates who were successful first time writers of the NCLEX-RN. Self-identification as critical thinkers and first-time passage of the NCLEX-RN were the sample selection criteria. A majority of the students in this study were ADN graduates. My study extended the knowledge gathered in Gardner's study by including a participant pool that demonstrated improved critical thinking skills from entrance to exit from an ADN program and expanded the literature on the perspective of ADN graduates through giving them more of a voice in what factors they believed impacted the development of their critical thinking skills.

Variables that Influence Critical Thinking

The literature has also identified numerous variables that influence critical thinking skills. This literature was reviewed in this section.

Age

Alfaro-LeFevre (2004) identified age as one of the personal factors that influence critical thinking, with increased age associated with a higher level of critical thinking. As individuals age, they have more opportunities to practice reasoning in different situations. Also, moral development usually comes with maturity. In March, 2004, the average age of the registered nurse population was estimated to be 46.8 years of age, more than a year older than the average age estimated for 2000 and more than four years older than the average age of the workforce in 1996 (U. S. Department of Health and Human Services, 2004). Due to changing demographics of nursing students, the age variability is great within and between nursing programs. With more second-degree accelerated baccalaureate nursing programs, the age of baccalaureate nursing students continues to increase. Some of these students are older, second-career individuals who bring a different set of life skills to the academic setting that the traditional 18 to 20-year old students. Associate degree nursing students also tend to be older than traditional baccalaureate nursing students.

Results from several studies in nursing have indicated a positive relationship between chronological age and critical thinking, with older students having higher scores (Behrens, 1996; Tiessen, 1987; Vaughn-Wrobel, O'Sullivan, and Smith, 1997). In contrast, other studies have suggested that age has no bearing on critical thinking ability in student nurses (Bowles, 2000; Thompson and Rebeschi, 1999; White & Gomez, 2002). These studies were limited by the small sample sizes used in the study.

Gender

The percentage of males entering the registered nurse workforce has increased only slightly from 2000 (5.4 %) to 2004 (5.7 %). The initial nursing preparation for more male

registered nurses was an associate's degree, rather than a diploma. When the highest nursing-related educational preparation was considered, 47.7 percent of female registered nurses completed at least a baccalaureate program compared to 46.2 percent of males (U.S. Department of Health and Human Resources, 2004). Facione (1990b) administered the California Critical Thinking Skills Test: College Level (CCTST) to 1196 students registered in four courses that satisfied the critical thinking component of general studies. The instrument was administered at the beginning and at the end of the course. The proportion of men and women were comparable, 237 men to 242 women. There was no statistically significant difference between the mean scores of men and of women on the CCTST pretest ($p = .366$). However, the posttests for both groups revealed a significant difference in means ($p = .016$). Facione attributed the difference in the posttest scores, men greater than women, to other factors, such as differences in Scholastic Aptitude Test (SAT) results and grade point averages (GPA), rather than the curricular materials or pedagogical methods used in the courses or in the way in which women and men learn critical thinking.

Few studies report on differences in gender and critical thinking. In a longitudinal study of baccalaureate nursing students, Berger (1984) examined changes in critical thinking from sophomore to senior year using the Watson Glaser Critical Thinking Appraisal (WGCTA). Although the results demonstrated a significant increase in critical thinking, there were no gender differences. Waite (1989) and Bidjerano (2005) also found no significant differences in critical thinking based upon gender.

Ethnicity

Approximately 88.4 percent of registered nurses are Caucasian (U. S. Department of Health and Human Resources, 2004). Facione (1990b) found no difference related to

ethnicity/race in critical thinking scores on the CCTST when SAT scores, GPA, and native English language ability were controlled factors. Both blacks and whites demonstrated improvement on the posttest, but native English speaking Asians and Hispanics showed no CT skill improvement.

Using the WGCTA to investigate whether there were significant differences between 51 African American and 52 Caucasian students on critical thinking and learning style, Gadzella, Masten, & Huang (1999) suggested that the Caucasian students had significantly higher mean scores ($p<.03$) than the African American students on four subtest scores of critical thinking and on the total critical thinking score. The researchers attributed the lower scores in African American students to difficulty with reading and comprehending the problems presented in the WGCTA.

Flowers and Pascarella (2003) used a student sample from the National Study of Student Learning to investigate the factors that influence learning and cognitive development in college. The sample consisted of 175 African American and 688 Caucasian students from 18 four year colleges and universities in 15 states. The results indicated that Caucasian students make significantly higher cognitive gains in college than African American students do in the first three years of college. This finding held for all of the standardized, objective measures of critical thinking, reading comprehension, mathematics, science reasoning, and writing skills.

A correlational comparative study using a sample of 68 graduates of an associate degree in nursing program who were successful first time test writers on the NCLEX-RN conducted by Sayles, Shelton, and Powell (2003) revealed that minority students were less likely than their Caucasian counterparts to pass the NCLEX-RN ($p=.03$). The implication of this study was that pre-admission and admission testing should be used to assist nursing students achieve their goals.

Grade Point Average (GPA)

Several studies related to critical thinking in nursing students include GPA as a variable for investigation. Frederickson (1979) found a positive correlation between total critical thinking scores and GPA. Kintgen-Andrews (1988) found a significant correlation between WGCTA raw scores and nursing course GPA. Miller (1992) documented a positive relationship between WGCTA scores and GPA in a study of 137 baccalaureate nursing students. Although Stone, Davidson, Evans, and Hansen (2001) found a small but significant relationship between GPA and the CCTST, the researchers' hypothesis that there would be a greater correlation between nursing didactic course GPAs and critical thinking skills was not supported by the data. Facione (1997) found final GPA to have a statistically significant correlation with CCTST total score.

Other studies found that critical thinking had no significant impact on GPA. No relationship between WGCTA raw scores and GPAs of either nursing courses or science courses was found by Berger (1984). Thompson and Rebeschi (1999) found no correlation between the CCTST total score and student GPA.

Critical thinking had a variable impact on achievement in still other studies. Miller (1992) found a statistically significant correlation between posttest critical thinking score and nursing GPA but not with GPA from other coursework. Jones (2005) found a statistically significant relationship between entry level critical thinking scores on the CTA and nursing course GPA but found no statistically significant relationship between end-program GPA and entry or exit level critical thinking scores.

Previous degree and previous experience in a nursing area

In a study by Vaughn-Wrobel, O'Sullivan, and Smith (1997), critical thinking skills were significantly higher for those baccalaureate students who had completed another degree.

However, the critical thinking skills were significantly lower for students with previous experience in a nursing area. Adams, Stover, and Whitlow (1999) found that there was no correlation between critical thinking skills and the first or second degree status of the student. No correlation between critical thinking skills and previous experience in a nursing area was found by Brigham (2000). Baker (2002) discovered no significant relationship between critical thinking skills and either previous experience in a nursing area or another degree.

Brown, Alverson, and Pepa (2001) compared changes between traditional, registered nurse to baccalaureate degree, and accelerated students, as measured by the WGCTA at the beginning and end of the same baccalaureate nursing program and found a significant difference in the pre- and post-test scores of traditional students and RN-BSN students, but not the accelerated students. The short time of the accelerated program was offered as an explanation for the lack of change in the levels.

Critical Thinking and Reading Comprehension

There were few studies in the nursing literature that explicitly examined reading comprehension of nursing students. Several studies used the Nurse Entrance Test; however, most often either the Scholastic Aptitude Test (SAT) Verbal or the American College Test (ACT) scores were used in nursing studies.

Stone, Davidson, Evans, and Hansen (2001), using the CCTST, found moderate correlations between SAT scores and critical thinking skills in a study of seniors enrolled in a baccalaureate nursing program. The SAT verbal score demonstrated a significant correlation with critical thinking skills. Specifically, the correlation between SAT scores and critical thinking were higher than the correlations between nursing GPA and critical thinking.

Rubino (1998) examined relationships between Nursing Entrance Test scores and outcomes of GPA, completion of the first year of a nursing curriculum, and success on the NCLEX-RN. Results demonstrated that composite reading was statistically related to first semester GPA, persistence to the second year, graduation, and performance on the NCLEX-RN. The small sample size is a major limitation of this study.

A correlational comparative study using a sample of 68 graduates of an associate degree in nursing who were successful first time test writers on the NCLEX-RN conducted by Sayles, Shelton, and Powell (2003) revealed six variables that correlated ($p \leq .05$) with passing the NCLEX-RN. As scores on the NET composite, math skills, and reading comprehension improved, so did the likelihood of passing the NCLEX-RN. Hoffman (2006), in a descriptive correlational analysis of secondary data from a baccalaureate nursing program, also found that the NET Reading Comprehension Scores were highly predictive of the first time success on the NCLEX-RN.

Variables that influence critical thinking skills discussed in this section of the literature review were age, gender, GPA, previous degree and/or previous experience in a nursing area, and reading comprehension. While these variables have been examined by a number of researchers, inconsistent findings were found in the literature regarding these variables and critical thinking ability. Many of these factors were of particular importance to my research because they were factors that are seen more often in students at the community college level.

Chapter Summary

This chapter has provided a detailed review of the literature related to critical thinking. Scholars from various disciplines have examined this concept to gain a better understanding of the process. The concept of critical thinking began with Socrates and the Socratic style and has

evolved into a major component within academic curricula, although the course has been, and continues to be, torturous.

As can be seen from the literature review, critical thinking is a prevalent and much studied concept. However, there is still an aura of mystery surrounding the term. One problem has been the lack of consistency in definition. Many people have attempted to define the term, and there are some unique, as well as some common, elements to many of the definitions; however, there has not been a consistent definition that one could point to as being what critical thinking truly involves. Perhaps the most substantial definition of critical thinking was developed in the late 1980's by a group of theoreticians and published by the American Philosophical Association in 1990. However, this definition has not been embraced by all and disparity remains about many aspects of the concept. Is critical thinking a purely intellectual process that uses established skills or steps to achieve a desired outcome or it is a process that depends on the context in which it occurs and has an affective, as well as a cognitive, component? Is critical thinking transferable across domains or is it a more discipline specific concept? Are some people more disposed to being critical thinkers? These are questions that have been left unanswered in the literature.

The importance of studying, teaching, and fostering critical thinking is a major theoretical framework in adult education, and reflection is certainly an important dimension of the process. Brookfield (1987) outlines critical thinking to include identifying and challenging assumptions, challenging the importance of context, imagining and exploring options, and exhibiting reflective skepticism, which involves the careful scrutiny of and readiness to test assumptions and truths against one's own experience and knowledge of the world.

Nursing has used the critical thinking definitions from education and philosophy to attempt to formulate its own view of what critical thinking encompasses. Enter any health care setting today and the need for critical thinking is clearly evident. Situations in a typical setting present a level of complexity that requires someone who can make rational and responsible decisions. The problem with establishing a clear definition in nursing is that so many synonyms are used for critical thinking in the literature. However, no matter what terminology is used, reflective practice is still considered by the nursing profession to be an important component of critical thinking.

Nursing education strives to develop critical thinking abilities in students through emphasis on process, inquiry, and reasoning. Critical thinking is a central component in nursing education programs at all levels; however, there is some evidence that educators are not doing well at teaching or assessing critical thinking skills. Some general themes are a lack of a clear definition, problems with the tools used to assess critical thinking not being specific to nursing, inconsistent research showing that nursing education contributes to the critical thinking skills of the students, and an unclear relationship between critical thinking and clinical judgment. As can be seen from the literature review, this problem persists. The collective outcomes of most of the studies reviewed were inconsistent. Some studies provided support for a positive effect of nursing education on critical skills, but others did not provide this support or provided mixed results. There was also inconsistency in the research evaluating different strategies used in the classroom and clinical arena to foster critical thinking. The literature about variables that influence critical thinking skills was also inconsistent.

Fostering critical thinking in nursing students is not an option. Mandates from governmental, professional and accreditation agencies have solidified the importance of making

critical thinking an integral component at all levels of nursing education. Most of the studies reviewed were quantitative studies that focused on baccalaureate programs. Nursing students at the associate degree level are different from those at the baccalaureate level in that they are usually nontraditional adult learners. Several studies pointed out the disparity between how nursing faculty and non-nursing faculty view critical thinking. Two of the studies demonstrated that faculty and students may also have disparate views of which instructional strategies fostered critical thinking skills. This study sought to identify, through a qualitative study, factors that graduates from an associate degree in nursing program attributed to development of their critical thinking skills.

CHAPTER 3

METHODOLOGY

Introduction

The purpose of this study was to identify factors that influence the development of critical thinking skills in student nurses from entrance to exit in an associate degree nursing program. The questions that guided this study were: (1) What pedagogical factors influence the development of critical thinking skills from entrance to exit for students in an associate degree nursing program? (2) What personal factors influence the development of critical thinking skills? and (3) What other factors influence the development of critical thinking skills?

In this chapter, the design of the study, sample selection, data collection methods, data analysis, validity and reliability, assumptions and limitations are discussed. A summary of the chapter will then be provided that pulls the sections of the chapter together and sets the stage for subsequent chapters.

Design of the Study

A qualitative design was used in this study. The three questions that guided this study began with what, which lent titself to qualitative study. The basic qualitative design is well suited to purposes of description, interpretation, and explanation. It can be used to gain new insights into problems about which information already exists, obtain new perspectives, or gain additional information that can be difficult to convey through quantitative methods. This study sought to expand knowledge about the development of critical thinking skills in nursing students through capturing their perspectives about what factors affected the development of these skills from entrance into an ADN nursing program to exit from the program.

Qualitative research is a complex system of terms, concepts, and assumptions that are discordant from those of quantitative research. It is a systematic, subjective approach used to describe and give meaning to life experiences. Qualitative approaches are based on a holistic world view and the belief that there is no single reality, that reality is different for each individual and changes over time, and that meaning can only be understood within a given context (Burns & Grove, 2001). This study was geared towards having students who had increased their critical thinking skills during the nursing program by at least 7.5% identify and describe those factors that affected the development of their critical thinking skills during the two years of the program. Graduates interviewed brought their own individual perspectives to the questions asked in the interview.

Qualitative research involves an interpretive, naturalistic approach to the world that emphasizes the quality of what is being studied rather than the quantity of the response (Denzin & Lincoln, 2000). Its philosophical position is broadly interpretive in the sense that it is concerned with how the social world is interpreted, understood, experienced, produced, or constituted; based on methods of data generation that are both flexible and sensitive to social context; and built on methods of analysis and explanation that involve understandings of complexity, detail, and context (Moon, 2002).

Although qualitative and quantitative research have some common features, including gaining understanding about a phenomenon, gathering and analyzing external evidence in a deliberate fashion, relying on human cooperation, being guided by ethical constraints that sometimes interfere with research goals, and understanding that all studies have some limitations and cannot answer a research question definitively, there are also many differences (Imel, Kerka,

& Wonacott, 2002; Polit & Beck, 2004). These differences were evident in the choice of a qualitative design for this particular study.

The first characteristic of qualitative research is the assumption that there are multiple socially constructed realities (Denzin & Lincoln, 2000) which are shaped by the participant's biography, past experience, knowledge of the world, and social and political views (Boyd, 2001). The overall purpose is to understand how people make sense of their lives and their experiences (Merriam, 2002). This study sought to identify what factors graduates of a two-year associate degree in nursing program perceived as influential in developing their critical thinking skills during the program.

The second characteristic is the epistemological assumptions that knowledge is established through the meanings attached to the phenomenon studied, that researchers interact with the participants of the study to obtain data, that inquiry changes both the researcher and the subject, and that knowledge is context and time dependent (Imel, Kerka, & Wonacott, 2002). The researcher and the participant create understanding together (Denzin & Lincoln, 2000). The researcher is the instrument, which requires the researcher to critically reflect on the choice of research problem and sampling techniques, as well as how personal characteristics and biases shape and influence the study. It is the responsibility of the researcher to identify biases that might impact the study (Burns & Grove, 2001; Guba & Lincoln, 2000; Imel, Kerka, & Wonacott, 2002; Merriam & Simpson, 2000).

The qualitative researcher maintains empathic neutrality. The neutrality results from the researcher establishing a middle ground between becoming too involved and remaining too distant, both of which could have undue influence on the study. The empathy comes from personal contact with the people interviewed and observed during the research (Patton, 2002).

Qualitative research is an inductive research strategy. In this study, the researcher was searching for the participants' perceptions of the development of critical thinking skills and the factors that influenced that development. Few studies have been conducted at the associate degree level about the development of critical thinking skills in nursing students. Most of the studies on critical thinking skills in any nursing program used quantitative strategies. This study sought to extend the knowledge in this area through the use of a qualitative design and through the study of associate degree nursing graduates.

A basic interpretive and descriptive study is used when the researcher is interested in understanding how participants make meaning of a phenomenon, the researcher is the instrument, the strategy is inductive, and the outcome is descriptive. The end result of the research is to discover and understand the phenomenon and the perspectives of the participants (Merriam, 2002). Interpretive studies facilitate greater understanding and insight about a phenomenon (McIntyre, 2001). The focus of this study was to increase understanding of the factors that affect the development of critical thinking from entrance to exit of students in an associate degree in nursing program.

Sample Selection

This study used a purposive sampling strategy. The focus of purposive sampling is on selecting information-rich cases whose contributions will most benefit the study (Burns & Grove, 2001; Polit & Beck, 2004). Purposive sampling is about finding individuals who will richly inform the intent, topic, and aim of a qualitative study (Patton, 2002). With this in mind, the participants in this study were selected because they had increased their critical thinking skills from entrance to exit from the nursing program. The Critical Thinking Assessment (CTA) developed by Assessment Technologies Incorporated (ATI) was used to identify participants in

the study. The CTA is a 40-item examination developed in compliance with educational outcomes criteria of the National League of Nursing to identify characteristics and skills that demonstrate critical thinking in nursing students. The definition of critical thinking used by the CTA is that critical thinking is a dynamic, purposeful, analytic process that results in reasoned decisions and judgments and that incorporates the competencies of interpretation, analysis, evaluation, inference, explanation, and self-regulation. The assessment has a global alpha of .694 and a standardized item alpha of .7012. The construct validity was established by an extensive review of the literature regarding critical thinking theory. Experts in the theory of critical thinking in nursing evaluated all items of the assessment and made the determination that all items adequately and appropriately represented the chosen constructs of ATI's critical thinking model. Content validation was established by asking professionals in critical thinking theory in nursing to identify the pertinent constructs to measure. These experts evaluated each test item for determination of appropriateness and relevance of the item content with the construct (Assessment Technologies Incorporated, 2001).

The CTA entrance assessment was administered to the students in the associate degree program within the first month of the student entering the program, and the CTA exit assessment was given in the last month of the program. The scores on the Critical Thinking Assessment range from 0 to 100%. For the purpose of this study, the composite score of the participant was used. This score is determined by dividing the number of questions answered correctly on the assessment by the number of questions on the assessment. The composite score for global critical thinking is a combination of all the competencies measured. Those students in the May, 2008 graduating class who improved their critical thinking scores on the exit assessment were rank ordered according to the percentage of improvement, and participants were selected based on this

rank ordering, starting with those students who demonstrated the most improvement. The percent increase in composite critical thinking scores for this cohort of nursing students ranged from 2.5 to 22.5 percent. Of the 89 graduates, 61 (68.6%) of them improved in their critical thinking scores, ten (11.2%) remained the same, and 18 (20.2%) decreased their critical thinking composite scores between entrance and exit in the nursing program. Of the 61 students who increased their composite scores, 33 (54%) increased them by at least 7.5% - a significant number. The students who met this criterion were approached to participate in the study, and data collection began after IRB approval was received. Since the graduates were rank ordered, saturation of the data was achieved with students who increased their critical thinking scores by at least 7.5 percent.

Lincoln and Guba (1985) recommended sample size to the point of redundancy or saturation. There were 10 participants in this study. After the tenth interview and data analysis, saturation in the categories was achieved. No new information was gained from the last two interviews. Although it was important to make the sample as diverse as possible in terms of gender, age, and ethnicity, the selection of participants in this study was bound by the criteria associated with increase in composite score on the CTA. Once IRB approval was received, potential participants were contacted by e-mail and/or by telephone about participating in the study. Each participant was interviewed within a year of graduation from the program.

Data Collection

Qualitative findings grow out of three kinds of data collection, in-depth, open-ended interviews; direct observation; and written documents. The most commonly used method is the interview; but, no matter which method is used, the quality of qualitative data depends to a great extent on the methodological skill, sensitivity, and integrity of the researcher (Patton, 2002).

The purpose of a qualitative research interview is to understand a phenomenon from the participant's perspective, along with how and why the participant has come to this particular perspective (King, 1994; Kvale, 1996). An interview is most appropriate when the meaning of a particular phenomenon, perceptions of processes within a social unit, and historical accounts of how a particular phenomenon developed is sought (King, 1994). Participants are interviewed to discover information that cannot be directly observed. The researcher begins with the assumption that the perspective of others is meaningful, evident, and can be made explicit (Patton, 2002).

