

AN EVALUATION OF THE RELATIONSHIP BETWEEN
REFLECTIVE JUDGMENT AND CRITICAL THINKING IN SENIOR
ASSOCIATE DEGREE NURSING STUDENTS

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ABSTRACT

Cynthia L. Maskey

AN EVALUATION OF THE RELATIONSHIP BETWEEN REFLECTIVE JUDGMENT AND CRITICAL THINKING IN SENIOR ASSOCIATE DEGREE NURSING STUDENTS

For nursing students to be successful in current and future practice they must be proficient critical thinkers *and* be able to use reflective judgment skills to manage the daily dilemmas of healthcare practice. Critical thinking and reflective judgment are not elements of nursing curricula unless faculty explicitly design learning activities to develop these skills.

This study examined the relationship between reflective judgment and critical thinking by comparing a measure of reflective judgment, the Reasoning about Current Issues (RCI) test, with a measure of critical thinking in nursing (the HESI Exit Exam) in a sample population of senior associate degree nursing (ADN) students ($N = 108$). The descriptive variables of individual ADN student's age, grade point average (GPA) in nursing courses and the number of completed college/university credit hours were also examined.

A modest correlation ($r = .370, p < .01$) was found between critical thinking and reflective judgment indicating a positive relationship between these two variables. However, the results supported the hypothesis that these are separate concepts; while the students achieved an acceptable level on the measure of critical thinking, they did not exhibit the skill level of an effective reflective thinker.

Positive correlations were found between reflective judgment and individual student age and nursing program GPA ($p < .01$). Critical thinking was also positively correlated with age ($r = .351$) and GPA ($r = .426$). There were no statistically significant correlations noted between the number of credits or previously earned baccalaureate degrees with either reflective judgment or critical thinking.

An appreciation of the unique commonalities and differences between reflective judgment and critical thinking is essential for the development of innovative strategies and pedagogies meant to advance teaching/learning within schools of nursing with an explicit focus on both concepts and an ultimate goal of improving competence in newly graduated nurses. The implication for nurse educators is in changes and innovations that can lead to more effective thinkers. Careful pedagogical planning and a mindful inclusion of learning activities to develop both reflective judgment and critical thinking skills may lead to increased competence as nursing students and as new graduate nurses.

Donna L. Boland, PhD, Chair

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LIST OF ABBREVIATIONS

ADN	Associate Degree Nursing
BSN	Bachelor of Science in Nursing
GPA	Grade point average
HESI	Health Education Systems, Inc.
HPM	HESI Predictor Model
NCLEX	National Council Licensure Examination
NLN	National League for Nursing
NRC	National Research Corporation
RCI	Reasoning about Current Issues
RJI	Reflective Judgment Interview
RJM	Reflective Judgment Model
RN	Registered Nurse
SJAN	Scale of Judgment of Ability in Nursing
WGCTA	Watson-Glaser Critical Thinking Appraisal

CHAPTER ONE

INTRODUCTION

Overview of Chapters

There are five chapters in this dissertation. The first chapter introduces the problem and its significance, the purpose of the study including the research questions and hypotheses, and the definition of terms and limitations of the study. Chapter Two explores the concepts of reflective judgment and critical thinking, explains the Reflective Judgment Model (RJM) and reviews the pertinent literature about both reflective judgment and critical thinking in nursing education. Chapter Three is a description of the design and methodology for the study. Chapter Four details the results of the study and Chapter Five is comprised of the summary, discussion, limitations and implications for further research.

Problem and Significance

Patient care decisions require increasingly higher level cognitive processing skills (Kuiper & Pesut, 2004; Miller, 2001), and today's nurses are expected to be able to make decisions in patient care situations that are complicated and intricate (Bowles, 2000; Navedo, 2006; Nickerson, 1991; Pittman, 2006; Saltzberg, 2002). Nursing educational programs are responsible for preparing safe, competent graduates who are able to function in an environment of ever-increasing patient-care acuity and complexity. It is becoming increasingly apparent to nurse educators that successful nursing students need more than what is being taught in traditional nursing programs.

Programs that limit their focus to content knowledge and critical thinking skills that require application of knowledge to problem identification and resolution are missing a crucial cognitive element that graduates need to function as competent practitioners in complex and ill-defined clinical situations. That metacognitive element is reflective judgment. A fundamental aim of this study is to explore the associations between reflective judgment and critical thinking and to add evidence to nursing education research on these topics.

Reflective judgment is the product of quality thinking that focuses on ill-structured problems often in the face of conflicting information. Nurses capable of reflective judgment are more adept at taking reasonable actions based on their evaluation of existing evidence. In addition, they are able to reevaluate and revise their actions based on new information (King & Kitchener, 2002). The theoretical model for this study was derived from King and Kitchener's (1994) Reflective Judgment Model (RJM). The RJM is a seven stage cognitive developmental model that explains how persons in late childhood to early adulthood develop consistent patterns in the ways in which they approach their understanding of difficult content and issues and also in the ways in which they support their decisions about this information (King & Kitchener, 1994, 2004; Love & Guthrie, 1999). An ill-structured problem is one that is controversial, complex, not well-defined and not easily answered with certainty even by experts in the particular discipline of the problem or issue (King & Kitchener, 2004; Love & Guthrie, 1999). In healthcare, nurses encounter ill-structured problems every day. These problems may be related to an ethical dilemma, inconsistencies

between policies and practice, or the uncertainty or ambiguity existing in the delivery of quality patient care. As nursing faculty our current approach to clinical problems is to provide students with what we have determined as *essential content* and challenge students to apply that knowledge with a critical thinking formula approach to clinical problems that tends to be structured to reflect the usual or common occurrence. Students often spend hours gathering existing information, making a diagnosis from a standardized list and following established medical regimens. Although critical thinking is vitally important as students learn how to use new knowledge it falls short of King and Kitchener's premise that "knowledge is an outcome of a process of reasonable inquiry" (1994, p. 15) rather than knowledge being the raw material that drives the nursing process. Critical thinking is important as students learn to analyze, synthesize and evaluate information but to deal with the complexity of ill-structured healthcare issues requires the additional skills of continual knowledge construction and evaluation of the quality of evidence (King & Kitchener, 1994).

From the moment students graduate from their entry level nursing programs, these novices practice in complex, fast-paced healthcare environments that require them to think critically and reflectively. New graduate nurses must apply what has been learned and what they are learning from ongoing real time judgments to provide competent, safe patient care.

Traditionally in schools of nursing, nurse educators have focused on teaching critical thinking skills to enhance the development of nursing judgment in students and this priority is evident in nursing curricula (Kuiper & Pesut, 2004).

Schools of nursing that focus exclusively on critical thinking as an outcome but neglect the concurrent development of reflective judgment may be failing to prepare graduates for the contemporary and complex world of nursing practice. Critical thinking is essential, but not sufficient, for dealing with clinical ambiguity and the ill-structured problems present in healthcare. For nursing students to be successful in their present and future practice they must be proficient critical thinkers *and* be able to use reflective judgment skills to manage the daily dilemmas of healthcare practice. The concepts of critical thinking and reflective judgment are closely related but in nursing practice the skills of reflective judgment are necessary in synchronicity with critical thinking for proficiency when faced with complex situations.

Purpose

The purpose of this correlational study was to determine the extent of the relationship between reflective judgment as measured by the RCI test and critical thinking in nursing, as measured by the Health Education Systems, Inc. (HESI) Exit Exam in a sample of senior ADN students nearing the end of their program of study. For these purposes, the researcher employed the conceptual and operational definitions of reflective judgment based on King and Kitchener's RJM (1994) and of the critical thinking instrument, the HESI Exit Exam, based on Paul's Critical Thinking Theory (1993). The specific aim of this correlational study was to investigate the degree to which senior ADN students developed reflective judgment and skills of critical thinking as a result of their educational experience. The study also examined the relationship of reflective judgment and

critical thinking to individual student age, GPA in nursing courses and number of college/university credits completed at testing time. Based on concept analysis of both concepts there appears to be some sharing of characteristics and attributes; however it is clear that the concepts are not the same (King & Kitchener, 1994). There is little evidence that reflective judgment is explicitly taught in nursing programs but students may be developing some of the characteristics associated with reflective judgment through the teaching emphasis placed on critical thinking in today's nursing programs.

The importance of this study is in determining the degree to which associate degree graduates possess characteristics consistent with reflective judgment. The more capable ADN students are at making reasonable judgments in the face of ambiguity and uncertainty, the better able they are to provide the quality of care necessary in a complex work environment. Experts in nursing education are calling for changes in pedagogies and approaches to curricula that support not only critical thinking but the development of intuition, judgment and evidence-based practice (Redding, 2001; Tanner, 2008). Being able to accurately assess the critical thinking skills and patterns of reflective judgment of entry level nurses and then to further examine the relationship between those skills in developing competency in nursing practice has implications for curriculum design and classroom innovation in programs of nursing education.

The RCI test was chosen as the measure of reflective judgment based on the significant empirical support and data from the vast amount of research related to the RJM (King & Kitchener, 1994, 2004). From a 2004 integrative

review conducted by Kuiper and Pesut, the reviewers made the assertion that critical thinking and reflective thinking are important as professional attributes, curricular outcomes, and as part of a plan for lifelong professional nursing growth. Within the Self-Regulated Learning (SRL) research model Kuiper and Pesut made the contention that clinical reasoning relies on concurrent development of cognitive and metacognitive skills. Kuiper and Pesut (2004) further posit that metacognition is similar in attributes to reflective thinking. Additionally, the cognitive thinking skills of critical thinking are incorporated within Kuiper's (2002) model of SRL in nursing. Cognitive and metacognitive thinking are important in the development of clinical reasoning.

Simmons (2010) completed a concept analysis on clinical reasoning based on the belief that, "Clinical reasoning guides nurses in assessing, assimilating, retrieving, and/or discarding components of information that affect patient care. It is considered a characteristic that separates professional nurses from ancillary healthcare providers" (2010, p. 1151). Simmons (2010) examined a number of other concepts related to clinical reasoning which included clinical judgment, problem-solving and decision-making. Attributes found to be related to clinical reasoning included analysis, logic, intuition, information processing, cognition and, again, metacognition (Simmons, 2010). This researcher chose reflective judgment based on agreement with Kuiper and Pesut (2004) and Simmons (2010), among others (Bowles, 2000; Miller, 2001; Pittman, 2006; Navedo, 2006; Redding, 2001; Rogal & Young, 2008; Seldomridge & Walsh, 2006; Tanner, 2008) that nurses must possess both skills of critical thinking and

reflective thinking (judgment) to work within the ambiguity and complexity of healthcare. As previously mentioned, the RCI test was chosen as the standardized measure of reflective judgment based on the vast amount of empirical data related to both reliability and validity.

The HESI Exit Exam was chosen as the measure of critical thinking in nursing based on the accessibility of empirical data and on the availability of central Illinois nursing programs that use this exam at the end of their program of study. Detailed information exists about the conceptual framework, reliability and validity for the HESI Exit Exam (Morrison, Adamson, Nibert & Hsia, 2004). The psychometric properties of the exam are sound and the exam is updated frequently based on the schedule of the National Council Licensure Exam (NCLEX) and ongoing administration (Morrison, et al., 2004). The HESI Exit Exam has been used more than 47,000 times and has both the reliability and validity measures that make it useful and practical (Morrison, et al., 2004). In addition, the HESI Exit Exam fits the model of assessing critical thinking using standardized tests with multiple choice items systematically applied to problems of clinical practice (Brunt, 2005b).

