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UNIVERSITY OF OKLAHOMA

GRADUATE COLLEGE

THE RELATIONSHIP BETWEEN NURSING STUDENT PERFORMANCE AND CRITICAL THINKING IN CLINICAL JUDGMENT

A Dissertation

SUBMITTED TO THE GRADUATE FACULTY

in partial fulfillment of the requirements for the

degree of

Doctor of Philosophy

By

PAMELA ALLYN DI VITO -THOMAS

Norman, Oklahoma

2002

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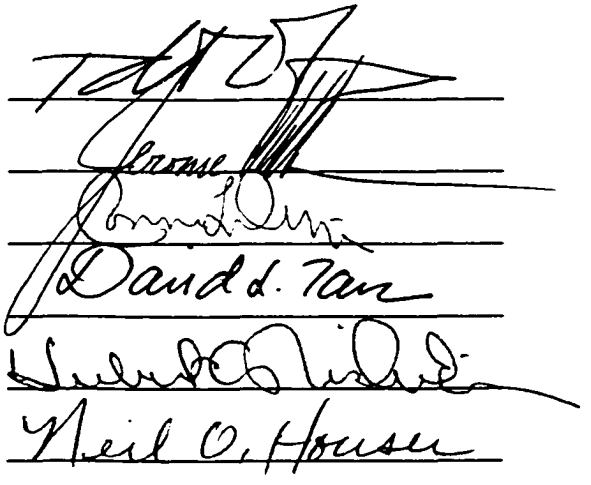
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THE RELATIONSHIP BETWEEN NURSING STUDENT PERFORMANCE AND CRITICAL THINKING IN CLINICAL JUDGEMENT

A Dissertation APPROVED FOR THE DEPARTMENT OF EDUCATIONAL LEADERSHIP AND POLICY STUDIES

BY



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ABSTRACT

The changing health care system, the nature of patient problems, and the movement of patient care from acute care facilities to diverse community settings has increased the demand for competent, professional nurses who are capable of thinking critically. The quality of thinking has become crucial for nursing practice because critical thinking is becoming the benchmark of professional competence and student performance. Therefore, the purpose of this study was to investigate the relationship between nursing student performance and critical thinking in clinical judgment among baccalaureate nursing students, and to describe the teaching/learning strategies that facilitate the development of critical thinking in clinical judgment. The research design included a mixed methodology of a quantitative causal-comparative design, and a qualitative constant-comparative design. The sample participants consisted of baccalaureate nursing students ($n = 134$). The instruments used in this study to collect quantitative data included the Adapted Six-Dimensional Scale of Nursing Performance (6-D) (1978), and the PDT Critical Thinking in Clinical Judgment Scale (PDT) (2000). The Pearson product-moment correlation indicated that the relationship between nursing student performance and critical thinking in clinical judgment was significant, $r = 0.732$, alpha = 0.01 (2-tailed). A concise explanation of the critical thinking process, and appeal to baccalaureate nursing curricula is well articulated in the following extraction from the data, "the broader way of thinking is learned by working in the field, and it has become clear that education is essential as a first

step, but education without experience lessens the capacity for an individual to think critically in a situation where lives are at stake. Education and experience must go hand in hand, so that the knowledge learned in the classroom becomes second-nature in practice. Clinical experience is the most important learning strategy in clinical judgment. You cannot learn that skill from a book."

The Relationship Between Nursing Student Performance and Critical Thinking in Clinical Judgment

Chapter 1

The changing health care system, the nature of patient problems, and the movement of patient care from acute care facilities to diverse community settings has increased the demand for competent, professional nurses who are capable of thinking critically. Today, nurses are challenged to think more globally about complex issues such as social responsibilities, life options, and expanding employment. The quality of thinking has become crucial for nursing practice because critical thinking is becoming the benchmark of professional competence and student performance. Most assuredly, the critical thinking nurse will "stand in the gap" to significantly improve the care provided in clinical systems, and serve to resolve and decrease errors throughout the health care system (Alfaro-LeFevre, 2000; Brigham, 1993; Daly, 1998; Di Vito -Thomas, 2000; Gendrop & Eisenhauer, 1996; Inouye & Flannelly, 1998; Jennings & Loan, 1999; May, Edell, Butell, Doughty, & Langford, 1999; Maynard, 1996; Sedlak, 1997; Thompson & Rebeschi, 1999; Wade, 1999).

Unmistakably, changes in the health care system preside over all the United States with "insurance companies practicing medicine," entangled in managed care, and cost-containment strategies. Often, within these changes a disengaged decision maker inadvertently delegates physical and interpersonal care to auxiliary workers (Tanner, Benner, Chelsa, & Gordon, 1993) resulting in decreased professional staff in acute care and community settings. Barnum (1999)

confirms that "nurse helpers-technicians" will increasingly be used, as well as, minimally trained personnel. Shall we not ask for whom the bell tolls with such unsound and questionable patient care outcomes? Providentially, critically thinking nursing professionals who are patient advocates will "stand in the gap" as the "primary sentinels of patient care, providing the first warning and rapid intervention for those too sick to help themselves" (Berens, 2000, p.1). Therefore, from the beginning of baccalaureate nursing education, and on to general practice, critical thinking in clinical judgment must be developed or the bell will toll for rising morbidity and mortality rates that could have been prevented.

Background

When theology, law, and medicine were the only contenders to the "professions" the discipline of nursing was struggling within the confines of women's roles in society, religious orders, wars, and technological advances. Historically, the traditional roles of women as wife, mother, daughter, and sister have included caring for, nurturing, and supporting other family members. These subservient roles contained the origins of nursing and in these times the nurse-slaves were dependent on master, healer or priest for "direction in the care of her charge" (Kosier, Erb, & Blais, 1997, p. 9).

Then, as time progressed nursing leaders emerged such as Florence Nightingale (1820-1910) who was known for her efforts in improving the standards for war casualties in the Crimea and who was designated as the "Lady with the Lamp." She was a reformer of public health, political activist, and nursing's first scientist/theorist. Her famous writings, *Notes On Nursing: What It*

Is And What It Is Not, provided the foundation for nursing practice. Reflecting on critical thinking in nursing, Nightingale wrote "If then, every woman must, at some time or other of her life, become a nurse, i.e., have charge of somebody's health, how immense and how valuable would be the produce of her united experience if every woman would think how to nurse" (1859/1992). In 1860, a grateful England provided funds to her that she used to establish the Nightingale Training School for Nurses. The school became a model for subsequent schools of nursing.

On American soil, Clara Barton (1812-1912) served as a volunteer nurse during the Civil War, and then established the American Red Cross which linked with the International Red Cross in 1882. Remarkably, she persuaded congress to ratify the Treaty of Geneva (Geneva Convention) so that humanitarian efforts could be performed by the Red Cross in times of peace. Another nursing activist was Lillian Wald (1867-1940), who is considered the founder of public health nursing. Because of her concern with fair child labor, she created the United States Children's Bureau in 1912. Interestingly, Lavinia Dock (1858-1956) actively participated in the protest movements for women's rights. The protest movements led to the historic Nineteenth Amendment of the U.S Constitution that gave women the right to vote. Later, Lavinia Dock, Mary Adelaid Nutting, and Isabel Hampton founded the American Society of Superintendents of Training Schools for Nurses of the United States and Canada. The Society was a precursor to the current National League for Nursing (NLN).

Nursing leaders continued to emerge and worked toward defining the scope of nursing education and practice. Consequently, rising women's health issues led Margaret Higgins Sanger (1879-1966) to establish Planned Parenthood. Then after World War I, Mary Breckinridge (1881-1965) started one of the first midwifery training schools in the United States (Kosier, Erb, & Blais, 1997). Notably, these women, and many others not presently mentioned represent the leaders in nursing history who inscribed the art and science of the evolving nursing profession and led nursing to where it was destined to flourish, beyond all cultural or socio-economic barriers, to care for those in its charge.

Christened with this resolve, nursing education ignited within schools of nursing in Hospital Diploma Programs (1860), Baccalaureate Programs (1909), and Community College/Associate Degree Programs (1950's). However, in 1965 the American Nurses Association (ANA) recommended that nursing education should be within the general system of education, and that minimal preparation for professional nursing practice should be at the baccalaureate level (Kosier, Erb, & Blais, 1997).

Today, a primary goal of nursing education at any level is to infuse and evaluate critical thinking in clinical judgment (Bechtel, Davidhizar, & Bradshaw, 1999; Loving & Wilson, 2000). The goal has the dynamic time-frame from the beginning of the student's nursing education, on to graduation, and accompanied by the implicit ambition of creating a commitment to life-long learning. The commitment to life-long learning is facilitated through continuing professional education (CPE) that serves to update and expand clinical competence. However,

to gain any benefit from CPE, the nurse needs to be able to think critically about the currency of one's own knowledge and skills for practice, to be aware of the available and accessible resources to develop new competencies, and a willingness to engage in self-assessment (Oermann, 1998).

Other goals to be achieved within nursing education are; 1) the development of innovative curricula comprised of teaching/learning strategies that promote critical thinking and challenge established theory and practice, and 2) valid and reliable evaluation measures of student performance to ensure patient safety and optimal patient outcomes (Duchscher, 1999; Girot, 2000; Inouye & Flannelly, 1998; May et al., 1999). "Evaluation is one of the most difficult and emotionally charged practices of clinical teaching...evaluation is crucial to the outcomes of nursing education programs" (Scanlan, Care, & Gessler, 2001, p. 23). Currently, the status of valid and reliable instruments that measure critical thinking in clinical judgment yields a two-fold need: A quest for accurate evaluation measures, and refinement of the phenomena of critical thinking in clinical judgment relative to the context of clinical nursing practice. Krichbaum, Rowan, Duckett, Ryden, and Savik (1994) reinforced this need with the idea that the "better one can define the phenomena, the better one can evaluate it" (p. 395). "Professional programs of nursing must explicate a clear definition of critical thinking, identify specific learning outcomes reflective of critical thinking abilities, and select appropriate ways to measure the achievement of these outcomes in graduating students" (Thompson & Rebeschi, 1999, p. 248). Therefore, in consideration of these needs an initial phenomenological study was

conducted to describe the essence of the phenomena of critical thinking in clinical judgment (Di Vito -Thomas, 2000). The exhaustive description of the study indicated a cognitive process, quite involved and discipline specific with an end point of excellence in patient care and optimal patient outcomes. The results from the phenomenological study provided insight and objective evaluation criteria for the development of The PDT Critical Thinking in Clinical Judgment Scale (2000) (see Table 1).

Table 1

The PDT Critical Thinking in Clinical Judgment Scale (2000)

1. Discipline-Specific Knowledge Uses theoretical and practical knowledge bases to analyze salient relationships (relationships that stand out) in providing patient care.
2. Critical Reflection Recognizes similarities in patterns despite differences in the objective features that permit a view of current situations in terms of past situations.
3. Critical Thinking Competency Demonstrates diagnostic reasoning, clinical inferences, synthesis of relevant information, identification of missing information, reflective validation of information, problem-solving, and decision-making skills.

(table continues)

Table 1 (continued).

The PDT Critical Thinking in Clinical Judgment Scale (2000)

---

4. Intellectual Virtues

   Conveys caring, confidence, fairness, discipline, perseverance, creativity, curiosity, integrity, and humility in clinical interactions with patients, staff, and peers.

5. Action Involvement and Improvement

   Takes appropriate action in specific context; acts responsibly with others to effect change and generate positive patient outcomes through knowing the patient.

Preliminary Study

The critical thinking behaviors of nursing students in clinical judgments is perceived by nurse educators and nurse clinicians as a cognitive process that results in a clinical judgment demonstrated by "thinking in action." The judgment is a choice between alternatives thought to be more right than wrong and may "imply conditions of uncertainty." The judgments are observed in "unique presentations" where "there may be no prescribed answer." However, the student is "quick to arrive at an appropriate conclusion for the setting" by being "open to reassessment and changing the intervention" and "implementing the intervention in an organized fashion that is related to their assessment." Reflection-in-action is described as a cognitive process such as "thinking through," "interpreting",

"responding," and "making connections between what they have seen and what they have learned." The student engages in reflection by "looking back at the patient," "attending to available cues," "processing all signs and symptoms," "generating and evaluating hypotheses," and "weighing the evidence against expectations, norms or standards." The student "has the ability to know what is needed, and the wisdom to apply that knowledge."

The theoretical and scientific knowledge used is "built within learning" and "comprised of both general and discipline-specific skills." The "analytic reasoning" is "not limited to inductive or deductive thinking" and "includes a set of dispositions and skills." Critical thinking in clinical judgment is an "attitude" that "conveys confidence, caring, accountability, responsibility, and enthusiasm." The student displays the "attitude" in "knowing the patient" and "having a relationship with the patient" which provides the opportunity to truly "know what is going on" and can "quickly make a decision to act, to intervene, to gather further data, or to notify the physician." Excellence in patient care, and optimal patient outcomes require critical thinking in sound clinical judgments; "they go hand in hand."

The (1) theoretical and scientific knowledge (discipline-specific knowledge) that is used to analyze salient relationships in providing patient care was described by participants as "they are making connections between what they see and what they have learned," "actions associated with knowledge built within learning," and "includes a set of dispositions and skills." Interestingly, the ability to recognize patterns in terms of past situations often termed (2) critical reflection

and was described by participants as "looking back at their patient," "something thought of through many years of experience," and "insight."

Historically, (3) critical thinking competencies are defined as an ability to demonstrate diagnostic reasoning, the synthesis of relevant information, problem-solving and decision-making skills. The description of this cognitive process by the participants was "the ability to accurately assess what is going on, step back, identify what is going on, and put it all together," "clinical reasoning," "analytic reasoning," "thinking quickly on their feet," "decisions for which there may be no prescribed answer," and "the process students go through to make decisions."

Conveying attitudes such as caring, confidence, fairness, creativity, and humility in clinical interactions are (4) intellectual virtues (Paul, 1993). The participants described similar virtues as an "attitude" that "acts in a responsible, accountable, and moral way," and "demonstrates confidence, understanding, enthusiasm, and caring." (5) Action involvement and improvement, as in taking appropriate action in specific context, effecting change, and generating improvement in positive patient outcomes through knowing the patient is paramount in nursing practice. The participants described the actions as "ability to talk to the patient," "interpreting, responding," "knowing the patient with a level of involvement," and "having relationships with patients."

The societal expectation is that nursing students can competently demonstrate a knowledge of general and discipline-specific skills, autonomy, commitment, and responsibility that is processed through critical thinking. In this,

nurse educators are challenged to facilitate nursing student development of inquiry and critical thinking, problem-solving, the ability to work in interdisciplinary healthcare teams, as well as the capacity to manage large volumes of information (Bellack, 1995). Also, "if exposure to faculty is a major influence on critical thinking ability and professional values, faculty must be assumed to be superior in these characteristics..." (Saarmann, Freitas, Rapps, & Riegal, 1992, p. 26). Hence, seeking the "truth of professional nursing practice" when teaching and evaluating an educational experience is of utmost importance because excellence in clinical performance has always been the hallmark of a "good nurse" (Krichbaum, et al., 1994).

Problem/Purpose

The changing health care system, the nature of patient problems, and the movement of patient care from acute care facilities to diverse community settings has increased the demand for competent, professional nurses who are capable of thinking critically. In recognition of these changing health care needs, nursing education has responded by a generalized curriculum shift with emphasis on outcomes-oriented education (Failla, Maher, & Duffy, 1999). Major issues within the curriculum shift are; (1) the development of teaching/learning strategies that facilitate the development of critical thinking for course work and clinical practice, and (2) the development of instruments that may be used to objectively evaluate critical thinking in clinical judgment within the specific context of nursing education. Inherent in both of these major issues is the implicit relationship between performance and critical thinking in clinical judgment, that

is as yet indeterminate. According to Adams (1999), review summaries of 22 research studies of critical thinking from 1977 to 1995 have concluded in mixed results, "that is, they neither confirm nor deny a relationship between critical thinking abilities and skills and nursing education. This unexpected conclusion warrants further research" (p. 118). Therefore, the purpose of this study was to investigate the relationship between nursing student performance and critical thinking in clinical judgment among baccalaureate nursing students, and to describe the teaching/learning strategies that facilitate the development of critical thinking in clinical judgment.