The advantages of interviews are that (a) ambiguous or confusing questions can be clarified by the interviewee; (b) information tends to be have more depth and can be enhanced through probes; (c) interviewees are less likely to leave a question unanswered; (d) different types of research questions can be considered, which provides more flexibility in data collection; (e) topics that explore different levels of meaning can be explored, and (f) most research participants readily accept this method (Burns & Grove, 2001; King, 1994; Patton, 2002).

A semi-structured interview guide was the data collection method most conducive to the purpose of this study. A demographic questionnaire was collected at the beginning of the interview (see Appendix B). An interview guide that listed open-ended questions to be covered with each respondent was prepared in advance of data collection and used to guide the interview (see Appendix C). The interviewer's function was to encourage participants to speak freely about all the questions on the interview guide and to use probes to get the richest information possible. This technique ensured that information will be provided on the topics outlined by giving participants the freedom to respond in their own words, provide as much detail as they wish, and offer illustrations and explanations (Polit & Beck, 2004).

The interviews were conducted within a year after participants graduated from the associate degree nursing program. The best time to conduct the interviews was after graduation, when the power of the instructor/student relationship has diminished. Once the CTA exit scores were received, the scores of those who had increased their critical thinking scores on the CTA during the program were rank-ordered, and IRB approval was achieved, potential participants were contacted by e-mail and/or by telephone. Several potential participants had moved out of state and contact information was not available. The graduate with the highest percentage increase, 22.2%, was planning a wedding and was totally consumed in this project.

All interviews were conducted on a one-on-one basis. The interviewer and interviewee negotiated the setting of the interview when the participant agreed to the interview. Most of the interviews were conducted in the researcher's office at a time when the interview would not be interrupted. At the beginning of the interview, I carefully reviewed the consent form with each participant and it was signed by both myself and the interviewee (see Appendix D for consent form). A copy of the informed consent was given to the interviewees for their record-keeping. Once consent was obtained, the demographic questionnaire was given to each interviewee to complete. This process took less than 5 minutes for each interview. After asking permission, the interview was begun and was audiotaped. During the interview, notes were kept on the nonverbal communication of the participants and focused on content items for further probing. The first three interviews were not as probing as the later interviews. After meeting with my major professor, several of the interview items were changed and more probes were added to the interview guide. I also became more adroit at focusing on follow-up questions as the study progressed. Each interview lasted between 35 and 75 minutes. Some interviewees were more

effusive than others, and some had great difficulty responding to the questions and resisted probes.

Methods of recording interviews for documentation and later analysis include: (a) audiotaping, (b) videotaping, (c) note taking, and (d) remembering. The most common method used is audiotape recording, which was used in this study. With a tape recorder, an interviewer can concentrate on the topic and dynamics of the interview and can respond appropriately to interviewee needs and cues. The interviewer can also take notes that can help in the formulation of new questions or in the clarification of points made during the interview and that will facilitate later analysis. A good tape or digital recorder and microphone are basic requirements, along with finding a place where there will be no background noise or distractions (Kvale, 1996; Patton, 2002). The tape recorder was checked prior to each interview and a new tape was used for each one. The location of the interviews was selected to minimize background noises and distractions.

The period after the interview is critical to the rigor and validity of the research. The recorder was checked to make sure that it worked properly, that the information was audible and clear, and that further clarification was not needed from the interviewees. At the beginning of the tapes and at the top of the notes made during the interview, a notation was made about the date of the interview, where the interview occurred, and who was being interviewed. In the notes made during the interview, the interviewees' nonverbal communication, as well as any other problems that occurred during the interview, was recorded.

Data Analysis

In qualitative research, data analysis is simultaneous with data collection. It is an inductive strategy that begins with a unit of data that gets compared to another unit of data, looking for common patterns across the data (Merriam, 2002). In this study, a constant

comparative analysis method was used to analyze the data. This method is an inductive procedure to develop and connect categories by comparing incidents in the data to different incidents, incidents to categories, and categories to different categories (Creswell, 2005).

After each interview was completed, the data was transcribed and checked for completeness. Notes were made on the transcription to indicate any pauses or nonverbal communication elicited during the interview. Conceptualizing the data will be the first step in analysis. In the first round of analysis, the data from each interview was scanned to increase familiarity with the content. Each line of the transcript was numbered for easier location as the data from each of the interviews was compared. Notes were made and areas that caught my attention as I went through the data were highlighted. During this process, an effort was made to look for patterns and themes that emerged from the data.

Conceptualization involves taking apart the data and giving each discrete incident, idea, or event a name that represents that particular phenomenon. The interview data was viewed in light of the study questions and information was initially grouped under each question. A folder for each study question was established in Microsoft Word. As the data continued to be reviewed, subfolders were initiated under the folder for the study question and categories identified under each question were established. As the analysis proceeded with each interview, the folders were further subdivided into subcategories that emerged under each category. The incidents were compared as the analysis proceeded so that similar phenomena were given the same name. At the end of the first stage of analysis, a common grouping of codes was established for the data. Once these conceptual labels are determined, the concepts were grouped or categorized. The phenomenon represented by a category was given a conceptual name, which was more abstract than the labels given to the concepts grouped under each category. During

each of these steps, a constant comparison of the data was made and grouping into categories was determined by the properties and dimensions of each of the concepts. Major categories were developed, and data from the interviews were used to substantiate the categories developed.

An example of this process was the development of the categories and subcategories under the study question about pedagogical factors that affected the development of critical thinking skills in the study participants. As the analysis of the data was initiated, data from the interviews that appeared to fit under this study question was placed in the folder for this question using the pseudonym for the participant and the segment of data that corresponded to this question. The data in that folder was then evaluated for categories under the question. Two primary categories were identified – Curriculum Design and Integrative Learning Activities. As the data under these categories was analyzed further, subcategories were identified. The subcategories under curriculum design were acquiring foundational concepts, progressing from simple to complex concepts, and applying learning in the clinical area. Subcategories under integrative learning activities included tests, case studies, simulations, and care maps. During this whole process, I went back and forth between the individual data from each interviewee and the categories and subcategories looking for similarities and inconsistencies in the data. After the tenth interview, redundancy was achieved. No new information was gained from the last two interviews.

Validity and Reliability

In qualitative research, rigor is associated with openness, strict adherence to a philosophical perspective, thoroughness in collecting data, and consideration of all the data. Evaluation of the rigor in a qualitative study is partially based on the logic of the emerging

themes and constructs and the clarity with which it sheds light on the phenomenon (Burns & Grove, 2001).

Methods for ensuring quality in a quantitative study include internal and external validity, reliability, and objectivity (Denzin & Lincoln, 2000). In a qualitative study, internal and external validity and reliability continue to be criteria for measuring quality of a study; however, they are used in different ways. Internal validity for qualitative research identifies how congruent the findings are with reality. There are several strategies used in qualitative research to ensure that the researcher is getting as close to reality as possible (Merriam & Simpson, 1995). In this study, member checks were conducted where the tentative interpretations of the data were brought back to two of the participants to verify that the researcher's interpretations were congruent with the participants' perception of the phenomenon. Several attempts were made to contact various participants in the study for validation of the interpretation but only two contacts were successful. Amy and Halle were telephoned and verification of the categories and subcategories, as well as the conclusions, was obtained. Neither participant had any further insights to add. Another strategy employed was having the major professor examine the data and the interpretation to see if it plausibly captured the data. The final strategy used to accent internal validity was a statement of the researcher's assumptions and biases so the readers can consider how the researcher's assumptions and biases might have affected the results of the study.

The most common method of external validity is reader or user generalizability. The readers of the research determine the extent to which findings can be applied to their context (Merriam, 1995; Merriam, 2002). Transferability posits that the researcher is responsible for providing sufficient descriptive data so that readers can evaluate the applicability of the data to other contexts (Polit & Beck, 2004). A thick description of the data is the most often used

strategy to strengthen external validity. Thus, I attempted to provide enough of a description of the participants and context of the study so that the readers could identify how congruent the context is to their own situations and, consequently, whether the findings could be transferred to their particular situations (Merriam & Simpson, 1995).

Researcher Bias and Assumptions

In qualitative research the researcher is the primary instrument for both data collection and data analysis, which requires the researcher to critically reflect on the choice of research problems and sampling techniques, as well as on how personal characteristics and biases shape and influence the study (Burns & Grove, 2001; Guba & Lincoln, 2000; Imel, Kerka, & Wonacott, 2002). This reflexivity must be integrated into the study. As the primary instrument for data collection and analysis, the importance of self-transparency and disclosure of biases and assumptions was disclosed at the beginning of the research endeavor.

One assumption in this study was that critical thinking development in nursing students can be measured by a critical thinking assessment given at the beginning and again at the end of the nursing program. The CTA entrance exam was administered to nursing students within the first month of the nursing program and the CTA exit exam was given two weeks prior to graduation. The difference in the composite score from entrance to exit indicated a change in the critical thinking skills of the students during the program. Participants who improved their composite scores by at least 7.5% from entrance to exit were potential participants in this study. The researcher assumed that improved results on the CTA from entrance to exit were a good measure for identifying potential participants for the study. The researcher also assumed that enough graduates who increased their critical thinking scores by at least 7.5% would agree to be

in the study so that saturation of categories would be achieved without having to go below the 7.5% increase in composite critical thinking scores.

Another assumption was that students who had developed their critical thinking skills during the course of the nursing program would be able to reflect on their experiences in the nursing program and articulate those factors that had affected that development through the course of the program. These graduates were able to express their perceptions about the factors that affected the development of their critical thinking skills during the course of the program.

A third assumption involved the timing of the interviews. The researcher assumed that the within the first year after graduation time frame would give potential participants time to reflect about their nursing school course and about the factors that affected the development of their critical thinking skills but not be so distant a memory that rich data would not be obtained. The graduates also had more of a chance to use these skills in the "real world" of nursing so that they may be better able to identify the skills that they had developed in the program.

A potential bias was that the researcher is a professor in the nursing program under study. The faculty in this program changed the curriculum based on their interpretation of instructional factors that affect critical thinking skills in nursing students. Consequently, I had to be very cognizant of not introducing personal and program perceptions about factors into the study through verbal and nonverbal communication. This was very difficult because the interviewees tended to respond to the questions as if they only related to the last semester of the program, which is the course the researcher coordinates. I had to direct the participants to other courses and activities in the program several times, although the information on the final course was very important to the researcher for personal purposes. I had to watch the specific probes used and

comments made so that I did not guide the participants in the direction that I wanted them to go rather than allowing them to voice their own perceptions.

Another potential bias was that the researcher had known and taught all of the participants in the study. The researcher developed a perception of the participants as students, which had to be overcome when they were interviewed as graduates. In actuality, it was interesting to see how the graduates had expanded their repertoire of skills and critical thinking abilities since graduation. The problem then became getting them to think back to the nursing program rather than projecting what they know now back to what they knew and did then. The graduates did well in overlooking the researcher as a faculty member. They were respectful, but they were very willing to share their thoughts and perceptions about what factors influenced their critical thinking abilities while they were in the nursing program. They wanted to be able to help future students in the program.

Chapter Summary

This chapter presented the design, sample selection, data collection, and methods of analysis were presented. Further, reliability and validity in qualitative research endeavor, as well as my personal biases and assumptions, were discussed.

CHAPTER 4

FINDINGS

Introduction

The purpose of this study was to identify factors that influence the development of critical thinking skills from entrance to exit for students in an associate degree in nursing program. The following questions guided the study:

1. What pedagogical factors influence the development of critical thinking skills from entrance to exit for students in an associate degree in nursing program?
2. What personal factors influence the development of critical thinking skills?
3. What other factors influence the development of critical thinking skills?

The participants in this qualitative study were graduates from an associate degree nursing program in middle Georgia. The criteria used to select the participants included that the participants had graduated from the associate degree in nursing program within the last 12 months and had improved their critical thinking composite score on the ATI Critical Thinking Assessment from entrance to exit. The results of those students who had increased their critical thinking composite scores were rank ordered to identify potential participants. The lowest percent increase included in the study was 7.5 percent and the highest was 17.5 percent.

This chapter has two sections. The first section presents a description of the study participants. The second section presents the significant themes that emerged during the data analysis of the 10 interviews conducted with the graduates who met the study criteria and agreed to participate in the study.

Description of Participants

Ten graduates were interviewed for this study. The ten graduates were contacted initially by e-mail, telephone, and/or a face-to-face meeting. A scripted dialog was used to explain to potential participants the purpose of the study and what was entailed in the study (see Appendix A). Once verbal consent was obtained, an appointment was established for the interview. Each interview lasted between 35 minutes and 75 minutes.

In this cohort of nursing students, 89 students completed the nursing program and took the ATI Critical Thinking Assessment Exit Exam. The composite critical thinking scores of the cohort ranged from 40% to 87.5% on entrance and from 55% to 95% on exiting the program. Of the 89 graduates, 18 (20.2%) actually decreased their critical thinking scores from entrance to exit. The percentage of decrease ranged from 2.5% to 15%. Two of the three graduates who did not pass the NCLEX-RN on the first attempt were in this group, with a 7.5% and a 12.5% decrease in scores. Ten students (11.2%) remained at the same level between entrance and exit. The remaining 61 graduates increased their critical thinking scores, with a range of a 2.5% to a 22.5% increase. The most dense percentage of increase was 7.5%, with 20 (22.5%) of the graduates in this group. The other graduate who did not pass the NCLEX-RN on the first attempt was in this group. The scores in the cohort were rank ordered to identify potential participants.

As shown in table 4.1, the scores of the 10 participants in the study ranged from 57.5% to 77.5% on the entrance exam and from 65.0% to 92.5% on the exit exam, a wide disparity of scores. The percent increase between entrance and exit ranged from 7.5% to 17.5%. Six participants increased their scores by 7.5%, one by 10.0%, two by 15.0%, and one by 17.5%. Donna, the participant who increased her score the most (17.5%), entered the program with the second highest score and exited with the highest score among the participants. Halle, who

increased her score 7.5%, entered with the lowest entrance score and exited with the lowest score among the participants. Halle's exit score was lower than six and equal to three of the participants' entrance scores. However, Halle contributed more insight into the factors that increased her critical thinking skills than several of the other participants in the study.

Table 4.1 provides a list of the participants by pseudonym, their entrance and exit scores on the ATI Critical Thinking Assessment, and the percent increase in those scores upon exit from the program.

Table 4.1 Participant Scoring on ATI Critical Thinking Assessment

Name	Entrance Score	Exit Score	Percent Increase
Amy	60.0%	75.0%	15.0%
Barbara	77.5%	85%	7.5%
Connie	72.5%	80.0%	7.5%
Donna	75.0%	92.5%	17.5%
Ellen	65.0%	72.5%	7.5%
Fran	70.0%	77.5%	7.5%
Greta	65.0%	75%	10.0%
Halle	57.5%	65.0%	7.5%
Ian	65.0%	72.5%	7.5%
Jen	67.5%	82.5%	15.0%

Table 4.2 presents a summary of the study participants. The participants ranged in age from 22 to 52 years of age. Eight of them were older than 35 years of age, and the average age was 39. This is consistent with the average age of students in the program for this cohort, which was 37. There were five African-American participants, four Caucasian participants, and one Asian participant. Nine were female and one was male. Five of the participants were licensed practical nurses (LPN) who entered through the LPN bridge program. Four of the remaining participants had some experience in the medical field, although not in nursing, prior to beginning the nursing program. All of the participants made a B or higher in the synthesis clinical course in their fourth semester, and all of them passed the NCLEX-RN on their first attempt.

Table 4.2 Participant Profile

Name	Age	Gender	Race	Experience	Nursing GPA	Percent Increase on CTA
Amy	37	Female	African-American	LPN	3.06	15.0%
Barbara	36	Female	African-American	LPN	3.15	7.5%
Connie	46	Female	Caucasian	Associate Degree in Social Work	2.55	7.5%
Donna	31	Female	African-American	ER Technician	2.85	17.5%
Ellen	35	Female	African-American	LPN	3.06	7.5%
Fran	22	Female	Caucasian	None	2.98	7.5%
Greta	41	Female	Asian	Pharmacy Technician	3.225	10.0%
Halle	52	Female	Caucasian	LPN	3.06	7.5%
Ian	51	Male	Caucasian	Paramedic	2.925	7.5%
Jen	40	Female	African-American	LPN	3.125	15.0%

This table presents a demographic profile of the participants. More specific information about each of the participants is discussed subsequently in this section.

Amy

Amy is a 37 year old, single, African-American female. Amy was one of the first graduates contacted since her critical thinking scores increased by 15% from entrance to exit in the program. Amy completed her nursing degree through the LPN bridge program. She had been an LPN for six years when she started the program, with most of her experience being in long term care and psychiatric facilities. Amy had health problems that forced her to miss class sporadically, several times because of hospitalization.

When contacted by telephone, Amy was eager to participate in the study. She decided that she would prefer to be interviewed in her home. It was difficult to set a date because of

Amy's work schedule since she worked night shift on a medical-surgical unit. However, Amy was very willing to participate, and we finally found a date that worked for both of us. After I arrived at her apartment and we caught up on what had been going on with her since graduation, we started the interview.

The first question asked for her concept of the term "critical thinking." She defined it as putting all the data together and coming up with a solution. She gave a clinical example of the use of critical thinking, citing a patient in fluid overload who needs to be assessed before the physician is called. She discussed how important it is to gather as much data as possible and analyze it to come up with a solution. The characteristics she associated with critical thinkers were being positive, seeking knowledge, and gathering information.

Amy was a quiet, shy student who was very bright but lacked confidence in both her academic and clinical skills. When asked to compare her critical thinking skills from entrance to exit from the program, she stated that her skills were a lot better and related her problem-solving ability in the clinical area as an example of this improvement. Amy was reticent and sought clarification that she was answering the questions as she should during the interview. This was very much in keeping with her personality and demeanor during the nursing program.

Barbara

Barbara is a 36 year old, single, African-American female. She had also entered the program through the LPN bridge program. She had been working in a Neonatal Intensive Care Unit (NICU) since she was discharged from the military where she received most of her medical experience and her LPN training. Barbara was quiet, but she was mature and confident in both her academic and clinical skills. A very bright student, Barbara completed the program with a 3.15 grade point average. Barbara continued to work in the NICU after graduation.

Barbara was contacted by telephone about participating in the study. She was eager to help and agreed to meet in my office at the college. The interview was conducted at a time when there were few students in the building so the interview could be conducted in a quiet environment. Barbara increased her critical thinking scores by 7.5%; however, she already had the highest score on entrance into the program of all the participants.

When asked what the term critical thinking meant to her, Barbara stated that it was being able to go beyond the obvious, being able to look at everything that is happening and pull it all together to come up with a solution. Congruent with all participants, she mentioned seeing the whole picture. The characteristics that Barbara associated with critical thinkers were wanting to know why, looking beyond the obvious and tying things together, having the knowledge to apply to a situation, seeing the whole picture, and looking at all sides and taking everything into consideration.

Barbara thought that her critical thinking ability was much improved by the end of the program. She was always curious about why things were done a certain way and that was why she came into the nursing program. By the end of the program, she thought that she was really starting to pull things together and look at situations in a different light from the way she had looked at them as an LPN.

Connie

Connie is a 46 year old Caucasian female, who is divorced with one adult child. Connie already had an associate's degree in social work and was working at a local hospital in case management when she started the nursing program. She thought that she had the medical terminology down because of the case management experience; but the nursing program brought

"depth to that, to what do those terms mean and how do they affect the family, how do they affect the patient, how do they affect the long term care goal."

When I contacted Connie by telephone, she was very willing to set up an appointment for the interview. Connie was a verbal and articulate student, so I was sure that she would contribute to the findings of the study. We agreed to meet at the college in my office since that was an intermediate place for both of us, and Connie was eager to see the other faculty. Since students were meeting with their faculty contacts, we moved to the clinical practice laboratory, which was not in use, and closed the door for quiet and privacy.

When asked what the term critical thinking meant to her, Connie stated that the meaning had changed from being critical of something before she came into the program to looking at the whole picture by the end of the program. It meant to "break it down into its pieces and bring it back together to what you need for treatment." The characteristics Connie associated with critical thinking included being open-minded, being open to new ideas and options, having a foundational knowledge and being open to new knowledge.

Connie thought that her critical thinking ability became much stronger in the program. The nursing program changed it from a two-dimensional process to one that was a multidimensional process, which she thought was necessary for her to function in today's health care environment. Connie was working in a cardiac intensive care unit, where she thought that critical thinking skills were paramount.

Donna

Donna is a 31 year old, African-American female, who was married with two small children while she was in the nursing program. However, she was experiencing marital discord then and has subsequently gotten a divorce. Donna was not a native English speaker; her family

came to the United States from Africa when she was a child. Donna did have a good command of English, but she had to search for a couple of words, mostly medical terminology, during the interview. Donna worked as an emergency room technician during the time she was in the program, and she attributed much of her success in the program to this work environment. Donna increased in her critical thinking scores the most of any other participant, 17.5%, and she entered the program with the second highest score of the participants.

I originally contacted Donna in September to be in the study, and she seemed eager to participate. However, it was not until February and several further attempts to contact her that we were able to set an appointment. Donna continued to work in an emergency room; however, she had changed jobs since I had originally spoken with her. She was on the night shift, so we made an appointment to meet at a chain book store closer to her residence on her day off. I got to the book store a little early to secure a quiet place for us to conduct the interview. Donna was about 20 minutes late because she was called in to work the night before and had not gotten off her shift until 7:00 that morning. I offered her the opportunity to change the appointment, but she wanted to continue.