Assumptions

There are some basic assumptions that must be made explicit in studying reflective judgment. Individuals hold different epistemic assumptions and are diverse in the ways in which they justify their personal beliefs regarding how they manage ill-structured problems, issues and dilemmas. There is extensive research based on the RJM that has led to the conclusion that identifiable

patterns do, in fact, exist regarding how individuals react to these ill-structured problems (Brabeck & Wood, 1990; Polkosnik & Winston, 1989; Sakalys, 1984; Welfel & Davison, 1986). Based on the interaction between education and age and previous RJM research, it was assumed that ADN students in this study are developing as other students in a predictable sequence throughout their program of study (Navedo, 2006). Research based on the RJM suggests that students can be taught to engage in reflective thinking and to question their assumptions about knowledge and evidence (King, 2000; King & Kitchener, 1994). Educators can foster reflective judgment in their students. Additionally, individuals cannot truly be considered to be at a single point or a single stage. They must be considered to be in a stage range (Love & Guthrie, 1999). The RJM is more accurately considered as a complex stage model as opposed to a simple stage model of development (King & Kitchener, 2004). Therefore, despite this being a one-time measure, the researcher was making the assumption that the RCI test score (an average of the three different scenarios– workforce, alcoholism and immigration), which was used as the measure of reflective judgment for this study, was reliable and valid for this particular use with this particular population. The researcher was further assuming that the HESI Exit Exam is a reliable and valid measure of critical thinking in nursing.

Experts in nursing education are calling for changes in pedagogies and approaches to curricula that support not only critical thinking but the development of intuition, judgment and evidence-based practice (Redding, 2001; Tanner, 2008). Being able to accurately assess the critical thinking skills and patterns of

reflective judgment of entry level nurses and then to further examine the relationship between those skills in developing competency in nursing practice has implications for curriculum design and classroom innovation in programs of nursing education.

Research Questions

The research questions this study proposed to answer were:

1. What is the relationship between the ADN students' levels of reflective judgment as measured by the RCI test and their levels of critical thinking in nursing as measured by the HESI Exit Exam?
2. To what degree is there a relationship between the measure of critical thinking in nursing of ADN students nearing the end of their program of study and their nursing program GPA, age, and number of college/university credits completed?
3. To what degree is there a relationship between the level of reflective judgment of ADN students nearing the end of their program and their nursing program GPA, age, and number of college/university credits completed?

The research questions were designed to explore several issues in nursing education. There is inadequate research and understanding of the development of reflective judgment and critical thinking in nursing. Therefore, one intention of this research was to add to the body of evidence related to these topics. This understanding has the potential to impact the assessment and teaching/learning processes used in nursing education by supporting the need to

explicitly focus on the teaching and learning of reflective judgment and critical thinking skills.

Research question one, the central question, was designed to explore the relationship between the students' levels of reflective judgment and their levels of critical thinking to better understand the relationship between the concepts and the assessments and developmental level of these skill sets in ADN students. A competent nurse is able to reason effectively when faced with complex, ill-structured, patient-care situations which require both reflective judgment and critical thinking (Rogal & Young, 2008; Seldomridge & Walsh, 2006). Based on the supposition that the skills of reflective judgment transcend and include critical thinking skills plus the ability to deal with great complexity and uncertainty, it is hypothesized that capable, competent nursing students with high levels of critical thinking will, in turn, also have high levels of reflective judgment.

Research Hypotheses

The following hypotheses were postulated in this study:

1. There will be a positive correlation between students' levels of reflective judgment as measured by their score on the RCI test and their composite scores on the measure of critical thinking in nursing (HESI Exit Exam).
2. Composite scores on the measure of critical thinking in nursing (HESI Exit Exam) will correlate positively with nursing program GPA, age, and number of college/university credits completed.

3. Scores on the measure of reflective judgment (RCI test) will correlate positively with nursing program GPA, age, and number of earned college/university credit hours.

Definition of Terms

Reflective Judgment

King and Kitchener have defined reflective judgment as, “the outcome of a developmental progression. While one must have both knowledge and reasoning skills to engage in reflective thinking, true reflective thinking presupposes that individuals hold the epistemic assumptions that allow them to understand and accept real uncertainty” (1994, p.17). Epistemic assumptions are individuals’ beliefs about knowledge and truth; what they believe, who they trust regarding evidence (or its necessity) and how they make decisions. The RJM is comprised of seven defined developmental stages. The stage descriptions are, “abstractions of the assumptions and reasoning styles that are apparent in the individual’s reasoning” (King & Kitchener, 1994, p. 46). King and Kitchener (1994) further explain that thinking can only be considered to be the *reflective thinking* (as defined here) when the individual is considering ill-structured, ambiguous problems or dilemmas. While no student fits a developmental stage perfectly, the student must express the attributes of the Pre-Reflective and Quasi-Reflective stages to move on to be a truly reflective thinker.

Within each stage of the RJM the individuals in that stage possess certain precise explanations about knowledge and particular ways in which they defend

their explanations about knowledge. King and Kitchener (1994) call this ability to defend their knowledge as justification. The stages of the RJM are divided into three levels: Pre-Reflective Thinking (Stages 1–3), Quasi-Reflective Thinking (Stages 4–5) and Reflective Thinking (Stages 6–7) (King & Kitchener 1994, 2002, 2004). Each level has distinct attributes regarding knowledge and how individuals make decisions about or justify what they believe to be true and accurate.

An individual functioning at the level of Pre-Reflective Thinking Stage 1 is thinking at a very low level. This individual's thinking is very concrete, simplistic and even child-like. This individual will only believe what is seen or read. Because knowledge is so absolute for these people, there is no need to justify their thinking, there are no discrepancies in their thought processes; nothing is even abstract. They do not possess skills necessary to solve ill-structured problems (King & Kitchener, 1994).

Pre-Reflective Stage 2 Thinkers continue to believe direct input from their senses but in addition they will dogmatically believe what authorities tell them to be true. They believe knowledge to be certain and have faith only in experts to have correct information and knowledge. There is no need for them to examine or to justify their thinking because they only believe in what the authorities tell them to be true and do not deal well (or at all) with ambiguity (King & Kitchener, 1994; Mines & Kitchener, 1986). Pre-Reflective Stage 2 thinking and learning is regrettably consistent with many traditional ways of teaching and assessing in post-secondary education.

Stage 3 Pre-Reflective Thinkers begin to comprehend that sometimes even the experts do not have all the answers or all the truth. However, their level of thinking is still fairly concrete with knowledge justification bolstered with personal opinion when there is not an authority to seek out for answers. A person in this stage is able to comprehend that there are problems for which there are no certain answers but this thinking pattern is ineffective for dealing with ill-structured problems in that they lack skills for seeking answers (King & Kitchener, 1994).

When people enter Stage 4, they are considered Quasi-Reflective Thinkers. An individual in Stage 4 holds an understanding that knowledge is uncertain and also situational. This person begins to understand that rationales and evidence must be given for a particular argument rather than just opinions. The issue with the Stage 4 Thinkers is that their rationales and even their evidence may be unique and idiosyncratic to them, only offered intermittently or when it benefits them in some way. They tend to believe that everyone is entitled to an opinion bearing the same weight despite expertise, education or background. Approaching ill-structured problems with the beliefs of a Stage 4 thinker may yield mixed results (King & Kitchener, 1994; Mines & Kitchener, 1986).

Quasi-Reflective Thinkers in Stage 5 are becoming more complex and enhanced in their thinking and are accepting of some uncertainty although much of their knowing and filtering of information is based in context, situation and personal perception. As in Stage 4, these individuals do have an appreciation for

the importance of evidence in making decisions. King and Kitchener (1994) explain that persons in Stage 5 may be capable of comprehending levels of abstraction but this abstract reasoning is frequently context bound as are the justifications for their beliefs leading to difficulty in making decisions related to ill-structured problems (King & Kitchener, 1994).

Persons who are Stage 6 Thinkers are considered true Reflective Thinkers. They understand that knowledge must be actively constructed using pertinent data. In addition they recognize that information and evidence must be constantly re-evaluated in light of new facts because knowledge is tentative and uncertain. They are able to make decisions about ill-structured problems based on credible evidence and to re-visit decisions as new information becomes available (King & Kitchener, 1994).

Stage 7 Reflective Thinkers are the most reasoned and effective reflective thinkers; not everyone reaches this level of thinking. They have a full understanding of ill-structured problems. Stage 7 Reflective Thinkers are able to seek out and examine evidence and give it the proper weight and integrity. Stage 7 Thinkers are comfortable and confident with all aspects of their thinking including knowledge construction, uncertainty, ambiguity, use of evidence, objectivity and the ability to change their views based on credible data (King & Kitchener, 1994).

Critical Thinking

There are many definitions of critical thinking in the literature but this study will use the conceptual definitions and subsequent operational definitions of

critical thinking used by the authors of the HESI Exit Exam Instrument. The authors of the HESI Exit Exam defined critical thinking within the context of nursing education. The HESI Exit Exam was developed based on Paul's Critical Thinking Theory (Paul, 1993), Bloom's Taxonomy (Bloom, 1956) and Classical Test Theory. Paul's Theory and Bloom's Taxonomy had a direct impact on the HESI chosen definition of critical thinking. The definition of critical thinking used by HESI as derived from Paul's (1993) definition is as follows:

Disciplined, self-directed thinking which exemplifies the perfections of thinking appropriate to a particular mode or domain of thinking. – Thinking that displays mastery of intellectual skills and abilities. – Thinking about your thinking in order to make your thinking better: more clear, more accurate, or more defensible (Morrison, Nibert & Flick, 2006, p. 11).

Paul's definitions were adapted by the HESI authors to aide and guide in the writing of critical thinking test items.

According to the HESI authors, for critical thinking assessment to occur, the following criteria must be met: Each individual test item must (1) be written at the level of application or above according to the Bloom's taxonomy (1956) domain of thinking, (2) require multilogical thinking mastery of intellectual skills or abilities to answer the individual item, and (3) require a high level of discrimination to choose from among plausible alternatives which directly connects with Paul's thinking about one's thinking. Bloom's taxonomy was introduced in 1956 and is used as a system for leveling learning objectives/thinking skills from lower levels of knowledge and comprehension to higher levels of application, analysis, synthesis and evaluation. Bloom's taxonomy fits within the *HESI Conceptual Framework for Developing*

Critical Thinking Exams because:

The basis for the (Bloom's) theory is rather straightforward, a person cannot understand something that he does not remember (know) nor can he/she analyze or apply that knowledge if the person does not understand the material. Though an ability to analyze and apply certainly supersedes the basic knowledge category, to synthesize entails divergently applying knowledge and/or skills to produce something new (Thomas, n.d., para. 2).

All HESI items are to be written at Bloom's level of application or higher and to require multilogical thinking to answer. Multilogical thinking was defined by Paul as, "Thinking that sympathetically enters, considers, and reasons within multiple points of view" (Paul, 1993, p. 544).

Limitations

It must be understood that individuals do not function in one stage of reflective judgment exclusively at any given time but across stages (King & Kitchener, 1994). Therefore, the measurement of reflective judgment used in this study was a snapshot of the student's development at a given point in time. Also, reflective judgment is assumed to increase as a function of education in general, not necessarily nursing education, so it is difficult to determine the specific weight of nursing education on the development of reflective judgment. In addition, interpretation of the RCI score is reflective of a functional level of performance at the time tested as opposed to the student's optimal level of epistemic performance (Kitchener, Lindsay & Brown, n.d.).

The study was further limited by the fact that the research is being conducted using a purposive, convenience sample of voluntary participants drawn from central Illinois nursing programs that use the HESI Exit Exam as part

of their nursing program curriculum. Therefore, the results are not generalizable. Other limitations relate to the psychometric properties of each of the instruments to be used in the study (HESI Exit Exam, RCI test). Each instrument will be explored in the methods sections of this dissertation.

Summary

Nurses work in a fast paced, complex healthcare environment and although critical thinking skills are necessary they are not sufficient to make complex care decisions in care situations where there is incomplete and or contradictory information which are common place in today's work environment. The researcher argues that schools of nursing that focus solely on critical thinking as their primary educational outcome will find that students are missing a crucial cognitive skill that is vital in preparing safe, competent nursing graduates. That element is reflective judgment. To flourish in the high-speed, difficult environment that is nursing today, graduates must be adept at *both* critical thinking and reflective judgment, and programs of nursing must consciously and purposefully prepare students to think critically with reflective judgment in mind.