Research Questions

1. How does nursing class, age, gender, and ethnicity relate to the scores on the Adapted Six-Dimensional Scale of Nursing Performance (6-D Scale) (1978), and scores on the PDT Critical Thinking in Clinical Judgment Scale (PDT Scale) (2000) among baccalaureate nursing students?
   Ho: There are no differences among the scores on the Adapted Six-Dimensional Scale of Nursing Performance (1978), and scores on the PDT Critical Thinking in Judgment Scale (2000) related to nursing class, age, gender, and ethnicity of baccalaureate nursing students.
2. What is the relationship between the performance of baccalaureate nursing students, as indicated by scores on the Adapted Six-Dimensional Scale of Nursing Performance (1978), and critical thinking in clinical judgment, as indicated by scores on the PDT Critical Thinking in Clinical Judgment Scale (2000)?

Ho: There is no relationship between the performance of baccalaureate nursing students, as indicated by scores on the Adapted Six-Dimensional Scale of Nursing Performance (1978), and critical thinking in clinical judgment, as indicated by scores on the PDT Critical Thinking in Clinical Judgment Scale (2000).

3. How would one describe how one thinks (the thinking process one goes through) when making clinical judgments?
4. What were the most important teaching/learning strategies in the development of clinical judgment?

Definitions

Critical Thinking

A complex developmental cognitive process based on rational and deliberate thought and self-regulatory judgment. (APA 1990; Paul, 1993).

Clinical Judgment

"an interpretation or conclusion about a patient's needs, concerns, or health problems, and/or the decision to take action (or not), and to use or modify the standard approaches, or to improve new ones as deemed appropriate by the patient's response...analytical and objective process, directed toward resolutions of problems and/or achievement of clearly defined ends" (Tanner, 1998, pgs. 19, 20).

Illustration of Critical Thinking in Clinical Judgment

Critical thinking in clinical judgment occurs when nursing students are "making connections between what they see and what they have learned," and

possess an "attitude" that "conveys confidence, caring, accountability, responsibility, and enthusiasm." The students display the "attitude" in "knowing the patient" and "having a relationship with the patient" which provides the opportunity to truly "know what is going on" and they can "quickly make a decision to act, to intervene, to gather further data, or to notify the physician." In reality, nursing students develop trusting relationships with patients and care for patients using a complex developmental cognitive process based on rational and deliberate thought, and self-regulated judgment. Critical thinking in clinical judgment is "the process students go through to make decisions" evident in the nursing process (assessing, diagnosing, planning [outcomes and interventions] implementing, and evaluating care), and demonstrated by "thinking in action," within the context of clinical practice.

Nursing Student

A nursing student is a student in the junior or senior year in a baccalaureate school of nursing that is accredited by the National League for Nursing (NLN).

Illustration of a Nursing Student

A college student who has completed the prerequisite courses for admission into a baccalaureate school of nursing and who is a junior or senior nursing student. The baccalaureate nursing student is actively engaged in a nursing theory course (medical/surgical or maternal/child) with a concurrent clinical practicum that affords the student the opportunity to experience the implementation of the nursing process in direct patient care.

Performance

"...performance is behavior which can be observed, and from which competence can be inferred, just as it is an observable performance on so-called intelligence tests from which we infer a construct we call intelligence" (Mast & Davis, 1994, p. 141).

Illustration of performance

A nursing student is observed taking appropriate action in specific context, and effecting change for a patient that results in positive patient outcomes. A nursing student is observed accurately assessing a patient's level of pain and managing a patient's pain experience. The appropriate action is a cardinal nursing performance and infers competence in clinical nursing practice (Wong, 2000).

Significance

The conceptual importance of the development of teaching/learning strategies that facilitate the development of critical thinking for course work and clinical practice, and the development of instruments that may be used to objectively evaluate critical thinking in clinical judgment within the specific context of nursing education is generated from a triad of societal, ethical, and economic needs. The needs are evident in the changing health care system, the nature of patient problems, and the movement of patient care from acute care facilities to diverse community settings. In recognition of these changing health care needs, nursing education has responded by a generalized curriculum shift with emphasis on outcomes-oriented education, and "a call for more nurses with

baccalaureate degrees" (Blegen, Vaughn, & Goode, 2001; Thompson, & Rebeschi, 1999).

Unfortunately, the evaluation process of obtaining information about the quality of student learning or achievement, and clinical performance (Oermann & Gaberson, 1998) may be problematic due to the lack of valid and reliable measures of critical thinking. Also, nursing faculty may be relying on the side of guesswork, experience, and personalized perceptions rather than on objective evidence. Although instruments such as the Watson & Glaser Critical Thinking Appraisal (WGCTA), the California Critical Thinking Skills Test (CCTST), the Ennis-Weir Critical Thinking Essay Test (EWCTET), and the Cornell Critical Thinking Test (CCTT) have been used in numerous nursing studies, they do not possess a connection to the context of nursing practice. The WGCTA and the CCTST broadly measure critical thinking traits while the EWCTET and the CCTT focus on analyzing a limited number of critical thinking behaviors.

According to Whitlow, Stover, and Johnson (1996), the WGCTA is the most widely used tool for measuring critical thinking among nursing students and the "WGCTA may not be the one of choice for measuring nursing students critical-thinking abilities as a criterion for determining the effectiveness of educational programs" (p.31; Pless & Clayton, 1993). The problem with these instruments is that they have a limited ability to describe the relationship between nursing student performance and their critical thinking abilities in clinical judgments. Respectively, in a recent study May et al. (1999) found that there was no significant relationship between critical thinking and clinical competence

between two graduating nursing classes (n = 143), and that clinical competence may not become evident until nursing students become practicing nurses.

Also, the importance of the issue is promoted through the National League for Nursing (NLN), as well as, the American Association of Colleges of Nursing (AACN) that provide accreditation, and a national agenda for nursing education. Currently, the NLN requires the demonstration of critical thinking in graduates of all nursing programs in the United States (Frye, Alfred, & Campbell, 1999; Stevens & Valiga, 1999). Further, Loving (1993) reinforced the importance of the national agenda for nursing education with the following:

> "Because clinical judgment measures and research are lacking, studies are needed that identify how students and faculty perceive the process of teaching and learning clinical judgment. Since students and faculty are the primary actors in nursing education, they are in a unique position to evaluate the effect of educational factors impacting how students learn clinical judgment." (p. 416)

Implications

Critical thinking is becoming the benchmark of professional competence and student performance. The development of critical thinking skills empowers the evolving nurses (nursing students) to promote and define the scope of professional nursing practice in their daily steps as they provide competent nursing care demonstrated through outstanding nursing performance. Through this, critically thinking nurses will meet the demands of clinical judgments wherever the health care practice environment may emerge whether in acute care

or community based settings. The ability to think critically, to improve clinical systems, and decrease errors in clinical judgments is ever the vision of historic and futuristic nursing practice. The historic vision "If then, every woman must, at some time or other of her life, become a nurse, i.e., have charge of somebody's health, how immense and how valuable would be the produce of her united experience if every woman would think how to nurse" (Nightingale, 1859/1992), manifest in nursing practice today, to think like a nurse, to ensure safe, efficient, and effective patient care.

Assumptions

This study is conducted under the following assumptions:

1. Society expects health care practitioners to be competent performers of critical thinking in clinical judgments and who have as their goal optimal health outcomes.
2. The study participants will be exposed to clinical nursing practicums that provide the nursing students with similar experiential opportunities for critical thinking in clinical judgment.
3. The study participants will self-report honestly and may possess many of the same clinical competencies.
4. The researcher assumes that a relationship exists between nursing student performance and critical thinking in clinical judgment and can be investigated by combining both quantitative and qualitative research methodologies.

5. The study participants will respond honestly and will not be affected by the role of the nursing faculty investigators or their status as nursing students.

Limitations

The study is conducted under the following limitations:

1. The research methodology is proposed as a mixed methodology inclusive of a quantitative causal-comparative design, and a qualitative constant-comparative design. The results may not be truly predictive or causal.
2. The data collection is to be obtained from participants in baccalaureate nursing programs within the settings of higher education and not inclusive of schools of nursing within vocational schools and community college settings.
3. The generalizability of the study is limited by the participants who are exposed to and representative of the western health care culture.

Organization of the study

The study will be reported in five chapters. Chapter one provides the introduction, background, problem/purpose, definitions, research questions and hypotheses, significance, implications, assumptions and limitations of the study. Chapter two provides a review of relevant literature with a focus on topics such as critical thinking, thinking and problem-solving, nursing studies related to nursing student performance and critical thinking in clinical judgment, and

teaching/learning strategies that facilitate the development of critical thinking. Chapter three provides the study methodology which is a mixed methodology including a causal-comparative, and a constant-comparative design to comprehensively evaluate the study questions and hypotheses. Chapter four provides the analyses and findings of the data that will consist of statistical tests that describe and measure the differences between groups, and the relationship between variables for the quantitative data, as well as, a constant-comparative analysis of the qualitative data. Finally, chapter five provides the conclusions of the study in relation to theory, practice, and future research while reflecting on the purpose of the study, and the review of literature.

Chapter 2

Chapter one provided the introduction, background, problem/purpose, definitions, research questions and hypotheses, significance, implications, assumptions, and limitations of the study. Chapter two contains a review of relevant literature on the concepts of critical thinking, problem-solving, nursing studies related to nursing student performance and critical thinking in clinical judgment, and teaching/learning strategies that facilitate the development of critical thinking. The review of literature represents an explanation of the relationship among these concepts to provide the reader with a fundamental orientation to what is known, and implicitly implies how the results of this study will add to the extant knowledge on the topic of critical thinking in nursing education (Hoskins, 1998).

Critical Thinking

Creative thinking, smart thinking, high-quality, and in-depth thinking are semantic representations of the concept that is widely labeled as critical thinking. Historically, the famous adage by Descartes "I think, therefore I am," has contributed much worth to the idea that thinking plays a key role in the very existence of man. In an evaluation of critical thinking models from 1912-1992 Gendrop & Eisenhauer (1996) found the common elements of process (active, explicit, purposeful), cognitive skill (inquiry, interpretation, reflection, analysis, creativity, inference, conceptualization, evaluation), data source (reality, evidence, theories, contexts, criteria, empathy, experience), and outcome (judgment, novel idea, novel response). Respectively, Scheffer and Rubenfeld

(2000) support the idea that critical thinking in nursing comprises ten habits of the mind (affective components; perseverance, open-mindedness, flexibility, confidence, creativity, inquisitiveness, reflection, intellectual integrity, intuition, contextual, and perspective), and seven skills (cognitive components; information seeking, discriminating, analyzing, transforming knowledge, predicting, applying standards, and logical reasoning).

Alas, the age-old debate regarding the nature and grounds of knowledge permit numerous differences among perspectives within the models of critical thinking. However, the models are uniquely connected within the act of thinking. The subjective nature of knowledge, as discovered by reflection, was upheld by Plato while the objective nature of knowledge, as discovered through empirical reality, was upheld by Aristotle. A tradition within these philosophies has been the cultivation of rational thinking for the purpose of guiding behavior (Paul, 1993).

Consequently, although there is no consensus among the definitions of critical thinking, nearly all of the definitions of critical thinking emphasize logic and reasoning. Amazingly, in his time Socrates proposed the idea that all thinking has a logic or structure. The idea suggests that any one statement only partially reveals the thinking underlying it and that no more than a tiny part of the system of interconnected beliefs is expressed. The part of the system that underlies the expressed beliefs may be reflective of the critical thinking phenomena. Notably, all thinking has intellectual traits, assumptions, makes or claims meanings, focuses on some things, throws others to the background, and uses concepts and

ideas. Accordingly, critical thinking is defined by purposes, issues, or problems, and is elaborate or underdeveloped. When thinking is challenged by more than one possible outcome such as in questions of ethics, it is multilogical in context. Likewise, when thinking has but one outcome such as in arithmetic or algebraic expressions, it is monological in context (Paul, 1993).

In nursing practice, Bandman and Bandman (1995) identified four types of reasoning that comprise critical thinking. The types are deductive, inductive, informal or everyday and practical. The authors contribute the following checklist of critical thinking functions in nursing:

1. Use the process of critical thinking in all of daily living.
2. Discriminate among the uses and misuses of language in nursing.
3. Identify and formulate nursing problems.
4. Analyze meanings of terms in relation to their indication, their cause or.
5. Verify, corroborate, and justify claims, beliefs, conclusions, purpose, and their significance.
6. Analyze arguments and issues into premises and conclusions.
7. Examine nursing assumptions.
8. Report data and clues appropriately.
9. Make and check inferences based on data, making sure that the inferences are, at least plausible.
10. Formulate and verify beliefs, decisions, and actions.
11. Give relevant reasons for beliefs and conclusions.

12. Formulate and verify value judgments.
13. Seek reasons, criteria, and principles that effectively justify value judgments.
14. Evaluate the soundness of conclusions. (p. 7)

Jacobs, Ott, Sullivan, Ulrich, and Short (1997) reinforce the above critical thinking functions in nursing, and continue to build on Paul's (1993) conceptualizations by defining critical thinking in nursing as "the repeated synthesis of relative information, examination of assumptions, identification of patterns, prediction of outcomes, generation of options and choices of actions with increasing independence" (p. 20). Elaborating on the previous definition, Alfero-LeFevre (2000) specifically describes critical thinking in nursing as:

1. Entails purposeful, outcome-directed (results-oriented) thinking.
2. Is driven by patient, family, and community needs.
3. Is based on principles of nursing process and scientific method.
4. Requires knowledge, skills, and experience.
5. Is guided by professional standards and ethics codes.
6. Requires strategies that maximize human potential (e.g., using individual strengths) and compensate for problems created by human nature (e.g., the powerful influence of personal perspectives, values, and beliefs).
7. Is constantly reevaluating, self-correcting, and striving to improve. (p. 9)

A Delphi research project from the American Philosophical Association (APA) (1990) reviewed 46 published critical thinking theorists from a variety of disciplines and provided the following consensus definition: "Critical thinking is the process of purposeful, self-regulatory judgment. This process gives reasoned consideration to evidence, contexts, conceptualizations, methods, and criteria" (p. 2). Also, within the process of becoming a critical thinker, the process provides a common denominator for knowledge that exemplifies disciplined, and self-directed thinking. The knowledge acquired is discovered by thinking, assessed by thinking, and organized by thinking (see discussion on memory, p. 27). The cognitive skills employed require intellectual discipline, self-evaluation, reflection, counter thinking, opposition, challenge and support. Critical thinking transforms the way an individual views themselves, understands the world, and makes decisions (Chaffee, 1994; Paul, 1993).

Considering nursing practice, Oermann (1998) suggests that "critical thinking enables nurses to analyze complex data about patients, make decisions about their problems, ...and decide on the most appropriate interventions considering the particular situation" (p. 323). Convincingly, some authors argue that there are general critical thinking skills and discipline specific critical thinking skills. Some critical thinking skills within the specific discipline of nursing may include the thinking involved in the decision-making nursing process. Duchscher (1999) proposes that critical thinking is one way that nurses apply the process of inquiry in the nursing process. The nursing process includes

assessing, planning (diagnosis, outcomes, and interventions) implementing, and evaluating nursing care (Alfero-Lefevre, 2000).

Decision-making and professional clinical judgment may be evidenced in the indications of critical thinking identified by Facione and Facione (1996);

1. fully and accurately interpret the data they use to make judgments
2. clearly and concisely frame the problem being addressed
3. properly identify relevant criteria (ethical, legal, physiologic, psychologic, etc) that should be used to make the judgment or solve the problem
4. systematically demand reasons and evidence for proposed solutions and proffered analyses
5. open-mindedly and creatively explore multiple possible solution paths before deciding to take action
6. fair-mindedly evaluate the most promising alternatives
7. prudently make, suspend, or revise judgments as appropriate
8. judiciously reframe problems when new information presents. (p. 43)

The empirical evidence is inconclusive and while critical thinking, clinical decision-making, and clinical judgment are related sets of cognitive skills, they are not necessarily the same. Interestingly, King and Kitchener (1994) proposed the Seven Stages of the Reflective Judgment Model that includes; pre-reflective thinking (Stages one-three), quasi reflective thinking (Stages four-five), and reflective thinking (Stages six-seven). In this model, critical thinking may be synonymous with reflective thinking because of the similarity between the

concepts described in stages six-seven. In stage six, knowledge is said to be uncertain but constructed by comparing evidence and opinion on different sides of an issue or across contexts. Then in stage seven, knowledge is revealed as the outcome of a process of reasonable inquiry. Also, according to Schon (1983) a kind of "knowing-in-action" is spontaneously displayed by a skillful practitioner but does not stem from prior intellectual operation. However, practitioners do reflect on their knowing-in-practice while in the midst of a practice situation, and then engage in reflection-in-action. The meaning of reflection-in-action needs to be considered in terms of the complexity of knowing-in-practice. Therefore, the terms knowing-in-action, reflection-in-action, knowing-in-practice, reflective thinking, and critical thinking possess related sets of cognitive skills, and yet, not necessarily the same skills. The similarity of the skills may be found in the notion of metacognition, thinking about thinking. Metacognitive skills involve monitoring, analyzing, predicting planning, evaluating, regulating, and revising. Pesut and Herman (1992) proposed:

> Metacognitive knowledge includes such things as knowing what one knows, knowing when and how one comes to know it, being able to think and plan strategically, the ability to represent knowledge effectively and in ways that permit efficient retrieval, and the ability to monitor, and consistently evaluate one's own competence. (p. 149)

Another important consideration is that some nursing programs have added an affective component in their critical thinking definitions. The addition of an affective component is important due to its inherent nature in professional

nursing practice. Also, the addition of an affective component acknowledges the significance of the nurse-client relationship, and the role of the clinician's emotional responses in clinical decision-making (Tanner, 1997). Overall, considering the above definitions leads to a primary definition of critical thinking in this study as: A complex developmental process based on rational and deliberate thought and self-regulatory judgment (APA, 1990; Paul 1993).