Donna defined critical thinking as being able to look at the whole picture and analyze what needs to be done. It is the ability to foresee what the outcome would be of each action and then select the best one. The characteristics she associated with critical thinking were being level-headed, calm, rational, independent, willing to go against the grain, and able to teach.

When asked how she would compare her critical thinking from the beginning to the end of the program, Donna stated that it was a lot better in all aspects of her life. She attributed the increased critical thinking skills to helping her as a mother, a student, a consumer, and a person

in society. During the interview, Donna remained focused and provided some good examples of activities in and out of the program that helped improve her critical thinking skills.

Ellen

Ellen is a 35 year old, African-American female, who is married with three children. Ellen was an LPN who entered through the LPN bridge program. She had worked as an LPN, primarily in a rehabilitation facility, for the last five years. Ellen had some academic problems in the final semester of the program which she admitted during the interview were due to marital problems and her work schedule. Ellen's husband was disabled and had received a kidney transplant six years prior to her starting the program. She had to work a full time job during the program in order to assist with finances and maintain health insurance. However, she regrouped and completed the course and the program successfully with a B average.

Ellen was originally approached by e-mail, and an appointment was set up in a telephone follow-up. However, Ellen had problems with her car on the day the interview was scheduled. Although there was an e-mail exchange about another time, nothing was established until I saw Ellen at the hospital where she worked nights on the step-down unit. By this time two months had passed since the missed interview, but we were able to set a time in the next week for the interview. We met in my office at the college. It was quiet that Friday morning because most of the students and faculty were in clinical.

She indicated that critical thinking meant that she reasoned through a situation and the possible causes of that situation. The characteristics she associated with critical thinking were being in deep thought, brainstorming with others, replaying things in your head, and coming to terms with what is happening.

Ellen increased her critical thinking assessment scores by 7.5%. She thought that her critical thinking ability was a little better at the end of the program. She could see the improvement in how she dealt with the critical patients that she took care of in her last clinical course and continued to care for as a graduate. She said, "I can't just be thinking like a regular simple basis because these patients could just go bad in the blink of an eye."

Fran

Fran is a 22 year old, single, Caucasian female. Fran was an outlier in the participants of this study, where the average age was 39. Fran graduated from high school, completed her core in a year, and started the nursing program. Fran also was the only participant with no medical experience. She lived at home with her parents and brother. She had been engaged when she entered the program, but she terminated the engagement to focus more on her studies.

I initially attempted to contact Fran by e-mail, since I did not have a current telephone number for her. I did not receive a reply from the e-mail because she had changed carriers. Two months after I initially attempted to reach her, I saw Fran on the medical-surgical unit where she had precepted in her last semester of the nursing program and where she now worked as a registered nurse, when I went to the hospital to check on current students in the program. Fran was a little reluctant to be in the study because she was afraid that she would not contribute much to the study. However, she did agree and a time for the interview was established. On the day she was due, Fran did not appear for the interview. I was concerned that she had changed her mind; but, the next day, at the time we had established for the previous day, Fran came to my office for the interview. She had written down the wrong date on her calendar. This was typical behavior for Fran, so I was not surprised to see her a day late.

When asked what the term critical thinking meant to her, Fran indicated that it was a situation that requires active thinking where people need to use everything they know in order to assess the situation. The examples she gave of critical thinking were emergency situations and tests. She had difficulty embellishing how these situations engendered critical thinking. Characteristics she associated with critical thinking were being knowledgeable, calm, and successful. Also, people who had made a lot of right decisions and were comfortable with themselves and those who had learned from mistakes in the past and were quick in decision-making were postulated as being critical thinkers.

Fran had increased her scores on the critical thinking assessment by 7.5%. When asked how she would compare her critical thinking skills from entrance to exit from the program, she stated that from starting school having no experience to exit she saw a great improvement. She thought that both the classroom and the clinical experiences helped her to grow in her critical thinking skills, and she offered some good examples to demonstrate her growth.

Greta

Greta is a 41 year old female, who was born in the Philippines and immigrated to the United States. She is married with one child. She has a good command of the English language but still tended to search for words. However, it did not hinder her in the program, where she made an A in the last clinical course and had a 3.225 program grade point average in the nursing program.

After several attempts, Greta was reached by telephone. She was eager to help in any way she could, but she was not sure what she had to offer to the study. A time and date for the interview were established for that same week. Greta met me in my office on a Friday afternoon after all classes were dismissed. Although it was quiet in the office, the telephone did ring a

couple of times to interrupt the interview. Greta did not seem to have problems refocusing on the interview after the interruptions.

When asked what the term critical thinking meant to her, Greta was a huge proponent of the nursing process. “Every time I hear critical thinking, just getting out of nursing school, it’s basically the nursing process. It seems that everything revolves around that.” She attributed the nursing process to the ability to make judgments and corrections to that judgment and to think things through. Characteristics she associated with critical thinking were being confident, willing to admit mistakes, being responsible for your own mistakes and willing to accept that, and being knowledgeable.

Greta had one of the higher increases in critical thinking assessment scores, 10%. Greta thought that she had increased her critical thinking skills considerably during the program. Before she came to nursing school, she saw everything on an even keel (she indicated this by moving her hand straight across). Coming out of nursing school, she felt that she was able to see more things and feel more alive. “I feel that somehow I have a place in society. I feel confident. I feel like I have something to say.”

Halle

Two months lapsed between the interviews with Greta and Halle. Halle was initially approached by e-mail, after she had contacted me for a reference letter. Halle was excited about being in the study and was very willing to be interviewed. An appointment was set for the next week. We met in my office during spring break, so there was only administrative staff in the building. Halle was an LPN who entered through the LPN bridge program. She was an LPN for several years, working in a medical clinic, before coming into the program. Halle is married and has two grown children, one of which graduated from the nursing program two years prior to

Halle's entering it. Halle's family was very supportive of her being in school, and she took a temporary position at her job so she would have to work only as needed during school breaks.

Halle had some personal problems just prior to the last semester that jeopardized her classroom performance. Her brother died of AIDS between the third and fourth semester. She had problems bouncing back from this experience and needed a lot of encouragement to continue in the program. However, she was determined to finish and completed the program with a 3.06 grade point average.

When asked what the term critical thinking meant to her, Halle explained that critical thinking was looking at all aspects of a situation, rather than looking at one particular aspect of it. The example she gave of using critical thinking was a client who is not breathing. The issue of not breathing had to be resolved first; but, once the patient is breathing again, all the factors that may have caused the problem that resulted in the patient's respiratory arrest needed to be evaluated. Characteristics associated with critical thinking were "number one, most importantly, knowing who you are as a person." "Knowing what you'll stand up for and what you'll say no to" were also characteristics mentioned.

Halle thought that her critical thinking ability definitely had improved by the end of the program. She improved on the critical thinking assessment by 7.5%, but she started and ended with the lowest scores of all the participants. Halle had "street smarts." She had much adversity in her life from an early age, and she had to fight and work for everything that she had obtained. She said, "I know where I came from, and I know where I have come." She was extremely proud of what she had done with her life.

Ian

Ian was the only male interviewed for the study. Out of a class of 89, Ian was one of the eight males in the class and the only one who improved his critical thinking assessment scores by at least 7.5%. I had waited to contact Ian because I truly did not think that he would agree to participate; but, I made the attempt because I thought it was important to get a male perspective.

Ian is a 51 year old Caucasian male who is married and has a teenage daughter. He was a paramedic for many years prior to starting the nursing program. Ian is a big, lumbering gentleman who talks and walks slowly. Ian resented the fact that, because of his appearance and his placid demeanor, people tended to overlook his intelligence and the experience he brought to the situation. He was very reserved during the program and talked only when he had something significant to contribute or when he was asked a question. He tended to be a loner in the class.

Ian precepted in a Pediatric Intensive Care Unit during the last semester of the program, and he was currently working in a cardiovascular step-down unit on the night shift. When I contacted him about being part of the study, he was on his way to work. He agreed right away to the interview, and a time was set for two days later. We met in a back corner of the county library during the early afternoon, when there were few people in the library. There were no interruptions during the interview, the shortest in the study at 35 minutes. Ian gave short answers and did not elaborate on many of the questions even when he was prompted continuously.

To Ian, the term critical thinking meant deductive reasoning where a person is able to think in a more rapid way to come to a resolution. The example he gave of critical thinking was one from the clinical area where a patient developed ventricular ectopy and hypotension after an infusion of Magnesium Sulfate. After mentally going through the possible causes, he deduced that the signs and symptoms were caused by the medication. He called the physician for a fluid

bolus to improve the client's perfusion. Characteristics he associated with critical thinking were intelligence, as well as good knowledge and experiential bases.

Ian had improved his scores on the critical thinking assessment by 7.5%, but he did not think that his critical thinking abilities had improved much while he was in the nursing program. He attributed this to him using a lot of critical thinking while he was a paramedic dealing with life threatening emergencies. He did think, however, that the program gave him a different perspective from that of a paramedic and provided him an expanded knowledge and experiential base.

Jen

Jen is a 40 year old, African-American, single female. Jen had retired from the military, where she received her LPN training, and worked in the nursery at a local hospital prior to starting the nursing program in the LPN bridge program.

Jen was contacted by telephone about participating in the study. She was willing to be interviewed, but there were time conflicts for two weeks after contact. Jen came to my office for the interview. She was working for a home health agency on an as-needed basis, but she had an interview the next day for a full-time position at a hospital in the maternal-child area.

Jen is a very pragmatic, no-nonsense person. She initially had problems getting her thoughts together in the interview, but she became more expansive as it progressed. When asked what the term critical thinking meant to her, she had a difficult time coming up with something to say. She thought for at least two minutes and finally said that it was a process that had to be thought about and that required thought to get the answer. She also had problems answering the question about characteristics she would associate with critical thinking. She thought that critical thinking was situational. "I think anybody can sometimes be a critical thinker. I mean it just

depends on the situation and what that entails. Any person with, you know, a little bit of sense can take the time to be a critical thinker."

Jen had improved her critical thinking assessment scores by 15% by the end of the program. She thought that her critical thinking skills, if she rated them, would be a strong B. She expanded on that by saying that she took more time to look at all areas instead of rushing to do things. The classes helped her to look at the overall picture and at what effect that decision might have on the future, rather than just focusing on what was happening at that moment.

Findings

The purpose of this study was to identify factors that influence the development of critical thinking skills from entrance to exit for students in an associate degree in nursing program. There were three questions that guided the research and the analysis of the results. The first set of findings connected to research question one which revolved around the pedagogical factors that influenced the development of critical thinking skills. In this area, two major themes were identified - curriculum design and integrative learning activities. Curriculum design was further delineated as acquiring foundational concepts, progressing from simple to complex, and applying learning in the clinical area. Integrative learning activities included tests, case studies, simulations, and care maps.

The second set of findings was associated with research question two, which focused on the personal factors that influenced the development of critical thinking. The major themes that evolved from this question were curiosity (investigating how and why), confidence, and perseverance.

The last set of findings was associated with research question three - the other factors that influenced the development of critical thinking. The major themes that came out of this section were faculty support and reinforcement. Table 4.3 outlines the major categories and subcategories identified in the data analysis.

Table 4.3 Factors that Influenced the Development of Critical Thinking Skills

I. Pedagogical Factors that Influence Critical Thinking Development A. Curriculum Design 1. Acquiring foundational concepts 2. Progressing from simple to complex concepts 3. Applying learning in the clinical area B. Integrative Learning Activities 1. Tests 2. Case studies 3. Simulations 4. Care maps
II. Personal Factors that Influence Critical Thinking Development A. Curiosity B. Confidence C. Perseverance
III. Other Factors that Influence Critical Thinking Development A. Faculty support B. Reinforcement, both in and out of the nursing program

Pedagogical Factors that Influenced Critical Thinking Development

Research question one sought to identify the pedagogical factors that influenced the development of critical thinking from entrance to exit in a associate degree in nursing program. The major categories derived from analysis of the data were curriculum design and integrative learning activities.

Curriculum design

The first research question sought a better understanding of what pedagogical factors influenced the development of critical thinking for the participants. Curriculum design was one of the major categories that emerged from the analysis. The subcategories that evolved were acquiring foundational concepts, progressing from simple to complex concepts, and applying learning in the clinical area.

Acquiring foundational concepts. Connie perhaps best characterized the importance of acquiring foundational concepts when she said, "I understand how important a foundation is. I didn't at the time to be honest with you. I just resented all the homework and all the frustrations, but I'm grateful now."

Greta, Jen, and Fran all mentioned the nursing process, the nursing profession's manifestation of a problem-solving framework, as the foundation of the nursing program. Greta expressed it best when she said:

> It seems everything revolves around the nursing process. Your ability to, you know, utilize the nursing process, ability to make judgments and corrections to your judgment or whatever. It's just your ability to think things through. I mean anyone can think, but it's just a matter of what direction you're going to go through. And that's why I always stand by the nursing process. It is the foundation, and it seems like it works anywhere I go.

These participants also mentioned looking at the whole picture, rather than just one piece, in taking care of a patient as part of the foundation of nursing practice. Connie spoke about looking at the whole picture and taking everything into consideration, not just one piece, when taking care of a patient.

I think, with the program and now with some little bit of experience in nursing … When a patient is presented, looking at the whole picture, looking at their history, looking at their co-morbidities, looking at, um, the medications that they're on, their history, their family … and bringing that all into play as opposed to just looking at the clinical picture or the report given to me. You know that there is more to that picture and taking all those things into consideration when I am taking care of that patient, not just one piece of it.

Jen agreed that the classes helped her significantly in looking at the overall picture and "not just focusing on what's going to happen at the moment but also on what's going to happen in the future." Fran concurred:

I think it is the way we were taught. I know that as a new student, I just focused on what stood out most to me and didn't assess it fully. I think that's something we are taught to do is assess each individual thing, take it all into account, and then prioritize from there. It's the big picture. And, as I said, coming from no experience that was a big thing to learn.

All of these participants thought that the way they were taught set the foundation to help them to put the picture together. Greta established that in each lesson plan the faculty provided little blocks for assessment, nursing diagnoses, planned outcomes, interventions, and evaluations, all the steps of the nursing process. They were always included in the lectures to provide the backdrop for acquiring the nursing process framework.

She elaborated with the statement:

Actually, you are just like being pounded. You know, like critical, critical, critical thinking, critical thinking critical thinking, but not really knowing, you know, what

you're after. But, you know, [the program] just kept on with critical thinking, critical thinking. Nursing process, nursing process, nursing process. And the last semester, I was going, "Oh, okay, I remember this from [the first semester]. I remember this from [the second semester]." So it seems like everything just went … A long puzzle came in, everything came in pieces just to make one thing.

Amy concurred that it was the whole format of the program that helped improve her critical thinking scores.

I think the entire format. You know, of having the, uh … You guys go in and pick out, you know, the information that we need to be responsible for so you can just be able to focus on that. Just being able to focus on the most important things, I think that was important.

Donna also associated the curriculum with her increase in critical thinking skills. She related:

You know just being in the program has taught me to think. Which, I thought I was thinking, but apparently I wasn't. I can see a definite difference in myself. Things that used to get me excited and all revved up, they really don't bother me as much now. Uh, I've learned to say, "Let me think about that, and I'll get back to you." I've learned to trust that inner voice which I never did before and to question events. If I don't feel comfortable with it or it just doesn't sound right, do my own research to find out why or what can be done better about it.

Ellen, whose critical thinking scores increased by 7.5%, emphasized the whole program and how it influenced her with the statement:

I can't just say it was inside the classroom or outside the classroom because I think

> the whole time, either in the clinical or either in school, we had to be thinking. I think it's, you know, the whole process between going to class and taking in all you can take in while you're in there and processing that information and then going out into your clinical and processing whatever information you had and using it to take care of your patients to the best of your ability.

Progressing from simple to complex concepts. The curriculum design of the program was one of building from simple concepts to more complex concepts. Barbara, Greta, and Halle referred to how the assignments and course material built on each other and culminated in bringing everything together in the last semester. Greta and Halle reported that, in the last semester, it was evident that the information from all the semesters provided the "pieces of the puzzle" that came together just to make one thing. Greta said, "In [the last semester] is when it really all came together. I can tell you exactly what it is now, it just seems like everything just made sense." She went on to clarify, "It just didn't dawn on me until, really until [the last semester], that we've been doing this all along. You know, the building up until you get there ….."

Barbara agreed that "all the assignments seemed to build on each other and that everything came together in the last semester. I think it was everything that just seemed to build upon each other to help us develop our skills. I can't think of one thing that was most important."

Ellen used the critical thinking entrance and exit exam to illustrate her change in perspective from simple to complex:

> The first time when we took [the critical thinking test], it was like this don't make any sense. This just don't make any sense! But, when I took it the second time, I actually read through my questions and I mentally … I did like a mental picture in my head of what

> this question was saying. And, I just, you know, I read the question and I had this mental picture of what exactly it was saying, and exactly what it was asking. And that way it helped me to realize what the question was really asking and how it made sense.

Fran referred to this building up to a more complex understanding as "connecting the dots." "Yeah, just suddenly the light bulbs go off and you kind of connect the dots and assess the situation and realize that something needs to be done." In this passage, Fran was referring to applying what she had learned in the program to a clinical experience. She continued to state that, as she started taking care of more patients with the same or similar diagnoses, she "started to see the trends. You start to see the trends. You see the signs and symptoms and you start to get it. It starts coming a little bit quicker every time too."

Fran also mentioned learning medications as a method of progressing from simple to complex concepts. As she researched medications she was giving in the clinical area and associated the medications with specific patients and responses, learning the medications became much easier for her. She related:

> Very early on, you don't really know what medications are what but you want to look them all up because you want to know and just, um, not being aware of what affects the body and how. The instructor (who was part-time) was very impressed that we kind of had that from our school, that our students wanted to know what the medication was before we went in [the patient's room]. It was very difficult to memorize those medications but when you see them every day, day in and day out, you see the people and it's like it's another connection. It's visualization, also. You see the people, you know their signs and symptoms and you know what they're getting it for, and you know how it's affecting them because you can see the results of that.

Halle referred to the process as going through the full circle of critical thinking, which culminates in the last semester. The comments by Halle best exemplifies what the other participants emphasized in this area:

> When I first started it was more, okay, this skill process but not really understanding why we did it. But, going through this program, it made me look at … outside the box. It made me understand, okay we're doing this because a situation happened and understanding why we need to do this. But, it was more a process of understanding that it is not just the tasks that I was taught to do as an LPN but the critical thinking aspect that allowed me to understand why, when, who, and how. So it encompassed the whole part of it, and it allowed the full circle of critical thinking to come all the way through with the ability to do it.

Applying learning in the clinical area. All of the participants mentioned applying their learning in the clinical area as a strong force in developing their critical thinking skills. They contributed the improvement to transferring their classroom knowledge to actual practice – that "hands-on" experience. Amy and Barbara attributed actual practice and being able to apply what was learned in the classroom to a situation in the clinical area as being extremely important in developing critical thinking skills, particularly when the application came immediately after or shortly after learning a concept in the classroom. Donna said that clinical practice "really helps put the whole puzzle together. You hear it in class and it makes sense, but until you actually see it in person …. It's like icing on the cake. It's like the 'ah ha' moment." Jen thought that the clinical application was the most important factor in improving her critical thinking skills. "But looking at, you know, putting two and two together. Looking at what it has in the book and then

seeing what it does, you know, on the floor. Those are the things that make it come together, when you're looking at it in the book and you're seeing it happen."

Ellen agreed with the other participants and stated:

> The whole process between going to class and taking in all you can take in while you are there and processing that information and then going out into your clinical and processing whatever information you had and using it to take care of your patients to the best of your ability.

Ian reiterated that the classroom material provided the knowledge base in order to do critical thinking, and that knowledge helps with the transition to the clinical area and using critical thinking in actual practice. Greta also attributed the amount of time spent in the clinical area and the build up in the number of patients assigned to the students as components that increase critical thinking skills. "In [first semester] you have one patient, in [second semester] you get two patients maybe, [third semester] you get up to like two or three patients, in [fourth semester] a team of patients. It's your constant clinical setting."

In the last semester of this ADN program, students can request to be with a preceptor in the clinical area for their 217 hours of clinical experience. The ultimate decision about the student's readiness to be assigned to a preceptor is made by the program faculty. Factors considered in the decision are the student's academic history and clinical expertise. Only those students with a 3.0 nursing GPA are allowed to precept in a specialty area, such as an intensive care unit, an emergency room, or the recovery room. However, some students who would be approved to work with a preceptor do not apply because of scheduling problems or because they choose to see different aspects of nursing, rather than being in one place the entire semester. Those who do not choose to or who are not approved for a precepted experience are

assigned a three week medical-surgical rotation with a clinical instructor, 36 hours in an intensive care unit with an instructor and/or a preceptor, and the remainder of the 217 hours are spent at various sites, which include dialysis clinics, physician offices, emergency rooms, health departments, hospices, long term facilities, and home health agencies. The students select from these sites which three they would prefer to be assigned for clinical experiences.