This study examined the relationship between a measure of reflective judgment (RCI test) and a measure of critical thinking in nursing (HESI Exit Exam) using a sample of senior ADN students in central Illinois. The researcher also examined the descriptive variables of age, nursing program GPA and the number of earned college/university credit hours to see if there was an association between and/or among these variables and the study variables.

It is hypothesized that there is a positive correlation between the measure of levels of reflective judgment and critical thinking in nursing. One belief was that students with higher GPAs in their nursing courses would also score higher on their critical thinking in nursing exam. It was also theorized that nursing students with higher GPAs in their nursing courses would have higher critical thinking and reflective judgment scores. It was further hypothesized that nursing students who are older and have a higher number of earned college/university credit hours would have higher critical thinking and reflective judgment scores as both concepts are considered developmental in nature. By investigating the relationship between reflective judgment and critical thinking in nursing in senior ADN nursing students this researcher wanted to determine the strength of the correlation between reflective judgment and critical thinking and discover whether or not age, academic success, and/or credit hours completed affected critical thinking or reflective judgment in these senior AD nursing students. Nursing students need reflective thinking and judgment skills as well as critical thinking skills in order to be effective, competent healthcare providers.

CHAPTER TWO

REVIEW OF THE LITERATURE

The purpose of this study was to evaluate the relationship between reflective judgment as measured by the RCI test and critical thinking in nursing as measured by the HESI Exit Exam in senior ADN students. This important question of whether senior ADN students nearing the completion of their program of study are competent in both reflective judgment and critical thinking is crucial because of the need to prepare safe nursing practitioners with both skills to be ready to function in today's complex, fast-paced healthcare environment (Allen, Rubenfeld & Scheffer, 2004; Brunt, 2005a; Distler, 2007).

This chapter begins by examining the relationship between the concepts of reflective judgment and critical thinking through a critical analysis of the attributes of both concepts. It will also describe research related to reflective judgment and critical thinking. This is followed by a review of the RJM including the supporting theories and research focusing on those particular to nursing and allied health. Finally critical thinking assessment and critical thinking research within nursing and nursing education will be explored to determine the current state of critical thinking outcomes in nursing educational programs.

Reflective Judgment and Critical Thinking as Concepts

Baldwin (2008), in her work on concept analysis, suggests that after defining a concept one should then look at the individual attributes of the concept to help, "to identify the set of attributes associated with the term and subsequently these will constitute its definition," (p. 56). As part of this study,

using Baldwin’s recommendation, the researcher put together a table (see Table 1) containing the conceptual attributes from the definitions of critical thinking posited by the authors of the HESI Exit Exam and also the conceptual definitional attributes from the King and Kitchener (1994) definition of reflective judgment focusing on the attributes associated with the final two reflective thinking stages, six and seven, of the RJM. This researcher then identified areas in which reflective judgment holds *additional* attributes beyond those of critical thinking to enhance the clarity of the differences between reflective judgment and critical thinking. It is these elements that conceptually separate reflective judgment from critical thinking. It is within the context of these unique *additional* attributes of reflective judgment that this researcher posits to be the necessary skills and abilities to make safe, competent nursing judgments regarding complex, ill-structured problems.

Table 1

Comparison of CT Attributes with RJ Additional Attributes

Critical Thinking ^a	Reflective Judgment ^b
- Mastery of intellectual skills	- Developmental progression
- Appropriate to mode or domain	- Acceptance of uncertainty
- Disciplined and Self-Directed	- Consideration of ill-structured problems
- Thinking about your Thinking	- Knowledge is constructed and continuously reevaluated
- Analysis, Synthesis and Evaluation	- General content as opposed to nursing content
- Clear, accurate, defensible thinking	
- Nursing Process and Content	

^aHESI critical thinking attributes. ^bReflective judgment *additional* attributes

Although critical thinking and reflective judgment are separate concepts, within the definition of reflective judgment is mastery of intellectual skills, being

appropriate to mode or manner of thinking and to domain or discipline, clear and defensible thinking, analysis and synthesis of information; all the critical thinking attributes measured by the HESI Exit Exam excluding nursing content and nursing process. These definitional attributes of critical thinking are subsumed within reflective thinking and judgment (King & Kitchener, 1994). The unique attributes present in the definition of reflective judgment are related to the developmental nature of King and Kitchener's theory. According to the RJM, as individuals mature their ability to deal with uncertainty and ambiguity increases as does their skill in being a more effective reflective thinker. Within the definitional attributes of critical thinking are characteristics of quality, logical thinking but not the capacity to deal with ill-structured problems; critical thinkers do not necessarily possess these traits. Another essential attribute of reflective judgment is the ability for a reflective thinker to construct and to continuously reevaluate knowledge to deal effectively with ill-structured problems. These are the critical definitional attributes that make reflective thinking, as a concept and as a skill, different from and more than critical thinking alone.

Figure 1 is a graphic illustration of how this researcher perceives the concepts of the study relating to each other within the context of nursing education. Reflective judgment transcends and includes critical thinking. In order to prepare competent graduates, the Nursing Content and the Nursing Process must be at the core of a program of entry level nursing education. In addition, the students must become skillful at managing this nursing content by using critical thinking skills and these skills could be enhanced with the addition

of reflective judgment. The graphic points out that although they do have a majority of attributes in common; reflective judgment is different from, and greater than critical thinking alone. Therefore, reflective judgment is actually represented as wrapping around both the Nursing Content-Nursing Process core *and* the critical thinking. It is the reflective judgment portion that, if consciously and explicitly included in a nursing program of study along with critical thinking, has the potential to enhance graduate outcomes related to clinical competence.

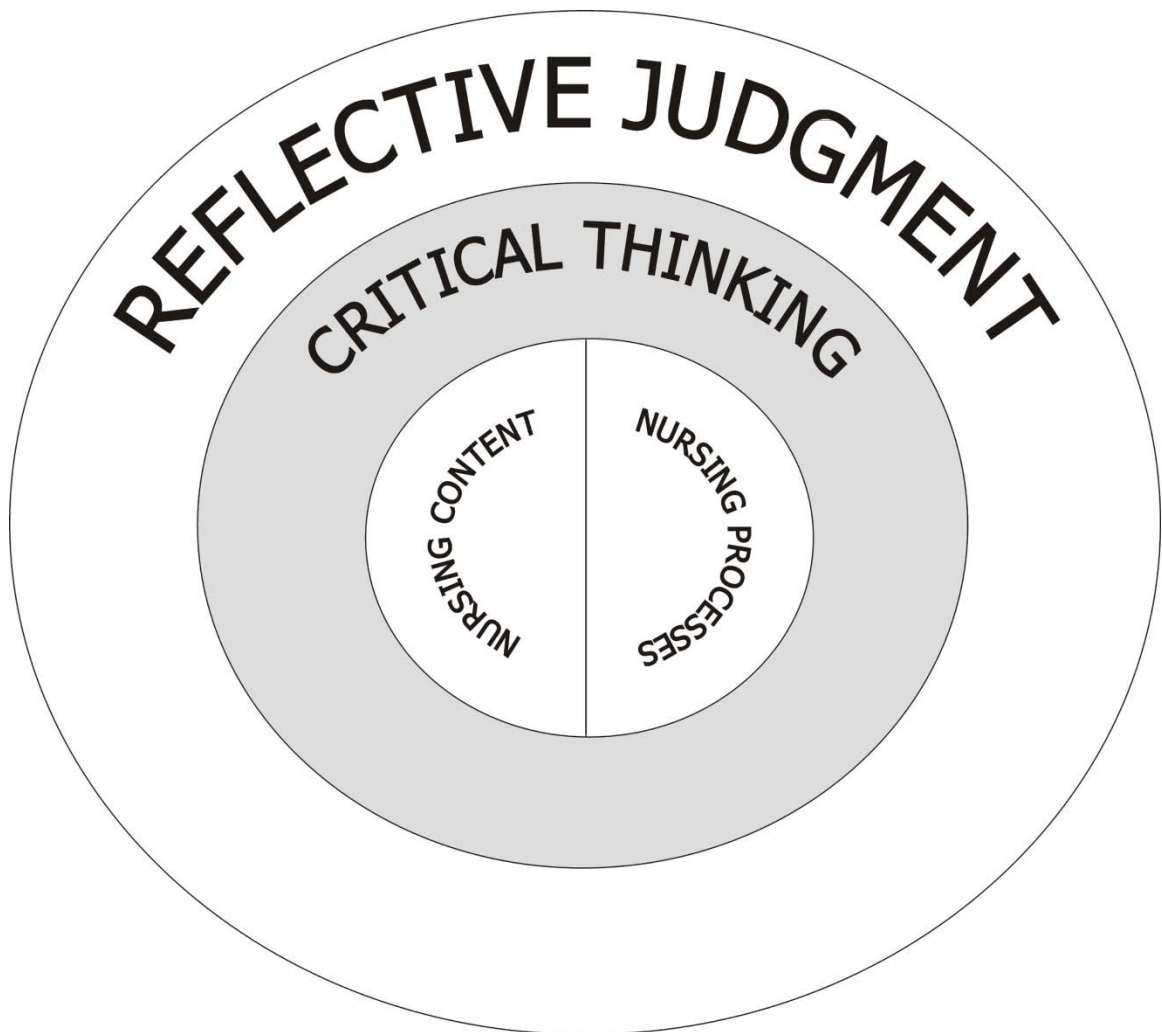


Figure 1. Relationships Between and Among Reflective Judgment, Critical Thinking, Nursing Content and Nursing Process

In her 2006 study, Navedo concluded, “critical thinking is no longer the golden standard [sic] for defining nursing judgment”, (p. 150) nor should critical thinking be the main outcome focus of nursing education. Nursing students encounter problems in caring for patients that are very complicated and not easily solved despite the use of critical thinking skills. Critical thinking alone is insufficient to meet the complexity of the healthcare environment. Critical thinking is seen by some as a linear, logical, focused problem-solving method. Critical thinking has been studied in terms of both well and ill-structured problems, but researchers have concluded that, in most assessments of critical thinking, the decision approach has been applied to either well-structured problems or well-structured answers (King & Kitchener, 1994, 2002). Critical thinking alone is not suited to the intricacy of today’s nursing practice because nurses deal with ill-structured problems without simple, logical solutions or answers. Each patient presents as an ill-structured problem. Nurses need the additional skills related to reflective thinking (Navedo, 2006; Pittman, 2006).

The Relationship Between Reflective Judgment and Critical Thinking

The development of *both* reflective judgment and critical thinking in nursing is necessary to make the, “rigorous and honest inquiries required to care for a patient or group of patients” (Bowles, 2000, p. 373). King and Kitchener (2004) explained that reflective thinkers engage in the careful deliberation necessary in complex circumstances to arrive at the kind of reasoned solutions that colleges and universities aspire to see in their graduates. Navedo in her 2006 work with nursing students clarified that the distinction between King and

Kitchener's definition of reflective judgment and critical thinking is that the "ambiguity and uncertainty, which are inseparable from the reality of nursing practice, are embraced" (p. 6) in reflective judgment. Reflective judgment focuses on the fact that "knowledge is the outcome of a process of reasonable inquiry in which solutions to ill-structured problems are constructed" (King & Kitchener, 1994, p. 7). Reflective thinkers are knowledge workers able to take pieces of information and construct resolutions to difficult problems (King & Kitchener, 2004). Pittman (2006) used King and Kitchener's RCI test comparing junior and senior nursing students and found no significant differences in their reflective judgment. However, Pittman (2006) identified her study as a contribution to the literature and encouraged further study, "to increase our understanding of reflective judgment," (p. 87) in this population. The data are lacking to support the notion that nursing students are developing reflective judgment as a result of nursing education, but the need for further study is evident as the argument for reflective judgment is an educational imperative.