Problem-Solving

A challenge for educators from any nursing program is to prepare graduates who are capable of looking beyond the obvious and engaging in appropriate problem-solving skills in a wide variety of situations. Facione, Facione, and Giancarlo (1996) suggest that students must be prepared to have motivating habits of mind for thoughtful, fair-minded engagement in problem-solving, decision-making, and professional judgment, in essence to be willing to think. As a "habit of the mind," problem-solving is a part of what is known as human information-processing consisting of the organization of memory, and influences on storage and retrieval from memory.

In recent years, research trends to separate memory systems (perceptual-a second or two, short term-less than 30 seconds unless repeated, long term-unlimited in time and capacity and stored on the basis of meaning) are declining. However, research trends are now moving toward distinguishing between memory used for storage and memory used for active manipulation of information. Regehr and Norman (1996) describe working or active memory as a process of enacting the higher cognitive functions, that is the act of thinking

which requires effort and attention. Conversely, stored or long-term memory consists of the blurred boundaries of episodic, and semantic memory that are subdivided into procedural, and declarative memory systems.

A way of considering the relationships between memory systems is the semantic network which is a set of connections between abstract concepts and/or specific experiences based on meaning. Novak (1998) suggests that "Each of these memory systems depends on the others, and what is stored in LTM strongly influences what will be perceived, how it will be processed in STM, and finally how it will be stored in LTM" (p. 22). Problem-solving is linked with the knowledge stored in long-term memory (LTM). Through contemporary research studies Novak (1998) found that the working memory system can only operate on about seven chunks of information as originally presented by Miller in 1956. Also, Novak's (1998) studies support the understanding that the size of a chunk depends on what you have stored in LTM. Hence, a learner must know something about a domain of knowledge that is stored in LTM, and have extensive practice in relevant problem-solving routines to be adept in identifying the situations in which the general routines would be most appropriate.

Increasingly, learners are required to draw upon the memory of numerous concepts within a specific domain of knowledge to be efficient problem-solvers. According to Gardner (1993):

> Intelligence entails the ability to solve problems or fashion products that are of consequence in a particular cultural setting or community. The

problem-solving skill allows one to approach a situation in which a goal is to be obtained and to locate the appropriate route to that goal. (p. 15)

Further, Gardner (1993) has identified seven intelligences as; musical, bodily-kinesthetic, logical-mathematical, linguistic, spatial, interpersonal, and intrapersonal. A competent problem-solver requires a combination of intelligences, and the total collection of problem-solving skills may be greater than the sum of the parts. The creative aspect needs to be "directed toward both style of learners, with opportunity available for exploration of new or alternate styles of processing information" (Snyder, 1993, p. 209).

A strategy to facilitate the development of problem-solving routines in specific domains of knowledge is proposed by Regehr and Norman (1996) and manifested in the use of analogy as described in the following:

> The good general problem solver will often be able to work out a general principle and therefore apply a general problem-solving routine in a reflective and considered manner to a specific situation. When a general routine is used within the context of a specific domain, however, the general strategy often evolves into a highly specific (or set of strategies). The use of the routine is adapted to the situation, becoming highly specialized and automated. Once this occurs, the generality of the principle is often lost in the specific task of getting the problem solved as quickly and efficiently as possible. (p. 996)

Beyond the rudiments of the nursing process, Le Sorti, Cullen, Hanzlik, Michiels, Piano, Ryan, and Johnson (1999) define creative problem-solving as a

cognitive process that goes beyond present thinking (routines) toward the achievement of "a goal by means of a novel and appropriate idea or product" (p. 63). The process has two primary principles of deferred judgment and divergent-convergent thinking sequences. A requirement of deferred judgment is that the problem solver or problem-solving group withhold all criticism during the phase where ideas or solutions are being generated so that quick conclusions or a negative response mode can be avoided. Then, divergent-convergent sequences permit opening-up to possibilities and then selecting the optimal possibilities for the problem being considered. The principles encourage the creative problem-solver to generate several alternative problem statements from a variety of perspectives (divergent) that may lead to selecting the one problem statement (convergent) which has been evaluated. The principles are repeated in the idea generation phase adding concepts such as fluency, flexibility, originality, and elaboration, as well as risk-taking, tolerance of ambiguity, competence for complexity, sensitivity, and curiosity (1999).

Another approach for nursing educators to facilitate a collaborative problem-solving process with students has been identified by Brookfield (1995) that involves a combination of individual reflection and collaborative critical analysis. The Good Practices Audit (GPA) is a three phase process to help teachers search their experiences for good responses to common problems. The processes are; 1) formulating the problem, 2) individual and collective analysis of experience, and 3) compilation of suggestions for practice. According to Brookfield (1995) formulating the problem is an individual task that reflects the

most pressing problems teachers encounter in their work and may take an extended period of time whereas collective analysis is where the group decides on the problem that requires the most assistance. During the compilation of suggestions for practice the group members summarize and compile the insights and techniques that emerged while collectively analyzing group responses.

Throughout the history of education, each discipline within the educational paradigm has a dynamic need to expand its theoretical foundations or create insight into where little is known. Undoubtedly, understanding and solving the right problem is paramount for the successful development of theory. Fortunately, a motivating force within the research process which serves to build theory is problem-solving, and striving to avoid Type I (claiming a significant difference when there is none [reject a true null]), and Type II errors (claiming no significant difference when there is a difference[accepting a false null]). Typically, Type I and Type II errors occur after problems are formulated (Toothaker & Miller, 1996).

However, Mitroff (1998) proposes that a Type 3 error emerged after the previous types of error, and it is "the error of solving the wrong problem precisely" (p. 16). Type 3 errors have five categories that occur in all contexts and should consciously be avoided; picking the wrong stakeholder, selecting too narrow a set of options, phrasing a problem incorrectly, setting the boundaries/scope of a problem to narrowly, and failing to think systematically (see Table 2). Unfortunately, solving the "right problem" is not always considered but may prevent the mistake of "solving the wrong problem precisely and in the

most efficient way" (Mitroff, 1998, p. 7). Nursing faculty, nursing students, and practicing nurses are constantly engaged in active problem-solving and would benefit from avoiding the Type 3 errors identified by Mitroff (1998).

Table 2

Mitroff's Five Categories of Type III Errors and Strategies to Avoid Them

Picking the Wrong Stakeholder
Strategy: Never make an important decision or take an important action without challenging at least one assumption about a critical stakeholder; also, consider at least two stakeholders who can and will oppose the decision or action.
Selecting Too Narrow a Set of Options
Strategy: Never accept a single definition of an important problem; it is vital to produce at least two very different formulations of any problem deemed important.
Phrasing a Problem Incorrectly
Strategy: Never produce or examine formulations of important problems phrased solely in technical or human variables; always strive to produce at least one formulation phrased in technical variables and at least one phrased in human variables.
Setting the Boundaries/Scope of a Problem Too Narrowly
Strategy: Never draw the boundaries of an important problem too narrowly;

(table continues)

Table 2 (continued).

Mitroff's Five Categories of Type III Errors and Strategies to Avoid Them

Setting the Boundaries/Scope of a Problem Too Narrowly (continued)
broaden the scope of every important problem up to and just beyond your comfort zone.
Failing to Think Systematically
Strategy: Never attempt to solve an important problem by fragmenting it into isolated and tiny parts; always locate and examine the broader system in which every important problem is situated; in many cases, the interactions between important problems are more important than the problems themselves. (pgs. 22-31)

Nursing Studies Related to Nursing Student Performance and Critical Thinking in Clinical Judgment

Some critical thinking skills within the specific discipline of nursing may include the thinking involved in the decision-making nursing process. Lewis (1997) investigated decision-making using a single sample repeated measures design with four factors (irrelevance, ambiguity, conflict, and change) to test the Decision-Making Task Complexity Model that has its roots in Newell and Simon's (1972) Information Processing Theory. The subjects included 41 critical care nurses with at least two years of experience in a critical care setting and with experience weaning clients from mechanical ventilation at least ten times in the

last year. The nurses rated the complexity of the decision-making task for 14 cases on a seven-point scale from one (low complexity) to seven (high complexity). Results indicated the following complexity means; cases containing conflict (mean = 3.91), cases containing change (mean = 3.65), cases containing ambiguity (mean = 3.62), and cases containing irrelevance (mean = 3.37). The Decision-Making Task Complexity Model may be used to prepare clinical decision-making tasks with various levels of complexity for nursing students in a safe learning environment.

Traditionally, student nurse-patient relationships generate novel personal experiences. Sedlak (1997) conducted a qualitative case study to describe beginning baccalaureate nursing student's reflections and critical thinking processes during the first clinical nursing course. The theoretical framework was derived from Paul's (1993) critical thinking dimensions. The participants included seven female, sophomore baccalaureate nursing students with age ranges of 20 - 33 years. The resulting organizing theme was perspective development. Four major themes were; development of the professional self-perspective with orchestration of the emotional self, development of perfectionist perspective, development of caring perspective, and development of self-directed learning perspective.

Discovering confidence in clinical reasoning, and critical thinking development in baccalaureate nursing students was the focus of an interpretive phenomenological study by Haffer and Raingruber (1998) that investigated how students perceive and experience their developing clinical reasoning and critical

thinking skills. The participants included one group of 15 baccalaureate students ranging in age from 24 - 49 years, who were enrolled in a clinical reasoning course (15 classes). The participants were provided narratives, and asked to specifically detail their experiences by sharing their most meaningful scenarios in which they made significant clinical decisions. The findings from the study revealed that students were apprehensive about entering nursing practice due to self-doubts and diminished confidence. Interestingly, discovering ways of responding to diminished feelings of confidence was the primary category which also included categories of diminished feelings of confidence, and increased feelings of confidence.

Haffer and Raingruber (1998) concluded that nursing faculty should help students feel recognized, not reinforce self-doubt, and build on improving clinical skills. Also, educators need to promote the acceptability of questioning by demonstrating this skill in asking students what they think they need to know and how they plan to seek answers to their questions.

In another descriptive study, Brooks and Shepherd (1990) investigated four types of nursing education programs. The researchers sought to determine which programs have higher mean scores on tests measuring clinical decision-making, and critical thinking abilities. The study hypothesis tested the major premise of lateral transference, that it is the ability to transfer generalized learning to other specific situations, and build on that learning. The convenience sample consisted of 50 senior nursing students from four programs (hospital based, associate, RN upper division, and generic baccalaureate). Data was

obtained on two instruments: The Watson-Glaser Critical Thinking Appraisal, and the Nursing Performance Simulation Instrument (NPSI). An ANOVA and Tukey's HSD were used to analyze the critical thinking abilities and clinical decision-making data. The analysis indicated that the mean scores for the upper division ($\underline{m} = 61$) and generic programs ($\underline{m} = 61.5$) were significantly different from the associate ($\underline{m} = 49$) and diploma ($\underline{m} = 52$) programs. "It is imperative that there be developed and subsequent evaluation of innovative baccalaureate nursing curricula by clinically competent faculty to meet the complex demands of health care delivery in the coming decades" (p. 398).

Further, Loving (1993) investigated baccalaureate nursing students' perceptions of learning clinical judgment using a grounded theory methodology. "Scientific inquiry conducted using a grounded theory approach does not seek to validate existing logically deduced formal theory. Rather, grounded theorists attempt to formulate theory that is grounded in qualitative data" (p. 416). The informants were 22 students and recent graduates of selected undergraduate nursing programs in a Midwestern state. The purposive sample consisted of five junior students, five graduate nurses, seven senior students, one group of four junior students, and one group of three senior students who were all female with a mean age of 24.5 years. Interestingly, Loving (1993) formulated a theoretical model of Competence Validation that included interrelated intrinsic motivation, extrinsic motivation, cognitive flexibility, cognitive rigidity, connecting, and learning the tricks in two educational contexts.

Another study conducted by McCarthy, Schuster, Zehr, and McDougal (1999) compared and contrasted the critical thinking abilities in beginning and graduating nursing students. The cross-sectional sample of baccalaureate nursing students included 156 sophomores and 85 seniors. The students were administered the California Critical Thinking Skills Test (CCTST) and the California Critical Thinking Disposition Inventory (CCTDI). The CCTST defines critical thinking as cognitive skills in the areas of analysis, interpretation, inference, evaluation and explanation of critical thinking. The CCTDI includes truth-seeking, open-mindedness, analyticity, systematicity, critical thinking, self-confidence, inquisitiveness, and cognitive maturity.

Results on the CCTST for the sophomores indicated a mean of 15.36 (SD $\pm$3.63), and for the seniors the results indicated a mean of 17.26 (SD $\pm$3.36). An independent t-test revealed that senior scores were overall significantly higher than sophomore scores on the CCTDI ($t\ [239] = 2.25$, $p < .001$). According to the researchers, the CCTST may be used as a non-specific test for changes in critical thinking. On the other hand, the CCTDI may be useful for curriculum development and counseling activities.

Competence validation (Loving, 1993), and defining and measuring critical thinking (May et al., 1999) are front and center on nursing's agenda for education and research. Consequently, reflecting upon that agenda, the purpose of this study was to investigate the relationship between nursing student performance and critical thinking in clinical judgment among baccalaureate nursing students,

as well as, describe the most important teaching/learning strategies that facilitate the development of clinical judgment.

Although the previous and other studies have attempted to examine critical thinking, critical thinking processes, confidence in reasoning, and the decision-making process of nursing students in clinical practice, questions persist concerning the relationships between these concepts and the appropriateness of study methodologies (Angel, Duffey, & Belyea, 2000; Brooks & Shepherd, 1990; Haffer & Raingruber, 1998); Hansten & Washburn, 2000; Girot, 2000; Lewis, 1997; Loving, 1993; McCarthy, Schuster, Zehr, & McDougal, 1999; Sedlak, 1997; Yim, Lee, Lee, Chau, Wootton, & Chang, 2000). Undeniably, the issue of evaluating critical thinking in clinical judgment is important because nurse educators who teach and evaluate the critical thinking performance of nursing students may not be knowledgeable concerning the validity and reliability of available tools, and how each tool defines and measures critical thinking within the context of nursing education (Adams et al., 1996; Adams, 1999; Daley, Shaw, Balistrieri, Glasenapp, & Piacentine, 1999).

According to Angel, Duffey, and Belyea (2000), few studies in the literature relate the concepts of critical thinking to clinical competence or similar terms. In 1996, Maynard found no relationship between critical thinking and clinical competence within a sample of 170 nursing baccalaureate graduates using Benner's Stages of Skill Acquisition and the Six-Dimensional Scale of Nursing Performance (1978). Also, May et al. (1999) conducted a study whose purpose was to test the relationship between critical thinking skills and clinical

competence. An exploratory, non-experimental design was used with a heterogeneous sample of two graduating nursing classes (n = 142). The concept of critical thinking was measured by the CCTCST (34 item cognitive skills test) and the CCTDI (75 item disposition of critical thinking test). Competence was measured by the criteria in the following definition of clinical competence:

> Clinical competence at the baccalaureate graduate level is a multifaceted concept which involves meeting set standards of knowledge application; psychomotor interventions implementation; critical, analytical, creative, and intuitive thinking; competency and accountability as a member of the nursing profession; competence and accountability in verbal and written communication; application of ethical, legal, cultural, and professional values; application of research findings to clinical practice; independent judgment; and collaborative decision-making. (p. 103)

As in previous studies, May et al. (1999) also failed to establish a correlation between critical thinking and clinical competence. The researchers suggest that perhaps the CCTCST (34 item cognitive skills test) and the CCTDI (75 item disposition of critical thinking test) were not wholly reflective of the concepts, and were unable to capture the relationship. An objective evaluation of the previous studies indicates that there are similarities in the definition of clinical competence and the PDT Critical thinking in Clinical Judgment Scale (2000).