Eight of the ten participants were assigned with preceptors on nursing units during their last clinical rotation. These students spent 217 hours with their preceptors in the clinical area working up to taking the preceptor's team of patients, with the preceptor being back-up, by the end of the semester. Four of the eight participants with preceptors were assigned to either a pediatric or adult intensive care unit. They all suggested that this assignment helped them because they could actually apply the advanced medical-surgical concepts covered in the classroom during the semester. Amy stated, "I was really grateful to be in the intensive care unit the last semester because a lot of the material corresponded with the classroom work."

The eight participants mentioned repeatedly that the preceptorship was instrumental in developing critical thinking. Fran affirms, "The preceptorship really helped. You know, you're in a situation where it's pretty close to what you are going to be doing; you have someone there that will help you." Amy asserted that she was "grateful to be in the ICU because a lot of the material corresponded with the classroom work." Amy, Barbara, and Ian agreed the "real world" atmosphere of being with a preceptor made a significant difference. According to Barbara, the clinical experience in the neonatal intensive care unit (NICU) the last semester "really helped me with pulling everything together. I was really able to apply what we were learning in the classroom to the experience in the NICU." Ian asserted that being in the pediatric intensive care unit (PICU) "really gave me a picture of what nursing was all about that I had not gotten in the

previous semesters. I think this is when I first realized how being a nurse is more complex and requires different knowledge and experience bases from that of a paramedic."

Jen appreciated that her preceptor allowed her to be more independent, an attribute that four of the other participants also mentioned. "You have someone who is going to push you, push you to be on your own. I had to sit there and think, 'Okay, what am I going to do, how am I going to prioritize, you know, what I have to do here?'"

Fran thought of the first time she was with her preceptor as an instance where she saw critical thinking in action. She related:

> I remember I was still in school. It was the first time I was with my preceptor. I had a patient on my own. The doctors had decided that she needed some blood pressure medicine to get her blood pressure down so we could send her home. I was taking the IV out of the woman, and she did not wake up. Right then and there, I think something hits you. That's when you say, I don't know if it's critical thinking, but you know that someone needs some help pretty quick.

Greta remarked about a similar experience in having to make a decision about a clinical situation during her preceptorship. Her contribution was:

> In [the last semester] I was in a preceptorship. I was like (snapping her fingers), I was like this. And, you know, I remember an instance … I don't know what had happened but, you know, my preceptor was not there and it seems like I was the only one there. And I don't remember what, but I had to make a decision so I made the decision. And it was just a signature or something. It was a consent form, I think. But my training came in and I knew what to do. My preceptor had my back, but she also allowed me independence to learn on my own.

What the participants observed or experienced in the clinical area, both positive and negative, contributed to the development of their critical thinking skills. Ian referred to an incident in the pediatric intensive care unit where he precepted as the first time he used critical thinking skills. The incident involved a pediatric patient who received too much of a particular medication that resulted in a negative outcome. "From that I've learned an important lesson about medication dosages in children, which reinforced the dosages we learned in our pharmacology course. I knew the smaller dose should have been given." Jen also related an incident where an infant received the incorrect rate of intravenous fluids. Jen and her preceptor were taking care of two infants ordered on the same fluids but at different rates. Jen had the feeling that something was not right, but it took a while for her preceptor to check with her and correct the problem. "I just said that from then on, you know, you just have to think from the get go that this is critical what you do to these infants. And you learn from your mistakes, and I learned that I'm going to the bedside and checking the intravenous fluids before the other nurse leaves from now on."

Halle had a more positive experience where she was able to apply her management skills in the clinical area. She had two medical assistants who were not taking the vital signs or getting the blood sugar readings for her clients. She went to the nurse assigned to those patients with her that shift about how to handle the situation, and he asked her what she thought she should do. "I thought for a minute and I said, 'Well, okay this is where I have to do my critical thinking and I have to be a registered nurse.'" Halle negotiated with the two assistants to where they did what she needed them to do and she agreed to help them as much as possible. "Guess what, I had no more problems. Those two gals were asking for me to be their nurse because they knew that they could count on me. That's critical thinking."

Donna attributed working with her preceptor as one of the most important things that contributed to her critical thinking. In her opinion:

> [My preceptor] was wonderful. She taught me so much. She was awesome. She would take me in and ever so calmly and ever so gently … she had a way with patients. Patients just came in and they were so scared, and she would just calm them right down. She had a calming thing about her. And she knows her stuff. She went in there and, you know, she laid it all out for me. She showed me how we do it, why we do it, and what happens.

Connie did not choose to be with a preceptor the last semester, although she was eligible to apply for one. She attributed a clinical instructor that gave students room to take care of their patients without towering over them and over analyzing everything that was happening as one that promoted critical thinking development. "Sometimes too much supervision shuts you down a little bit; but, just enough room to let you go but know they're there I felt was more breathable and more … um, it gave you more room to learn. I guess more breathing room."

Integrative Learning Activities

Integrative learning activities that influenced the development of critical thinking emphasized by the participants were tests, case studies, simulations, and care maps. The tests encompassed both the unit exams in the nursing courses and the program-wide computer testing included in the program. Each semester, students in this nursing program are tested, using course specific tests from ATI to verify learning of the material in the course. For example, the ATI fundamentals computer test is given at the end of the first nursing course. Benchmarks are set for each computer test. The students are provided practice tests that they can complete during the semester to help prepare them for the test at the end of the semester. Case studies were activities used in seminars, and students also developed and presented a case study of a client

they cared for in the last semester as part of the course work for that course. Simulations were used exclusively with the LPN bridge program students and included evolving case studies and debriefings. Care maps were completed on clients that the students had in the clinical area to prepare them for taking care of the patient and to evaluate the care given to the patient.

Tests. All of the participants mentioned unit exams as a method that helped them develop critical thinking skills. Most of the impact of the tests was associated with the level at which the questions were written. According to Fran, "The tests really whipped you into shape." Ellen elaborated on this point when she said:

> You had to really think your way though what, you know, what this question is really asking you and what the answer really is because sometimes it is not just right there in the book. Because I mean, honestly, sometimes you study and you think you know the stuff and then when you get your test, it's like this is a foreign language to me. It's just the whole process of, you know, trying to wake up and realize you're going to have to think a little bit harder, honey, because the answer just isn't in there waiting for you to pick it out. You're going to have to really think about the answers and what this question is asking you if you want to finish this program.

Greta agreed with this assertion by confirming that on the first few tests in the program she did what she had always done to answer a question - look for the familiar answers. She soon realized that not everything that looks familiar was the right answer, it just depended on the circumstances given in the question. "You know, I have learned to step back, look at the question, look at the big picture."

Halle had a problem with the questions, particularly in the last semester, until she discussed her test taking strategies with the faculty.

> And, when [the faculty member] told me how to look at questions and using the study guide and looking at what that question is asking you, that was the light bulb that went on for me. I mean it was explained to us back in earlier semesters but it wasn't really that the light went on completely until [the faculty member] and I sat down that day and she told me, "You've got to look at what the question is asking you." Okay, so show us how to look at these questions and really pull out what it is asking you. Because there was a lot of times that it may have been sheer luck that I got the question right.

Ian mentioned the unit tests in context with the NCLEX-RN. "The questions in school were harder than the questions on this test. You had to use the critical thinking process on it. You don't want to be presumptive and choose an answer just because it contains something that you remember. The tests in school really prepared me for the NCLEX."

Ellen agreed that the unit tests in the nursing program prepared her for the NCLEX-RN. She asserted,

> Being able to reason my way through exam questions in the program is the only way I survived the Boards. When I was sitting down at the Boards and, you know, I was getting these questions, I was like I have no idea, I've never seen this, where are they pulling this stuff from. And I guess it was because I was sitting there and I read my questions and I was like, 'What are they really asking me?" And I just processed whatever information that I knew about what they were asking me and I just, you know, thought it through and apparently it worked for me. You need to look at the answers, and you're like what really makes sense here. So you just kinda have to look at what makes sense and just really process what is being asked and process the information given and put it into play.

Barbara, Ellen, and Halle indicated that the computer programs used by the nursing program also helped them with developing critical thinking skills. Barbara thought that the ATI and MedsPub programs, which are used for instruction and remediation as well as for testing, were significant. According to Barbara, "They also reinforced the information and helped us to apply what we had learned." Halle agreed that these programs helped her, by not just going through and answering a question but by having to know and understand the reason associated with the answer. "No, you had to read it and figure out why it gave the answers the way it does. And the answers that I really thought would have been the correct answers in fact were not. And it was because I wasn't using critical thinking." Later in the interview, Halle spoke about the computer programs again. "The computer programs, as much as they were time consuming, I felt like those were very good at making you think."

Ellen agreed, "The computer programs really helped me to practice my test taking skills and reinforced information received in the classroom." Fran liked the books associated with the ATI materials. She said, "I liked those books. Those are really good, and the tests are something we could do on our own time too, although we did have a certain time period to complete them."

Case studies. Case studies were discussed in two contexts. The first context was the case study presentation, a requirement in the last clinical course of the program. Barbara, Ellen, and Fran articulated how this assignment helped them develop critical thinking skills. This assignment encouraged the students to take a client for whom they had provided care and investigate the medical and nursing care for this client, along with the rationales for that care. Ellen avowed,

> We had the whole process to go through and all but we had to be the ones to say why we thought this was happening to this patient. You know, what… I mean we had the

information that was given to us in the medical records or whatever the case may be. But we had to be able to give more information as to what, you know, what we thought went on with this patient. We couldn't just, you know… We had to be able to assess what went on with the patient and use that information to come up with a conclusion about what went on with this patient. This project really put us in that state where we had to do the thinking and it wasn't just there for us, we had to kinda bring it all together.

Barbara also thought that the case studies helped. She elaborated on this point in the following statement:

> The case study really helped me to see how things go together. We had to look up the diagnosis; look at the medical care, labs, medications of our patient; and then tie that all together to see how it fit. We also had to look at the nursing care that we provided as student nurses and how that related to everything else. It also had us look at teaching needs for the client and how we would provide those. This project really helped me to see the whole picture and why we give the nursing care we do and the results of our care for a particular patient. It sure did make me think and see how everything fit and influenced everything else.

Fran elaborated on other aspects of the presentation. "This was an opportunity for me to do it on my own level, do it at my own pace, figure it out on my own. You can tell me all you want that that's the way it is, but until I can figure out why it's that way, I don't really understand." She also agreed with the other participants that this project forced her to consider the whole picture of the client. She reported:

> One assignment that we had to do was take a patient and go over all the tests and all

> the diagnostic work that they had done, their diagnosis… You know, everything we were taught in school from beginning to end. Standing up there and giving an overview of your one patient, going over one diagnosis, seeing all the tests that were done and seeing what was positive, reviewing signs and symptoms, what the doctors ordered for them. You really start putting it all together. I know what they are looking for now. I see what they see now. So, when you see other people going for a test you have an idea about what the doctor is looking for now.

The second context associated with case studies was those used in the concept seminars where the class is divided into smaller groups and case studies are used to promote group work and stimulate a more active and interactive learning environment. These case studies can be used to make a point. For example, Ian remembered an instance where one of the psychiatric nurse faculty brought out the importance of maintaining safety for a client in one-on-one seclusion because of suicidal ideation. Ian was impressed with that case scenario because it brought to life the liability of leaving someone in seclusion to help with another patient who was getting out of hand on a unit that was short-staffed. He said,

> Mrs. Bright, when we were at a particular facility, gave a scenario where, uh, you know, you're short staffed, uh, and a patient is getting kind of out of hand and you also have one that's on one-to-one seclusion. You know, do you leave the one that's on one-to-one seclusion to help take care of this other patient? And she gave us a good scenario where, you know, you can be held liable if this patient who is on one-to-one commits suicide while you're out there taking care of another. And, uh, I said I would try to handle both, and she said you can't. And I said, "Woo,

> because of the liability." You always think you can be Johnny on the spot, you can do everything sometimes, but it's a problem.

Fran also related an activity used in the first semester where each group was given case scenarios with several patients and asked to determine who needed to be seen first. Fran related:

> Half-way through the first semester, we were doing an assignment. I think the assignments are a good activity. It's a more relaxed environment. You have a goal in mind. You have other people, and you get to hear their ideas. Um, it was one of those activities. It was a situation. They put you in a situation where you have so many patients, who do you need to see first. It was one of those basic nursing skills – who do you assess first? When they go over the case studies, you're thinking in your head, "Well yeah, I should have known that." But you don't at the time because you don't see the big picture. You're focused on the little things. It was one of those assignments where it finally clicked, like you get what's important. You can prioritize your patients, and you know who needs your help first. And it's one of those situations that I remember it first working. I mean you can feel it working. You can feel your thinking kicking in.

Simulations. Simulations incorporating high-fidelity manikins were used with the five LPN bridge students and were touted by the students as being particularly helpful in increasing their critical thinking skills. The LPN bridge students spent six of their twelve clinical weeks in the simulation lab during the third semester. The assumption by the faculty was that the LPN bridge students needed more experience with critical thinking exercises than with taking care of multiple patients, which was something they were doing at their jobs. For the simulation

exercises, the students were given case studies of the patients they would be assessing in the simulations that they needed to review and prepare a plan of care prior to the simulation. During the simulation, the conditions of the patients in the case study evolved from the basic information given in the case studies. The students had to do a physical assessment on the manikins, relate that additional information to the original case study, and change their plan of care based on the additional information. After the simulation, the group met in a classroom for an extensive debriefing. During the debriefing, what had happened in the simulation and how the plan of care changed were discussed, along with the rationale for the plan of care provided. The students were encouraged to pull all the information together to create a cohesive, relevant plan of care for the simulated patients.

Amy, Barbara and Jen provided the most input into how the simulations helped them develop their critical thinking skills. Amy concluded,

> Back in school I really thought that the simulations and when we did the care plans on the board really helped me to develop good critical skills. I felt like we were being taught critical … a lot of critical thinking applications. Of course, you know, you were able to show this diagnosis and then, you know, these are the interventions and these are the signs and symptoms that you want to be looking for and these are the interventions that you are going to do. And it ties it all together. Yeah, that put the light on a little bit when we had the six weeks of clinical in the simulation lab. I think at really helped. In the clinical we were pretty much just assessing the patients and, you know, just giving them their medication and stuff like that but actually the simulation scenarios helped put everything together better.

Barbara agreed that the simulations helped to tie everything together. She concluded:

> I could say that the simulations we did were good in helping me tie things together. We were able to go through a scenario, do the basic assessment on the manikin, investigate what was going on with the patient, look up what we needed to look up, and then get together and tie all the information together. It also helped that the scenarios basically followed what we had learned about in the class that week, so we were able to reinforce the information we got in class and also apply the information to a case scenario. The simulations gave you time to think through what you would do and take all the pieces of the puzzle and bring them together. They helped a lot in letting us investigate different ways of looking at the information and really tying it all together.

Jen concurred with the others and added that the simulations provided a lot of different situations that students can think through and make decisions about in a safe environment. She said, "They really do stimulate critical thinking. I think you should use simulations more."

Care maps. Students researched and developed care maps for the patients they had in clinical. Greta was a huge proponent of care maps. She effused about the care maps, stating:

> I love doing care maps. You know I'm bilingual, so it takes a while for me. But the care map made me really look at the big picture. I could research and research and research and really get into it. These little pieces from, you know, all the systems to your psychological to everything else. It's time consuming and, you know, you come home from getting your assignment at about 7:00 at night and have to do care maps for

4 to 5 hours and have to wake up at 5:00 in the morning. It made me feel like I was ready for that patient by the time I had to take care of him.

Amy and Barbara agreed that the care maps helped pull everything together. Barbara further identified that the tying everything together achieved by the care maps in the previous semesters was brought forward into the simulations and into the clinical in the last semester, where care maps were no longer a requirement in the clinical area. She further stated, "In the care plans, we had to look up the diagnoses, labs, medications and tie them all back to the patient. We had to really start bringing everything together."

So the care maps seemed to set the stage for the students seeing the big picture and being able to pull all they had learned together in the last semester. As Amy said, "I think they really helped to develop good critical thinking skills. They really helped me to start seeing the client as a whole person and how all the information I had gathered about him made a difference."

Connie discussed care mapping in a more specific way. She stated:

> All the instructors encouraged walking into a situation and evaluating the whole situation. To not only walk in and look at the picture and the person in front of you and the situation but to dig into the chart, get the background, get the history. What is the whole picture? I remember one of my first experiences where I walked in to the patient's room with some background information that I had gotten from the chart. And I remember that patient responding to me outside the information that I had read and basically elaborated on some information that could make a difference in her treatment. So, I had to adjust my plan of care for the day based on this additional information. So that, I guess, was the first time I kinda went, okay this added information plus the clinical picture, plus the chart, you know?

Gathering information and developing the care map pulls them together to help give this patient better care.

Section Summary

This section presented findings related to pedagogical factors that influenced the development of critical thinking in ten graduates of an associate degree in nursing program. These factors included the major ones of curriculum design and integrative learning activities. The two major factors were composed to several subcategories. For curriculum design, this included acquiring foundational concepts, progressing from simple to complex, and applying learning in the clinical area. Integrative learning activities included tests, case studies, simulations, and care maps. Each of these subcategories were substantiated by the words of the participants in the study.

Personal Factors that Influenced Critical Thinking Development

This section refers to the second research question concerning what personal factors the participants believed influenced the development of their critical thinking skills. Three categories were derived in the analysis of the data: curiosity, confidence, and perseverance. The participants demonstrated curiosity by seeking answers to why and how. Confidence was associated with participants' assurance of their reasoning abilities. The last category revolved around perseverance, which was related to the participants' persistence in a demanding program despite many odds, as well as the participants' use of critical thinking in all aspects of their lives.

Curiosity

All of the participants listed curiosity as a factor that helped develop their critical thinking skills. Amy commented,

I like to read. I like to gather information and try to be prepared for situations. When

there were questions, being curious enough to go back and find the information. I felt that I was gaining the knowledge that helped to increase my critical thinking.

Donna talked about seeking information about situations that puzzled or didn't feel right to her and using the information she obtained to assist her clients. She asserted, If I don't feel comfortable with an event or it just doesn't sound right, do my own research to find out why or what can be done better about it. We had a patient that I gave narcotics to and … she was on a boat load of narcotics at home. She was a chronic pain patient. Well, when she came in, I gave her a narcotic and the doctor discharged her an hour later. Well, I didn't feel comfortable about sending her home. She didn't have a car, there was nobody there with her, and I just didn't feel comfortable. And the doctor said that she was on a boat load of narcotics at home so it would be just fine to send her home in a taxi. I was concerned that something could happen to her that would put her safety and my license on the line. So, I went to my charge nurse and discussed my concerns, and she said by the hospital policy we could not send her home. I didn't even know there was a policy to that effect at the time, but I didn't just stop at the first answer I got. I kept searching.

Donna went on to assert that she had "learned to trust that inner voice, to actually listen to that inner voice, which I never did before, and to question events." If she did not feel comfortable with a situation or had too many questions about it, she researched to find out why the situation presented the way it did or what could be done to manage it better. "Ask somebody, find out" was her mantra.

Halle actively sought the knowledge that she knew she did not have. "I crave that knowledge, and I go to where I can get the knowledge. That's critical thinking too. I know where

to go." Halle continued,

> By allowing me to say, 'Well what about…? Or why…?" [helped] me to grow in critical thinking because, even though the way that I may have been interpreting something may be right, just to hear someone else's interpretation sheds light in a different perspective. And I don't have the knowledge in certain areas, but I may have knowledge in my own way. Like, I could probably teach you a lot about surviving as an incest victim. Because I have lived it and I have been through it, I could probably teach you something. Well, the same with your knowledge. I don't know all there is about nursing, what is involved in it and the medical aspect of it and how this works and how that works. If I could just pick your brain, I would pick it for weeks and weeks, one-on-one with no distractions because you've got the knowledge.

Barbara emphasized that she had entered the nursing program because she really wanted to know why things were done a certain way, something she did not get in the more skills-based LPN program she attended. She reflected,

> We were always wondering why the doctors fed the NEC (Necrotizing Enterocolitis) babies so quickly. Then we had the lecture on NEC and the lecture on MODS (Multi-Organ Dysfunction Syndrome) and SIRS (Systemic Inflammatory Response Syndrome) the last semester and that told me why the babies were being fed so soon. I was able to pull that together and understand why things happen the way they do in my practice. That was really exciting to me. I was able to finally understand some things that I had been doing.

Jen, also an LPN, reflected on how the program helped her look at other things and why things are done the way they are or how the context of the situation changes the way things are done, rather than looking at just the task at hand. She reiterated,

> I think the program helped me to look at other things besides just the tasks and why they're doing the things, not just the task at hand. You made us think about what we were doing. A lot of LPNs want to know why they're doing things. I'm always a why person. But some of the things that we were taught as an LPN didn't go into why. For instance, we got into acid-base material and things of that nature. I really didn't know them, and I was weak in them. And the acid-base system affects us so much, you know. But you start to learn these things and you just learn so much.