Research in Reflective Judgment and Critical Thinking

Because the concepts are so closely related, there have been researchers who have chosen to study the empirical relationship between critical thinking and reflective judgment (King, Wood & Mines, 1990; Mines, King, Hood & Wood, 1990). The issue that surfaces most often is the difficulty in defining and measuring critical thinking. In their summary of the research related to critical thinking, King and Kitchener (1994) describe studies with samples of multiple ages and education levels. In 1980, Brabeck examined critical thinking and

reflective judgment with a population consisting of 30 high school students, 30 college sophomores, 30 college seniors and 29 masters students matched for scores on their critical thinking assessments. The instruments Brabeck used were the Reflective Judgment Interview (RJI) and the Watson-Glaser Critical Thinking Appraisal (WGCTA). She found, as have other researchers, that levels of reflective judgment increase with education (King, Kitchener, Wood & Davison, 1989; Polkosnik & Winston, 1989; Welfel & Davison, 1986) and that subjects with higher levels of critical thinking also score higher on their RJI while those with lower scores on the WGCTA score lower on the RJI. Other researchers studying critical thinking and reflective judgment report the use of the RJI as the measure of reflective judgment and either the WGCTA or the Cornell Critical Thinking Test (CCTT) as the measure of critical thinking (King, et al., 1990; Mines, et al., 1990). Summarizing the information, they came to the conclusion that although critical thinking and reflective judgment are related, they are not the same construct (King & Kitchener, 2004). Evidence showed that a student may possess critical thinking skills without the skills of reflective judgment but a student will never possess reflective judgment without critical thinking skills (Brabeck, 1980; King, et al., 1990; King & Kitchener, 1994; Mines, et al., 1990). An individual cannot possess high levels of reflective judgment and low levels of critical thinking because of the relationship between the two concepts; they are not inversely related. A search of the literature for more recent research using the RJI and measures of critical thinking only reveals the literature that will be discussed later

related specifically to nursing (Miller, 2001; Navedo, 2006) and allied health (Boyd, 2005).

The RJM

King and Kitchener (1994) report that all the work done on their RJM is based on Dewey's (1933) early conceptions of reflective thinking and critical thinking. The primary difference between critical thinking and reflective judgment is that critical thinking serves only to answer those questions that simple logic or formulas can eventually answer while reflective judgment is necessary for controversial or complicated issues where information is missing and even the experts do not agree (King & Kitchener, 1994). For the purpose of this study, the researcher reasons that proficient nursing graduates need abilities of reflective judgment that include knowing how to handle ambiguity and dilemmas of patient care, more than mere critical thinking skills, to successfully and smoothly transition into the healthcare workforce.

The development of reflective judgment occurs in persons (late childhood through adulthood) in stages. "The basis of this model is seven distinct sets of epistemic assumptions and concepts of justification, or, put more simply, seven consistent patterns that describe how people approach complex issues and defend what they believe to be true" (Love & Guthrie, 1999, p. 42). King and Kitchener's RJM (1994) described the progression of how adolescents and young adults develop their abstract processes of knowing and their justification of personal beliefs about solving ill-structured problems and stated, "the model describes the development of epistemic cognition" (King & Kitchener, 1994, p.

13). King and Kitchener's RJM (1994) is based on the theoretical work of many researchers but especially Perry's (1970) work with college students related to intellectual and ethical development. Piaget (1970) also had a significant influence on their model in both his stage related theory and in the ways that individuals use assimilation and accommodation throughout life to continue learning. Fischer's Model of Cognitive Development nearly mirrors the RJM in its stages although it begins in childhood and moves through adulthood (Fischer, 1980).

The seven stages of the RJM were introduced in Chapter One. Individuals functioning at levels of Pre-Reflective Thinking (stages 1–3) have cognitive skills that are insufficient to deal with clinical complexity while those functioning at a Quasi-Reflective Level (stages 4–5) are just beginning to comprehend the importance of evidence and justification of knowledge. Only authentic Reflective Thinkers (stages 6–7) deal effectively with ambiguity and complexity. In comparison, most programs of nursing education begin with the basic fundamentals of care focused on the curricular content, teaching the nursing process and proceeding from simple to complex. As a nursing program progresses, assessment and evaluation of learning generally progresses from the lower levels of Bloom's taxonomy (1956), knowledge and comprehension to the higher and more difficult levels of synthesis and evaluation which require higher level cognitive skills and metacognitive skills to achieve academic success (Kuiper & Pesut, 2004). It is therefore clear and apparent to this researcher that a curricular plan to improve students' reflective judgment skills and ways of

comprehending knowledge and ambiguity could simultaneously improve their progression in their programs of study.

A student's level of reflective judgment within the RJM was initially assessed using an instrument called the RJI but more recently using a newer instrument, the RCI test, was used in this study. The RCI test is a computerized, online instrument that requires the student to endorse responses rather than generate responses to ill-structured, current issues or problems in our society (King, et al., n.d.). (See Appendix A for an example).

The work done by Fischer and his associates, one of whom was Kitchener, was not part of the original work done on the RJM (King & Kitchener, 1994; Wood, et al., 1993) but has implications for education at the post-secondary level. Fischer's Model of Cognitive Development (1980) consists of seven skill levels that coincide directly with the seven stages of the RJM. It is a developmental model (much like the RJM), but the skill level stages go from age two until age 30. The age limit of the Fischer model has implications for this study due to the fact many of the students in ADN education are older than 30 years. But unlike the RJM, each stage in the Fischer model has potentially greater sensitivity with two levels, *functional* and *optimal*, and a person's developmental range is the difference between those two levels. The importance to educators is the influence that education can have on moving individuals' *functional* levels toward their *optimal* levels. A 1993 study of Fischer's skill theory (Wood, et al., 1993) and the development of reflective judgment showed mixed results regarding whether providing a student with contextual support

could improve the individual's functional developmental stage. Much of the work related to both Fischer's skill theory and the RJM has focused on the educational implications of being able to impact a person's current level of development and improve upon it.

Research Related to Reflective Judgment

After more than twenty-five years of use with students, the RJM has been studied extensively (King & Kitchener, 1994, 2002; King, et al., 1989; King et al., 1990; Welfel & Davison, 1986; Wood, 1997; Wood, et al., 1993; Wood, et al., 2003). There have been more than 30 studies using the RJI or the RCI to assess reflective judgment (Boyd, 2005) and the many variables that interact with the development of reflective judgment, specifically time, age, years of education/degrees, programs of study, domain, gender, ethnicity, critical thinking, intelligence and even personality (King & Kitchener, 2002; Wood, et al., 2003).

From the very beginning, King and Kitchener knew that there would be a need for longitudinal evidence to support a developmental model of reflective judgment. So, the primary longitudinal study was completed by them but there are also six others (Brabeck & Wood, 1990; Polkosnik & Winston, 1989; Sakalys, 1984; Schmidt, 1985; Van Tine, 1990; Welfel & Davison, 1986) to support their study (King & Kitchener, 1994, 2002). Their original sample group was comprised of three age/educational groups of twenty 16 year-old high school students, forty 21 year-old college juniors and then 20 students who were third year doctoral students (King & Kitchener, 1994, 2002). They followed this group for ten years with four testing periods using the RJI as their instrument. They

found that the RJI scores of all participants increased during the ten years of the study, but during the interim testing intervals more than two-thirds of the group remained the same. These upward changes seemed to follow the stages of the model without regression or skipping of stages; all evidence in support of the RJM. In the six other aforementioned longitudinal studies, the two variables/instances that did not lead to statistically significant increases in levels of reflective judgment as measured by the RJI were: (1) when there was a short amount of time between testing periods (less than 4 months) (Polkosnik & Winston, 1989; Sakalys, 1984) and (2) when there was a significant increased age of subject (> 21 for college freshman and > 30 for graduate students) (King & Kitchener, 1994; Schmidt, 1985). These findings further support the developmental nature of the RJM.

The RJM research indicates that epistemic cognition increases developmentally with educational level (King, et al., 1989; Polkosnik & Winston, 1989; Welfel & Davison, 1986). The difference in magnitude of the positive effect of education depends on the research population and the length of time for the study. Wood, et al., (2003) have also determined that “the RCI scale detected both educational level and pre-post differences in a magnitude similar to the RJI” (p.18), minimizing questions related to instrumentation and the RJM. Students with the lowest scores of reflective judgment at the beginning of the study will show the most increase over time and individuals without any college coursework at all will consistently score lower than those with college degrees (Boyd, 2005; King & Kitchener, 2002).

There are also many studies both longitudinal and cross-sectional to verify that individuals follow the stages and the sequences of the RJM without regression (Brabeck & Wood, 1990; King & Kitchener, 2002; Pittman, 2006; Sakalys, 1984; Welfel & Davison, 1986; Wood, 1997). King and Kitchener (2002) examined aggregated samples from the longitudinal studies; the high school students aggregated sample reported scores showing pre-reflective levels of judgment ($N = 172$, 11 samples, 5 studies), traditional-age college students scored between stage 3 and 4 ($N = 966$, 44 samples, 20 studies) while graduate students scored on average 4.76 ($N = 196$, 12 samples, 7 studies). Wood (1994) examined multiple studies completed using the RJI and related research and also found data supporting the developmental progression of reflective judgment. Wood (1997) also reviewed the results from multiple studies ($N = 946$) and noted that there was very little variability in the RJI scores between the college freshman (3.63) and sophomores (3.57) but marked differences between undergraduate and graduate students. There are implications for this study because senior ADN students are actually college/university sophomores but tend to be over 25 years-of-age and a number of them enter nursing programs with previous earned degrees.

Another question is whether reflective judgment increases with age alone. This has only been marginally answered by examining non-traditionally aged college students (over 25 years). From the combined research studies ($N = 137$), in the non-traditional age students it was found that levels of reflective judgment were not significantly different than traditional age students (King &

Kitchener, 1994). However, in the non-traditional age students, which the majority of ADN students are, the shift between stages from freshman year to senior year was “noteworthy” (King & Kitchener, 2002, p. 46) because it occurred at a more rapid rate than for traditional age students. Age becomes non-significant related to reflective judgment when it is examined in the graduate student population (King & Kitchener, 2002). Graduate students have higher RJI scores and show the least progression with further education. However, one researcher, Mann (1999), found that age alone was not significant overall in a student’s reflective judgment level. The interaction of age and education seems to be most important in the development of reflective judgment.

King and Kitchener (1994) explicated the research regarding the question of gender differences and reflective judgment and found mixed results. Seven of 14 studies reporting on gender reported no differences, but the reporting for the other seven studies was more complicated. Six of the remaining studies found higher scores for reflective judgment in males, and the remaining one noted a “class by gender interaction,” (p. 176), meaning that the traditional age and the non-traditional age females (over 25) both scored higher than their male counterparts in the sample. Because reflective judgment is a complex developmental issue, Wood, et al., (1993) examined the gender question and noted differences between genders exhibited as growth spurts. Wood (1994) believed that the timing of the assessment of reflective judgment makes a difference in the findings for gender. Wood found that females show more rapid developmental progression in their late teens and males in later college and even

graduate school years. In their more recent examination of reflective judgment research, King and Kitchener (2002) continue to report mixed results regarding gender with the questions being those related to differences between the genders and their overall ways of knowing.

There have been fewer studies regarding ethnicity and culture using the RJM with the RJI or the RCI as the tool. King and Kitchener (1994) report a study with a German sample using the RJI which showed no significant differences in reflective judgment except those related to educational level. In their 2002 review of the reflective judgment research, King and Kitchener found that ethnicity proved to be non-significant as a variable in the few studies that were done.

Reflective judgment has been researched in relation to intellectual development, intelligence, and formal operations using the RJM (King & Kitchener, 1994). There have been many studies to try to examine these relationships and to establish the boundaries of each. Research related to intelligence tends to focus on measures of verbal reasoning and formal operations which do increase with age and educational level as does reflective judgment (Pirttila-Backman & Kajanne, 2001). However, the constructs of intelligence and reflective judgment still remain different falling only under the umbrella of intellectual development. Therefore, the research related to reflective judgment and the intellectual constructs of intelligence, logic and formal operations have consistently found reflective judgment skills to be, “necessary prerequisites for higher level thinking” (King & Kitchener, 1994, p. 202).