The goal of this study was to investigate the concepts of nursing student performance and critical thinking in clinical judgment with the advantage of a different approach that combines the benefits of both quantitative and qualitative

research methodologies. In this, the goal potentially contributes to the growing knowledge base of baccalaureate nursing student studies that provide insight and direction for improving nursing educational outcomes.

Teaching/Learning Strategies That Facilitate the Development of Critical Thinking in Coursework and Clinical Judgment

Typically, nursing education involves adult learners as students. Notably, understanding the learning needs of adults has been recognized as being distinctly different than understanding the learning needs of children (pedagogy). Because of the theoretical and practical distinctions between the learning needs of adults and children, Malcolm Knowles (1980) theorized the education of adults as; andragogy. The concept of andragogy embodies a central theme that adult learners are capable decision makers and need to be active participants in the learning process. Lewis (2000) provides the following assumptions about the differences between pedagogy and andragogy that need to be utilized by nursing faculty when teaching adult learners (see Table 3).

Table 3

Assumptions About the Learning Environment

Pedagogy	Androgogy [sic]
The climate is authoritative.	The climate is relaxed and informal.

(table continues)

Table 3 (continued).

Assumptions About the Learning Environment

Competition is encouraged.	Collaboration is encouraged.
Teacher sets goals.	Teacher and class sets goals.
Decisions by teacher.	Decisions by teacher and students.
Lecture by teacher.	Process activities and inquiry projects.
Evaluation by teacher.	Evaluation by teacher, self, and peers.
Teacher directed.	Self-directed/*self-organized* (p. 9).

Adult learners possess a history of learning experiences, and may construct knowledge by linking concepts together in meaningful ways based on former learning and life experiences. Novak's (1998) extensive history and research on meaningful learning lead to his adoption of Ausubel's Assimilation Learning Theory. Ausubel's Theory includes the interrelationships of subsumption (an interactive process between newly learned material and existing concepts [subsumers]), progressive differentiation (refinement of a concept with more precision and specificity), and integrative reconciliation (crosslinking of concepts; similar but not always exact). According to Novak (1998), these

conceptual interrelationships are evident in concept mapping, and concept maps are to be constructed in a specific way, as in the following:

> Concept maps are to be read from the top to the bottom, proceeding from the higher order-more general-concepts at the top to the lower order-more specific concepts at the bottom. Concept maps also have crosslinks that show relationships between ideas in different segments of the map. (p. 3)

Concept mapping is based on the theoretical framework of constructivist epistemology whereby understanding is characterized by the nature and structure of knowledge, of how facts are organized, and about the relationships between superordinate concepts (Tomey, 2000). Importantly, "learners first may learn the higher-order concept and then subsume the lower-order concepts, or learners may learn the lower-order concepts and then relate them to the higher-order one" (Daley, Balistrieri, Glasenapp, & Piacentine, 1999, p. 43). The ability to visualize conceptual interrelationships in an hierarchical and causal manner is useful to many disciplines, and provides the learner with an opportunity to practice both inductive and deductive thinking. The distinction of the organizing techniques in concept mapping demonstrates that concept maps are not flow charts or outlines (Edmonson, 1995).

According to Austin and Shore, (1995) concept maps provide objective criteria for the condensed version of a student's understanding regarding a large amount of subject matter. The maps are time effective, easy to create, and may help to identify a gap in a student's understanding of a knowledge base. Also, the mental connections between major and minor concepts helps learners organize

what is learned, that is the learner's conceptual associations (Tomey, 2000). Also, meaningful learning can be measured by computing indices for the concept maps. Some suggestions for the indices include; the total number of valid linkages, appropriate coding, and number of components.

In many aspects, the use of concept maps in nursing education demonstrates the shift in nursing education from "an information-driven approach in teaching to a process that promotes higher level thinking and clinical judgment" (Bechtel, Davidhizar, & Bradshaw, 1999, p. 182). The shift emphasizes that nursing education is not just a fact-loading process (Facione, Facione, & Sanchez, 1994). Also, the shift in nursing education has stimulated much interest and research into other innovative teaching/learning strategies that facilitate the development of critical "in-depth" thinking in nursing students. Abegglen and Conger (1997), Betchel, Davidhizar, and Bradshaw (1999), Eason (1999), Fonteyne and Cahill (1998), Norman (1988), Platzer, Blake, and Ashford (2000), Segal and Mason (1998), Sedlak and Doheny (1998), and Wade (1999) have identified some of the more recent trends in teaching/learning strategies that facilitate the development of critical thinking in clinical judgments. The teaching/learning strategies are identified as; self-directed learning activities, role playing, problem-based learning, mastery learning, case studies, clinical rounds, reflective logs (journaling), and reflective practice groups.

Interestingly, the skill of metacognition, thinking about thinking, is encouraged through the use of reflective writing in clinical logs. The reflective logs provide the student with the opportunity to define and express the clinical

experience in their own words. Also, an analysis of the reflective logs by faculty permits individual student instruction, and creates a potential arena for personal dialogue between faculty and student for an optimal learning experience.

Another teaching/learning strategy that promotes open communication is student-led clinical rounds. During clinical rounds students have the opportunity to communicate assessment data, collaborate ideas, create plans for patients, and view the situation from multiple perspectives. Sedlak and Doheny (1998) suggest the following protocols to be used during clinical rounds with student peers:

1. Present important physical and psychosocial assessment findings in a two-to-three minute report.
2. Identify and prioritize pertinent nursing diagnoses, nursing interventions, and outcomes.
3. Introduce the patient to the peer group (when possible).
4. Review documentation with peers (written nurses' notes) for completeness and accuracy. (p. 43)

Remarkably, Alfero-LeFevre's (2000) strategies for promoting critical thinking have practical application in all of the teaching/learning strategies (see Table 4).

Table 4

Alfero-LeFevre's Strategies Promoting Critical Thinking

1. Anticipate questions others might ask, such as What will my supervisor

(table continues)

Table 4 (continued).

Alfero-LeFevre's Strategies Promoting Critical Thinking

want to know? This helps identify a wider scope of questions that must be answered to gain relevant information.
2. **Ask "What if"** questions like, What if something goes wrong? or What if we try...? This helps you to be proactive and creative.
3. **Look for flaws in your thinking**. Ask questions like, What's missing? Have I recognized my biases? & How could this be made better? This helps you to evaluate your thinking & make improvements.
4. **Develop "good habits of inquiry"** (habits that aid in the search for truth, like always keeping an open mind, verifying information, & taking enough time). These habits can make critical thinking more automatic.
5. **Develop interpersonal skills,** such as conflict resolution & getting along with those who have different communication styles. If you don't have good interpersonal skills you're unlikely to get the help or information you need to think critically.
6. **Replace "I don't know" & "I'm not sure" with "I'll find out."** This demonstrates you have the ability to find answers & mobilizes you to locate resources.

(table continues)

Table 4 (continued).

Alfero-LeFevre's Strategies Promoting Critical Thinking

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7. **Turn errors into learning opportunities.** We all make mistakes: They're stepping stones to maturity and new ideas. If you aren't making mistakes, maybe you're not trying hard enough. (p. 5)

The curious notion by some that "Faculty teach. Students learn" (Love & Wilson, 2000, p. 70) is not the "rest of the story." Undoubtedly, nursing faculty and nursing students teach each other and learn from each other. Also, within the dynamics of clinical practicums, both faculty and students learn much from "knowing the patient." With good grace, nursing faculty must present themselves to their students as superior in their critical thinking abilities. "This externalization of the thinking process and the fair-mindedness in thinking is what is meant by "modeling critical thinking in our teaching of clinical judgment" (Facione, 1996, p. 135).

Summary

Chapter two presented a review of relevant literature that was guided by the purpose of the study; to investigate the relationship between nursing student performance and critical thinking in clinical judgment among baccalaureate nursing students, and to describe the most important teaching/learning strategies that facilitate the develop clinical judgment.

Although there is no consensus, nearly all of the definitions of critical thinking emphasize logic and reasoning. Overall, the primary definition of critical thinking used in this study is that critical thinking is: A complex developmental process based on rational and deliberate thought and self-regulatory judgment (APA, 1990; Paul, 1993).

Increasingly, learners are required to draw upon the memory of numerous concepts within a specific domain of knowledge to be efficient problem-solvers. According to Gardner (1993):

> Intelligence entails the ability to solve problems or fashion products that are of consequence in a particular cultural setting or community. The problem-solving skill allows one to approach a situation in which a goal is to be obtained and to locate the appropriate route to that goal." (p. 15)

Consequently, Mitroff (1998) has identified a problem within problem-solving, and termed the problem as a Type 3 error. Unfortunately, the art of solving the "right problem" is not always considered and may result in a Type 3 error, that is "solving the wrong problem precisely and in the most efficient way" (Mitroff, 1998, p. 7). Nursing faculty, nursing students, and practicing nurses are constantly engaged in active problem-solving and would benefit from avoiding the Type 3 errors identified by Mitroff (1998).

Notably, the shift in nursing education from "an information-driven approach in teaching to a process that promotes higher level thinking and clinical judgment" (Bechtel, Davidhizar, & Bradshaw, 1999, p. 182) has stimulated much interest and research into other innovative teaching/learning strategies that

facilitate the development of critical "in-depth" thinking in nursing students. Current research into teaching/learning strategies that promote the development of critical "in-depth" thinking in nursing students are identified as concept mapping, self-directed learning activities, role playing, problem-based learning, mastery learning, case studies, clinical rounds, reflective logs (journaling), and reflective practice groups.

In review, critical thinking, problem-solving, and concept mapping are best described as critical thinking being the cognitive energy that fuels problem-solving, and can be visualized on the graphic display of a knowledge representation tool, a concept map. The cognitive energy is essential because nursing education is not just a fact-loading process to be disdained by nursing students but the beginning of a unique educational journey that leads to professional nursing practice.

Chapter 3

Methodology

The changing health care system, the nature of patient problems, and the movement of patient care from acute care facilities to diverse community settings has increased the demand for competent, professional nurses who are capable of thinking critically. The quality of thinking has become crucial for nursing practice because critical thinking is becoming the benchmark of professional competence and student performance (Alfaro-LeFevre, 2000; Brigham, 1993; Daly, 1998; Di Vito -Thomas, 2000; Gendrop & Eisenhauer, 1996; Inouye & Flannelly, 1998; Jennings & Loan, 1999; May et al., 1999; Maynard, 1996; Sedlak, 1997; Thompson & Rebeschi, 1999; Wade, 1999).

The new challenges require the development of innovative nursing education curricula comprised of teaching/learning strategies that promote critical thinking, as well as, reliable evaluation measures of student performance to ensure patient safety and optimal patient outcomes (Duchscher, 1999; Girot, 2000). Therefore, the purpose of this study was to investigate the relationship between nursing student performance and critical thinking in clinical judgment among baccalaureate nursing students, and to describe the teaching/learning strategies that facilitate the development of critical thinking in clinical judgment.

Research Design

The mixed methodology of a quantitative causal-comparative design, and a qualitative constant-comparative design was conducted. The quantitative data analysis was accomplished by using statistics for determining the differences

between the variables of age, gender, ethnicity, and educational level (an ANCOVA and a Tukey's HSD), and the relationship between variables (Pearson product-moment correlation). The appropriateness of this design lies in the understanding that this type of research "attempts to determine the causes for, or the consequences of, differences that already exist in groups of individuals" (Ary, Jacobs, & Razavieth, 1996, p. 565). Respectively, the qualitative data was analyzed by a constant-comparative method whereby categories emerged, and were integrated during the analysis. The general process involved bringing together provisional categories that; relate to the same content, have specific properties and dimensions, and are internally consistent and mutually exclusive (Glaser & Strauss, 1967; Strauss & Corbin, 1998; Tashakkori & Teddlie, 1998).

Population and Sample

The sampling-frame used in this study was a published list of the Oklahoma Council of Deans and Chairpersons of Baccalaureate and Higher Degree Programs for Nursing 2000-2002 Roster. The purposive, convenient sample used in this study consisted of baccalaureate nursing students (n = 134) from three private, and one state university in the Midwestern United States. Purposive sampling is a commonly used feasible strategy when "the researcher's knowledge of the population and it's elements is used to handpick the cases to be included in the sample" (LoBiondo-Wood, 2002, p. 2). The response rate was 41% from the study participants, perhaps due to the catastrophic events within the United States of America on September 11, 2002. Hence, the sample participants (an accessible subset of the population of all NLN accredited baccalaureate

(an accessible subset of the population of all NLN accredited baccalaureate programs) included baccalaureate nursing students at four NLN accredited schools of nursing. The Dean of each nursing program acted as the study coordinator at their institution. By reviewing Cohen's (1988) theory regarding power analysis, the sample size required for the variables in this study was n = 85.

Instruments

The instruments used in this study to collect quantitative data included the Adapted Six-Dimensional Scale of Nursing Performance (6-D) (1978), the PDT Critical Thinking in Clinical Judgment Scale (PDT) (2000), and a researcher generated demographic questionnaire with categories of age, gender, ethnicity, nursing education level, and ancillary health care experience. The "ancillary health care experience" category was used as a screening category for the inclusion criteria, and to control for the confounding effect of prolonged clinical exposure and experience.

The first instrument is the Adapted Six-Dimensional (6-D) Scale of Nursing Performance (Schwirian, 1978) with the subscales of leadership, critical care (critical nursing skills), teaching/collaboration, planning/evaluation, interpersonal relations/communication, and professional development. An adaptation of the scale was made due to the deletion of the professional development subscale. The 6-D Scale (1978) consists of 52 items that are observable nursing performances (39 items used in this study). The scale assesses the skills (performance activities) intrinsic to clinical nursing practice in a variety of settings and is consistent with generic nursing education. Reliability values of

of 0.84 for the leadership subscale to 0.98 for the professional development subscale. Also, content and construct validity are proposed by the author in the instrument's development (Schwirian, 1978). Written permission to use the 6-D Scale (1978) was obtained from the author of the 6-D Scale (1978), Dr. P. Schwirian. Each 6-D Scale has a calculated mean that was used in the data analysis ($\Sigma x \div n$) (see Appendix A).

The second instrument is the PDT Critical Thinking in Clinical Judgment Scale (2000) that was developed, in part, from criteria generated in a phenomenological pilot study, *Identifying Critical Thinking Behaviors in Clinical Judgment* (Di Vito -Thomas, 2000). The criteria for the scale emerged as discipline-specific knowledge, critical reflection, critical thinking competency, intellectual virtues, and action involvement and improvement. Face and content validity were achieved through two expert reviewers who widely research, publish, and nationally present on the topic of critical thinking in nursing practice. Also, in an effort to build a reliable and valid scale, a pilot study was conducted with the PDT Scale (2000) during the spring of 2001. Permission was granted through the Dean of a baccalaureate nursing program who was the IRB Chair for the university. A nursing faculty employed full-time at the school of nursing volunteered to administer the Scale for the researcher. The nursing faculty explained informed consent to the senior ($n = 25$) and junior ($n = 15$) nursing classes. The baccalaureate nursing students (seniors, $n = 21$, and juniors, $n = 13$) voluntarily signed the consent forms, and completed the Scale with additional comments regarding the clarity of the Scale. Respectively, the Scale was revised

after the pilot study for clarity by adding additional explanations to each criteria category where it was deemed necessary by the researcher. The results of the Chronbach's Alpha are provided in Table 5. Each PDT Scale (2000) has a calculated mean that was used in the data analysis ($\Sigma x \div n$).