Connie started the program anticipating learning skills, understanding conditions, and understanding diseases. She didn't really understand until later in the program that "the why of why I'm learning that is to bring better outcomes to this patient." Connie also spoke about how important it is to continue to learn and seek answers. "In critical care, I go in thinking something and come out learning something totally different. We never stop learning."

Ellen demonstrated curiosity in solving problems in the clinical area. She ruminated,

> I think it's, you know, the whole process between going to the class and taking in all you can take in while you're there and processing that information and then going out into you clinical and processing whatever information you had and using it to take care of your patients to the best of your ability. You've got to process and use what you have, you know. And, if the information isn't there for you, you're going to have to think about it and try to come up with the best solution. Because not every situation

are you going to have the answer in there just staring you in the face. You're going to have to come up with something and, hopefully, it works for your patient.

Confidence

Confidence described the participants' assurance of their own reasoning ability. As the participants gained confidence in their reasoning and clinical skills and as they developed tacit knowledge, they thought that their critical thinking skills improved.

Fran discussed how her critical thinking skills had improved greatly while she was in the nursing program as she gained more confidence in her skills and in her knowledge base. Since she had no medical experience upon entering the program, Fran thought that everything was harder for her. She stated,

> It's very hard. I went to school with somebody who was an LPN and the things that she said, and I was like, "How is she getting this? How does she understand it so well and I don't get it?" I've been sitting here right beside her and heard the same thing she has heard all this time, and she gets it so much easier than I do. But, it comes to me now. I really understand. So, from starting in school with no experience until now, I see a great improvement in my [critical thinking]. …I can prioritize my patients, and I know who needs my help first. I mean, [I]can feel it working, and [I] can feel [my] thinking kicking in. … And then there is that time when it just hits you in the back of the head. It's like, "I have been here all the time, you just haven't listened to me." But, it all gets pulled together. You have a sense of "I can do this."

When Greta was asked how her critical thinking skills improved during the program, she said, “Oh … if I was to rate myself 0 to 10 with 10 being good, I’d rate myself an 11. I feel confident. I feel like I have something to say.” She talked about how she really started gaining confidence in herself and her skills as the program progressed and as she improved her critical thinking skills. She elaborated:

> Maybe [the third semester] I started to pick out, to pick out answers that I think I wouldn’t usually pick out, but I started to feel a little more comfortable with it. And then in [the last semester] is when it really all came together. It seems like everything just made sense. I don’t know if I was a slow learner or if it took me that long, four semesters, to realize it but as long as I realized it. I really think I started looking at everything and pulling it all together.

Greta also provided an example of how her critical thinking abilities improved in the clinical area as she gained more confidence.

> In [the last semester] I felt confident going to clinical as opposed to when I was in [the first semester]. Although I had worked in the hospital for twenty years as a pharmacy tech, it was different. By [the last semester] I was like (snapping her fingers). I remember an instance [when] my preceptor was not on the unit and it seems like I was the only one there. And, I had to make a decision. It was something not too critical, but it seems like I asked one nurse and she was like, “Well, I don’t know.” And I asked another nurse and she was like, “Well, I don’t know. I think it should be okay.” I had to make a decision. It was my patient, and no one can tell me. I had to make a decision, so I made a decision. …By the time I started working in my internship after graduation, I was like,

> "I can do that." Yeah, I can call the doctor. It's no problem. I can talk to him and give him the information that he needs. We were able to do that in clinical in school.

Halle also thought that her critical thinking skills had definitely improved during the nursing program. Halle was in the LPN bridge program and had been an LPN for several years prior to beginning the program, so she was already confident about her technical skills. However, like many of the participants in this study who came through the LPN bridge program, she was not as confident about the how, why, or what of the skills that she had been doing as an LPN. As she gained more confidence in thinking like a registered nurse and bringing in those critical thinking aspects of the position, she felt that her critical thinking skills definitely improved. She reiterated:

> I was able to see that through where I was and where I've come. When I first started, it was more a skill process but not really understanding why we did it. But, going through this program, it really made me look at … outside of that box. It made me understand we're doing this because a situation happened and understanding why we need to do this in order to bring that patient back to …homeostasis. But it was more of a process of understanding that it is not just the tasks that I was taught to do as an LPN but the critical thinking aspect that allowed me to understand why, when, who, and how.

Donna thought that the program really taught her to think. "I thought I was thinking, but apparently I wasn't. I can see a definite difference in myself." Donna expressed her gain in confidence and thus growth in critical thinking skills as learning to "trust that inner voice."

She said,

> I've learned to trust that inner voice, to actually listen to that inner voice which I never did before, and to question events. If I don't feel comfortable with it or it just doesn't sound right, do my own research to find out why or what can be done better about it. I don't just stop at the first answer I get. I keep searching, and I advocate for my patients…. You know, you start thinking about this stuff. Especially working in the [emergency room], I think is a high test of critical thinking skills. You have to be able to see what the patient needs because I work at night and, when you work at night after 3 a.m. there's only 1 physician for all the rooms. So you have to be on top of your 4 patients. You have to know what they need and then you go to the physician and ask, "Can I do this? Can I do that? Can I do the other thing?" You have to be able to know what your patient needs.

Connie related how she "still goes in [to the critical care unit] with trepidation because it is a new patient, a new scenario." However as she gained more experience in the clinical area and honed in on her skills, she started seeing how her actions and decisions impacted her patient care. Connie emphasized several times in the interview that the faculty encouraged her to "think outside the box." However, she could not really actualize that statement until she gained more confidence in her technical skills and in her knowledge base. As this has occurred, she has continued to improve her critical thinking skills and has become comfortable with recognizing that she is an important member of the healthcare team

and, as such, can contribute to the care of her patients. She confirmed,

> I'm constantly learning and will for the rest of my life, but at least I'm getting a foundation of the whys of so much that we were given [in school]. Instead of just, oh gosh, we did that and we did this but how is thing going to make an impact. You know, I really didn't have that clear understanding until being a part of nursing. I think what I learned more than anything else from the faculty [in school] is to think beyond the box, be your own person. You're not just one of the many members, you are a very important member [of the healthcare team] because you are at the bedside. And, you are with that patient day in and day out, the doctors aren't. You've got to be the voice when there is no voice with the sick. I'm looking at their vital signs, I'm looking at their intake and output; their doctor doesn't see that all day. I've got to tell him, "Well, I know you're wanting to do this, but he hasn't had any output for three hours so … I don't know if that is a good idea.

Barbara thought that her critical thinking abilities were much improved by the end of the nursing program. Barbara was an LPN bridge student, who came to the ADN program because she wanted to know why she did the skills that she employed in her practice. She wanted to look beyond the skills-based education that she received as an LPN. As she gained more knowledge and more of a base to build her critical thinking skills, she became more confident in looking beyond the obvious and looking for other options that might be more effective in taking care of the critical infants in the NICU where she worked. She related,

> A critical thinker needs to be able to look beyond the obvious and to tie things together to come up with an answer. A critical thinker needs to have the knowledge

> to apply to a situation and to see the whole picture. A critical thinker needs to look at all sides and take everything into consideration. If I have a baby that is demonstrating certain signs and symptoms, I want to look beyond the obvious to what is going on with the baby. I want to look at the lab values, vital signs, fluids, output and put it all together to figure out what needs to be done. Critical thinking allows me to do that. … This program gave me the information to understand why certain things happen and why some things are done. Again, if I have a baby that turns bad, I can look at a lot of factors and decide what is important to consider and what actions I need to make. I could also take what I learned in the classroom and apply it to the clinical area.

Perseverance

The last category was perseverance. Perseverance is the pursuit of a course with determination to overcome obstacles. Perseverance was a personal characteristic that served the participants in searching out the best options, rather than accepting the first answer or maintaining the status quo.

Ellen spoke of how she persisted in evaluating a patient who had a sudden change in status. Her perseverance helped her with critically thinking through the situation. She related,

> You've dealt with the client all day and then you see this patient and it's like something is not right about this patient but you can't put your finger on it. So, you start thinking, "Well could it be this?" And, you continue to look at him and try to think through different things and see if they make sense and, you know, put rationales with it. So, you're thinking, "What happened? What could I have done

differently?" What could have transpired between these times, based on the plan of care? I was trying to figure out what happened and why…. You've got to process and use what you have and, if the information isn't there for you, you're going to have to think about it and try to come up with the best solution. Not in every situation are you going to have the answer staring you in the face. You're going to have to come up with something and, hopefully, it works for your patient.

Greta also used a patient care scenario to illustrate how perseverance, along with a strong knowledge base, can improve critical thinking skills and help her establish a plan of care for the patient. She stated,

> Like patients coming in with chest pain. Anyway, you do your assessment, you look at everything, and you look at the labs. You know everyone who comes in with chest pain is not really heart related. It could be gastroenteritis or something like that. So, I would look at the labs, I would look at everything else, and if I know that the labs or the cardiac enzymes are within normal levels then I would know at least it's not cardiac related. The chest pain is not cardiac related so it's probably something like stress, maybe a build up in acid or something like that. You know, it's just the way you look at the whole picture.

Greta also spoke about how doing care maps during the program really helped her bring all of the different aspects of the client together and provide a total picture, rather than just looking at one piece of the puzzle. She spent hours completing the care maps; but, in the end, she thought that her perseverance paid off by allowing her to see the "big

picture" of what was going on with the client. She acknowledged,

> I loved to do the care maps. I would spend … You know I'm bilingual so it takes a while for me. But the care map made me really look at the big picture. I loved doing it. I could research and research and research, really get into it. I know that sounds strange. Those little pieces together from all the systems – your psychological to everything else. It's time consuming. Oh yeah, it's time consuming and, you know, you come home from getting your assignment at about 7 at night and have to do the care maps for 4 to 5 hours and have to wake up at 5 a.m. It made me feel like I was ready for that patient by the time I had to take care of him because I had all my information together and had already processed what information I had and determined a potential plan of care. Not that it might not change the next day, but I had an initial plan.

An example of how perseverance is related to improved critical thinking skills was also provide by Halle when she spoke about being terminated from a job unfairly and having a "blemished" job history because of it. Halle was placed on work as needed status at her job when she started in the LPN bridge program. She found out at the end of the program when she called to see about returning to the clinic as a registered nurse that she had been terminated for not working as much as expected in the [work as needed] status she was placed on while she was in school. She asserted,

> Today I called and spoke with the manager of the last facility that I worked with, and I explained to her that I really felt that there may have been miscommunication on their part, as well as on my part, about the protocol that follows with a [work as

needed] position. She is going to check into it because I need to know if there is a blemish on my record; and, if there is, we need to meet together and come to some kind of resolution because I feel that I'm being possibly judged in character by false statements. So, in that critical process of thinking through all of the different things that I could do…. You know, I could have gone up there and just showed my backside. I could have been ugly, demanding, and all that. But, the overall thing that I'm wanting to salvage here is my integrity and my character and my role as a nurse at this facility. So, I'm having to take baby steps to resolve it.

Donna spoke of perseverance in terms of lessons about taking control of her life that she learned while she was in the nursing program. Before she came into the program, she felt that she had little control over her life. However, as she progressed through the program, she realized that there were more options available to her and that she could, indeed, take control of her life and how she lived it. She realized that she could transfer the sense of accountability that she had in the program to other aspects of her life. In looking at different options and in accepting responsibility and accountability for her actions, she realized that she could take charge of her life. This was not an easy process for her and required persistence, evaluation, and reevaluation on her part. Donna improved her critical thinking scores from entrance to exit more than any of the other participants, 17.5%. As she related,

Before I came into the program …, I just let life live me because I let things happen to me and I didn't take control. I didn't take charge of my situation. And, being in the program and being held accountable for my actions, being accountable for my decisions, being accountable for my time helped me to realize, "Hey, you do

make a difference." You don't have to let life live you. Things are going to be tough, that's just the way it is. Things are going to happen. You are going to cry, sometimes it helps to go into the closet and get a little cry out, so go ahead and get a little cry out. But then come out fighting. Don't just lie down and quit. You have many options, you just need to think them through and decide which one is right for you.

Section Summary

Within this section, personal factors that influenced the critical thinking development of the participants were identified and discussed. These factors included several personal characteristics that have been recognized as characteristics of critical thinkers in the literature - curiosity, confidence, and perseverance.

Other Factors that Influenced Critical Thinking Development

Two categories were discovered in the data analysis that did not fit into either pedagogical or personal factors. Data analysis revealed that the "other factors" that promoted the development of critical thinking were faculty support and reinforcement, both in and out of the nursing program.

Faculty support

Several of the participants mentioned support given by the faculty as an element that facilitated the development of their critical thinking skills. Amy, Barbara, Donna, Fran, and Halle all remarked that the instructors always were willing to help them when there was something that they did not understand, to put whatever it was in simpler terms, or to explain it in a different way. Donna reiterated, "All the instructors worked as hard for you as you wanted to work. If you wanted to work hard, they are right here toe-to-toe with you. These are people who are your biggest cheerleaders." She went on to clarify that the instructors also made her realize

that she needed to be a partner in her education. “And that, to me, made me realize that I was in charge of my own education. It made me realize that I had to own my education. It’s not going to be given to you in [this program], it’s not. Nobody is going to baby you.”

Halle mentioned going to an instructor when she was considering withdrawing from the program because the death of her brother had affected her to the point that she was having academic problems. “I sought out people I knew I could count on. I went to [the instructor] because I knew she would be honest with me. I was seeking guidance according to what she saw of me as a nurse and as a student and what my capabilities were.” She also captured the essence of the qualities she found most important in an instructor. “I learned the most from [the instructor]. She was the hardest but I said that’s where my learning came from because she was determined, believed in me, saw something that I was not able to see, and helped me to see.”

Connie appreciated that the faculty promoted the mantra of “Think outside the box.” She thought that the faculty supported her in developing her individualism and her ability to look at a situation critically. “Think outside the box, think outside of what you know, think outside of what you’ve been taught. Think outside your experience and be open to not only receiving ideas but bringing new ideas to the situation.”

Halle agreed with Connie on this point and interjected that one of the most important factors involved in developing her critical thinking skills was that the instructors allowed the students to voice their thoughts. As she stated,

> Everyone has their own way of looking, listening, interpreting, feeling, and expressing. And by allowing me to say, “Well, what about…? Or why…?” I think that allowed me to grow in critical thinking because, even though the way I may have been interpreting

something right, just to hear someone else's interpretation sheds light on a different perspective.

Several of the students also talked about how support given by clinical instructors and clinical preceptors was also important to the development of their critical thinking skills. Halle disclosed the attributes of an encouraging clinical instructor as "one that is going to push you, challenge you, encourage you as well as correct you, but never make you feel like you are less than or feel stupid. I was never afraid to ask her questions or to receive constructive criticism from her."

Donna also contributed that a clinical instructor challenging the student was influential to the development of her critical thinking skills. She related how a clinical instructor she had never gave her answers. She continued,

> She asks, "Why did you do that?" Not that your answer was right or wrong, although you didn't know that at that point. You would think that you were on the hot seat. You would have to think your way through why you did what you did and explain to her, almost like teaching her, why you did what you did. And to me, that helped a lot because that helps you to not just do things. You are not a robot. She had you always thinking. She didn't want you to just do it out of habit.

Connie attributed her most effective clinical experiences to clinical instructors who were there for reference and whom the student could approach safely to ask a question, but who gave the student room to find out what she knew. "Sometimes too much supervision shuts you down a little bit, but just enough room to let you go but know you're there gave [the student] more room to learn."

Jen echoed this statement when she was describing her experience with her preceptor. She got the most out of this clinical rotation because she was more independent than she had been with an instructor. The preceptor was someone who pushed her to be on her own; however, she was still very present and was there to verify and clarify anything that Jen was unsure about.

Halle related the characteristics of a clinical instructor that she found most supportive of developing critical thinking skills. This instructor would be one that "is going to push you, challenge you. She never made me feel intimidated. I was never scared to go to her. I was never afraid to ask her questions, nor was I ever afraid to receive constructive criticism from her." Halle further delineated an incidence with this clinical instructor concerning Halle's fear of starting an IV:

> [The instructor] asked me - and this is critical thinking on her part to help me see critical thinking, you know, basic critical thinking – "What are you afraid of?" If you can zone in on what it is that you're afraid of about starting an IV, then you can branch off from that and possibly resolve those issues. She helped me to see that I have a job to do and that job is that I am trying to help the patient and that's what I need to focus on. So she walked me around China, but I did get the point. I'm glad I listened to her because, when I do have to start an IV, I'm going to be a lot better. It's probably going to hurt, and I can't help that, but I feel pretty confident about it now. I don't really have that anxiety.

Reinforcement, both in and out of the nursing program

Reinforcement presented itself as a form of repetition in the program and as an indication that the faculty stood united and consistent. It was also evident in the way that the participants

identified that they used critical thinking in all aspects of their lives, reinforcing the development of those skills.

Connie first brought out the reinforcement of principles and the consistency among faculty. She related that all clinical instructors encouraged the students to "not only walk in and look at the picture and the person in front of you and the situation, but to dig into the chart, get the background, get the history, what is going on, what is the whole picture." She further asserted that these exercises were emphasized in each clinical experience.

Donna also espoused reinforcement. She described an experience where her preceptor guided her through a procedure that Donna thought that she should already know, "but I really had no clue." The preceptor led her through the steps of the procedure and "she was this is how we do it. This is why we do it, this is what happens if you don't do it or don't do it right. And the next time you are going to do it and I'll watch." A reinforcement of the "watch one, do one philosophy" that is often used as a teaching tool in skill development. Fran also thought that the most important factor that contributed to the development of her critical thinking skills was the repetitive nature of the program. "You know, we kept on going over things."

Greta talked about continuation and consistency in the program, as well. She asserted,

> The way [the faculty] has the lesson plan. Every time you talk about a certain disease or whatever, you have the assessment. You know you have those little blocks – assessment, and then you have nursing diagnoses, these are examples of nursing diagnoses, the planned outcome that is what you want, implementation, and evaluation. That was always at the back end of all the lectures.

Classroom material is often reinforced in the clinical arena. Donna expounded on this when she spoke about the reinforcement of material she received in class as an emergency room technician:

> I'll read about chest pain and then I'd go to work the next day and I'd see a patient come in and I'd see that we'd given them oxygen and we'd give Morphine, we give them Aspirin, and get an EKG (electrocardiogram) all within the first 10 minutes. Because you'd been in there and you see the outcomes, you're like, "Oh! Okay, I learned that in school. I saw that in class." So, that really helps put the whole puzzle together.

Barbara and Amy agreed that it helped to have simulation experiences and clinical experiences that mirrored the information presented in the classroom. Barbara related, "It also helped that the scenarios basically followed what we had learned about in the class that week, so we were able to reinforce the information we got in class and also apply the information to a case scenario." She underscored this with her statement about the clinical experiences in the last semester, "The clinical experience in the last semester really helped me with pulling everything together. I was able to apply what we were learning in the classroom to the experience in the NICU." Amy agreed that being in the adult ICU helped her in the last semester because "a lot of the material corresponded with the classroom work."

All of the participants alleged that critical thinking was evident in all aspects of their lives. This reinforcement of the skills in various situations also assisted in increasing their ability to use critical thinking. Donna attributed her increased critical thinking skills with helping her always to stop and think before she says or does something. This helped in communicating with her 10-year-old son, as well as with her peers. She also commented that she used

critical thinking skills in such mundane activities as grocery shopping:

> When I go to the store and I get [a detergent]… I went to buy [a detergent] the other day … the laundry detergent. When I thought about, you know, they come in different sizes. Being a critical thinker helped me to think, okay there's x amount of ounces in this one and there's x amount in that one but let me see how much each ounce comes up to, you know, per box. And I saw that not … the big box is not necessarily the cheaper box. Sometimes the smaller boxes, especially when it is on sale or when you have a coupon or something like that. It helps you to think more than just to go to the store, get the box, and go.

Ian and Fran contributed driving experiences as examples of critical thinking, mostly being proactive in their driving activities. An example, according to Ian, was:

> Driving a car. I mean, one night I had some friends of my daughter's in my car and my wife was in there and, uh, a car crossed the center line one night and I had to hurry up and pull over to the side of the road and in an instant get out of the way of the car. As I was doing that, I was slowing down so that, if we did have impact, you know; but, I didn't want to slam on the brakes and lose control. And, uh, I used that also as an example to my daughter of how to pay attention whenever you're driving because you don't know if that other driver is drunk, fallen asleep, under the influence of drugs, or might have a heart attack, a seizure. And I just gave all those examples of why you have to be a defensive driver and always on the lookout of what's coming down the road.

Other participants spoke of making job choices, financial decisions, and relationship decisions as examples of critical thinking outside the program. Jen spoke about

a job interview that she had where she was rescheduled for the interview twice because the manager of the unit was ill. When the second interview was cancelled, the recruiter invited Jen to the unit to meet with the charge nurse and tour the unit. Jen initially refused the offer but then reconsidered:

> After I got off the phone with her, I started thinking again, you know, that if I went in it would really show that I'm interested in the job. If I took the time to go out there, even though it's not the interview and I'm going to have to come back again… It's just those things you have to think about, you know, not just, "No, I don't want to drive out there. You know, I don't want to be inconvenienced." But, if you want a job, you have to think about the long run. This is going to look better that I took the time to go out there and see the charge nurse and tour the area, get some information and make me feel more comfortable about meeting the charge nurse. Hopefully it will pay off Thursday when I go for the interview.