Reflective judgment has been studied as it relates to certain personality constructs, and a link has been noted between moral development and the development of reflective judgment. However, they are truly different concepts (Fischer, 1980; King, Kitchener & Wood, 1991; King, et al., 1989; Wood, 1983). King and Kitchener noted similarities between models of moral development and the RJM and listed those striking similarities in a table in their 1994 book. The development of reflective judgment and moral development have been studied using different instruments and with both cross-sectional and longitudinal studies (King, et al., 1989; King, et al., 1991). Most of the studies have found some type of relationship between moral reasoning and reflective judgment with the exception of Josephson's (1988) dissertation study using the RJI and Kohlberg's Moral Judgment Interview.

Reflective Judgment Research in Nursing and Allied Health

The RJM has been used in nursing and allied health education research but almost exclusively in dissertation work. The one journal article (Sakalys, 1984) using the RJM in nursing was taken from the author's doctoral study. Sakalys (1982) was the earliest nurse researcher to use the RJI. Sakalys (1982) used a quasi-experimental, pre-test/post-test design with 50 undergraduate nursing students enrolled in a semester long research methods course. Following the research course there were no significant differences in the reflective judgment scores between the experimental and control groups but Sakalys (1982) noted the RJI scores of the experimental group to be slightly higher than those of the control.

Saltzberg (2002) and Navedo (2006) both approached their dissertation studies using the RJM with qualitative, descriptive designs which used the RJI as just one of their multi-modal approaches to data collection. Saltzberg interviewed 28 baccalaureate, masters and doctoral nursing students about their epistemological thinking while also completing the RJI and an instrument called the Epistemological Reflection. Saltzberg supplemented the RJI with information regarding emotion and affect about cognition and ways of knowing in nursing education. Saltzberg added to the knowledge base by compiling stories about how affect and emotion impact students' epistemological thinking and the implications this has for curricular design. Navedo's (2006) qualitative study with senior baccalaureate nursing students used the RJI, reflective journaling, seminar discussions and nursing dilemmas in a format to examine critical thinking as the primary educational outcome of nursing education. Navedo's results served to validate the fact that nursing judgment is more than critical thinking alone.

King (1987) studied second year ADN students and working ADN registered nurses (RNs). She divided the subjects into three groups, ADN students ages 19–22, ADN students ages 28–36 and the working RNs. There were 13 subjects in each group. Her research question was whether there were cognitive differences between the three groups and what implications these differences might have for educational strategies. The RJI scores for the 19–22 year-old ADN students were significantly lower than the scores for the other two groups. This led King to the conclusion that the younger students were significantly

different cognitively than the other two groups. She also concluded that both age and education, together, influenced the higher scores in the older ADN students and practicing RNs, not just one or the other of these variables. The suggestions from her study included varying instructional strategies based on both the age and reflective judgment level of the students in programs of nursing.

Hansen (1996) conducted the only study using the RJM with the Reflective Thinking Appraisal (RTA) as the tool with a population of working nursing staff ages 18–35. There were no nursing students in his study. The nursing staff worked as RNs, licensed practical nurses and certified nursing assistants. He studied reflective judgment as one of four cognitive variables as they related to the nursing staff who chose to smoke or not smoke. There were no differences found in the levels of reflective judgment in the smokers and non-smokers even on the smoking related dilemma in the RTA.

Nickerson (1991) and Miller (2001) studied populations of nursing students with a curricular focus and a course related focus respectively, but both found no significant differences in levels of reflective judgment as measured by the RJI. Nickerson (1991) studied 26 senior nursing students in two groups from two different baccalaureate programs, one program having a progressive curricular design and the other with a building (known also as an upper division) curricular design. A building curricular design is a more traditional approach to Bachelor of Science in Nursing (BSN) education in which the first two years are spent on the general education courses followed by the final two years of nursing courses while in the progressive curricular design the nursing major courses

begin in the first years along with the general education courses (Nickerson, 1991). Nickerson's (1991) hypothesis was that students from the program with the progressive curricular design would have higher levels of reflective judgment but she found the opposite. The students in the program with a curriculum with a building design had slightly higher, but non-significantly higher levels, of reflective judgment. Limiting factors to this study were the small sample size and the religious affiliation of both colleges possibly influencing the RJI dilemma responses.

Miller (2001) examined (1) scores on the RJI, (2) scores on the WGCTA, (3) scores on a Scale of Judgment Ability in Nursing (SJAN), an instrument developed by Seidl and Sauter (1990), and (4) the relationship of these three measures to student scores in a medical/surgical course. A significant positive relationship was found between scores in the medical/surgical course and the WGCTA and the SJAN but not the RJI. Miller (2001) also secondarily collected data from a group of working nurses and compared her student data to that of the working nurses' group. There were no differences in the above three measures between the student nurses and the working nurses until Miller pulled out the students who failed the medical/surgical course. The students who passed the medical/surgical course scored significantly higher on the SJAN than working nurses. Miller (2001) also found evidence that the concepts measured by the WGCTA and the SJAN overlapped with each other to some degree while the RJI, as the measure of reflective judgment, evaluated a different construct completely.

Pittman (2006) is the one of the most recent nurse researchers to use the RJM. Pittman used the online RCI to evaluate the relationships of 110 junior and senior BSN students' levels of reflective judgment to academic class (junior or senior), nursing program GPA, age and previous college degrees. The only relationship found to be significant with reflective judgment as measured by the RCI was nursing program GPA, meaning that the higher the nursing program GPA, the higher the RCI. Age, whether the student was a junior or senior nursing student and whether or not the student had previous degrees were not significant in Pittman's study. This is in opposition to some of the empirical work with other populations regarding age, education and reflective judgment.

Four authors have used the RJM in dissertation studies with students in medical education (Montecinos, 1989) and allied health (Boyd, 2005; Owen, 2005; Schwartz, 1992). The scope and focus of their dissertation studies have been different, but the importance of the ability to make judgments about ill-structured problems in healthcare is tantamount. In Montecinos' (1989) study with medical students she used the Reflective Judgment Scheme, not the RJM, to examine whether the students' levels of reflective judgment increased as their medical training increased. Her study affirmed this hypothesis but also showed that these students exhibited more complex reasoning skills in medical situations rather than in other contexts.

Boyd (2005) studied first year dental students while Schwartz (1992) studied dental hygienists in relation to their levels of reflective judgment. Boyd used a mixed, quantitative/qualitative, pretest/posttest design with a focus on

increasing the critical thinking skills of the dental students by introducing clinical journaling in the first year of the program. There were no significant differences in the clinical journaling group of dental students although their RCI scores were slightly higher following the intervention. Schwartz surveyed educators of dental hygienists regarding reflective practices based on background and teaching practices. Her work was the basis for further study of the need for reflective practices in dental hygienist programs of education.

The fourth allied health researcher, Owen (2005), used the paper-and-pencil RCI to examine the relationship of reflective judgment to clinical judgment in graduate student counselors. His study supported the use of the RJM in graduate counselor education. Owen indicated that student counselors with higher levels of reflective judgment relied less on confirmatory clinical judgments. This means that student counselors with higher levels of reflective judgment were able to make clinical judgments with less confirmatory questioning or seeking of information, and they were better able to figure out patient care scenarios than students with lower levels of reflective judgment.

Critical Thinking Assessment

Critical thinking skills are considered essential in nursing, but defining and measuring critical thinking skills in nursing and nursing education has been problematic (Adams, Whitlow, Stover & Johnson, 1996; Allen, et al., 2004; Brunt, 2005a; Follman, 2003; Turner, 2005; Walsh & Seldomridge, 2006). The California Critical Thinking Skills Test (CCSTT) and the Watson Glaser Critical Thinking Appraisal (WGCTA) are the most commonly used critical thinking

definitions and instruments in nursing education programs (Adams, 1999; Adams, et al., 1996; Brunt, 2005a; Staib, 2003). Brunt (2005b) reviewed the nursing literature from the past 11 years and identified six models of critical thinking assessment used in programs of nursing education. The models identified by Brunt (2005b) had both general and nursing foci. One model Brunt identified included self-regulation and critical thinking habits of mind. This model was not original to nursing, nor did it use the term critical thinking until Rubenfeld and Scheffer (2001) identified the ten habits of the mind and seven skills for critical thinking in nursing. A second model is Kataoka-Yahiro and Saylor's (1994) nursing critical thinking and nursing judgment model which includes nursing competencies, standards and nursing experience as part of their decision model. The third model identified by Brunt (2005b) was Ford and Profetto-McGrath's (1994) model of critical thinking within the praxis of the curriculum. Their model examined the interplay of critical reflection and action in the context of the nursing curriculum. Critical thinking models four and five identified by Brunt (2005b) were by Miller and Malcolm (1990) and then Miller and Babcock (1996) building upon the Kataoka-Yahiro and Saylor (1994) model but adding more complexity by including other concepts related to language, evidence and drawing conclusions. Standardized tests with the use of higher-order, problem-solving, multiple choice test items is the sixth of the models identified by Brunt (2005b) to measure critical thinking in nursing. The HESI Exit Exam fits this sixth model of measuring/assessing critical thinking in nursing education.

The HESI Exit Exam is designed to measure critical thinking in nursing beginning with specific definitions of critical thinking within the context of nursing education. HESI's Conceptual Framework for the HESI Exit Exam is grounded in Paul's (1993) definitions of critical thinking. HESI's authors defined critical thinking to fit their conceptual model and then identified additional specific criteria related to writing the HESI test items (Morrison, et al., 2006) coupled with a current test plan based on the NCLEX test plan.

Research in Critical Thinking in Nursing and Nursing Education

Researchers in nursing and nursing education have conceptually connected clinical judgment, critical thinking and reflection (Kuiper & Pesut, 2004; Nielson, Stragnell & Jester, 2007). Kuiper and Pesut's (2004) model of clinical reasoning is based on the development of critical thinking (cognitive) and reflective thinking (metacognitive) skills. In their model, critical thinking and reflective thinking skills are, "inextricably linked and come together with the use of self-regulated learning prompts" (Kuiper & Pesut, 2004, p. 381) to allow the development of clinical reasoning; both skills (reflective thinking and critical thinking) must develop together. Reflection is believed to further enhance learning from clinical experiences (Cirocco, 2007; Kuiper & Pesut, 2004; Nielsen, et al., 2007; Tanner, 2006). Reflection has also been shown to improve the critical thinking skills in practicing nurses (Cirocco, 2007). Active reflection can be promoted in nursing students and practicing nurses through learning strategies and assignments that support their thinking and developmental processes (Cirocco, 2007; Kuiper & Pesut, 2004; Neilson, et al. 2007). The

many different *reflection terms* that are present in the nursing literature convey the significance of reflection and thus reflective judgment in nursing and nursing education. In her concept analysis that highlighted the importance of clinical reasoning for nursing professionals, Simmons (2010) also recognized reflective judgment as a related and necessary quality for nursing competence.

Most of the literature regarding the need for critical thinking in nursing has focused on the increasing complexity of care for clients in acute care settings (Allen, et al. 2004; Bandman & Bandman, 1988; Brunt, 2005a; Daly, 1998; Distler, 2007; Farrell, 1996; Mottola & Murphy, 2001; Ulsenheimer, Bailey, McCollough, Thornton & Warden, 1997; Videbeck, 1997). The rapidly changing environment of healthcare and the technology that allows healthcare workers to successfully care for more acutely ill clients leads to a need for nurses to be able to think critically about the care they give to clients. Nurses are expected to question assumptions, to explore alternatives, to be reflectively skeptical and to communicate effectively (Allen, et al., 2004; Daly, 1998; Ulsenheimer et al., 1997). Healthcare is demanding the use of critical thinking skills in nursing practice (Distler, 2007; Farrell, 1996; Mottola & Murphy, 2001; Ulsenheimer et al., 1997). Yet, just as in general education, critical thinking in nursing education has not been well defined nor is there one accepted measure or assessment.