Table 5

Results of the Pilot Study on the PDT Scale (2000)

Class	N	Mean	SD	Alpha
Senior	21	3.3143	0.0902	0.6852
Junior	13	2.9167	0.4171	0.7646

Protection of Human Subjects

Confidentiality was maintained by the containment of the completed survey and Scales at the researcher's home office in a locked cabinet. The data are reported as group data with only the designation of junior or senior baccalaureate nursing student without any identification of the school of nursing. There will be no subsequent physiological harm or psychological distress or discomfort imparted to any participant in the study. Fair treatment and privacy was maintained and any participant had the opportunity to withdraw from the study at any time without physical, psychosocial, or monetary repercussion. Permission for this study was approved under the regulations of the University of Oklahoma Norman Campus Policies and Procedures for the Protection of Human Subject in

Research Activities (IRB number 01373). The study participants (baccalaureate nursing students) voluntarily read, signed and dated the Informed Consent Form, and then participated in the study (see Appendix B).

Data Collection and Analysis

A cover letter was mailed to each Dean of the schools of nursing who were participating in the study. The cover letter included the instruments with specific protocols and time requirements. Data was collected on the two instruments by the researcher, and a nursing faculty member who was designated by the Dean of the schools of nursing, and who agreed to participate in the study. The nursing faculty was thoroughly prepared for their role by the researcher, as to the study protocols. The data was hand carried from the schools of nursing by the researcher to the confidential site.

The quantitative data was analyzed using SPSS (1999), and a qualitative constant-comparative approach. SPSS "is a comprehensive system for analyzing data...and generate tabular reports, charts, and plots of distributions and trends, descriptive statistics, and complex statistical analyses" (p.iii). SPSS produced an ANCOVA, Tukey's HSD, and the Pearson product-moment correlation using each participant's mean for both the 6-D Scale (1978) and the PDT Scale (2000).

The constant-comparative analysis involved the explicit coding of data and constantly redesigning and reintegrating theoretical notions while reviewing the data. The constant-comparative method described by Glaser and Strauss (1967) used to analyze the data in this study includes: 1) Comparing incident

applicable to each category, 2) Integrating categories and their properties, and 3) Delimiting the theory (see Chapter 4).

The current study investigated the relationship between nursing student performance and critical thinking in clinical judgment among baccalaureate nursing students, and described the teaching/learning strategies that facilitate the development of critical thinking in clinical judgment. The variables under study were; performance, and critical thinking in clinical judgment. Performance was the dependent variable, and critical thinking in clinical judgment was the independent variable. The 6-D Scale of Nursing performance (1978) was used to measure the performance variable, and the PDT Critical Thinking in Clinical Judgment Scale (2000) was used to measure the critical thinking in clinical judgment variable.

Question One

How does nursing class, age, gender, and ethnicity relate to the scores on the Adapted Six-Dimensional Scale of Nursing Performance (6-D Scale) (1978), and scores on the PDT Critical Thinking in Clinical Judgment Scale (PDT Scale) (2000) among baccalaureate nursing students?

Ho: There are no differences among the scores on the Adapted Six-Dimensional Scale of Nursing Performance (1978), and scores on the PDT Critical Thinking in Judgment Scale (2000) related to nursing class, age, gender, and ethnicity of baccalaureate nursing students.

The statistical analyses for the first null hypothesis included an ANCOVA, and a Tukey's HSD procedure. The means on the 6-D Scale (1978) reflect the measurement of performance, and the means on PDT Scale (2000) reflect the measurement of critical thinking in clinical judgment related to nursing class, age, gender, and ethnicity of the baccalaureate nursing students. Also, a measure of central tendency (the mean), and a measure of variability (the standard deviation) are presented for both Scales in chapter four.

Question Two

What is the relationship between the performance of baccalaureate nursing students, as indicated by scores on the Adapted Six-Dimensional Scale of Nursing Performance (1978), and critical thinking in clinical judgment, as indicated by scores on the PDT Critical Thinking in Clinical Judgment Scale (2000)?

Ho: There is no relationship between the performance of baccalaureate nursing students, as indicated by scores on the Adapted Six-Dimensional Scale of Nursing Performance (1978), and critical thinking in clinical judgment, as indicated by scores on the PDT Critical Thinking in Clinical Judgment Scale (2000).

The relationship between the mean scores on the 6-D Scale (1978) (performance), and the mean scores on the PDT Scale (2000) (critical thinking in clinical judgment) was achieved using a Pearson product-moment correlation analysis (r), and the results are presented in chapter four.

Questions Three and Four

The constant-comparative approach developed by Glaser and Strauss (1967) was used to analyze study questions three and four. Question three was: How would one describe how one thinks (the thinking process that one goes through) when making clinical judgments? Respectively, question four was: What were the most important teaching/learning strategies in the development of clinical judgment? The data was analyzed by; 1) Comparing incident applicable to each category, 2) Integrating categories and their properties, and 3) Delimiting the theory. The results are presented in chapter four.

Summary

The research design that was conducted included a mixed methodology of a quantitative causal-comparative design, and a qualitative constant-comparative design. The sample participants consisted of baccalaureate nursing students (n = 134) from three private, and one state university. The Dean of each nursing program acted as the study coordinator at their institution. Also, the universities were located in the Midwestern United States.

The instruments used in this study to collect quantitative data included the Adapted Six-Dimensional Scale of Nursing Performance (1978), the PDT Critical Thinking in Clinical Judgment Scale (2000), a researcher generated demographic questionnaire with categories of; age, gender, ethnicity, nursing education level, ancillary health care experience, and two narrative questions. Confidentiality was upheld, as well as, the protection of the study participants. Permission for this study was approved under the regulations of the University of Oklahoma Norman

Campus Policies and Procedures for the Protection of Human Subject in Research Activities (IRB number 01373). The study participants (baccalaureate nursing students) voluntarily read, signed and dated the Informed Consent Form, and then participated in the study. Data collection was accomplished by the researcher, and a nursing faculty member who was designated by the Dean of the schools of nursing, and who agreed to participate in the study.

The quantitative data was analyzed using SPSS (1999) that produced an ANCOVA, Tukey's HSD, and the Pearson product-moment correlation using each study participant's mean for both Scales. The qualitative data was analyzed using the constant-comparative approach developed by Glaser and Strauss (1967). The current study investigated the relationship between nursing student performance and critical thinking in clinical judgment among baccalaureate nursing students, and described the teaching/learning strategies that facilitate the development of critical thinking in clinical judgment. The analysis and findings are presented in chapter four.

Chapter 4

Analysis and Findings

In this study, research questions one through four combined two paradigms of mixed methodology for data analysis that provided an alternative to traditional data analytic strategies. The two paradigms are both quantitative data analysis whereby statistics were used for determining the relationship between variables and the differences between groups, as well as, qualitative data analysis whereby themes or categories emerged during the analysis (Tashakkori & Teddlie, 1998).

The contents of chapter four provide the results of the analyses for this study that explored the relationship between nursing student performance and critical thinking in clinical judgment among junior and senior baccalaureate nursing students, and the teaching/learning strategies that facilitate the development of critical thinking in clinical judgment. The detailed results of the quantitative data analysis for research questions one and two are reflected in numeric expressions. By contrast, the results of the qualitative data analysis are expressed in categorical concepts and narrative statements of "the story within the data" (Glaser & Strauss, 1967, p. 108).

Description of the Sample

The demographics obtained from the 134 study participants included academic level in their nursing program, age, gender, and ethnicity. None of the participants were licensed health care providers. Academically, there were 59 (44%) junior and 75 (56%) senior nursing students who voluntarily signed and

dated the Informed Consent Form, and then participated in the study (see Table 6).

Table 6

Age Ranges of Study Participants

Age Ranges	n	Percent
18 - 25 years	91	67.9%
26 - 32 years	27	20.1%
33 – 40 years	12	9.0%
41 - 47 years	3	2.2%
48 – 54 years	1	0.7%
Ethnic Group Identification	**n**	**Percent**
Caucasian	101	75%
African American	13	9.7%
Asian	8	6.0%
Other	5	3.7%
Hispanic	4	3.0%
Native American	3	2.2%

The ages of the participants ranged from 18 - 54 years-of-age with the highest number n = 91 (68%) occurring in the age ranges of 18 - 25 years. The gender of the participants was primarily female n = 123 (92%), with fewer males n = 11 (8%). Also, the ethnic majority of the participants was Caucasian with n = 101 (75%) members.

Data Analysis Related to Research Questions

The following section will provide the findings of the data analysis to research questions one through four. Each research question and hypothesis will be restated to provide the reader with a review, and insights into justification of the rationale that determined the selection of the statistical analyses.

Question One

How does nursing class, age, gender, and ethnicity relate to the scores on the Adapted Six-Dimensional Scale of Nursing Performance (6-D Scale) (1978), and scores on the PDT Critical Thinking in Clinical Judgment Scale (PDT Scale) (2000) among baccalaureate nursing students?

Ho: There are no differences among the scores on the Adapted Six-Dimensional Scale of Nursing Performance (1978), and scores on the PDT Critical Thinking in Judgment Scale (2000) related to nursing class, age, gender, and ethnicity of baccalaureate nursing students.

The statistical analyses for the first null hypothesis included an ANCOVA, and a Tukey's HSD procedure. The means on 6-D Scale (1978) reflect the measurement of performance and the means on the PDT Scale (2000) reflect the

measurement of critical thinking in clinical judgment related to nursing class, age, gender, and ethnicity of the baccalaureate nursing students (see Table 7).

Table 7

Descriptive Analysis of the Scores on the 6-D Scale (1978) (Performance) and the PDT Scale (2000) (Critical Thinking in Clinical Judgment)

Category	n	Mean/SD on 6-D Scale	Mean/SD on PDT Scale
Senior	75	2.9057 /0.4045	2.9307/0.4992
Junior	59	2.9524/0.5505	2.9424/0.6012
*****			
18 - 25 yrs.	91	2.9079/0.4478	2.9085/0.5597
26 - 32 yrs.	27	2.9019/0.4243	2.9381/0.4925
33 - 40 yrs.	12	2.9675/0.5179	2.9667/0.5245
41 - 47 yrs.	3	3.4467/0.5564	3.4667/0.6110
48 - 54 yrs.	1	3.2000	3.4000
*****			
Females	123	2.9156/0.4825	2.9268/0.5500
Males	11	3.0455/0.3435	3.0364/0.4884
*****			

(table continues)

Table 7 (continued).

Descriptive Analysis of the Scores on the 6-D Scale (1978) (Performance) and the PDT Scale (2000) (Critical Thinking in Clinical Judgment)

Category	n	Mean/SD on 6-D Scale	Mean/SD on PDT Scale
Caucasian	101	2.8935/0.4369	2.8979/0.5171
African American	13	3.1815/0.4117	3.2462/0.4255
Asian	8	2.6088/0.6550	2.6075/0.7712
Other	5	3.4280/0.3491	3.2600/0.3130
Hispanic	4	3.1600/0.5746	3.0375/0.8788
Native American	3	2.6233/0.5650	3.0667/0.6110

Interestingly, the mean scores of both scales increased as years-of-age increased to the highest mean score of both scales occurring in the ages of 41-47 years (n = 3). Also, the Other ethnic group (n = 5) leads the ethnic groups with the highest mean score of 3.4280 on the 6-D Scale (1978), and 3.260 on the PDT Scale (2000). The difference among all ethnic groups on the 6-D Scale (1978) (performance) between the highest score 3.4280 (Other n = 5) and the lowest score 2.6088 (Asian n = 8) was 0.8192. Also, the difference among all ethnic

groups on the PDT Scale (2002) (critical thinking in clinical judgment) between the highest score 3.2600 (Other n = 5) and the lowest score 2.6075 (Asian n = 8) was 0.6625. The results of the ANCOVA are presented in Table 8.

Table 8

Analysis of Covariance of the Six-Dimensional Scale (1978)

Covariates	Factor	df	F	Sig.	ES
Age	Ethnicity	5	3.080	0.012	0.116
Gender	Ethnicity	5	3.747	0.004	0.150

Tukey's HSD on Ethnicity: Asian, p = 0.028, Other, p = 0.028, and alpha = 0.05

There were no significant results of the analysis of covariance (ANCOVA) on the PDT Scale (2000). However, on the 6-D Scale (1978), the ANCOVA revealed that ethnicity was significant, p = 0.012 (Age), alpha 0.05, and p = 0.004 (Gender), alpha = 0.05. The effect size was small with both variables, 0.116 (Age), and 0.150 (Gender), alpha = 0.05. Although the ANCOVA identified Ethnicity as significant when age and gender are covariates, the results of the Tukey's HSD is suspect due to the small sample size and the small effect size of the two variables.

The above results indicate that there are no meaningful differences between nursing class, age, gender, and ethnicity related to the scores on the

Adapted Six-Dimensional Scale of Nursing Performance (1978) and scores on the PDT Critical thinking in Clinical Judgment Scale (2000) among baccalaureate nursing students. Therefore, due to the suspicious results of the technical analysis, and considering the concepts of Type I and Type II errors, the results support the first null hypothesis (perhaps erring on the side of a Type II error because of the small sample size, and small effect size of the two Ethnic groups).

Question Two

What is the relationship between the performance of baccalaureate nursing students, as indicated by scores on the Adapted Six-Dimensional Scale of Nursing Performance (1978), and critical thinking in clinical judgment, as indicated by scores on the PDT Critical Thinking in Clinical Judgment Scale (2000)?

Ho: There is no relationship between the performance of baccalaureate nursing students, as indicated by scores on the Adapted Six-Dimensional Scale of Nursing Performance (1978), and critical thinking in clinical judgment, as indicated by scores on the PDT Critical Thinking in Clinical Judgment Scale (2000).

The measures of association/relationship are single indicators of the degree of relationship between two or more variables (Tashakkori & Teddlie, 1998) and the variables of interest in this study are performance and critical thinking in clinical judgment. The relationship between the mean scores on the 6-D Scale (1978) (performance), and the mean scores on the PDT Scale (2000) (critical thinking in clinical judgment) was achieved using a Pearson product-moment correlation analysis (r), and the results are presented in Table 9.

Table 9

Pearson Product-Moment Correlation: The Relationship Between Performance and Critical Thinking in Clinical Judgment

Scale	n	SD	Mean	r	r_2
6D Scale	134	0.4730	2.9263	0.732	0.535
PDT Scale	134	0.5444	2.9358	0.732	0.535

The relationship between the 6-D Scale (1978) (performance) and the PDT Scale (2000) (critical thinking in clinical judgment) was significant, r = 0.732, alpha = 0.01 (2-tailed). The Pearson product-moment correlation squared (coefficient of determination) was 0.535, leaving a remaining 0.465 (coefficient of non-determination). Also, the measures of association between the averages of the scales for the parameter (Eta) and estimate (Eta Squared) of the relationship are denoted as Eta = 0.797, and Eta Squared = 0.635, p = 0.000.

The results from the Pearson product-moment analysis revealed a significant relationship between performance and critical thinking in clinical judgment, r = 0.732, p = 0.01. Because the coefficient of determination was 0.535 inferring that approximately 54% of the criterion variable (level of performance) can be attributed to the effects of the independent variable (the level of critical thinking in clinical judgment), the results support the rejection of the second null hypothesis that stated, Ho: There is no relationship between the performance of

baccalaureate nursing students, as indicated by scores on the Adapted Six-Dimensional Scale of Nursing Performance (1978), and critical thinking in clinical judgment, as indicated by scores on the PDT Critical Thinking in Clinical Judgment Scale (2000). However, the results indicate that a significant relationship exists between the performance of baccalaureate nursing students, as indicated by scores on the Adapted Six-Dimensional Scale of Nursing Performance (1978), and critical thinking in clinical judgment, as indicated by scores on the PDT Critical Thinking in Clinical Judgment Scale.

Questions Three and Four

In this study, the constant-comparative approach developed by Glaser and Strauss (1967) was used to analyze study questions three and four. Question three was: How would you describe how one thinks (the thinking process that one goes through) when making clinical judgments? Respectively, question four was: What were the most important teaching/learning strategies in the development of clinical judgment? The general process involved bringing together provisional categories that relate to the same content, have specific properties and dimensions, and are internally consistent and mutually exclusive (Strauss & Corbin, 1990; Tashakkori & Teddlie, 1998). The explicit coding of data and constantly redesigning and reintegrating theoretical notions while reviewing the data provides a systematic approach to delineate and generate theory. The systematizing is integrated, plausible, consistent, close to the data, and in a clear enough form to be operationalized in theory development. The following selected processes of the constant-comparative method described by Glaser and Strauss

(1967) used to analyze the data in this study are: 1) Comparing incident applicable to each category, 2) Integrating categories and their properties, and 3) Delimiting the theory.