Fran used critical thinking skills in making a relationship decision when she was in the program:

> I had plans to get married right out of high school and move out and all kinds of things. It didn't work out that way. I realized, once I got to school, that I needed to focus on school and not have any other distractions. So, it has worked out better that way in the long run. You just sit down and think how it's going to affect in the long run. I'm going to need more money; well I'm going to need a full time job and go to school if I'm going to do that. It would have been much more difficult.

Greta also used a relationship example that involved her daughter and how she dealt with the problem:

> There was this incident when my daughter – she just didn't look right to me. She was what, 10 or 11 years old, when I was in nursing school. She used to be very happy. She was like … You know, I'm doing my assessment, you know. In my mind, I'm doing my assessment. And, I'm going she's not happy, there's something wrong and that. And her grades are not falling, but I can see the trend. So, I sat down and had a talk with her. And, you know, it boiled down to, because she thinks that if she talks to me, that I'm going … that she's going to be bothering me. And really, I mean you know, it broke my heart. So I was able to fix that in a way and where, you know … Okay, that's not it and I'm sorry. Again, being reliable for your own mistakes, reliable for correcting them and everything. And, after that she was fine. It was just a matter of actually talking.

Greta looked at her position in the economic big picture and made some contingency plans for what may evolve in the healthcare system because of the depressed economy:

> Okay, I'm in nursing. You know, it's a stable job. But to me, it's not as stable as what people think. I'm not really nervous, but you can't really … if you look at the big picture. You have people who have lost their jobs and are coming to the hospital very sick and with no insurance. Let's say you have 300 patients and 75% of them have lost their jobs. So, you know, you lose all that money. You know, you're providing healthcare that the hospital is going to lose money on, so who's going to end up losing their jobs eventually? Nurses. So when

you apply your critical thinking …. Yeah, I look at that … you look at the big picture and think okay what can I do right now? What can I do right now to enable that … you know, just in case I lose my job. What is Plan B? I mean it makes you feel better the more you have planned. I'm one of those just in case girls. I have always been like that.

Section Summary

In this section, the third research question about the other factors that influence the development of critical thinking skills was addressed. The major categories that emerged from the data in this section were faculty support and reinforcement. Faculty support included support from several sources: classroom faculty, clinical instructors, and preceptors. Reinforcement was approached from the perspective of both reinforcement of major concepts in the didactic and clinical areas and reinforcement of critical thinking skills by transference of those skills to different situations outside the program.

Tying It All Together

Pedagogical factors, personal factors and other factors influenced the development of critical thinking from entrance to exit in students in an ADN program. Pedagogical factors incorporated curriculum design and integrative learning activities. Personal factors identified were curiosity, confidence, and perseverance. Other factors included faculty support and reinforcement of critical thinking, both in and other of the nursing program. The findings of this study indicated interrelationships among all these factors. (See Figure 1)

The pedagogical factors were those touted by the graduates of this ADN program as the most significant ones for building critical thinking, as indicated in figure 1 by the large box that encompasses these factors. The ADN program in this study used a simple to complex framework

to guide the curriculum. In essence, a foundation was laid in the first nursing course and that foundation was built upon in the subsequent courses. The participants in this study suggested that curriculum design had an impact on the development of their critical thinking skills. They also indicated that building from simple to complex concepts helped them improve their skills. The experiential learning gained in the clinical area was identified by all of the participants as a factor that increased critical thinking skills because they were able to apply theory to practice. This ability to apply theory to practice, particularly when it could be done in a timely manner, was touted as one of the most important factors in improving critical thinking skills.

The other subcategory under pedagogical factors is integrative learning activities. As can be seen in Figure 1, these learning activities include tests, case studies, simulations, and care maps. The integrative learning activities followed the course of the curriculum design, flowing from simple to complex concepts. All of these methodologies helped the participants in this study to bring knowledge and experience together to "see the big picture," and thus improve their critical thinking skills.

The three personal characteristics gleamed from the data in the study were curiosity, confidence, and perseverance. These personal characteristics predisposed the participants in this study to develop critical thinking skills. A disposition toward critical thinking can be fostered by effective pedagogical factors. As the disposition toward critical thinking is developed, the more complex concepts associated with the pedagogical factors can be used to further improve critical thinking skills. As can be seen in Figure 1, pedagogical factors and personal factors have an additive effect on improving critical thinking.

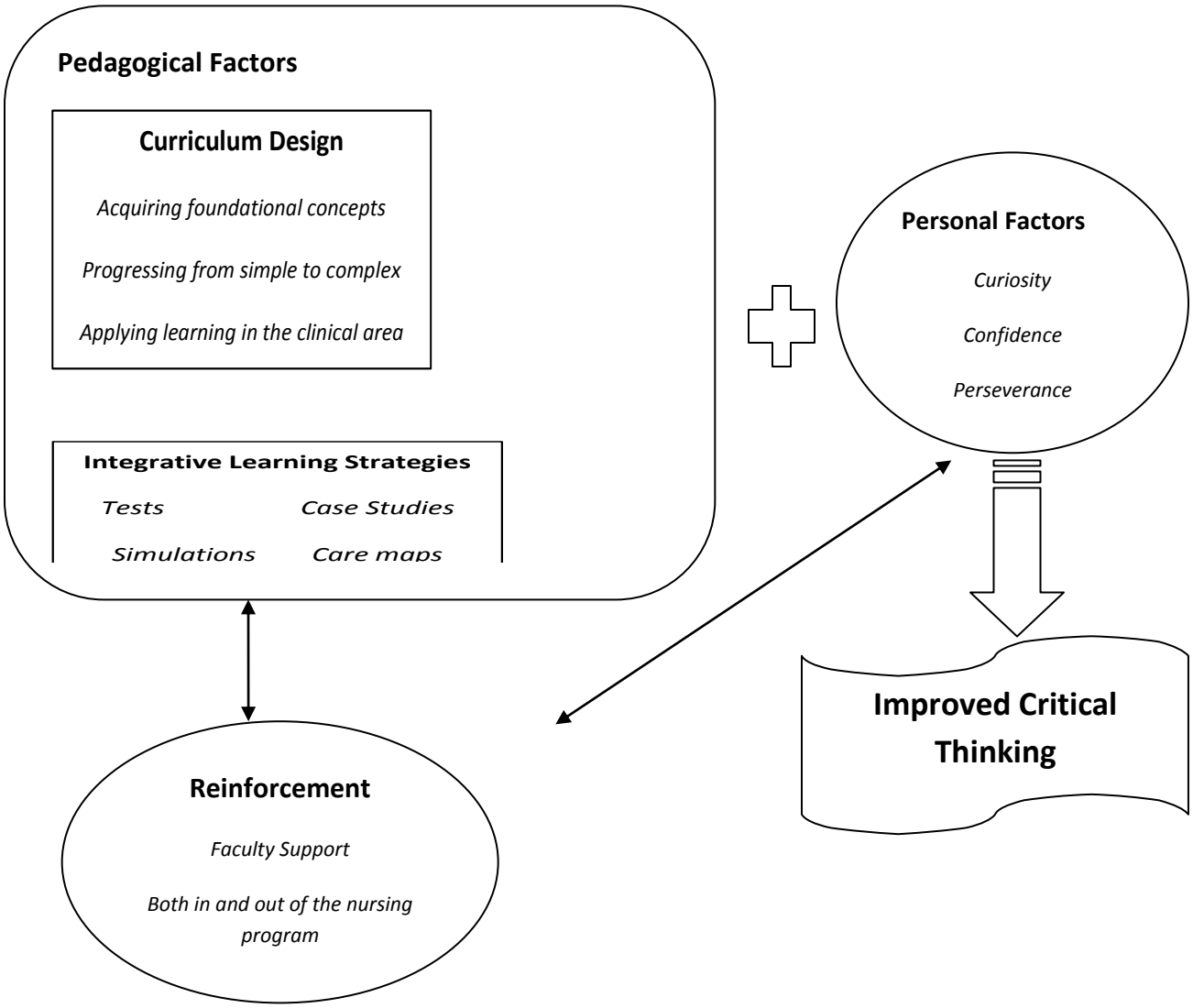

Figure 1.

The third factor that influences the development of critical thinking skills involves faculty support and reinforcement of critical thinking, both in and out of the nursing program. Faculty support was discussed as helping the participants to identify what content was important and to encourage the participants to "think outside the box." Faculty support was also important in that the faculty could help the students think through a problem and come up with a more effective solution by helping them break down the problem to its basic

components and then building it back up again so that the participants were looking at the whole picture rather than at individual pieces of the puzzle.

Reinforcement involved both the reinforcement of concepts in the program and the reinforcement of critical thinking activities outside the program. The participants in this study collectively thought that the program prepared them to develop critical thinking skills by acquiring foundational concepts that were consequently reinforced and expanded as the program processed; thus, more complex concepts were easier to assimilate in subsequent nursing courses. Reinforcement had a bidirectional relationship with personal characteristics. The personal characteristics predisposed the participants to be more inquisitive and to seek reinforcement in the form of conducting additional research, asking questions, and challenging the status quo.

Participants thought that the critical thinking skills that they improved in the nursing program extended into every aspect of their lives. This would also be a bidirectional relationship, as continued use of critical thinking skills in and out of the program would reinforce critical thinking skills, thus improving them more. As seen in Figure 1, reinforcement has a bidirectional relationship with both pedagogical factors and personal factors and through them improve the critical thinking of the participants. Thus, as the different factors improved the development of critical thinking skills in the participants, the interrelationships between all of these factors improved these skills even further. Consequently, as the participants improved their critical thinking skills, the relationship between critical thinking skills and the factors were also affected.

Chapter Summary

The findings of this study have provided insight into what factors the ten participants attributed to the development of critical thinking skills. Over six months, ten interviews were

done with graduates of an associate degree in nursing program who had increased their critical thinking scores on the ATI Critical Thinking Assessment by at least 7.5% from entrance into to exit from the program. Graduates of associate degree programs are different in that usually they are older and have more life experiences than traditional college students. Five of the participants were already LPN's, and four of the other participants had some medical experience. This level of experience also sets them apart from traditional baccalaureate nursing programs.

The first question investigated the pedagogical factors that influenced the development of critical thinking skills from entrance to exit for students in an associate degree in nursing program. The major categories identified were curriculum design and integrative learning activities. Under curriculum design, the subcategories were acquiring foundational concepts, progressing from simple to complex concepts, and applying learning in the clinical area. In terms of integrative learning activities, there were four subcategories - tests, case studies, simulations, and care maps.

The next research question touched upon the personal factors that influenced the development of critical thinking skills. The personal factors mentioned by the participants were very consistent. The personal factors identified as influencing the development of critical thinking skills were curiosity, confidence, and perseverance. All of the participants related that curiosity was an important factor in developing their critical thinking skills, with the curiosity being demonstrated by reading, researching, and asking questions. The participants also related many examples of how they gained confidence in their skills and in their decision-making processes as the program progressed, culminating in much more confidence in the last semester of the program. Several of the participants had significant personal hindrances during the program that they had to compensate for and/or resolve in order

to complete the program. They spoke about their motivation to complete the program and their perseverance in spite of the odds.

The third research question looked at the other factors that influenced the development of critical thinking skills. The two major categories identified in this question were faculty support and reinforcement. All of the participants referred to faculty support at some point during the interviews. This included support in both the academic and the clinical areas. For faculty to be available to them was extremely important. In the clinical area, these participants wanted someone who would challenge them, be available as a resource person, and allow them some degree of independence, particularly in the last semester. Reinforcement was construed as having a consistent, repetitive message from the didactic and clinical faculty in the program. Reinforcement also occurred as participants transferred their critical thinking skills to other aspects of their lives.

The three factors were subsequently tied together to demonstrate interrelationships between them. There was a bidirectional relationship between reinforcement, both in and out of the program and pedagogical and personal factors. Pedagogical and personal factors had an additive effect on improving critical thinking. The end result was an improvement in the critical thinking skills of the participants in this study.

CHAPTER 5

CONCLUSIONS, DISCUSSION, IMPLICATIONS, AND RECOMMENDATIONS

This purpose of this study was to identify factors that influence the development of critical thinking skills from entrance to exit for students in an associate degree in nursing program. Several research questions guided this study. First, what pedagogical factors influence the development of critical thinking skills from entrance to exit for students in an associate degree in nursing program? Second, what personal factors influence the development of critical thinking skills? Third, what other factors influence the development of critical thinking skills? Eligible participants were graduates from the associate degree nursing program within the last year who had increased their critical thinking scores on the Critical Thinking Assessment (CTA) on exit from the program. The participants were rank ordered, based on the percentage increase in their exit scores versus entrance scores on the CTA, and potential participants were contacted about inclusion in the study. Over the course of six months, ten participants were interviewed to provide the data for the study. Saturation of the categories was achieved in ten interviews. All participants were interviewed face-to-face, the data were transcribed, and the data were analyzed using the constant comparative method.

The data analysis revealed significant findings in relation to each of the research questions. Two major pedagogical factors were identified that influenced the development of critical thinking for these participants. The first major factor, curriculum design, was further delineated into acquiring foundational concepts, progressing from simple to complex, and applying learning in the clinical area. The second major factor was integrative learning

activities. The categories subsumed under this factor were tests, case studies, simulations, and care maps.

The second research question focused on the personal factors that influenced the development of critical thinking. The major factors identified under this question were curiosity, confidence, and perseverance. The third question was associated with the other factors that influenced the development of critical thinking. The major factors that evolved from this section were faculty support and reinforcement.

In this chapter, three conclusions based on these findings were discussed. Implications for practice and recommendations for future research were also presented.

Conclusions and Discussion

Three conclusions derived from the findings of this study are: (1) curriculum design is a key factor in promoting critical thinking, (2) personal characteristics promote the development of critical thinking, and (3) reinforcement promotes the development of critical thinking. These conclusions are elaborated upon in the subsequent sections.

Conclusion One: Curriculum Design is a Key Factor in Promoting Critical Thinking

The definition of critical thinking used in this study was one associated with the Critical Thinking Assessment (CTA) developed by Assessment Technologies Incorporated (ATI) and administered on entrance and exit from the associate degree in nursing program. According to this definition, critical thinking is a dynamic, purposeful, analytic process that results in reasoned decisions and judgment. This process incorporates the competencies of interpretation, analysis, evaluation, inference, explanation, and self-regulation. Interpretation involves the ability to understand and identify problems. Analysis concerns the ability to examine, organize, classify, categorize, differentiate, and prioritize variables. Evaluation

includes assessing the credibility, significance, and applicability of sources of information necessary to support conclusions. Inference is the ability to explain the assumptions that lead to the conclusions reached. Self-regulation incorporates the ability to self-examine and self-correct (Assessment Technologies Incorporated, 2001).

The design of the nursing curriculum reflects the field's understanding of critical thinking. When asked for their definitions of critical thinking, the participants mentioned many of the aspects of critical thinking included in ATI definition. The participants spoke of being able to look at the whole picture and reason through a situation and the possible causes of that situation (interpretation); analyzing the information by breaking it down into its pieces and bringing it back together to determine what needs to be done (analysis); going beyond the obvious, using all their knowledge to evaluate the situation and the possible solutions, and being able to forsee what the outcome would be for each action and then select the best one (evaluation, inference, and explanation); and the ability to make corrections to their judgment and to learn from their mistakes (self-regulation).

Many studies have evaluated the impact of the nursing curriculum on the development of critical thinking with inconsistent findings. An integrated review of several studies measuring changes in critical thinking skills from entrance to exit in nursing programs showed that ten of them found a positive change in critical thinking scores, with a statistically significant increase in critical thinking abilities; six found no significant change in critical thinking abilities; and two reported mixed results. Adams (1999) concluded that "there was no consistent evidence that nursing education contributes to increasing the critical thinking abilities of nursing students" (p. 115).

However, the study reported herein was not designed to measure change in critical thinking skills but rather to identify what factors contributed to a significant increase in critical thinking scores. The participants in this study all increased their critical thinking skills by at least 7.5%, as measured by the CTA on entrance into and exit from the nursing program. In analyzing the data from the interviews, a consistent finding was that several aspects of the nursing curriculum did influence the development of the participants' critical thinking skills. This finding is consistent with those studies that identified a positive change in critical thinking skills over the course of the nursing program, suggesting that curriculum design has a positive impact on the development of critical thinking skills of nursing students (Baker, 2002; Berger, 1984; Facione & Facione, 1997; Frederickson, 1979; Gross, Takazawa, & Rose, 1987; Kokinda, 1989; McCarthy, Schuster, Zehr, & McDougal, 1999; Miller, 1992; Thompson & Rebeschi, 1999).

Curriculum Strategies

Gardner (2004) examined nurse graduates' perception of teaching methodologies or techniques in nursing school that contributed to their critical thinking abilities. Gardner's quantitative study asked the graduates to rate different techniques outlined in the survey. The graduates in Gardner's study reported lecture, case studies, reading, and multiple choice questions as techniques influencing their critical thinking abilities, with lecture and case studies rated the highest of these techniques. In comparison, my study was a qualitative study that sought to identify factors that the graduates themselves thought contributed to the development of their critical thinking skills. The participants in my study identified several aspects of curriculum design that influenced the development of their critical thinking, in particular testing, case studies, simulations, and clinical experience. Somewhat surprisingly, the most consistent

strategy mentioned by the participants in my study was testing. All of the participants mentioned testing as a method that helped them to develop critical thinking skills.

Tests. It has long been a supposition that testing can improve critical thinking skills, and Bloom's taxonomy has been used in nursing, as well as in other disciplines, as a means of developing test questions that foster the development of those skills. Bloom's taxonomy was created in the 1950's as a guide for teachers to create educational objectives. The taxonomy provided a hierarchy for the cognitive domain learning objectives – knowledge, comprehension, application, analysis, synthesis, and evaluation (Bloom, 1956). The last four of the categories require the higher order thinking processes associated with critical thinking (Paul, 1990). The associate degree nursing program in this study had a test review committee that reviewed all exam questions in the clinical courses to ensure that the questions met the course objectives and that the questions were written at least at the application level of Bloom's taxonomy. The participants in my study elaborated on how the exams forced them to examine each question, consider the context of the question, and think through what the question was really asking them to answer in order to determine the correct response. The correct answer was not always the one that the student would have chosen at first glance.

Burkhardt and Irwin (2004) asserted that correctly answering questions at the application and analysis level was required to successfully pass the NCLEX-RN on the first attempt. Their contention was that critical thinking was required to correctly answer these higher-level questions. Savage (1998) and Chin (2004) agreed that questions needed to extend beyond factual recall; and Chin posed six ways to foster deeper and more reflective thinking through questioning, particularly emphasizing how, why, what if questions, as well as questions that link new experiences to previous learning. Students need to be able to recognize

that nursing care is based on principles and to know which principle matches a specific situation. Use of testing that challenges the student to select one option over another requires reflection in order to "go beneath the surface structure of the situation to reveal the underlying assumptions" (Ford & Profetto-McGrath, 1994, p. 343).

Alternative format items, such as multiple answer questions or constructed response items that require that the answer be written or typed, were also included in the unit exams in the nursing program in this study. Wendt and Kenny (2009) studied the use of alternative format items on exams. Their assumption was that items not limited to a single response was the key to encouraging the examinee to move from recall to application or analysis, thus demonstrating cognitive processes that could be identified as critical thinking. The participants in Wendt and Kenny's qualitative study agreed that alternate items allowed them to demonstrate their competence in a more realistic and challenging way, compared to multiple-choice items. The participants in my study also found the multiple response items on the exams to be more challenging and to make them think through the questions more carefully and thoroughly.

However, all the literature does not espouse the importance of testing as a means of improving critical thinking skills. Although Paul (1990) agreed that testing was a means for encouraging critical thinking, he cautioned that teachers should not rely on the ability to generate questions within Bloom's taxonomy as the only strategy used to improve critical thinking skills and that instructional strategies to foster critical thinking also needed to be included in teaching repertoires. Shroeder (2007) evaluated improvement of critical thinking skills in first semester nursing students after taking multiple choice tests with questions written at higher levels of the taxonomy and found no statistical improvement in critical thinking between the pretest and posttest scores of these students.

Testing is certainly not a panacea for the development of critical thinking skills in nursing students, but the graduates who participated in my study were adamant about the benefits they received from the construction of the tests at Bloom's higher cognitive levels. The tests encouraged them to go beyond the obvious to investigate what the questions were asking them and to pull all their knowledge together in order to select the correct answer.