Many of the studies on assessment of critical thinking in nursing education begin with a unique definition, a model, or both to be able to make any judgments about interventions or curricula in nursing programs (Brunt, 2005a; Jacobs, Ott, Sullivan, Urich & Short, 1997; Rane-Szostak & Robertson, 1996; Seldomridge &

Walsh, 2006; Videbeck, 1997). Farrell (1996) proposes the use of a, “series of modules to develop critical thinking in baccalaureate nursing education based on Paul’s (1992) definition of critical thinking” (p, 278). Mottola and Murphy (2001) developed their definition of critical thinking based on those of Paul (1993) and Brookfield (1995) and then used an activity they called an Antidote Dilemma to promote this definition of critical thinking. Rossignol (1997) developed activities called selected discourse strategies. Rossignol created a theoretical model and used the WGCTA and another instrument, Bellack’s (1966) Linguistic Analysis System (BLAS), as her tools. The discourse strategies were teacher questioning prompts during clinical post-conferences, measured with the BLAS (Rossignol, 1997). The findings for this strategy were inconsistent and in addition the study showed that faculty tend to question students at a low level of cognition according to Bloom’s Taxonomy (1956) which does not promote development of critical thinking skills or reflection. Concepts maps have also been used in multiple studies as a means to teach and evaluate critical thinking in nursing students (Abel & Freeze, 2006; Daly, Shaw, Balstieri, Glasenapp & Piacentine, 1999; Wilgis & McConnell, 2008).

Much of the research on strategies to improve critical thinking in nursing education tends to identify the tools/instruments for measurement of critical thinking as part of the study. Lusk and Conklin (2003) and Mitchell and Melton (2003) used collaborative testing as a strategy to improve critical thinking and compared test scores as their measures. Krejci (1997) used imagery and the resulting mental models for study evaluation, and Jenkins and Turick-Gibson

(1999) used role playing and journaling as their critical thinking product. Saucier, Stevens and Williams (2000) used a program of computer assisted instruction as a tool to improve critical thinking in nursing education using a randomized, pretest/posttest design but no significant differences in critical thinking were noted on the posttest between the two groups. More recently, one study used logic based models in a nursing curriculum to improve critical thinking skills (Ellerman, Kataoka-Yahiro & Wong, 2006) while another attempted problem-based modules as opposed to the traditional education model to improve critical thinking in nursing (Ozturk, Muslu & Dicle, 2008). The results of the differing approaches to assessing and measuring critical thinking continue to be mixed (Adams, 1999; Brunt, 2005a; Turner, 2005).

In some critical thinking research, National Council Licensure Exam (NCLEX) type questions are used in the evaluation/assessment of critical thinking as an outcome of nursing education (Brunt, 2005b). Some authors believe NCLEX type questions to be a direct measure of critical thinking (Morrison & Free, 2001) while others see NCLEX type questions as an indirect measure of critical thinking (Farrell, 1996; National Council of State Boards of Nursing, 2004; Staib, 2003) further adding to the controversy over critical thinking assessment (Staib, 2003). There are authors within nursing that support the definition of critical thinking as context specific (Alfaro-LeFevre, 1995, Morrison, et al. 2006) while others see critical thinking as both general and subject or discipline specific (Bandman & Bandman 1988).

The HESI Exit Exam, the critical thinking measure for this study, has been developed using a conceptual framework based on critical thinking theory and classical test theory (Morrison, et al., 2004). Each test item meets the guidelines set forth in the conceptual framework and is written by nurse experts based on course syllabi and textbooks from nursing programs across the United States and the NCLEX blueprint test plan. Within the conceptual framework is evidence of content, construct and criterion-related validity for the HESI Exit Exam (Morrison, et al., 2004). Reliability estimates are calculated and updated on an ongoing basis for the HESI Exit Exam and the exam has been used in programs of nursing education more than 47,000 times with reliabilities ranging from .86 to .99 (Morrison, et al., 2004). The HESI Exit Exam is a well-known and widely-used measure of critical thinking in nursing education used to assess student progress, program outcomes and readiness for licensure. As previously mentioned, the researcher chose the HESI Exit Exam because both the reliability and validity measures make it an appropriate, useful and practical instrument as the measure of critical thinking in nursing for this study and because of ease and access in schools being sampled.

Synthesis of Related Literature

As has been found in both general education (Brabeck, 1980; King, et al., 1990; Mines, et al., 1990) and in the nursing literature (Navedo, 2006), critical thinking is related to, but not sufficient for, true reflective judgment. Age alone is insufficient for the development of reflective judgment (King, 1987; King & Kitchener, 1994, 2002; Mann, 1999). The data on whether education level

increases levels of reflective judgment is primarily positive but in the undergraduate population, and in the studies of nursing students, the results are mixed (King, 1987; King & Kitchener, 2002; Pittman, 2006; Wood, 1997). Pittman (2006) was the only nurse researcher to look at reflective judgment and GPA. Pittman (2006) found GPA to be non-significant and Miller (2001) examined scores in a medical/surgical course and also found no significant relationship between a medical/surgical course score and reflective judgment. However, Miller (2001) did find a significant positive relationship with the students' scores in the medical/surgical course and critical thinking scores on the WGCTA. All of the nurse researchers who have used the RJM in their studies, no matter the results, have come to the conclusion that understanding the relationship between critical thinking and reflective judgment is crucial to understanding how to best prepare competent nursing practitioners (King, 1987; Miller 2001; Nevado, 2006; Nickerson, 1991; Pittman, 2006; Sakalys, 1982; Saltzberg, 2002). Adding to this body of research will be beneficial to both nursing education and practice. The literature related to the RJM recommends many strategies and tactics for nurse educators to foster and cultivate reflective judgment in students. However, for effective pedagogical strategies to occur there must be a better understanding of the concepts and significant faculty professional development of which strategies are most effective with nursing students.

CHAPTER THREE

METHODOLOGY

Design

The design for this study was correlational and fit the purpose of the study which was to evaluate the relationship between the measure of reflective judgment (RCI test) and the measure of critical thinking in nursing (the HESI Exit Exam) in senior ADN students nearing the end of their program of study. The primary purpose of this correlational study was to investigate if senior ADN students are simultaneously developing reflective judgment and skills of critical thinking through their entry level nursing educational experience. The study also examined relationships between and among the measure of reflective judgment (RCI test), the measure of critical thinking in nursing (HESI Exit Exam), and certain demographics in the ADN student sample including age, nursing program GPA and number of earned college/university earned credit hours.

Instruments

RCI Test

The RCI test is the current measure of reflective judgment endorsed by King, Kitchener and their colleagues (King, et al., n.d.). The RCI test was developed based on the RJM with the intention of measuring reflective judgment but in a more objective and efficient manner (King, et al. n.d.; King & Kitchener, 2002, 2004; Wood, Kitchener & Jensen, 2002). The first version of the RCI was a paper-and-pencil version, but the instrument is now online. Studies showed no statistical differences between the online and the written version (Wood, et al.,

2003). The RCI researchers had a sample population of over 6000 students of various levels of education in the norming study for the RCI (Owen, 2005).

The reliability of the RCI instrument has been variable. In its original written form it was in two sections, one that called for the participant to endorse an answer and the other that asked the participant to discriminate between answers. The reliabilities of this original format were .61 for freshmen and .67 for seniors respectively (Wood, et al., 2002). Only the endorse format now exists in the online RCI; it is more of a measure of functional, rather than optimal, reflective judgment ability (Pittman, 2006). Reliability for the RCI overall in a large sample of college students was found to be in the range of the low to middle .70s (Wood, et al., 2002). Results from the norming of the RCI on the sample of over 10,000 college students revealed .75 to .83 reliability data (Boyd, 2005). The RCI is appropriate as a measure for the RJM as it changes developmentally over time and can discriminate between age and educational levels (King, et al., n.d., King & Kitchener, 2002, 2004; Wood, et al., 2002; Wood, et al., 2003). The participant is asked to rank statements regarding the three dilemmas as to whether they are similar or dissimilar to their own thinking. The RCI score for each dilemma is an approximation of the reflective judgment level most often chosen by the participant. The overall RCI score is the average of the three dilemma scores and can range from a reflective judgment score of a Pre-Reflective Thinker 2 to that of Reflective Thinker 7 (Wood, et al., 2003).

The RCI has three current dilemmas related to alcoholism, immigration and issues of workforce preparation and asks the students to rate ten statements

as to how closely they resemble their own thinking and then to further rank the top three statements that were most like their thinking about the dilemma (Wood, et al., 2003). An example of an RCI dilemma is included as Appendix A. Each participant was given a password by the researcher as the computer lab monitor to sign on and complete the RCI. The RCI takes approximately 20 to 30 minutes to complete online and the results then went directly to the University of Denver RCI database.

HESI Exit Exam

The HESI is a computerized exam available from a proprietary company founded by Morrison. The HESI Exit Exams are purported to predict NCLEX licensure success (Lauchner, Newmann & Britt, 1999) and to assist programs of nursing with developed policies for progression and remediation (Morrison, Free & Newmann, 2002). The researchers employed by HESI (now Elsevier Evolve) continually collect data on their instrument including reliability and validity statistics which are published approximately annually (Morrison, et al., 2004; Nibert, Young & Adamson, 2002). The HESI Exit Exam is meant to be administered at, or near, the end of an entry level program.

The Exit Exam consists of 150 test items and ten pilot (non-scored) items. The pilot items are included to assure ongoing updating of the pool of test items (Morrison, et al., 2004). There are multiple versions of the HESI Exit Exam for programs that allow students to retest after remediation. The estimated reliability for four versions of the HESI Exit Exam-RN was 0.940, 0.941, 0.951 and 0.960 respectively (Morrison, et al., 2004). As previously explained the conceptual

framework for HESI Exit Exam is based on critical thinking and classical test theory (Morrison, et al., 2004). The content validity of the exam was established with expert nurse educators focused on basic nursing knowledge from multiple areas including reviewing current nursing texts, syllabi from multiple nursing courses and programs and the identified client needs from the NCLEX test plan (Morrison, et al., 2004). Morrison, et al., (2004) also maintain significant data on how they established construct and criterion-related validity for the HESI Exit Exam.

Students have approximately three hours to complete the exit exam. At the end of the exam both the student and the program will get individual student results. Students do not get a percentage score when they finish the exam, they get a *HESI score*, specifically a HESI Predictor Model (HPM) score, which is a prediction regarding their probability of passing their licensure exam. The HESI score is defined as follows: “the HESI score reflects application of the mathematical model to raw scores. The HPM considers several factors, including the difficulty level of each test item to perform the calculation of each score reported on all HESI examinations” (Nibert, et al., 2002, p. 262). The composite, critical thinking and all other subscales are immediately available when the students take the exam. An HPM score of 850 is the minimum acceptable score for the exam and the most common level set as a progression/graduation requirement although some programs set 900 as their benchmark score (Nibert, et al., 2002). Students who meet the 850 HPM are predicted to have an average probability of passing NCLEX while those with a

900 or higher HPM have an excellent or outstanding probability of passing their licensure exam (Nibert, et al., 2002).

Procedures

Human Subjects Approval

Before proceeding with the study, approval was sought from the Indiana University Purdue University Indianapolis (IUPUI) Institutional Review Board (IRB) (Appendix B). The terms and information about the study was also communicated to the administration and the Department of Institutional Research or IRB at each community college whose students were included in the study.

Following approval from the IUPUI-IRB and the participating community colleges, voluntary approval was sought from the nurse administrator of each of the nursing programs before scheduling computer lab time near the end of the spring semester (2009) and again in fall 2009 for completion of the informed consent, demographic sheet and the RCI. The purpose of the study, including the benefits and risks, was explained by the researcher and was also provided in writing (Appendix C). The voluntary nature of participation in the study and the fact that the student could withdraw at any time with no repercussions was clearly explained. Written permission including having each participant complete a short demographic data sheet was also obtained prior to this researcher assisting the participants with the RCI instruments. Students' confidentiality and anonymity was protected by coding of subjects and by protection of all data on the researcher's password protected personal computer and data storage device.