Comparing Incidents Applicable to Each Category of Question Three

Initially, the responses (incidents) described by the participants in this study for question three (n = 147) were analyzed by comparing each incident applicable to each category according to the "fit" of the response within the context of "the thinking process that one goes through when making clinical judgments." The incidents were coded in a manner that adhered to the basic defining rule for the constant-comparative method, "while coding an incident for a category, compare it with the previous incidents in the same and different groups coded in the same category" (Glaser & Strauss, 1967, p. 106). The integrated categories of the critical thinking process were generated from the data and are presented in Table 10.

Table 10

Integrated Categories of the Critical Thinking Process

1. A Broader Way of Thinking Beyond the Obvious
2. Exceeding Present Boundaries
3. Abstract Thinking

(table continues)

Table 10 (continued).

Integrated Categories of the Critical Thinking Process

4. Clear
5. Common Sense
6. Compare and Contrasts
7. Developed Through Experience
8. Dictated by Theory
9. Disciplined
10. Enlightening
11. Identifying Gaps
12. Intuitive
13. Mind to Hand
14. Moral Thinking
15. Open to Expertise
16. Organized/Proper Place
17. Reflection
18. Relating Concepts
19. Reasoning
20. Integrating Knowledge
21. Processing Information

(table continues)

Table 10 (continued).

Integrated Categories of the Critical Thinking Process

22. Self-Critiquing and Revising
23. Sound
24. Thinking About Thinking
25. Thinking in Action
26. Thinking Screened Through Emotions
27. Whole Picture Thinking
28. Zigzagging Cause and Effect

The responses of each question were judiciously compared with each previous category considering the full range of properties and dimensions of the designated category. By a constant-comparative process, the categories were integrated while considering alternative ways by which the categories could be coded and compared resulting in the final coding of 28 categories for question three. The coding of the 28 categories is evident in the sensitive manner in which the categories "take apart the story in the data" (Glaser & Strauss, 1967, p. 108). The following narrative description is intended to acquaint the reader with the "story within the data." Also, a subscript number follows the narrative description and correlates the narrative description with the appropriate category to provide the reader with a fuller understanding of the properties and dimensions of the designated category.

The Story Within the Integrated Categories of Question Three

The "thinking process that one goes through" was described as a cognitive process developing through "experience in practice." (7) Often, the responses reflected a similar understanding that the process of critical thinking "may not be polished as of yet, however, as time goes on and I have an opportunity to practice using these skills, they will improve." Because, "in the beginning it was hard to think critically without our notes or books to look at, but as clinicals go on it becomes easier." You see, "the broader way of thinking (1) is learned by working in the field," and although one's experience may be limited "it has become clear that education is essential as a first step, but education without experience lessens the capacity for an individual to think critically in a situation where lives are at stake." "Education and experience must go hand in hand" (13) so that "the knowledge gained in the classroom (8) becomes second nature in practice." Certainly, "you can learn a lot from books, (10) but the best experiences come from real-life situations."

The broader way of thinking critically in clinical judgments goes beyond (2) "what you see or hear, and what is presently known" and requires "discipline" (9) and a willingness to "round everything up" and "put it all together." (18) How the thinking process comes together may be described as being "like a picture tube without an antenna *where* thinking seems scrambled, confused, *and* hazy. (3) Put an antenna on the TV and you get a perception-the light goes on and one is able to put things in their proper place (16) -no longer hazy, or confused, *and* everything becomes clear." (4) Also, clarifying the thinking is accomplished by

"reasoning skills" (19) used to "figure-out" "what is wrong and what is right" and "what could have caused the problem." (12) (28) By "thinking through different options (25) and weighing each option" according (6) "to the best interest of the patient, family, and community," "what should be done first to improve patient outcomes" is realized.

During the thinking process, the thinker may "integrate different concepts (18) and relate them to each other" by going over "all the information and seeing how it relates," while "thinking back to the facts, situations, and patients cared for in the past." The thinking process also involves reflection, and is described as a "picture in my mind," a "sort of concept map in my head of the varying problems taking place with the patient," and "like concept mapping, going back to the earliest recognizable contributing factor to the patient's current disease and going forward," (17) to "see the correlations and the evolutions of the disease process." "By prioritizing and grouping information," (21) the thinker may "see how the *factors* connect to each other and their influences on the patient and his/her condition."

Notably, deductive and inductive reasoning enter into the thinking process. Deductively, "beginning with the most obvious whole picture (27) and working toward minute details," and inductively by "putting 2 & 2 together", "step by step," and "thinking it through." (24) Both types of reasoning involve "calculating assessment information that is gathered, not only from the medical point of view but also the patient's point of view as well." (20) (22) Also, the thinking process is open to expertise when "unsuccessful," and additional

resources are used when "there are things I do not know, *and* I go to the nurse or faculty" or "refer the problems elsewhere." (15) At any rate, the assessment information is uniquely filtered through the decision-making nursing process whereby "safe, efficient, and effective care" is individualized to "ensure the soundness (23) of clinical choices when making clinical judgments for the patient and family." (14)

Delimiting the Integrated Categories of Question Three

According to Glaser and Strauss (1967), the delimiting features of the constant-comparative method leads to the discovery of uniformities in the original sets of categories that can be formulated by a smaller set of higher level concepts resulting in a reduction of terminology. At this point, delimiting the theory involves the reduction of terminology, whereby the terminology may be categorized by other theories, conceptual frameworks, or definitions in the literature. In this study, delimiting the theory is accomplished by comparing the 28 integrated categories of question three to the five aspects of the PDT Critical Thinking in Clinical Judgment Scale (2000) of: Discipline Specific Knowledge, Critical Reflection, Critical Thinking Competencies, Intellectual Virtues, and Action Involvement and Improvement, and prominent literature.

The first aspect of the PDT Critical Thinking in Clinical Judgment Scale (2000) is Discipline-Specific Knowledge, and is defined as "utilizes theoretical and practical knowledge bases to analyze salient relationships (relationships that stand out) in providing patient care." The integrated category that compares to this aspect of the Scale is category (8) Dictated by Theory, because "education is

essential as a first step," and "you can learn a lot from books." Also, "the knowledge gained in the classrooms becomes second nature in practice." Gendrop and Eisenhauer (1996) concur with the concepts depicted here of the thinking process and its link to theoretical foundations, and found similar elements of process, cognitive skill, data source, and outcome.

The second aspect of the PDT Critical Thinking in Clinical Judgment Scale (2000) is Critical Reflection, and is defined as "recognizes similarities in patterns despite differences in the objective features that permit a view of current situations in terms of past situations." The integrated categories of (3) Abstract Thinking, (6) Compare and Contrast, and (17) Reflection compare to the description of critical reflection because "going back to the earliest recognizable contributing factor to the patient's current disease and going forward to see the correlations and the evolutions of the disease process" is a vivid abstraction of reflection while concurrently "thinking through different options and weighing each option according to the best interests of the patient, family, and community." Also, "Patient assessment is not limited to the initial patient encounter. It is a continuous process reflective of the dynamic nature of the patients condition" (Broughton, 1998, p. 59).

According to King and Kitchner (1994), reflective thinking is uncertain, but constructed by comparing evidence and opinion on different sides of an issue, or across contexts that leads to knowledge that is the outcome of the process of reasonable inquiry. The cognitive exercise of reflection-in action previously described by these nursing students may be fundamental to a kind of

"knowing-in-action" that is displayed by a skillful practitioner but does not stem from prior intellectual operation (Schon, 1983).

The third aspect of the PDT Critical Thinking in Clinical Judgment Scale (2000) is Critical Thinking Competency, and is defined as "demonstrates diagnostic reasoning, clinical inferences, synthesis of relevant information, identification of missing information, reflective validation of information, problem-solving, and decision-making skills." Interestingly, most of the integrated categories of question three compare to this aspect due to the focus of question three "the thinking process that you go through when making clinical judgments." The categories are (1) A Broader Way of Thinking Beyond the Obvious, (2) Exceeding Present Boundaries (4) Clear, (5) Common Sense, (11) Identifying Gaps, (12) Intuition, (15) Open to Expertise, (16) Organized/Proper, (19) Reasoning, (18) Relating Concepts, (20) Integrating Knowledge, (21) Processing Information, (22)Self-Critiquing and Revising, (23) Sound, (27) Whole Picture Thinking, and (28) *Zigzagging* Cause and Effect (see Exemplar 1).

Exemplar 1

"I look at a situation and follow through by doing a little research, before actually planning or implementing decisions. For instance, a patient's BP has been low 100/50 but the patient has a history of HTN. Do I hold the drug? I'll look in the chart at yesterday's vital signs and whether the drug has been given. If the drug has not been given yesterday or the day before, I question myself as to whether hold the drug or call the doctor regarding

the situation." By "thinking through different options and weighing each option," "what should be done first to improve patient outcomes" is realized. "I know it is hard to put all the knowledge that we have learned in school into practice, but I know it will come with practice."

Exemplar 1 describes a process that is multilogical in nature (Paul 1993), and uniquely illustrates a portion of the multitask challenges of clinical nursing practice. The properties and dimensions of the integrated categories that were ascribed to the third aspect of the Scale, Critical Thinking Competency, entail purposeful thinking that is outcome-directed (results-oriented), driven by patient, family, and community needs, and is self-correcting while striving to improve (Alfero-LeFevre, 2000). "Our students at all levels must develop the habit and skill of asking, "why are we doing this?" "What is the evidence that supports this action? This is what critical thinking is all about" (Tanner, 1999, p. 99).

The fourth aspect of the PDT Critical Thinking in Clinical Judgment Scale (2000) is Intellectual Virtues, and is defined as "conveys caring, confidence, fairness, discipline, perseverance, creativity, curiosity, integrity, and humility in clinical interactions with patient's, staff, and peers." A few of the integrated categories compare to this aspect, and seem to embrace a notion of an ethical/moral code. The categories are (14) Moral Thinking, (24) Thinking About Thinking, and (26) Thinking Screened Through Emotions. Indeed, the virtuous ideals of a baccalaureate nursing student exemplified in the data are consummate with the goal of providing "safe, efficient, and effective care" achieved by "thinking it through, when lives are at stake." Notably, the manner in which the

"thinking it through, when lives are at stake." Notably, the manner in which the care is provided effects the outcome of the care, and the best outcomes are patient focused, and guaranteed by thinking that is "based on what is best for my patient, body, mind and spirit." The most appropriate interventions that take into consideration "the particular situation" are guided by professional standards and ethics codes that may be dictated by a profession, a personal code of ethical/moral conduct, or prominent world view (Alfero-LeFevre, 2000; Oermann, 1998).

The fifth, and final aspect of the PDT Critical Thinking in Clinical Judgment Scale (2000) is Action Involvement and Improvement, and is defined as "takes appropriate action in specific context; acts responsibly with others to effect change, and generate positive patient outcomes through knowing the patient." The integrated categories that compare to this action-oriented aspect are (7) Developed Through Experience, (13) Mind to Hand, and (25) Thinking In Action. The proclamation that "education and experience must go hand in hand" is seemingly generated through a motivation to be actively involved in patient care "to figure out" "what is wrong and what is right, and what could have caused the problem" for "the best interest of the patient, family, and community." Also, Tanner (1997) refers to an affective component inherent in the nurse-patient relationship, and the emotional interactions in clinical decision-making that undoubtedly play a part in generating positive patient outcomes through knowing the patient. Overall, the integrated categories that are delimited within the five aspects of the PDT Critical Thinking in Clinical Judgment Scale (2000), and the literature reflect a consensus

that the thinking process is a complex developmental process based on rational and deliberate thought, and self-regulatory judgment (APA 1990; Paul, 1993).

Comparing Incidents Applicable to Each Category of Question Four

Likewise, the responses (incidents) described by the participants in this study for question four (n = 162) were analyzed by comparing each incident applicable to each category according to the "fit" of the response within the context of "the most important teaching/learning strategies in the development of clinical judgment" of question four. By the same constant-comparative process, the categories were integrated while considering alternative ways by which the categories could be coded and compared resulting in the final coding of 28 categories for question four. The integrated categories of the teaching/learning strategies that promote the critical thinking process in clinical judgments are presented in Table 11.

Table 11

Integrated Categories of the Teaching and Learning Strategies That Facilitate the Development of Critical Thinking in Clinical Judgment

1. Assignments
2. Auditory Tapes
3. Case Studies
4. Developing Therapeutic Relationships

(table continues)

Table 11 (continued).

Integrated Categories of the Teaching and Learning Strategies That Facilitate the Development of Critical Thinking in Clinical Judgment

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5. First Theory, Then Immediate Practice
6. Following a Caring Nurse
7. Giving Report
8. Hands On
9. In-depth Discussion with Instructors
10. Interrelating Systems/Concepts
11. Lectures
12. Making Joint Decisions on Care
13. Mentoring
14. More Clinical Time and Experience
15. More Courtesies From Staff Nurses
16. Nursing Process
17. Observing Clinical Dynamics
18. Practice, Practice, Practice
19. Process Maps
20. Providing Rationales for Interventions
21. Questioning

(table continues)

Table 11 (continued).

Integrated Categories of the Teaching and Learning Strategies That Facilitate the Development of Critical Thinking in Clinical Judgment

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22. Utilizing Clinical Resources

23. Return Demonstration

24. Role Modeling

25. Simulation Lab

26. Text Books

27. Video Tapes

28. Working One-on-One

The Story Within the Integrated Categories of Question Four

As with question three, the following narrative description is intended to acquaint the reader with the "story" within the integrated categories. A subscript number follows the narrative description and correlates the narrative description with the appropriate category to provide the reader with a fuller understanding of the properties and dimensions of the designated category.

"Clinical experience is the most important learning strategy in the development of clinical judgment. You cannot learn that skill from a book." Moreover, the "hospital experience" provides opportunity "to observe other health care professionals in the medical field that are known for their competence and ability." In the clinical environment, "other health care workers influence my

clinical judgment," by "my thinking through observation," (17) "watching other nurses," and seeing "how they respond," which contributes greatly to knowing "what to do in a given situation."

The notion of "learning by example," and "hands on experience" (8) requires "having more clinical time," to be "immersed in the environment" and to "practice, practice, practice" (18) the "interventions that have been learned." "Some of the interventions include completing "assessments," "giving reports," (7) "providing overall patient care," (16) and "developing a therapeutic relationship" (4) through a fuller "awareness of the individual and their family." The time experienced in clinicals is most important "because once you are able to perform an activity or procedure" "hands on," you understand and remember." (23) Consequently, it's easier "to forget something if not applied."

Also, "actual clinical experience," and interacting with direct care nurses (28) provides "role modeling" (24) for "different approaches to care." (12) Caring nurses are "very excellent, helpful, and encouraging," and "facilitate learning" because these nurses are "willing to help, and teach us more in-depth." (6) However, nurses that are "impatient, unkind," and lack "enthusiasm" hinder learning. (15) Fortunately, there are many "resources available in the clinical setting, (22) that is, people around to draw knowledge from" like "clinical instructors that make you think, and *who* are open to suggestions." (24) For example, "an instructor who consistently walked me through decisions until I made the most sound clinical choice" and "who questioned my assessment findings" (21) has helped me to develop positive clinical judgment skills." Also,

"having the instructor being there but not doing anything until asked, or going over it before going into the patient's room, forces us to do it on our own." "If I visit a patient with my instructor to care for the patient in various ways, when we leave the room my instructor will discuss with me the issues concerning the patient circumstances." (9) "This mentoring type teaching worked best for me," and "has been very helpful." (13)

All learning is vital, and "learning things in class" such as "theory content" should be taught "side by side" with "hands-on experiences." (5) Other helpful non-clinical experiences include "nursing lectures" (11) that are formatted in the "nursing process, backed with rationales of why," (20) and accompanied by "slides, diagrams, and handouts." Also, "general knowledge" can be gained through "reading textbooks," (26) "completing assignments and care plans," (1) attending "simulation lab experiences," (25) and using "videos and auditory tapes." (2, 27)

Also, the "linking of concepts in healthcare process maps (19) helps displays the interrelatedness of how all the body systems work together, (10) and effect each other to create total health." Notably, case studies (3) are highly favored because "you are able to think about one specific client and not just a huge obscure concept." Case studies "help make learning real and tie things together." All things considered, "theory is great but being able to apply that knowledge more than once a week *in clinicals* would be helpful," "to be there and do it, not just read a book." "Experience is definitely most important." (14)

Delimiting the Integrated Categories of Question Four

Delimiting the theory for question four is accomplished by comparing the integrated categories of question four to the pragmatic instructional techniques categories identified by Caffarella (1994) of: Acquisition of Knowledge, Enhancement of Thinking Skills, Development of Psychomotor Skill, and Changes in Attitudes, Values, and Feelings. Also, the dimensions of low participant involvement, medium participant involvement, and high participant involvement are considered.