Case studies. In both the Gardner (2004) and the Elliott (2003) studies, case studies were identified as a methodology used to improve critical thinking skills. The Gardner study examined nurse graduate perceptions and Elliott's study looked at nurse educator perceptions about methodologies that improve critical thinking skills in nursing students. The participants in my study also mentioned case studies as important in the development of their critical thinking skills. Case studies were mentioned within two contexts in the study – the case study that the students were assigned to present either verbally or in writing (the choice was the student's) in their last clinical course and the case studies used in seminars and clinical conferences. Case studies are simulations of individual, family, and community stories that are written, video-taped, or computer based. The goal in developing case studies like a story is for others to feel connected to persons in the story and to use thinking similar to that used in real situations when considering how to provide nursing care. Lunney (2008) maintained that the benefit of case studies was that students are given extra practice in clinical decision making outside the clinical area when case studies are used.

Pesut and Herman (1999) reflected that practical experiences, combined with academic experiences, built nursing knowledge and enhanced individual and collective nursing intelligence. This intelligence was enhanced every time students talked with themselves and others in a reflective way about client care situations. Cook (2001) identified use of case studies

as a way to encourage students to think about how concepts related to real-life situations. They teach students to "think on their feet" and to reinforce the need to understand the concepts presented in the case study in real-life situations. Mayo (2004) found a significant improvement in students' numerical averages in students instructed using a case-based approach in a psychology course. However, Allen and Razvi (2006) found little relationship between students' scores on the California Critical Thinking Disposition Inventory and the level of epistemological understanding exhibited during case study discussions in a psychology course.

Several participants in my study reported that the case study that they presented either verbally to their peers in seminars or in writing as a formal paper helped them to pull everything that they had been taught during the nursing program together into one package. This project allowed the students to bring the whole picture of what was happening with their case study patient together and develop a plan of care for the patient that evolved from the various pieces of information that they had gathered during their care of the client. As Barbara reiterated,

> This project really helped me to see the whole picture and why we give the nursing care we do and the results of our care for a particular patient. It sure did make me think and see how everything fit and influenced everything else.

Simulations. Although the only students in the study who experienced simulations in the program were the LPN bridge students, four of the five mentioned simulations as a means of improving critical thinking skills. Human patient simulators are highly interactive, computer-driven, full body manikins that replicate a variety of patient functions and can be programmed to reflect changes in clinical conditions. Simulation experiences are needed in nursing education as a result of the lack of clinical site availability, low patient census in some clinical areas, and the nursing faculty shortage (Jeffries, 2008). Medley and Horne (2005) agreed that simulation

experiences enhance the learning environment by providing similar skills, knowledge, and practice to all students.

Many educators think that students' critical thinking may be enhanced by participation in simulation experiences. Brannon, White, and Bezanson (2008) suggested that the human patient simulation method, as compared to lecture, resulted in a gain in knowledge of content for the students studied; but, there was no indication of how significant the differences were in the two instructional methods. Ravert (2008) studied three groups, one which participated in five simulations, one which participated in five small group discussions about the patient scenarios, and one that was the control group and had no enrichment activities, to determine whether measures of critical thinking (disposition and skills) would be different among the three groups. All groups demonstrated a moderate to large effect size in critical thinking scores of disposition and skill. There was no statistically significant effect among groups, which Ravert contributed to a small, homogeneous sample. Another possibility presented by the author was that the increase in critical thinking skills by all three groups may have resulted from maturity and time in the nursing program rather than the kind of enrichment activity. The form of measurement was questioned, with Ravert suggesting that the measurement used in the study did not measure content specific to nursing.

Both Hovancsek (2007) and Wrobel (2005) asserted that, once students are accustomed to simulation experiences, they reported a decreased level of performance anxiety and a heightened sense of self-confidence in their psychomotor skills and critical thinking abilities. The results of my study help to support the benefit of using simulation exercises with the LPN bridge nursing students. They reported benefits of experiencing different patient care situations in an environment where they had time to think and reflect on what was going on, what

knowledge and skills they brought to the situation, and different options available to them in clinical decision making, all in a safe, controlled environment.

Guided reflection is an essential aspect of the simulation experience and is one of the aspects of the simulations that the participants in this study mentioned consistently. A post-simulation conference is used in the same way as a post-clinical conference to critically analyze the experience (Decker, 2007). After each simulation experience in my study, patient scenarios were discussed in terms of what the students observed and did during the simulation, as well as expanding the experience to include a discussion of the many aspects, both physical and emotional, encountered in the case scenarios and simulation experiences. The students, along with the faculty, developed a comprehensive plan of care for the clients' situations in the simulations. The participants in my study attributed this post-simulation conference as one of the most valuable parts of the simulation. Barbara, again, provided the best insight when she related,

> I could say that the simulations we did were good in helping me tie things together. We were able to go through a scenario, do the basic assessment on the manikin, investigate what was going on with the patient, look up what we needed to look up, and then get together and tie all the information together. … The simulations gave you time to think through what you would do and take all the pieces of the puzzle and bring them together. They helped a lot in letting us investigate different ways of looking at the information and really tying it all together.

Applying learning in the clinical area

Without a doubt, the major factor in developing critical thinking that the participants in my study expounded upon was applying learning in the clinical area. Since a significant amount

of the student's time is spent in the clinical area or preparing for the clinical area, this was not a surprising finding. Most students reported that they did not really learn until they had hands-on experience. The clinical practice helped the students to pull the "puzzle" together because they applied what they learned in the academic setting to a real-life situation.

Eight of the ten participants in my study were placed in a preceptorship with a nurse in a clinical setting during the last semester. In 2003, the American Association of Colleges of Nursing endorsed the use of a preceptorship model as an innovative means to provide students with a quality clinical experience. The salient definition of preceptorship in the literature is that of a one-to-one relationship between a staff registered nurse and a nursing student during an intense, time-limited clinical experience, with the support of nursing faculty to facilitate student learning and provide evaluation of course objectives (Udlis, 2008). An integrative review of the literature revealed that few empirical studies have been conducted that demonstrate the effectiveness of a preceptored clinical experience. Six areas of study identified in the review were nursing performance/role socialization, role conception/ role deprivation, learning styles/adaptive competencies, clinical competence, critical thinking, and NCLEX-RN pass rates. Out of these areas, critical thinking was the only one that pertained to my study. In this area, only one study examined the effect of preceptorship on critical thinking and no significant differences in critical thinking or self-confidence levels were found between preceptored and nonpreceptored groups of students (Udlis, 2008). The purpose of my study was not to compare changes in critical thinking between preceptored and nonpreceptored students; however, the participants of my study identified the preceptor experience as contributing to the development of their critical thinking skills.

Benner and Sutphen (2007) examined integration of apprenticeships in nursing education and found that these experiences strengthened novice nurses' intellectual capacities, improved skill-based clinical practice, and developed the ethical dimensions permeating professional responsibilities. The positive aspects of a preceptorship included reducing the theory-practice gap, receiving effective mentoring, working with supportive staff members, being treated as a team member, and developing self-confidence. Negative aspects were identified as receiving poor mentorship, being assigned unproductive tasks, encountering unrealistic time constraints, and being unfairly evaluated by preceptors (Ralph, Walker, & Wimmer, 2009). The participants in my study who were with preceptors voiced many of the positive aspects of the role. They collectively thought that the preceptored experience the last clinical semester helped them in developing their clinical skills, self-confidence, and critical thinking skills.

Several studies examined students' clinical judgment and critical thinking abilities (Benner, 1984; Brooks & Shepard, 1990; Kataoka-Yahiro & Saylor, 1994). Benner's work first described the five stages of skill acquisition in nursing practice - novice, advanced beginner, competent, proficient, and expert nurse. As nurses deliver patient care, the novice tends to view only the tasks at hand, whereas the expert nurse operates from "a deep understanding of the total situation" (Benner, 1984, p. 32). Benner, Tanner and Chelsea (1996) alleged that beginners often look at clinical situations as puzzles. Beginners often work in situations where they have only a minimal understanding of the client's condition, and they have difficulty seeing the relationships of the client's multiple problems. New graduates often require at least a mental checklist to know what to watch for in particular client situations. Nursing judgment and critical thinking develop over time as a nursing student and graduate gains more tacit knowledge and experience. Most new nursing graduates are at the

novice stage, and most of the participants in my study were at this stage at the time of their interviews. However, the examples of instances where the graduate used critical thinking skills provided by the LPN bridge students, who had clinical skill expertise upon entering the program, demonstrated a more complete transition into the advanced beginner stage. The graduates who went through the generic track were still ingrained in the novice stage of skill acquisition. This finding may, indeed, be a reflection of the need of nursing graduates to develop competence in clinical skills prior to perfecting clinical judgment.

Martin (2002) found that critical thinking scores increased as the level of expertise in nursing was obtained, which is consistent with Benner's work. In accord, May *et al*. (1999) suggested that critical thinking may not emerge as an associated factor with clinical competence until nursing students gain more experience in the work area.

Learning to think critically about one's work is a large part of nursing. Critical thinking occurs continuously, expands with experience, and eventually becomes second nature. Etheridge (2007) examined the perceptions of recent nursing graduates about learning to make clinical judgments. These graduates identified that the most helpful strategy for learning to think like a nurse was being in the clinical setting with patients and having a variety of experiences. It was in the clinical setting that the correlation between classroom learning and actual practice occurred.

Etheridge (2007) studied new nurse graduates to identify what factors in nursing school helped them to learn to think like a nurse. New graduates in this study did not think that they had enough autonomy or opportunities to think for themselves during the clinical experiences as students. The participants in my study also discussed the need to be allowed more autonomy or independence in providing care for their patients during the last semester.

The students who were being precepted thought that they had more autonomy than they had with faculty. The set-up with the student and preceptor being one-on-one seemed to lend itself to giving the student more independence, which the participants in my study appreciated and that they attributed to gaining improved critical thinking skills.

In the Etheridge (2007) study, the new graduates asserted that asking students questions about the patients was one of the most helpful learning strategies faculty used to help them think like a nurse. These graduates believed that faculty members were their role models and wanted faculty to ask them questions and challenge them to think like nurses. Benner and Sutphen (2007) also supported treating clinical students as collaborators in the nursing role and engaging them in professional dialogue and exploration of their thinking as important to building their confidence and critical thinking skills in the clinical area. The importance of reflection as a mediator between the experiences of students and the meaning they make of their experiences was also espoused.

Experiential learning is not unique to nursing. Fenwick (2000, 2003) suggested that reflection on experience is one of the most important aspects of the Constructivist Theory of Learning. Boud and his associates asserted that learners must be consciously engaged for learning to occur at any level. The constructivist view alerted educators to the need to focus on learners and their active meaning-making processes. A key element of experience-based learning is that learners analyze their experience by reflecting, evaluating, and reconstructing it in order to draw meaning from it in light of prior experience. This process may lead to further action. Five propositions or assumptions for experience-based learning are: (1) the experience is the foundation of, and the stimulus for, learning; (2) learners actively construct their experience;

(3) learning is a holistic process; (4) learning is socially and culturally constructed; and (5) learning is influenced by the context in which it occurs (Boud, Cohen, & Walker, 1993).

Brookfield (1998) countered that reflection is not necessarily critical. He provided seven reasons why experience is a problematic concept. First, there is no proof that richness of experience flows from chronology. Second, there is no basis for assuming that a learner's experience provides a rich resource upon which the educator can build. Third and fourth, there is no evidence that increasing age confers a capacity to learn from experience or that adults across cultures and history get better at learning from experience. Fifth, there is confusion surrounding discussions of learning from experience that view experience as an objective artifact or fixed category rather than viewing it as something that is constructed by the learner and as something that is always open to reinterpretation. Sixth, there is orthodoxy in the assumption that experiential learning approaches are inherently emancipatory. And seventh, there is naivety on the part of educators that learners' experiences are viewed as the legitimate start and finish of adult education rather than considering critical analysis as an essential part of the equation. These reasons underscore the importance of reflection being critical. Learning can only occur if critical reflection takes place, as the participants in my study indicated when they talked about "learning from mistakes" and learning from other lived experiences.

Boud and Walker (1993) advocated reflection as a means of unlocking meaning and building knowledge from experience. The outcome of the process is personal growth, with progression towards greater maturity and more refined knowledge. The participants of my study would agree with this assertion. They thought that the clinical experiences and their reflection of those experiences were instrumental in developing their critical thinking skills.

Other studies in adult education also supported the importance of learning from experience. Zhang and Li (2004) investigated the effects of an experienced-based learning environment on information systems students' knowledge structure. Informal feedback from the students revealed that they found the learning activities, which included teamwork, real-world problem solving, decision making, and critical thinking exercises more meaningful than the traditional approach of lecturing and taking multiple-choice or short answer exams. They identified the relevance of knowledge and skills to their career and became more engaged in their learning. Kreber (2001) contended that experiential learning approaches are often implemented incompletely by educators in higher education. University teaching has emphasized abstract conceptualizations and has ignored, for the most part, the fostering of internal reflection and transformation. Providing concrete events does not necessarily lead to experiential learning. Reflection on the meaning of experiences requires both an understanding of the concept and the skills to apply it (Fiddler & Marienau, 2008). Kreber (2001) did proceed to make a case of facilitating experiential learning through the use of case studies.

Galloway and Goldenberg (2004) discussed several broad issues about the current and future direction of inquiry in the field of experiential education. The themes identified in these discussions were the need for access to, and adaptation of, research from closely related academic fields that cross conceptual lines into experiential education; additional investigation of research methods to reevaluate research practices and to relate to others the successes and challenges of particular methodologies; and the continuing necessity to involve practitioners in the development of research questions. My study, for example, used qualitative methods to

allow the graduates themselves to identify what factors influenced the development of their critical thinking skills.

Conclusion one established that curriculum design is a key factor in promoting critical thinking skills. Methodologies discussed by the participants in my study were many of those investigated individually in other studies, but this study investigated the pedagogical factors that improved critical thinking skills from the students' perspective rather than from quantitative measuring of improvement in critical thinking skills. The strategies specifically identified by the participants in my study as improving their critical thinking skills were tests, case studies, simulations, and applying learning in the clinical area. All of these strategies helped the participants in this study to bring all of their knowledge and experience together to "see the big picture." This validated the efforts made by the faculty to encourage and model reflection and to provide experiential learning in various aspects of the program, not just in the clinical area. The biggest surprise that evolved from my study in this area was that all of the participants attributed testing to the development of their critical thinking skills, a testament to the efforts made by the faculty in the study's nursing program to test the students at a higher cognitive level.

Conclusion Two: Personal Characteristics of the Student Promote the Development of Critical Thinking

When the participants in my study were asked to identify characteristics of critical thinkers, they included the characteristics of being positive, seeking knowledge, wanting to know why, looking beyond the obvious, seeing the whole picture, being open-minded and open to new ideas, being willing to go against the grain, reflecting on experiences, being confident, and being willing to admit and take responsibility for their own mistakes. These characteristics are

congruent with the characteristics or dispositions toward critical thinking outlined in the nursing literature (Alfaro-LeFevre, 2004; Kataoka-Yahiro & Saylor, 1994; Scheffer & Rubenfeld, 2000; Turner, 2005). Many of these characteristics are also consistent with the skills and dispositions identified in the APA Delphi report on critical thinking, which included courageous truth-seeking, open-mindedness, persistence, thoroughness, intellectual integrity, confidence in reasoned decision-making, and maturity of judgment (Facione & Facione, 2007). The participants in my study voiced many of these same characteristics when they identified the personal characteristics they thought helped them develop their critical thinking skills, as well as the characteristics that they identified as those exhibited by a critical thinker.

In defining and describing critical thinking, a number of researchers in adult education have also included the concept of dispositions or habits of mind. Dispositions are learners' intentional inclinations to approach thinking and learning in a particular way, or the characteristics of self-regulated learners (Kassem, 2005). Many experts (Ennis, 1987; Facione, Facione & Giancarlo, 1998; Paul, 1990; Perkins, Jay, & Tishman, 1993) have identified dispositions essential to good thinking, including inquisitiveness, open-mindedness, flexibility, perseverance, and fair-mindedness. Beyer (1997), Costa (2001), and Costa and Krelick (2000) believe that dispositions or habits of the mind can be improved with effective instruction.

The three personal characteristics derived from the analysis of the data in my study that the participants thought contributed to the development of their critical thinking skills were curiosity, confidence, and perseverance. Motivational theories conjecture that part of human nature is to be curious, to be active, to initiate thought and behavior, to make meaning from

experience, and to be effective at what is valued. When adults can see that what they are learning makes sense and is important according to their values and perspectives, motivation emerges (Wlodkowski, 2004). Being inquisitive is an individual disposition in the California Critical Thinking Disposition Inventory (CCTDI). In this case, inquisitiveness refers to being curious and enthusiastic in wanting to acquire knowledge, wanting to know how things work, even when the application is not immediately apparent (Facione, Facione, & Sanchez, 1994). Profetto-McGrath (2003) gave the CCTDI to 228 nursing students and found that the highest mean score among the seven critical thinking dispositions on the measure was inquisitiveness. "Since the knowledge base for competent … nursing practice continues to expand, a deficit in inquisitiveness would signal a fundamental limitation of one's own potential to develop expert knowledge and professional practice" (Facione, Sanchez, Facione, & Gainer, 1995, p. 4). Inquisitiveness was also a habit of the mind identified in a Delphi study of 51 nursing experts that was looking for a consensus of definitions of habits of the mind and skills of critical thinking in nursing. Inquisitiveness was defined as an eagerness to know by seeking knowledge and understanding through observation and thoughtful questioning in order to explore possibilities and alternatives (Rubenfeld & Scheffer, 2006).

The participants in my study all mentioned curiosity, or wanting to know why, as a personal factor that fostered the development of their critical thinking skills. As Amy stated, "I like to read. I like to gather information and try to be prepared for situations. …I felt that I was gaining the knowledge that helped to increase my critical thinking." Donna researched to find out why a situation presented the way it did or to find out what could be done to manage a situation better. Halle actively sought the knowledge she knew she did not have.

"I crave that knowledge, and I go to where I can get the knowledge. That's critical thinking too. I know where to go."

Another personal characteristic the participants in my study identified as helping them to develop critical thinking skills was confidence. Confidence described the participants' assurance of their own reasoning ability and the soundness of their own judgments. Confidence was identified as a disposition or habit of the mind associated with critical thinking by several researchers (Facione, 2007; Kataoka-Yahiro & Saylor, 1994; Rubenfeld & Scheffer, 2006).

Examples of developing confidence were verbalized by several of the participants in my study. Donna felt like a nurse for the first time after she discovered that a patient had received a medication too quickly and was able to answer the primary nurse's question about what needed to be done. Ellen stated that the important thing was leaving at the end of the day knowing that she had done a good job. "And when you leave that day, you're like … I did good today. You know, [the patients] are doing good, and I utilized the information that I've learned and it helped my patient." Fran reiterated this point by stating, "I think it all finally hit me, I'd say, about half way into the last semester when I finally had a sense of 'I can do this.' They've taught me well. I'm using what I was taught, what I have learned."

The last personal characteristic identified by the participants in my study as influencing their critical thinking skills was perseverance. Perseverance was identified by Rubenfeld and Scheffer (2006) as a habit of the mind of critical thinking in nursing. These authors defined perseverance as the pursuit of a course with determination to overcome obstacles. Perseverance was also identified by several other authors as being a critical thinking disposition or habit of the mind (Facione, 2007; Halpern, 1998; Kataoka-Yahiro & Saylor, 1994). Examples of

perseverance given by the participants in my study were abundant. Ellen had some personal problems during the last semester of the nursing program, but she pulled herself together and persevered. “I was determined to finish this program, so I did what I had to do.” Halle had to make a decision about staying in the program after she was failing at mid-term and had experienced a devastating loss of a family member. “I knew where to go to get support, and I knew that I knew myself well enough that I was making the right decision [to stay in the program], and I never looked back.” Halle already had to overcome an abusive childhood and many other trials in her life to get to the position she was in to come to school to be a registered nurse, something she attributed to perseverance and taking care of the thing that were important.

In conclusion two, the personal characteristics that the participants in my study identified as important in cultivating critical thinking skills were compared to the characteristics or dispositions of critical thinkers found in the literature. It was surprising how many of the characteristics of critical thinkers that the participants identified when asked a question about the characteristics associated with critical thinking were the same as those identified in the literature as critical thinking dispositions or habits of the mind. Curiosity, confidence, and perseverance were the three personal characteristics that the participants in my study attributed to the development of their critical thinking skills. All three of these characteristics are identified in the literature, as well.

Conclusion Three: Reinforcement, Both in and Out of the Program, Promotes the Development of Critical Thinking

The participants in my study spoke of reinforcement as important in acquiring foundational concepts in the program. One of the primary foundational concepts in the nursing

program is the nursing process. Several of them spoke of the nursing process and how it helped them to organize their thinking and provide consistency in how they looked at information. This information is then brought together to develop and implement a plan of care. The nursing process, with the step-wise progression of analysis from assessment, defining the problem, planning, taking action, and evaluating the action, is an approach that has been embraced by nursing for a long time. Several studies (Facione, Facione, & Sanchez, 1994; Kataoka-Yahiro & Saylor, 1994) have shown that decision making via the nursing process is related to the process of critical thinking. Jackson (2004) was concerned that many novice and advanced beginner nurses believe that the problem is solved and the issue is over once the nursing process ends, rather than thinking of it as a continuous cycle. The nursing process has been used effectively in nursing to teach students basic problem-solving thinking through the identification of interrelationships, but it does not support the multidimensional reasoning demonstrated in expert nursing practice (Benner, Tanner, & Chesla, 1996). Greta was particularly effusive about the nursing process. She stated, "It seems everything revolves around the nursing process…. It is the foundation, and it seems to work anywhere I go." She went on to relate that "those little blocks – assessment …, nursing diagnoses …, planned outcomes …, implementation, and evaluation … were always at the back end of all the lectures."