Sample

A purposive, convenience sample of the students in their final semesters of study during spring 2009 and fall 2009 semester classes from the ADN programs in central Illinois was solicited from five different central Illinois community colleges. These five college nursing programs currently have their senior ADN students complete the HESI Exit Exam at the end of their program of study. The nurse administrator of each program had indicated a willingness to serve as sites of data collection. The nurse administrator of each program distributed an invitation from the researcher to the prospective participants (Appendix D). Each community college site had a computer lab available for scheduling of the RCI. The researcher served as the administrator of the RCI as is suggested on the Reflective Judgment website (King, et al., n.d.). The researcher gave each nursing student \$5 as an incentive to participate, and then further held a drawing for a \$25 gift card among the participants at each community college. The researcher later collected the participants' HESI Exit Exam scores from the nurse administrator of each respective nursing program for the correlation analyses. With the assistance of the nurse administrator, nursing faculty and staff at each of the community colleges and permission from the participants, this researcher was able to collect full data on all participants.

Data was collected at two data points (spring and fall 2009) because following the spring 2009 data collection the RCI results from one of the initial four community colleges scheduled as study sites was lost due to a Web hosting error by the company with whom the RJM researchers had contracted for

services. This was the largest of the four college groups ($n = 42$) and made the data pool ($N = 52$) too small to proceed at that point in time.

An attempt was made to get the RCI data from the spring 2009 ADN student group at the college whose data was lost. This researcher mailed (US Postal Service) each graduate in the class (both those who had participated and those who had not) and invited them to participate again. This mailed invitation yielded only seven of a possible 75 participants. In addition, some of these graduates had been working as RNs and some had not. Due to this small number and the confounding variables of graduation and working as an RN, a decision was made not to include these seven participants.

In December 2009, this researcher again followed the same procedures to collect data as before including obtaining informed consent, the \$5 incentive to participate and the \$25 gift care drawing at each college site. Data was collected at the college where the data had been lost in spring semester 2009 and at an additional college that had December graduates. Programs with both spring and fall graduating class are not common in central Illinois so this researcher had to recruit a fifth college. An additional 56 participants were collected in December 2009 to bring the total participants to 108.

Hypotheses and Data Analyses

Data analysis began with a review of the demographics of the senior ADN student participants ($N = 108$). The data from the participants was originally examined collectively without regard to college or time point of data collection. Following data collection descriptive statistics were initially examined.

The researcher examined the research questions and related hypotheses with a plan for data analyses. As this is an overall correlational study, the research questions can be answered by examining the direction and degree of the relationships between the variables with correlation coefficients following a process of standardization (Field, 2005). Each variable frequency was examined using a histogram with a normal curve to evaluate whether or not the data fit a normal distribution. A Pearson Correlation Coefficient was used for analysis of data that was found to be normally distributed while a Spearman Rho Correlation Coefficient was used for analysis of data that was not normally distributed (Cronk, 2006). Data related to the RCI test, HESI Exit Exam scores, and GPA were found to be normally distributed while the data related to student age and number of college/university credits were not normally distributed. Reliability information was also analyzed on both the HESI Exit Exam and the RCI test.

Summary

This study investigated the relationship between reflective judgment as measured by the RCI test and critical thinking in nursing as measured by the HESI Exit Exam. The purpose of this correlational study was to investigate whether senior ADN students are simultaneously developing reflective judgment and skills of critical thinking as a result of their educational programs. This is an important question because both skills are necessary to provide competent, proficient nursing care. The proposed study sample consisted of senior ADN students from five nursing programs in central Illinois nearing the end of their program of study. The relationships of both reflective judgment and critical

thinking to the demographic variables of age, nursing program GPA and number of earned college/university credit hours were also investigated. The data analyses involved the examination of the research questions and related hypotheses with descriptive and correlation statistics to determine the relationships including the direction of the relationships between the variables. Reliability of both instruments was also included as part of the statistical analyses. All human subjects' permissions and rights were be obtained prior to participation in the study and maintained throughout the duration of the research project.

CHAPTER FOUR

RESULTS

The results of the data analyses are organized into three sections. The first section provides the demographic data, the second section addresses reliability data regarding the instruments used in the study and the last section addresses the research questions hypothesized.

The purpose of this correlational study was to evaluate the relationship between reflective judgment, as measured by the RCI test, and critical thinking in nursing, as measured by the HESI Exit Exam, in a sample of senior ADN students nearing the end of their program of study. The specific aim of this investigation was to examine whether senior ADN students were simultaneously developing reflective judgment and skills of critical thinking during the course of their education. The study also explored the relationship of reflective judgment and critical thinking to individual student's age, GPA in nursing courses and the number of college/university credits completed.

Demographic Data

Data were collected from senior ADN students nearing graduation at five different community colleges in central Illinois at two different time points, prior to the May 2009 graduation for colleges one through three and again prior to the December 2009 graduation for colleges four and five. A total of 108 participants were included from these five colleges. Table 2 includes the demographics of the study participants by college. The colleges are listed in the order in which data was collected from each. An examination of the means for the variables

(age, gender, ethnicity/race, degree completed) was run to support the underlying assumption that the participants were homogenous despite the community college from which they were drawn or the time the data was collected. Of considerable note from this comparison was that the most northern community college (college one) had a participant sample that included a 69% Hispanic majority; nearly the entire group of minority students in the study were from this one community college. This particular college is the closest to the Chicago area and this higher minority population is reflective of the surrounding area (Cicero, Illinois, 2010).

The total study participants included eight male students (7.4%) and sixteen students (14.8%) who had completed their baccalaureate degrees in a discipline other than nursing. Both of these minority characteristics (male and bachelor degree) were interspersed evenly between the five colleges and were not significantly associated with either critical thinking (male $p = .398$; baccalaureate $p = .415$) or reflective judgment (male $p = .731$; baccalaureate $p = .378$).

Table 2

Participant Demographics by College

College	Sample	Mean Age	Percent		
			Male	Non-White	Degree ^a
	108				
One	13	32.2	8	69	23
Two	29	28.4	4	10	10
Three	10	38.9	0	0	10
Four	22	31.6	14	0	18
Five	34	28.3	8	0	15

^aDegree=With Baccalaureate.

The study participants were overwhelmingly female and Caucasian, non-Hispanic. There was one African American and one American Indian student with nine percent Hispanic students (see Table 3). The average age of the participants was 30.5 with a large range of ages from 20 years to 52 years of age. The average nursing course GPA was 2.91, again with a range from 2.00 to 3.91. The majority of students were finishing their first associate degree (85%). No students held a degree higher than the baccalaureate.

Table 3

Demographic Variables

Variable	<i>M</i>	Range	<i>SD</i>	
Age	30.51	20–52	8.977	
Nursing GPA	2.908	2.00–3.91	.42706	
<i>N</i> = 108		Frequency		Percent
Gender	<u>Female</u>		<u>Male</u>	
	100	8	92.6	7.4
Degree Complete				
Associate	92		85.2	
Baccalaureate	16		14.8	
Masters	0		0	
Ethnicity/Race				
Non-Hispanic	96		88.9	
Hispanic	10		9.3	
African American	1		0.9	
American Indian	1		0.9	

Although there are some anomalies within the small sample populations of the different community colleges, the overall study sample is relatively homogeneous and mirrors the current nursing workforce for both this state (National Research Corporation [NRC], 2007) and the nation (Gilchrist & Rector, 2007). The 11.1% ethnic minority representation in this ADN graduate sample is

comparable with national statistics that show the nursing workforce to be about 10.6% ethnic minority (Noone, 2008) while the Illinois state population was at 92.7% white in 2007 with 10.6% indicating Black and a very small 0.9% minority indicating Spanish, Hispanic or Latino (NRC, 2007). The percentage of males in nursing nationwide is currently less than 6% (Gilchrist & Rector, 2007; Minority Nursing Statistics, n.d) and statewide is 3.6% (NRC, 2007); this study sample is higher with 7.4% males. However, according to the National League for Nursing 2008–2009 survey there were 15% male students in ADN nursing programs.

The mean age for the total sample listed in Table 3 is 30.51. The mean age at each of the colleges with the exception of college three was close to the total sample mean. At college three the mean age was 38.9. The ages of the ten individuals at that particular site ranged from 26 to 51 but half of the students were between 40 and 50 making this particular mean age higher. The overall age figures for this study and those of this college are in line with data from the NLN nursing education research showing that approximately half of all AD nursing students are over 30 years of age (NLN, 2009). Furthermore, the most common age classification for nurses in a 2007 study commissioned by the Illinois Board of Nursing was between 46 and 55 (33.8% of all respondents), while the second most common age was 36–45 followed by nurses ages 56–60 (NRC, 2007).

Reliability Data

The Cronbach's Alpha for the RCI test for the study subjects tested by the RCI/Reflective Judgment researchers was .586. This statistic was tabulated for

this researcher by Sheila S. Thompson, PhD at the University of Denver as part of her work with her colleagues on the RJM. This is lower than the .75 to .83 reliability data results which were obtained in the norming of the RCI on the sample of over 10,000 college students (Boyd, 2005). This lower than expected reliability will be discussed more in Chapter Five with the limitations.

Table 4 lists the Kuder-Richardson 20 (KR 20) internal reliability for each of the five college's HESI Exit Exams from which the HESI results were collected. As the HESI Exit Exam was administered at each college, the researcher obtained the KR 20 from each college's nurse administrator. There was no procedure for combining the participant data from the five different colleges for an overall KR 20 for this study so individual KR 20 results were obtained from each college. The results range from a high of .80 to a low of .64 but in actuality four of five range from .78 to .80, only the college with the smallest sample ($n = 10$) was at the lowest range of .64. These KR 20 values are based on full item analyses of the HESI Exit Exam at each college with each cohort AD graduate group. An acceptable reliability coefficient (KR 20) for teacher made tests is considered to be .70 or above, although .65 is acceptable in homogenous schools of nursing (Morrison, et al., 2006). Four of the five colleges had KR 20s between .78 and .80 which is considered well above acceptable, only college three was just below what is considered acceptable at .64. This college had both the smallest sample group (10 of 17 total graduates) and had the highest mean age (38.9) with half the participant group being over the age of 40.

Table 4

Kuder-Richardson 20 on HESI Exit Exams

KR 20	.78	.78	.64	.80	.79
Participants	13	29	10	22	34

Note. KR 20 = Kuder-Richardson 20.

Research Questions

Research Question and Hypothesis 1

What is the relationship between the ADN students' levels of reflective judgment as measured by the RCI test and their levels of critical thinking in nursing as measured by the HESI Exit Exam?

Hypothesis 1: There will be a positive correlation between students' levels of reflective judgment as measured by their score on the RCI test and their composite scores on the measure of critical thinking in nursing (HESI Exit Exam).

The overall RCI mean reflective judgment score was 4.7755 while the HESI Exit Exam mean score of 848.92 with a significant modest positive correlation of .370 ($p < .01$). This correlation between the RCI mean score as a measure of reflective judgment and the HESI Exit Exam as a measure of critical thinking in nursing does support the first research hypothesis of a positive correlation between reflective judgment and critical thinking in ADN nursing students nearing the end of their program of study. However, the strength of the correlation is only in the medium range (Cronk, 2006; Field, 2005). The implication of the mean scores for the two measures and the correlation will be discussed more in-depth later, but in review, an RCI score of 4.7755 is within the Quasi-Reflective level which includes stages 4–5, below the level of true

Reflective Judgment (6–7). The HESI Exit Exam score of 848.92 is very close to what is considered an acceptable HPM score of 850 (Nibert, et al., 2002).