The first instructional technique category of Acquisition of Knowledge, conceptually compares to the integrated categories of (1) Assignments, (2) Auditory Tapes, (5) First Theory, Then Immediate Practice, (9) In-depth Discussion with Instructors, (11) Lectures, (20) Providing Rationales for Interventions, (17) Observing Clinical Dynamics (21) Questioning, (22) Utilizing Clinical Resources, (25) Simulation Lab (26) Text Books, and (27) Video Tapes. In this study, some of the teaching/learning strategies identified that facilitate the acquisition of "general knowledge," and are perceived as helpful, are techniques such as "completing assignments and doing care plans," "nursing lectures," that are formatted in the "nursing process," backed by "rationales of why," "reading textbooks," and "using auditory," and "video tapes." The level of involvement in most of these techniques is low to moderate.

A second comparison is made of the appropriate integrated categories of question four that compare to the instructional techniques category of

(10) Interrelating Systems/Concepts, (12) Making Joint Decisions on Care, (16) Nursing Process, and (19) Process Map. The nursing process (assessment, diagnosis, planning [outcomes and interventions], implementation, and evaluation) is a continual mental activity in clinical dynamics and presents a tremendous challenge to one's thinking skills when "making joint decision on patient care." Also, "case studies" are most helpful to "make learning real and tie things together." The Enhancement of Thinking Skills usually requires a high level of participation. Typically, adult learners need to be able to relate to what they are learning, and to be involved in the learning experience. "People become ready to learn something when they experience a need to learn it in order to cope more satisfyingly with real-life tasks or problems" (Knowles, 1980, p. 44).

The Development of Psychomotor Skills of the third instructional techniques category is simply rudiment in nursing education. The integrated categories of (8) Hands On, (14) More Clinical Time and Experience, (18) Practice, Practice, Practice, (23) Return Demonstration, and (28) Working One-On-One are easily nested within the properties and dimension of this high participant involvement category. According to Facione and Facione (1996), "professional judgment develops and matures with the acquisition of greater content knowledge and with reflective analysis and evaluation, and actual practice experience" (p. 41). "The challenge of providing students the optimal clinical experience to prepare them for their nursing career has become nearly overwhelming in this rapidly changing health care environment" (Weirda, & Natzke, 2000, p. 183) (see Exemplar 2).

Exemplar 2

"The most important teaching/learning strategies in the development of my clinical judgment have been observing procedures being done, then having to do them myself, and then basic repetition from there. Each time that I perform procedures, and take care of patients, I have seen new things and learned more. So, my judgment has become more in tune and accurate from this." You see, "I can read it in a book a thousand times but until I see it demonstrated and implement it myself, it is just a bunch of words I can visualize." "I would definitely say that having more clinical experience would help develop better critical thinking skills in regard to clinical judgments."

The fourth and final instructional category is Changes in Attitudes, Values, and Feelings. The integrated categories that compare to this instructional category are (6) Following a Caring Nurse, (7) Giving Report, (13) Mentoring, (15) More Courtesies From Staff Nurses, and (24) Role Modeling. "Actual clinical experience" with nursing instructors who care, and interactions with direct care nurses provide "role modeling" for "different approaches to care." In these encounters, there is high participant involvement for both the instructor and learner, because they have an opportunity to analyze the process that was used to reach a decision and the quality or outcome of that decision on the patient (Lamond, & Thompson, 2000).

The art and science of caring in professional nursing practice is learned by observing and being mentored by "nurses who are very excellent, helpful, and

The art and science of caring in professional nursing practice is learned by observing and being mentored by "nurses who are very excellent, helpful, and encouraging" and who "facilitate learning" because these nurses are "willing to help, and teach us more in-depth." An investment of time and energy is evident in a mentoring relationship, and "advantages of the relationship include sharing knowledge, intellectual stimulation, and motivation from the support given by the mentor" (Di Vito -Thomas, 1998, p. 111). "Learners see education as a process of developing increased competence to achieve their full potential in life. They want to be able to apply whatever knowledge and skill they gain today to living more effectively tomorrow" (Knowles, 1980, p. 44).

The pragmatic instructional techniques categories identified by Caffarella (1994) support increased competence through the acquisition of knowledge, enhancement of thinking skills, development of psychomotor skill, and changes in attitudes, values, and feelings. These techniques facilitate increasing competence that needs to be coordinated with and through clinical experience because "clinical experience is the most important learning strategy in the development of clinical judgment. You cannot learn that skill from a book." "Experience is definitely most important."

Summary

The contents of chapter four provided the results of the analyses for this study that explored the relationship between nursing student performance and critical thinking in clinical judgment among baccalaureate nursing students, and described the teaching learning strategies that facilitate the development of critical

thinking in clinical judgment. The participants in this study were baccalaureate nursing students (n = 134) from four NLN nursing programs in three private, and one state university. The ages of the participants ranged from 18 - 54 years-of-age with the highest number n = 91 (67%) occurring in the age ranges of 18 - 25 years. The gender of the participants was primarily female n = 123 (91.8%), with fewer males n = 11 (8.2%). Also, the ethnic majority of the participants was Caucasian with n = 101 (75.4%) members.

In regard to question one, the ANCOVA and the Tukey's HSD indicated that there are no meaningful differences between nursing class, age, gender, and ethnicity relate to the scores on the Adapted Six-Dimensional Scale of Nursing Performance (6-D Scale) (1978) and scores on the PDT Critical thinking in Clinical Judgment Scale (PDT Scale) (2000) among baccalaureate nursing students. Therefore, the results support the first null hypothesis that states, Ho: There are no differences among the scores on the Adapted Six-Dimensional Scale of Nursing Performance (1978), and scores on the PDT Critical Thinking in Judgment Scale (2000) related to nursing class, age, gender, and ethnicity of baccalaureate nursing students.

However, question two: What is the relationship between the performance of baccalaureate nursing students, as indicated by scores on the Adapted Six-Dimensional Scale of Nursing Performance (1978), and critical thinking in clinical judgment, as indicated by scores on the PDT Critical Thinking in Clinical Judgment Scale (2000) was found to be significantly different. The Pearson product-moment correlation indicated that the relationship between the 6-D Scale

(1978) (performance) and the PDT Scale (2000) (critical thinking in clinical judgment) was significant, r = 0.732, alpha = 0.01 (2-tailed). The Pearson product-moment correlation squared (coefficient of determination) was 0.535, leaving a remaining 0.465 (coefficient of non-determination). Also, the measures of association between the averages of the scales for the parameter (Eta) and estimate (Eta Squared) of the relationship are denoted as Eta = 0.797, and Eta Squared = 0.635, p = 0.000.

Because the coefficient of determination was 0.535 inferring that approximately 54% of the criterion variable (level of performance) can be attributed to the effects of the independent variable (the level of critical thinking in clinical judgment), the results support the rejection of the second null hypothesis that states, Ho: There is no relationship between the performance of baccalaureate nursing students, as indicated by scores on the Adapted Six-Dimensional Scale of Nursing Performance (1978), and critical thinking in clinical judgment, as indicated by scores on the PDT Critical Thinking in Clinical Judgment Scale (2000).

The results indicate that a significant relationship exists between the performance of baccalaureate nursing students, as indicated by scores on the Adapted Six-Dimensional Scale of Nursing Performance (1978), and critical thinking in clinical judgment, as indicated by scores on the PDT Critical Thinking in Clinical Judgment Scale (2000).

The constant-comparative approach developed by Glaser and Strauss (1963) was used to analyze study questions three and four. Question three was:

How would one describe how one thinks (the thinking process that one goes through when making clinical judgments? By a constant-comparative process, the categories were integrated while considering alternative ways by which the categories could be coded and compared resulting in the final coding of 28 categories for question three. Then, delimiting the theory was accomplished by comparing the 28 integrated categories of question three to the five aspects of the PDT Critical Thinking in Clinical Judgment Scale (2000) of: Discipline Specific Knowledge, Critical Reflection, Critical Thinking Competencies, Intellectual Virtues, and Action Involvement and Improvement, and prominent literature. Overall, the integrated categories are delimited within the five aspects of the PDT Critical Thinking in Clinical Judgment Scale (2000) and prominent literature.

Respectively, question four was: What were the most important teaching/learning strategies in the development of clinical judgment? By the same constant-comparative process, 28 integrated categories emerged for question four. Then, delimiting the theory for question four was accomplished by further integrating the 28 categories of question four within the framework of the pragmatic instructional techniques categories identified by Caffarella (1994). The instructional techniques are: Acquisition of Knowledge, Enhancement of Thinking Skills, Development of Psychomotor Skill, and Changes in Attitudes, Values, and Feelings and provide variations of low participant involvement, medium participant involvement, and high participant involvement. Notably, high participant involvement was evident within the "story within the data" that proclaimed "clinical experience is the most important learning strategy in the

development of clinical judgment. You cannot learn that skill from a book." "Experience is definitely most important."

The conclusions of the data analyses in regard to questions one, and two, as well as, implications for theory, practice, and research are provided in chapter five. The relationship between performance and critical thinking in clinical judgment provides new insights and questions for baccalaureate nursing education, and encourages reflection-on current educational practices.

Chapter 5

Conclusions

Today, a goal to be achieved within nursing education is to infuse, and evaluate critical thinking in clinical judgment among nursing students so that safe and effective nursing care will continue to ensure optimal patient outcomes. The goal is enforced by a triad of societal, ethical, and economic needs that are evident in the changing health care system besieged by managed care, the nature of patient problems, and the movement of patient care from acute care facilities to a diversity of community settings. In recognition of the goal, the purpose of this study was to explore the relationship between nursing student performance and critical thinking in clinical judgment, and to describe the teaching/learning strategies that facilitate the development of critical thinking in clinical judgment. The information generated by the nursing students who participated in this study was analyzed in chapter four. The conclusions for questions one and two, implications for theory, practice, and research are provided in this chapter.

Conclusion for Question One

In this study, the findings supported the first null hypothesis that stated, Ho: There are no differences among the scores on the Adapted Six-Dimensional Scale of Nursing Performance (1978), and scores on the PDT Critical Thinking in Clinical Judgment Scale (2000) related to nursing class, age, gender, and ethnicity of baccalaureate nursing students. The support of the first null hypothesis was due to the small sample size, small effect size, and a potential unintentional dimension of cultural bias.

The potential for cultural bias is a concern in all aspects of nursing education. Gooden (2001) reported that "educators must keep in mind that nursing students come from a diverse range of cultural backgrounds and may lack the necessary experience to perform well on tests if these cultural differences are not taken into account" (p. 68). According to Yoder (2001), students have deeply embedded cultural values, beliefs, and world views. In nursing education today, faculty must recognize the cultural diversity among nursing students, and evaluate their own approaches to teaching, as well as, to testing. Further, Yoder (2001) admonishes nursing faculty to assess student cues and messages, identify and distinguish cultural problems, and recognize the barriers that many culturally diverse students encounter.

Question Two Conclusion

In recent literature, the relationship between the level that a student nurse (future health care practitioner) thinks, and its effect on the level that a student nurse performs has been, as yet indeterminate. Consequently, this curious relationship was the focus of the second question: What is the relationship between the performance of baccalaureate nursing students, as indicated by scores on the Adapted Six Dimensional scale of Nursing Performance (1978), and critical thinking in clinical judgment, as indicated by scores on the PDT Critical Thinking in Clinical Judgment Scale (2002). The results from the Pearson product-moment correlation revealed a significant relationship between performance and critical thinking in clinical judgment. Therefore, the findings support the rejection of the second null hypothesis, and support the alternative

hypothesis that there is a relationship between the performance of baccalaureate nursing students and critical thinking in clinical judgment.

The findings from the research in this study provide direction for nursing educational strategies, as well as, support for a mandate within society from the Joint Commission on Accreditation of HealthCare Organizations (JCAHO) that nurses "must be competent to perform their job responsibilities" (Good & Schulman, 2000, p. 75). In essence, student nurses (future nurses) are depending on their faculty, and nursing education facilitate the development of their critical thinking in clinical judgment so that they can achieve the JCAHO mandate to be competent to perform their job responsibilities. Interestingly, a previous study May et al. (1999) measured clinical competence and posed that:

> Clinical competence at the baccalaureate graduate level is a multifaceted concept which involves meeting set standards of knowledge application; psychomotor interventions implementation; critical, analytical, creative, and intuitive thinking; competency and accountability as a member of the nursing profession; competence and accountability in verbal and written communication; application of ethical, legal, cultural, and professional values; application of research findings to clinical practice; independent judgment; and collaborative decision-making. (p. 103)

Regrettably, the study by May et al. (1999) failed to establish a correlation between critical thinking and clinical competence, and the researchers suggested that perhaps the tools were not wholly reflective of the concepts and unable to capture the relationship. In contrast, this study found a

between performance, and critical thinking in clinical judgment among baccalaureate nursing students. Also, the results in this study concur with the supposition by Pesut and Herman (1992) that:

> Competence demonstrated through performance can be consistently evaluated and involves "such things as knowing what one knows, knowing when and how one comes to know it, being able to think and plan strategically, the ability to represent knowledge effectively and in ways that permit efficient retrieval, and the ability to monitor, and consistently evaluate one's own competence. (p. 149)

Also, the conceptual importance of the relationship between nursing student performance and critical thinking in clinical judgment serves as an impetus for nursing education to ascertain that the teaching/learning strategies employed throughout the nursing education curriculum facilitate the development of critical thinking in clinical judgment. The importance links to the understanding that when the student nurse transitions into practice, there is a high probability that the "nurse" will have to think, and make clinical judgments for an increasing number of unlicensed health care personnel who will be providing direct patient care. Barnum (1998) cautions about the near and present danger of minimally trained personnel. Therefore, competence must be evident in nursing performance, and in all aspects of clinical judgments, or the bell will toll for rising morbidity and mortality rates that could have been prevented.

Conclusions for Questions Three and Four

The conclusions for questions three and four of the qualitative analysis emerged within the third constant-comparative stage of delimiting the theory, and are included in chapter four. The third question: How would one describe how one thinks (the thinking process that one goes through) when making clinical judgments resulted in the 28 integrated categories of question three being further delimited within the five aspects of the PDT Critical Thinking in Clinical Judgment Scale (2000) of: Discipline Specific Knowledge, Critical Reflection, Critical Thinking Competencies, Intellectual Virtues, and Action Involvement and Improvement, and prominent literature. The assumption holds that: The thinking process is a complex developmental process based on rational and deliberate thought, and self-regulatory judgment (APA 1990; Paul, 1993). Further, critical thinking or "the broader way of thinking is learned by working in the field," and although one's experience may be limited "it has become clear that education is essential as a first step, but education without experience lessens the capacity for an individual to think critically in a situation where lives are at stake." "Education and experience must go hand in hand" so that "the knowledge gained in the classroom becomes second nature in practice." Certainly, "you can learn a lot from books, but the best experiences come from real-life situations" (see Table 10, and Exemplar 1 in Chapter 4).

Respectively, question four was: What were the most important teaching/learning strategies in the development of clinical judgment? The 28 integrated categories for question four were further delimited within the

framework of the pragmatic instructional techniques categories identified by Caffarella (1994). The instructional techniques are: Acquisition of Knowledge, Enhancement of Thinking Skills, Development of Psychomotor Skill, and Changes in Attitudes, Values, and Feelings. Other teaching /learning strategies that infuse and promote critical "in-depth" thinking in nursing students are self-directed learning activities, role playing, problem-based learning, mastery learning, case studies, clinical rounds, reflective logs, and reflective practice groups (Abegglen & Conger, 1997; Bechtel, Davidhizar, & Bradshaw, 1999; Eason, 1999; Fonteyne & Cahill, 1998; Norman, 1988; Platzer, Blake, & Ashford, 2000; Segal & Mason, 1998; Sedlak & Doheny, 1998; Wade, 1999). Considering all of these educational strategies, "clinical experience is the most important learning strategy in the development of clinical judgment. You cannot learn that skill from a book." "Experience is definitely most important" (see Table 11, and Exemplar 2 in Chapter 4). Perhaps it is here within the clinical experience that the results of learning are translated into observable behavior (Hergenhahn & Olson, 2001), and confidence in practice is achieved.