The participants in my study also talked about the concept maps as reinforcement and how they helped the participants pull everything together. Students in the nursing program in my study researched and developed care maps for the patients they had in clinical each semester. Barbara related that the tying together achieved by the care maps in the previous semesters was brought forward into the simulations and into the clinical area in the last semester, where care maps were no longer a requirement. The foundation on how to develop a plan of care for the

client would already by laid at that point and the students did not need the reinforcement of the visualization of the care map form. The care maps appeared to set the stage for the students to see the "big picture" and to be able to incorporate all they had learned in the program into their academic and clinical experiences in the last semester, thus extending their thinking from simple to more complex concepts with incorporation of the care map in the clinical decision making but not having to lay the map out in such precision as with other semesters. The students were also more adroit at visualizing the interconnections between the different parts of the care map and tying all the components together.

Participants in my study also spoke of applying theory to practice as important in developing critical thinking skills. The timing of this application so that material learned in the classroom was practiced subsequently in the clinical arena was a significant part of the equation. Barbara and Amy agreed that it helped to have simulation experiences and clinical experiences that mirrored the information presented in the classroom. "We were able to reinforce the information we got in class and also apply the information to a case scenario … and to experiences in the [clinical] area."

According to Lunney (2008), teaching critical thinking has positive effects on application only when it is associated with content knowledge and repeated practice with the specific types of thinking tasks. The participants in my study felt that the repetitiveness, cohesiveness, and consistency of the activities in the program aided them in improving their critical thinking skills.

Klaassens (1988) asserted that critical thinking is an essential component of problem-solving for nursing. She identified four principles for teaching critical thinking. The teaching method: (1) should move systematically through the stages of readiness, introduction, reinforcement, and extension; (2) should be focused, moving from introduction of material to

demonstration, supervised practice, and restatement and explanation of the concept, along with a return demonstration by the student; (3) should be integrated with standard subject matters, and (4) should guide the students through the stages of knowledge development, ending in formal learning. The nursing program in my study developed the curriculum to progress from simple to more complex concepts so that the major concepts were reinforced and extended each semester. Klaassens' article identified the principles that support this part of the design. The participants in my study referred to how the assignments and course material built on each other, thus reinforcing and extending the information, and culminated in bringing everything together in the last semester. Greta said, "It just didn't dawn on me until [the last semester], that we've been doing this all along. You know, the building up until you get there …"

Klaassens (1988) also maintained that analysis is a major ingredient of the critical thinking process. The nursing program used in my study also incorporated analysis in the curriculum design in the form of the integrated learning activities and the experiential learning activities, where theory learned in the classroom was translated into practice. Even the tests used in the program required analysis in that the students had to identify what the question was asking and select the best answer, which was not always their first inclination because the tests were designed to evaluate the student at or above the application level on Bloom's taxonomy.

Finally, Klaassens (1988) suggested that the nursing process be taught in a hierarchial manner with the focus placed on one or more specific steps for each level of the nursing sequence, but that the entire process needed to be used throughout the program. The students should be guided through decisions about health problems, using a simple to complex approach. In my study, the nursing program used the nursing process as the foundation of the curriculum. Use of the nursing process was initiated in the first semester, and the process built upon itself,

using a simple to complex approach where the students not only advanced to patients with more complex health problems but also in the number of patients assigned. In the last semester, students care for four to five patients with multiple, complex health problems each clinical rotation. In this last semester, students no longer have to visually demonstrate the nursing process through preparation of care maps for each of their patients. The belief of the faculty was that the student should be able to internally go through the nursing process and develop a plan of care for their patients at this point.

Klaassens concluded that critical thinking can be taught, practiced, and continually reinforced in nursing education by use of the nursing process supplemented and enhanced by innovative strategies based on sound educational principles and nursing research. The findings of my study supported this assertion. The participants in my study identified pedagogical factors, which included curriculum design and integrative learning activities, as integral to improving critical thinking skills. They also touted the importance of reinforcement and faculty support in this process.

Another aspect of reinforcement was the affirmation by all of the participants in my study that critical thinking was used in all aspects of their lives, not just in nursing. This reinforcement of skill usage in multiple and varied situations was touted by the participants as increasing their critical thinking skills. The graduates in my study spoke of using critical thinking skills in such diverse situations as communicating with others, going grocery shopping, driving a car, and making decisions about jobs, finances, and relationships. Donna spoke about comparing prices at the store because, when comparing a product ounce per ounce, the big box is not necessarily the cheaper one. “It helps you to think more than just to go to the store, get the box, and go.” Jen used critical thinking in determining whether to not to meet the

charge nurse on the unit where she was seeking employment or to just wait and go when the unit manager was there. “If you want a job, you have to think about the long run. This is going to look better that I took the time to go out there and see the charge nurse and tour the area, get some information and make me feel more comfortable about meeting the charge nurse.”

Brookfield (1997) believed that critical thinking “seems to hold the promise of constituting a universal theory of adult learning and, by implication, a template for adult education practice. If critical thinking is a uniquely adult learning process, then fostering critical thinking becomes, by implication, a uniquely adult education process” (p. 17). Although most everyone can critically think, there are different degrees of critical thinking. Brookfield (2005) sees critical thinkers as actively engaged with life. Therefore, critical thinking also exists outside the classroom and is present in the decisions made in our lives. An assessment of individuals’ skills and abilities may be directly related to the measure of their critical thinking ability.

One of the most intense debates about critical thinking concerns its assessment. The debate regarding the generalizability or specificity is foundational and unresolved. Brookfield (1997) believes that critical thinking is irrevocably context bound. “The same person can be highly critical in one situation, or with regard to one set of ideas, but completely closed to reappraising another situation or idea critically” (p. 18). Critical thinking is also a social process so that peers and teachers become critical mirrors. The manifestations of critical thinking are irrevocably embedded in local conditions. “It makes no sense to import formal tests devised by those outside the immediate context in which the critical thinking to be assessed is taking place (Brookfield, 1997).

Other critical thinking experts do not always agree about the transferability of critical thinking skills. Facione (1990a) alleged that critical thinking was not a separate body of knowledge to be delivered to students but was to be infused into all areas of life and learning. Ennis (1962) and Kurfiss (1988) agreed that critical thinking skills could be transferred between disciplines and situations and a more general measure could be used to assess it. However, McPeck (1981) and Meyers (1986) believed that critical thinking is not a generalized skill and must vary among disciplines because the core ingredient of critical thinking was the foundational, or epistemic, knowledge of a given discipline. An individual might have the disposition to think critically in all areas, but that person is not a critical thinker unless understanding of the specific area or field being evaluated is achieved.

The critical thinking assessment used to determine the group of students that comprised the participant pool for my study was a more nursing-specific assessment, particularly on exit from the program. Almost all nursing studies that use a critical thinking assessment measure cite the generality of the measure used to assess critical thinking as a problem with the study. The evaluation of critical-thinking skills in nursing is a major difficulty because commercial critical-thinking instruments are not specific to nursing. Alternative forms of evaluation have been suggested, such as the use of concept maps in nursing education, analysis of writing portfolios based on writing assignments that have been carefully designed to foster critical thinking skills, or asking students to document a situational analysis, potential solutions, and sound rationale for the decisions made (Daley, Shaw, Balistrieri, Glasenapp, & Piacentine, 1999; Oermann, Truesdell, & Zidkowski, 2000; Simpson & Courtney, 2002).

Conclusion three spoke to the reinforcement of critical thinking skills both in and out of the nursing program. The participants in my study collectively thought that the program

prepared them to develop their critical thinking skills by acquiring foundational concepts that were reinforced and expanded as the program progressed. The participants' also asserted that critical thinking skills are important in all aspects of their lives and provided several examples about how they used critical thinking skills in their lives outside the nursing program.

Implications for Practice

The nursing profession has become active in the critical thinking movement by mandating critical thinking theory and application throughout nursing programs and licensure exams. Many nursing studies have evaluated changes in critical thinking skills from entrance in to exit from a nursing program with inconsistent findings. The participants in this study had shown an increase in critical thinking scores by at least 7.5% between the CTA entrance assessment given in the first month of the nursing program to the CTA exit assessment given within the last month of the nursing program. Hence, this study sought to identify the pedagogical, personal, and other factors that the participants in the study thought helped in the development of their critical thinking skills.

Various teaching methodologies are currently in use to enhance critical thinking skills in adult students. Academic disciplines have identified innovative ways to promote a higher level of thinking so students will be able to question, analyze, make decisions, and consider all viewpoints. Active learning strategies, including such experiential activities as case studies, need to be incorporated in the adult education curriculum. The ability to think critically is first fostered in the classroom through the use of many instructional strategies. Educators need to communicate what strategies work for them in getting the student to be an active participant in the classroom. Adult educators also need to build in time for critical reflection.

The biggest surprise in my study was that the participants thought that testing was a pedagogical factor that enhanced critical thinking skills. Adult educators may want to rethink how tests are used in the curriculum. A system that has worked well in the nursing program involved in the study is the development of a test committee that ensures that the test questions meet the course objectives and are written at a level of application or higher level using Bloom's taxonomy. Objective testing, if it forces the students to think through the questions and answers, can indeed encourage reflection and critical thinking in adult learners, as evidenced by the comments made by the participants in this study.

One of the problems in nursing education, as in any discipline, is that the information explosion in the last few years has made it impossible for the faculty to teach everything. Consequently, the emphasis has been on teaching more and more content in the curricula rather than focusing on use of, or application of, knowledge. Program administration should encourage the faculty to utilize teaching methodologies that promote the development of critical thinking, characteristics or dispositions toward critical thinking, and faculty interaction with the students, thus promoting an active learning environment. Classroom activities and assignments must be structured to build critical thinking skills at increasing levels of sophistication over the two years of the program. The participants in my study identified this when they promoted acquiring foundational concepts and progressing from simple to complex concepts in the curriculum design as fostering their critical thinking skills.

Simulations were identified by the LPN bridge program graduates as an integrative learning activity that assisted them in developing their critical thinking skills. This result provides support to the value of integrating simulations into undergraduate education. The simulations were only used with LPN bridge program students because of the lack

of availability of manikins and time to incorporate this methodology into the curriculum. The thought was that the LPN bridge students already had basic clinical skills and needed to focus on the critical thinking aspect of providing care to patients. These participants felt that simulations assisted them in understanding concepts, were valuable learning experiences, helped to stimulate critical thinking abilities, and assisted in decreasing their anxiety. However, for the simulations to provide the desired effect, time and money need to be devoted to faculty development in the design of effective simulation and in the complicated technology of the simulation equipment. Simulations should be incorporated across the curriculum, not just in the last semester. Objectives need to be written according to the educational level of the students, beginning with simple concepts and working toward more complex ones. Use of simulation can be extremely valuable in meeting the needs of any adult learners who need immediate feedback, as well as applicability of educational tasks to real life situations.

Nursing students need consistent experience with both visual simulation and real patients to learn how to effective focus on and manage patient problems. New approaches to student clinical assignments could be used where the goal is to improve thinking and problem-solving about care rather than to actually perform care as the student progresses through the program. Nursing students are too involved in learning the skills of nursing early in the program. Faculty need to actively search for opportunities for the students to accomplish and get more comfortable with their skills. It is not until the students feel that they are comfortable with their skills that they can branch out into reflecting on what they are doing and why they are doing it. Faculty and preceptors need to model critical thinking in the clinical area. They need to coach and ask questions that force the student to synthesize material and experiences. Strategies for externalizing the thought processes of experts, such as faculty think aloud moments, could be

used to model critical thinking in the clinical area.

Educators need to have at least baseline knowledge of the concept of critical thinking . Without this, education may use teaching methodologies solely because of mandates. The teaching methodologies would then simply become an activity rather than an activity used to help the student acquire higher level thinking abilities. Many nursing educators have little or no formal background in educational principles. These educators need to be mentored by more seasoned faculty who have a working knowledge of the concept of critical thinking and strategies that improve critical thinking skills in nursing students.

Another aspect that may have a direct affect on the critical thinking abilities of adult students is the characteristics of critical thinking. As noted in the literature, there are several skills, characteristics and dispositions necessary for a student to become a critical thinker. The three characteristics the participants in my study identified as important in improving their critical thinking skills were curiosity, confidence, and perseverance. These characteristics need to be fostered by adult educators, nursing faculty in particular, in order for the students to develop critical thinking skills.

The results of this study can be used by adult educators to further their own knowledge base about pedagogical factors, personal factors, and other factors that influence critical thinking development in adult students, nursing students specifically. The findings of the study could be used to develop a more effective curriculum design that fosters the development of critical thinking.

Recommendations for Future Research

A couple of interesting things were incidentally discovered in designing and implementing my study. One was that 28 students in this cohort of 89 remained at the same level of critical thinking on the composite critical thinking scores (10) or actually decreased their critical thinking skills on the CTA exit exam (18). The percentage of decrease in scores ranged from 2.5% to 15%. It would be interesting to look at this group of students to try to identify why they did not improve or why they declined in their critical thinking skills.

The second incidental finding was that the percent increase in critical thinking skills on CTA exit exam did not necessarily correlate with the participant's grade point average (GPA). Amy, who increased her percentage score by 15% from entrance to exit, and Halle, who increased by 7.5% and had the lowest scores of the cohort at the beginning and the end of the program, had the same GPA. Donna, who had the higher percentage of increase in scores, had the lowest GPA of the participants. It might be worthwhile to investigate how GPA correlates with critical thinking scores.

This study had an equal number of students from the LPN bridge program and the generic program. All but one of the participants had some health care experience. A future study might separate the two tracks through the program, rather than looking at them together. This may provide more information about what factors the students in the LPN bridge program attribute to the development of their critical thinking skills and how these compare to those of the generic students.

The factors identified in this qualitative study could be used to develop a quantitative assessment tool for nursing students to rank the relative significance of the factors. Also, such an instrument could be used to determine how the factors correlate with other variables, such as

prior experience, age, gender, ethnicity, grade point average, and reading comprehension.

The curriculum design in the ADN program used in this study progressed from simple to complex concepts. Building foundational knowledge and skill through the use of the nursing process is the backbone of this program. The results of this study were influenced by the curriculum design of the program. It would be interesting to discover if the same results would be obtained in a program using a different curriculum design, such as a program using a problem-based or evidence-based design.

The last recommendation would involve the measurement tool used to identify students who improved their critical thinking skills from entrance to exit in the program. The only other study I found that used the ATI CTA on entrance and exit from the program did not find a significant change in the student's scores from entrance to exit (Jones, 2005). Most of the nursing studies that measured critical thinking scores suggested that the tools did not adequately measure critical thinking skills in nursing students. Most of the tools used evaluate generic critical thinking skills, with the predominate tools used in nursing studies being the Watson-Glaser Critical Thinking Appraisal, the California Critical Thinking Skills Test, and the California Critical Thinking Disposition Inventory. Nursing educators need to agree on a consistent definition of critical thinking in nursing and from that develop or be actively involved in the development of an assessment tool that is specific to nursing. Comparisons of studies that measure critical thinking in nursing students cannot be done easily or effectively if the studies are all using different language and different measures.

Chapter Summary

This final chapter presented a discussion of the three conclusions that were derived from the data generated in this qualitative study. The first conclusion was that curriculum design

is a key factor in promoting critical thinking. Another conclusion was that personal characteristics promote the development of critical thinking. The third conclusion was that reinforcement promotes the development of critical thinking. Implications for practice and recommendations for future research were also provided.

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APPENDIX A

PHONE SCRIPT

Hello _____, this is Anne Purvis. I am contacting you to request your participation in a study that I am conducting as part of my dissertation on factors that influence the development of critical thinking skills in associate degree nursing students. You have been selected as a potential participant in this study based on the significant change that you made between the entrance and exit Critical Thinking Assessment scores. Based on this improvement, I think that you would be the best choice to discuss factors that improved your critical thinking skills during the program. I used the contact information from the last nursing class to contact you about participating.

Participation will entail reading and signing an informed consent form; completing a short questionnaire, which will take a couple minutes; and completing an interview, which will take about an hour. The interview will be audiotaped for accuracy and completeness. The interviews will be transcribed and analyzed by the investigator. I may also contact you, as I get into analyzing the transcripts for common themes, to ensure that I am capturing and understanding what you said accurately. This can be done over the phone and should take about 30 minutes.

Confidentiality will be maintained at all times. You will be given an identification number that will be carried over on all documents. The form that matches the number to your name will be shredded at the completion of the study. Until then, it will be kept with the audiotapes and transcription notes in a locked box. At the completion of the study, audiotapes will be destroyed.

There should be no risk to you in participating. The benefits you receive will be more indirect. Although you may not be the direct beneficiary of the results of the study, you can help our nursing program, as well as other programs, to identify ways to assist future students in improving their critical thinking skills. Your participation would be greatly appreciated.

A date and time for the interview will be set based on convenience for both you and myself, if you agree. Thank you so much for your time and your consideration of being a participant in this study.

APPENDIX B

DEMOGRAPHIC QUESTIONNAIRE

Please complete the questionnaire and return it to the interviewer. Fill in the blank and circle the appropriate response as needed.

Age _____

Gender M F

Ethnicity Caucasian Black Hispanic Asian Island

GPA College _____ Nursing _____

Prior work experience or degree: _____

_____

Critical Thinking Assessment Scores

Entrance _____ Exit _____

APPENDIX C

INTERVIEW GUIDE

General

(1) When you hear the term critical thinking, what does it mean to you? What are some examples of critical thinking?

(2) What are some examples of characteristics that you associate with critical thinking? Can you elaborate on a time when these characteristics were demonstrated by yourself or someone else?

(3) You mentioned _____ as a feature of critical thinking. Can you describe an activity or assignment where you applied that skill?

(4) How would you rate your critical thinking ability today compared to entry into the nursing program? How has it changed?

(5) Tell me about a time or an instance in your program where you feel that you first used critical thinking skills. (Probe answer)

(6) Tell me about another time when you demonstrated critical thinking. (Probe answer)

(7) Give me an example of an experience outside the clinical and classroom that you think contributed to the development of your critical thinking skills. (Probe) Research has shown that we develop and hone CT in all facets of our life. Could you give me an example of how CT is demonstrated or honed in your life?

(8) As you look back on your time in the nursing program, what other experiences or events do you think contributed to the development of your critical thinking skills?

(9) Considering all the factors, what do you think were the most important factors that contributed to the development of these skills? Why?

APPENDIX D

CONSENT FORM

I, _____, agree to participate in a research study titled "Factors that Influence the Development of Critical Thinking Skills in Associate Degree Nursing Students" conducted by Carol Anne Purvis from the Department of Adult Education at the University of Georgia under the direction of Dr. Sharan Merriam, Department of Adult Education, University of Georgia. I understand that my participation is voluntary. I can refuse to participate or stop taking part without giving any reason, and without penalty or loss of benefits to which I am otherwise entitled. I can ask to have all the information about me returned to me, removed from the research records, or destroyed.

The purpose of this study is to identify the factors that graduates from an Associate Degree in Nursing program perceive as enhancing the development of their critical thinking skills from entrance to exit in the program. If I volunteer to take part in this study, I will be asked to do the following things:

1) Read and sign the consent form
2) Complete a short demographic form which will take 2-5 minutes.
3) Answer questions from an interview protocol that will take approximately 1 hour. The interview will be audiotaped.
4) The investigator may call to clarify information gained from the interview.
5) The investigator may seek your assistance in verifying that the investigator captured your perceptions as you intended after the data has been collected and analyzed, an approximate 30 minute to 1 hour phone call or meeting.

Although there are no direct benefits to me, the information will be used to strengthen the curriculum of the associate degree in nursing program so that others may benefit from my participation.

No risk is expected from participation in this study. No individually-identifiable information about me, or provided by me during the study, will be shared with others without my written permission. I will be assigned an identifying number and this number will be used on all of the questionnaires I fill out. Only the investigator will have access to the audiotapes. The audiotapes will be used by the investigator for transcription purposes so that your words can be accurately and completely captured in the study. All tapes will be destroyed at the end of the study.

The investigator will answer any questions about the research, now or during the course of the study.

I understand that I am agreeing by my signature on this form to take part in this research project and understand that I will receive a signed copy of this consent form for my records.

Carol Anne Purvis _____ _____
Name of Investigator Signature Date
Telephone: (770) 358-5142
Email: purviscarol@bellsouth.net or a_purvis@gdn.edu

_____ _____ _____
Name of Participant Signature Date

Please sign both copies, keep one and return one to the investigator.

Additional questions or problems regarding your rights as a research participant should be addressed to The Chairperson, Institutional Review Board, University of Georgia, 612 Boyd Graduate Studies Research Center, Athens, Georgia 30602-7411; Telephone (706 542-3199; E-mail address IRB@uga.edu