Implications for Theory

Each discipline within the educational paradigm has a dynamic need to expand its theoretical foundations or create insight into where little is known. Commemorating the need, LoBiondo-Wood and Haber (2002) suggest that research links theory, education, and practice. Through research, theory based nursing practice is formulated. The findings in this study of; 1) the significant relationship between nursing student performance and critical thinking in clinical

judgment, and 2) the teaching/learning strategies described as facilitating the development of critical thinking in clinical judgment contribute to both basic and applied nursing research paradigms. The findings serve as a link in a currently evolving chain in nursing research that seeks to build the theoretical basis for critical thinking in nursing education. Also, the findings provide insight for nursing educators to; review, revise, develop, and implement teaching/learning and evaluation strategies that facilitate the development of critical thinking in clinical judgment.

In addition, the results from this study employed methodologies from both research approaches of the positivists and the naturalists, and concur with insights from Lincoln and Guba (1985). On the side of the positivists, the findings contribute to nursing theory development as listed in the following axioms (universally recognized truths) of the positivist paradigm:

1. Ontology (nature of reality): The relationship exists between performance and critical thinking in clinical judgment and is objectively demonstrated in the Pearson product-moment analysis that revealed a relationship between performance and critical thinking in clinical judgment significant, $r = 0.732$, alpha $= 0.01$.
2. Axiology (role of values in inquiry): The study is value-free and objectively evaluated through numeric expressions.
3. Epistemology (relationship between the knower and the known): The researcher and the numeric data are disengaged, separable.

4. Generalizations: The possibility exists for the results of this study to be true beyond current temporal and contextual restraints.
5. Deductive logic: The study contributes to what is currently known about critical thinking in the literature, and primarily concurs with the theoretical notions of Paul (1993), Facione, Facione and Giacarlo (1996), and Alfero-Lefevre, (2000) that point toward testing known theory, or conceptual frameworks.

On the side of the naturalists, the findings contribute to nursing theory development as listed in the following axioms (universally recognized truths) of the naturalist paradigm:

1. Ontological (nature of reality): Each of the study participants provided a unique, personal contribution to the "story within the data" for the description of the thinking process that one goes through when making clinical judgments, and the most important teaching/learning strategies in the development of clinical judgment.
2. Axiology (the role of values in inquiry): The data derived from the study participants is value-bound and interpreted from narrative statements.
3. Epistemology (the relationship between the knower and the known): The researcher and the descriptive narrations are engaged, inseparable, and the researcher is the key instrument of data collection.

4. Generalizations: The generalizations from the study participants are understood within their present experiences in schools of nursing, within current temporal and contextual restraints.
5. Inductive logic: The resulting information of the "stories within the data" for questions three and four of the constant-comparative analysis was grounded in the data.

Implications for Practice

Historically, the nursing profession has gone beyond all cultural or socioeconomic barriers to care for those in its charge, and the opportunities and challenges for nursing practice are greater now than ever. Baccalaureate nursing student graduates soon enter the rigors of clinical nursing practice and other professional practice setting, and will become resource managers, information brokers, interdisciplinary team members, and perhaps even planners for emergency and disaster preparedness on state and national levels (Barnum, 1999; Gebbie & Qureshi, 2002). Undeniably, these new members to nursing will help define the scope of professional nursing practice as they think critically about the provision of competent care demonstrated through outstanding nursing performance. The implications from this study suggest that critical thinking in clinical judgments positively effects the outcome of safe, efficient, and effective care.

Hence, nursing faculty are challenged to ascertain that baccalaureate nursing students are thoroughly versed from generic nursing education to general practice in critical thinking abilities, and evaluated in clinical judgments with

valid and reliable, context-appropriate criteria or nursing care may be rendered unsafe, inefficient, and ineffective. The criteria in the PDT Critical Thinking in Clinical Judgments Scale (2000) is comprised of five categories that provide context-appropriate criteria of: (1) Discipline Specific Knowledge, (2) Critical Reflection, (3) Critical Thinking Competency, (4) Intellectual Virtues, (5) Action Involvement and Improvement, and may be considered in the evaluation criteria of clinical practicums.

Undeniably, within both theoretical and clinical educational experiences innovative teaching/learning techniques are needed. A concise explanation of the critical thinking process, and appeal to baccalaureate nursing curricula is well articulated in the following extraction from the data of questions three and four:

> The broader way of thinking is learned by working in the field, and it has become clear that education is essential as a first step, but education without experience lessens the capacity for an individual to think critically in a situation where lives are at stake. Education and experience must go hand in hand, so that the knowledge learned in the classroom becomes second-nature in practice. Clinical experience is the most important learning strategy in clinical judgment. You cannot learn that skill from a book.

A major promoter, evaluator, and guardian of nursing education, the American Association of Colleges of Nursing (AACN) (1998) is concerned with "the most important learning strategies," and has identified the essential components of professional nursing education as including liberal education,

professional values, core competencies, core knowledge, and role development. The results from this study, the relationship between performance and critical thinking in clinical judgment, and the results from the constant-comparative analysis, serve to facilitate the progression of the AACN core competency of critical thinking for course work and clinical practice as;

- use nursing and other appropriate theories and models, and an appropriate ethical framework;
- apply research-based knowledge from nursing and the sciences as the basis for practice;
- use clinical judgment and decision making skills;
- engage in self-reflection and collegial dialog about professional practice;
- evaluate nursing care outcomes through the acquisition of data and the questioning of inconsistencies, allowing for the revision of actions and goals;
- engage in creative problem-solving. (p. 10)

Implication for Research

Research begins in practice and feeds back into practice (LeBiondo-Woods & Haber, 2002). The practice environment in nursing education, as well as, in other health professions is in a universe of change. The change requires further research concerning adult learners who may be entering the health professions, and who possess a "reservoir of experiences that becomes an increasingly rich resource for learning-for themselves and for others,"...and

who are "performance-centered in their orientation to learning" (Knowles, 1980, p. 44). Often, the "performance-centered" adult learners may require different approaches to accommodate their learning styles, and nurse educators "must be aware of each learner's maturity and learning style (Musinski, 1999, p. 23). Therefore, within the confines of the health professions, teaching/learning techniques that incur high performance involvement, merit further investigation.

In fact, much change is evident in the age, gender, and ethnic orientation of baccalaureate nursing student profiles. Each of these factors, and their effects on learning the art and science of nursing, demands further research. "Educators must address the challenge of increasing the success of students from diverse populations in nursing programs" (Yoder, 2001, p. 319). Specifically, aspects of the growth and development issues of aging, gender traits, and ethnic practices generate new questions for nursing education, and may be explored more fully through the combined research approaches of the positivists, and the naturalists.

Also, continued reliability and validity studies are defensible for the PDT Critical Thinking in Clinical Judgment Scale (2000). The Scale has initial face, content, construct, and concurrent validity. However more defined research regarding criterion validity, and reliability studies are required. Future research in these needed areas will feed back into nursing practice, and in this the cycle continues infinitum.

Summary

The conclusions for questions one and two, implications for theory, practice, and research were provided in this chapter. The conclusions for

questions three and four of the qualitative analysis emerged within the third constant-comparative stage of delimiting the theory, and were included in chapter four. The significant relationship between performance and critical thinking in clinical judgment, and teaching/learning strategies that facilitate the development of critical thinking in clinical judgment serves as a link in the currently evolving chain that seeks to build the theoretical basis for critical thinking in nursing education. As well, the findings in this study provide insight for nursing faculty to; review, revise, develop, and implement teaching/learning and evaluation strategies that facilitate the development of critical thinking in clinical judgment in nursing students.

Also, nursing faculty are challenged to ascertain that baccalaureate nursing students are thoroughly versed from generic nursing education to general practice in critical thinking abilities, and evaluated in clinical judgments with valid and reliable, context-appropriate criteria or nursing care may be rendered unsafe, inefficient, and ineffective. The criteria in the PDT Critical Thinking in Clinical Judgments Scale (2000) is comprised of five categories that provide context-appropriate criteria of: (1) Discipline Specific Knowledge, (2) Critical Reflection, (3) Critical Thinking Competency, (4) Intellectual Virtues, (5) Action Involvement and Improvement, and may be considered in the evaluation criteria of clinical practicums.

A concise explanation of the critical thinking process, and appeal to baccalaureate nursing curricula is well articulated in the following extraction from the data:

> The broader way of thinking is learned by working in the field, and it has become clear that education is essential as a first step, but education without experience lessens the capacity for an individual to think critically in a situation where lives are at stake. Education and experience must go hand in hand, so that the knowledge learned in the classroom becomes second-nature in practice. Clinical experience is the most important learning strategy in clinical judgment. You cannot learn that skill from a book.

Future research focusing on aspects of the growth and development issues of aging, gender traits, and ethnic practices of emerging nursing students is needed, and may be explored more fully through the combined research approaches of the positivists, and the naturalists. Future research in these needed areas will feed back into practice.

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Appendix A

Six-Dimensional Scale (1978) Permision Form

To Whom It May Concern:

Sam Wi Wito Thomas has my permission to use the Six Dimension Scale of Nursing Performance (6-D Scale) in his/her research/evaluation study, The Relationship Between Nursing Student Performance and Critical Thinking in Clinical Judgment.

It is understood that, should the investigator use a form other than the Standard form, the NURSING RESEARCH citation for the original 6-D Scale Will appear as part of the modified form.

Patricia M Schwirian

Aug 26, 2000

Patricia M. Schwirian, PhD,RN
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The Ohio State University College of Nursiing
1591 Grenoble Road
Columbus, OH 43221

Appendix B

INFORMED CONSENT

Informed Consent Form for Research Being conducted Under the Auspices of the University of Oklahoma-Norman Campus

INTRODUCTION:

I understand that this study "The Relationship Between Nursing Student Performance and Critical Thinking in Clinical Judgment" is sponsored by the University of Oklahoma-Norman Campus and directed by Dr. Robert Fox and Pamela A. Di Vito-Thomas, MS, RN. This document is an individual's consent to participate in this research project.

DESCRIPTION OF THE STUDY:

Critical thinking is becoming the benchmark of professional competence and student performance and the purpose of this study is to investigate the relationship between nursing student performance and critical thinking in clinical judgment among junior and senior nursing students. The development of critical thinking skills empowers the evolving nurse (nursing student) to promote and define the scope of professional nursing practice in his/her daily steps as he/she provides competent nursing care demonstrated through outstanding nursing performance. Through this, the critically thinking nurse will meet the demands of clinical judgments wherever the health care practice environment emerges whether in acute care or community based settings. Completion of the sales will take approximately 20 minutes.

POTENTIAL RISKS AND BENEFITS OF PARTICIPATION:

There are no foreseeable risks or discomforts to the study participants as a result of participating in this study beyond normal everyday academic life. A potential benefit to the study participants includes insight into thinking about thinking critically in clinical judgments.

SUBJECT ASSURANCES:

By signing this consent form, you acknowledge that your participation in this study is voluntary, and that refusal to participate will involve no penalty or loss of benefits to which you are otherwise entitled, and that you may discontinue participation at any time without penalty or loss of benefits to which you are otherwise entitled. To participate you must be 18 years of age or older.

CONFIDENTIALITY:

The data from this study will be treated confidentially. No names will be used on the scales. No one can identify any study participant or their family. The results of this study will be reported as group data and only used to make general statements.

Questions about the rights of the study participants may be addressed by contacting the Office of Research Administration, Buchanan Hall, Room 314, Norman, Oklahoma 703019-0430. Telephone (405) 325-4757 and ask for the IRB numbered 01373.

SIGNATURES/DATES:

I hereby agree to participate in the above-described research. I understand my participation is voluntary and that I may withdraw at any time without loss or penalty of benefits.

DATE SIGNATURE

_____ _____

Appendix C

Demographic Form

Please circle the correct response.

1. **Age in years.**

   A. 18-25 D. 41-47

   B. 26-32 E. 48-54

   C. 33-40 F. > 54

2. **Gender**

   A. Female B. Male

3. **Ethnicity**

   A. Caucasian D. Hispanic

   B. African American E. Asian

   C. Native American F. Other _____

4. **Ancillary Health Care Experience**

   A. Nurse Assistant

   B. Nurse Tech

   C. Other_____

Appendix D

Study Scale

The Six-Dimensional Scale of Nursing Performance (Schwirian, 1978)

_____Teach a patient's family members about the patient's needs.
_____Coordinate the plan of nursing care with the medical plan of care.
_____Give praise and recognition for achievement of those under your direction.
_____Teach preventative health measures to patients and their families.
_____Identify and use community resources in developing a plan of care for a patient and their family.
_____Identify and include in nursing care plans anticipated changes in a patient's health condition.
_____Evaluate results of nursing care.
_____Promote the inclusion of the patient's decisions and desires concerning his/her care.
_____Perform technical care; e.g. oral suctioning, tracheostomy care, intravenous therapy, catheter care, dressing changes, etc.
_____Adapt teaching methods and materials to the understanding of the particular audience; age of patient, educational background, and sensory deprivations.
_____Identify and include immediate patient needs in the planning of nursing care.
_____Develop innovative methods and materials for teaching patients.
_____Communicate a feeling of acceptance of each patient and a concern for the patients welfare.
_____Seek assistance when necessary.
_____Help a patient communicate with others.
_____Use mechanical devices: e.g. suction machine, Gomco, cardiac monitor, etc.
_____Give emotional support to the family of a dying patient.
_____Verbally communicate facts, ideas, and feelings to other health team members.
_____Promote the patient's right to privacy.
_____Contribute to an atmosphere of mutual trust, acceptance, and respect among other health team members.
_____Delegate responsibility for care based on assessment of priorities of nursing care needs and the abilities and limitations of available health care personnel.
_____Explain nursing procedures to a patient prior to performing them.
_____Guide other health team members in planning for nursing care.
_____Accept responsibility for the level of care provided by those under your direction.

Appendix D (continued)

Study Scale

The Six-Dimensional Scale of Nursing Performance Schwirian (1978)
Continued...

_____Perform appropriate measure in emergency situations.
_____Use teaching aids and resource materials in teaching patient's and their families.
_____Perform nursing care required by critically ill patients.
_____Encourage the family to participate in the care of the patient.
_____Identify and use resources within your health care agency in developing a plan of care for a patient and his/her family.
_____Use nursing procedures as opportunities for interaction with patients.
_____Contribute to productive working relationships with other health team members.
_____Help a patient meet his/her emotional needs.
_____Contribute to the plan of nursing care for the patient.
_____Recognize and meet the emotional needs of a dying patient.
_____Communicate facts, ideas, and professional opinions in writing to patients and their families.
_____Plan for the integration of patient needs with family needs.
_____Function calmly and competently in emergency situations.
_____Remain open to the suggestions of those under your direction and use them when appropriate.
_____Use opportunities for patient teaching when they arise.

Key for Scale:

(1) Not very well (2) Satisfactorily (3) Well

(4) Very well 5) Not as yet

Appendix E

Study Scale

The PDT Critical Thinking in Clinical Judgment Scale (2000)

Discipline-Specific Knowledge
Utilizes theoretical and practical knowledge bases to analyze salient relationships (relationships that stand out) in providing patient care.

Select: 1_____ 2_____ 3_____ 4_____ 5_____

Critical Reflection
Recognizes similarities in patterns despite differences in the objective features that permit a view of current situations in terms of past situations.

Select: 1_____ 2_____ 3_____ 4_____ 5_____

Critical Thinking Competency
Demonstrates diagnostic reasoning, clinical inferences, synthesis of relevant information, identification of missing information, reflective validation of information, problem-solving, and decision-making skills.

Select: 1_____ 2_____ 3_____ 4_____ 5_____

Intellectual Virtues
Conveys caring, confidence, fairness, discipline, perseverance, creativity, curiosity, integrity, and humility in clinical interactions with patients, staff, a and peers.

Select: 1_____ 2_____ 3_____ 4_____ 5_____

Action Involvement and Improvement
Takes appropriate action in specific context; acts responsibly with others to effect change and generate positive patient outcomes through knowing the patient.

Select: 1_____ 2_____ 3_____ 4_____ 5_____

Key for Scale:

(1) Not very well (2) Satisfactorily (3) Well

(4) Very well 5) Not as yet

Appendix F

Narrative Description Form

Please respond freely and earnestly to the following questions based on your own experience. Use the back of this paper if necessary. Thank You.

How would you describe how you think (the thinking process you go through) when making clinical judgments?

What were the most important teaching/learning strategies in the development of your clinical judgment?