A Quasi-Reflective judgment score of 4.7755 is comparable with what has been found in other nursing research (Table 5) using the RJI or RCI. Pittman (2006) was the only other researcher to use the RCI with nursing students and she chose to report her data as an adjusted 4.103 mean score (instead of the actual RCI 5.103) based on the fact that the RCI is a recognition task as opposed to a production task making subsequent scores potentially higher (King & Kitchener, 2002; Wood et al., 2003). Sheila Summer Thompson, PhD who runs all the RCI data advised this researcher to report the RCI data score as found and not to do an adjustment (S. Thompson, personal communication, June, 21, 2010). As is apparent in Table 5, most of the research with nursing subjects revealed results in upper three to lower four range; the only exception was seen with Sakalys (1982) in BSN students where the upper range score was 4.67.

Table 5

Reflective Judgment Scores from Previous Nursing Research

Researcher	Year	Instrument-Program	Score
Sakalys	1982	RJI BSN	3.59–3.87
King	1987	RJI ADN	28–36 yrs 4.3
		RJI ADN	19–22 yrs 3.5
Nickerson	1991	RJI BSN	3.83–4.33
Miller	2001	RJI ADN	3.68
Saltzberg	2002	RJI Traditional BSN	2.67–4.67
Navedo	2006	RJI Traditional Age	3.99
Pittman	2006	RCI BSN	Adjusted 4.103

Table 6 lists this study’s mean scores for the individual scenarios in the RCI test plus the overall RCI mean. As has happened in other research within

nursing and general education students using the RCI, these students scored highest in the scenario related to alcoholism (Pittman, 2006; Wood, et al., 2003) although it also had the widest range of scores from 1.50 to 7.00.

Table 6

RCI Overall Score and Individual Scenario Scores

Scenario	Range	<i>M</i>
Overall RCI	2.67–6.67	4.7755
Work Force	2.00–7.00	4.7476
Alcoholism	1.50–7.00	4.9775
Immigration	2.00–7.00	4.5958

A significant positive correlation was found between reflective judgment and critical thinking in this study ($p < .01$) but the strength of the correlational relationship can be considered moderate at best (Field, 2005). There are multiple items that may have affected the limited magnitude of this relationship; first is the limited size and homogeneity of the sample population. The sample consisted of 108 participants who were by and large white females mostly in their 20s (see Figure 2). The instruments used to measure both reflective judgment and critical thinking may have also had an effect on the limited strength of the correlation of the relationship between the two variables; the HESI Exit Exam is specific to the discipline of nursing while the RCI test is a general measure of reflective judgment. One tool (the HESI Exit Exam) is also a test of nursing content knowledge while the other (the RCI test) is not designed to be content specific. The reliability of each tool (HESI Exit Exam KR20 = .758, RCI Test Cronbach's Alpha = .586) would have also had an effect on the overall results of the correlation. The KR 20 for the HESI Exit Exam is in the acceptable reliability

range but not high or excellent range of reliability which might affect the ultimate strength of the overall relationship between the two variables (Morrison, et al., 2004; Wood, et al., 2003). The reliability for the RCI test (.586) is *not* within the acceptable range and will be discussed further as a noteworthy limitation of this study. The less than acceptable reliability of the RCI test will be discussed in Chapter Five limitations section.

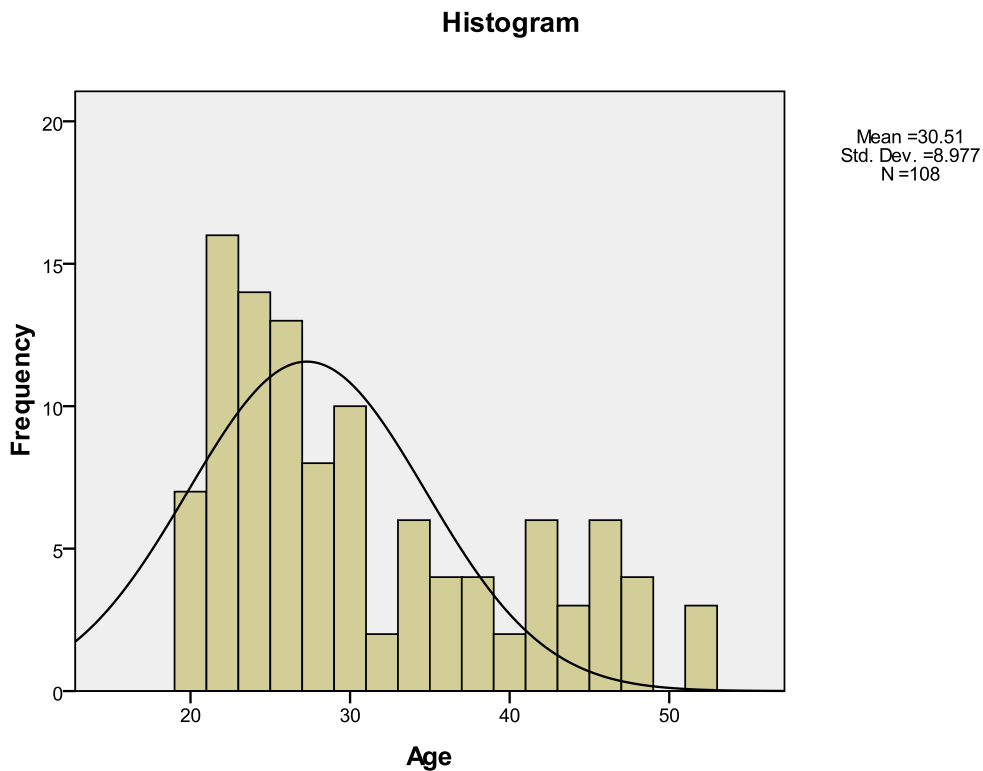


Figure 2. Histogram of age frequencies

While examining the data, the researcher noted that 13% of the sample group, the participants from college one, scored 85 points higher than the mean HESI score while another 27%, those from college two, scored 90 points below

the mean HESI score. At that point another analysis of the data was run dropping out both college one and college two as the high and low mean scores respectively. Statistics were then run to examine the correlation and means for the reflective judgment and critical thinking study variables for the remaining 60% ($n = 67$) from colleges three, four and five where the data clustered more closely around the mean. These results revealed a stronger positive correlation ($r = .428, p < .01$) between the resulting HESI Exit Exam mean of 846.44 and the RCI test mean score of 4.7261 for this group. Both of these mean scores are slightly lower than those for the total participants (HESI 848.92, RCI 4.7755) while the resulting correlation is higher.

The mean score for the HESI Exit Exam, the measure of critical thinking in nursing, for the sample population was 848.92 ($SD 117.606$). This mean score is just below the HPM acceptable level of 850 which is also the most common benchmark set by ADN, BSN and Diploma nursing programs that use the HESI Exit Exam as a progression/graduation assessment (Nibert, et al., 2002). This probably speaks to the discipline specific nature of the HESI Exit Exam and the limited level of the reflective judgment RCI score 4.7755 ($SD .93934$), a Quasi-Reflective level, as opposed to a level of true Reflective Judgment (6–7).

The HESI Exit Exam mean score of 848.92 was the first attempt at the exam by each participant group at their respective colleges. The mean scores for each individual college are listed in Table 7. The participants at four of the five colleges are required to pass the HESI Exit Exam with a score of 850 or above to complete their nursing program. However, at each college with the

HESI Exit Exam requirement they have more than one attempt to reach the 850 benchmark; depending on the college they are allowed either two or three attempts (different versions) to meet the 850 score. At college two, where the HESI mean score was 759, the participants take the Exit Exam without consequence to their program grade or progression.

Table 7

Mean Scores on HESI Exit Exams by College

College	One	Two	Three	Four	Five
HESI	934	759	855	850	842
Participants	13	29	10	22	34

At college two, the HESI Exit Exam is used as an end-of-program assessment only but has no effect on the students' grades or progression toward graduation. This researcher questioned whether the students at college two had HESI Exit Exam scores that were lower because it is not mandatory for progression and the mean score for that college seems to support that theory. This mean score seems to indicate that these students do not perhaps have the same investment or motivation for the HESI Exam as the students at the other four colleges. The HESI mean score for college two is 90 points below the HESI mean score for the total group. When the scores for college two are removed, the mean score for the HESI Exit Exam for the rest of the participants increases to 860.90, which is above the acceptable HPM benchmark.

The researcher was concerned if it was a possible limitation of this study that 13% of the sample group scored 85 points higher than the mean HESI score while another 27% scored 90 points below the mean HESI. The remaining 60%

(the participants of remaining three colleges) scored within six points of the overall mean HESI score. Both of these variations contribute to the potential risk of possible Type I errors (Field, 2005), finding significance that is not there. These variations further confound the researcher with results outside the norm and limit the generalizability of the results. However, another way to view the variances in the mean scores from college one and two is that the resultant distribution of all the HESI mean scores even when college one and two are included fits fairly well within a normal bell curve with the exception of the outlier HESI score of 467 from college two (see Figure 3) so the results overall are not different than might be expected on a standardized exam.

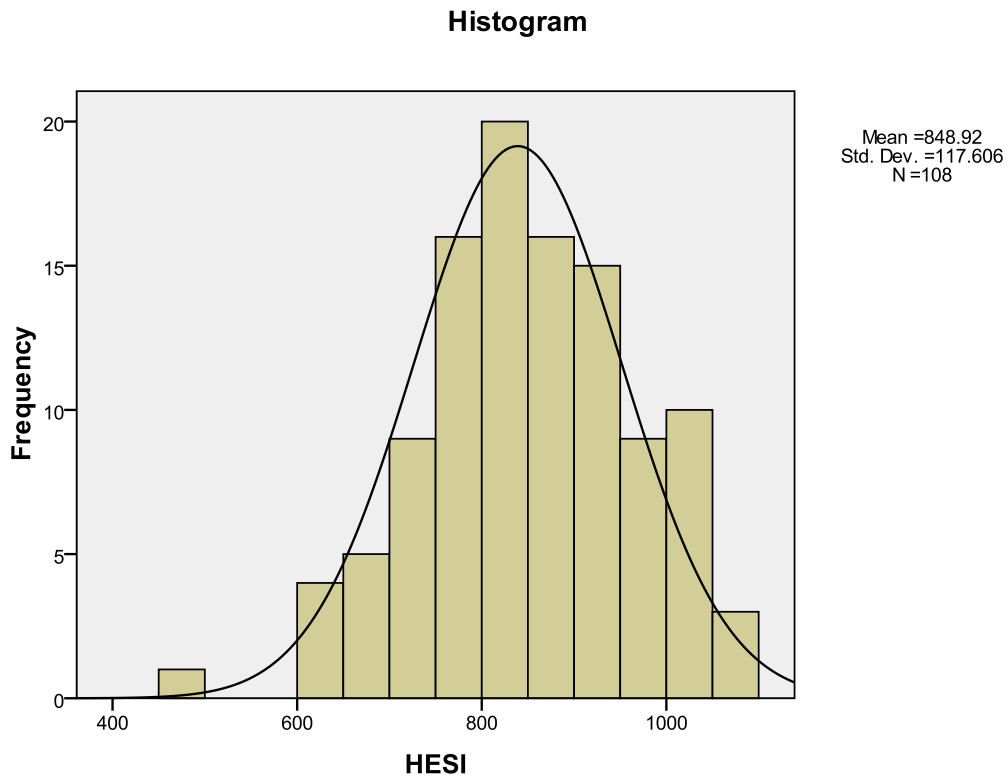


Figure 3. Distribution of HESI mean scores with normal curve

Research Question and Hypothesis 2

To what degree is there a relationship between the measure of critical thinking in nursing of ADN students nearing the end of their program of study and their nursing program GPA, age and number of college/university credits completed?

Hypothesis 2: Composite scores on the measure of critical thinking in nursing (HESI Exit Exam) will correlate positively with nursing program GPA, age and number of college/university credits completed.

Table 8 includes the correlations between the HESI Critical Thinking Scores and the selected variables of age, nursing program GPA and number of college/university credits. Both the senior ADN student's age and nursing program GPA were found to be positively correlated with their HESI scores ($p < .01$ level) meaning the higher the HESI score the higher the age and also the nursing course GPA. The number of college/university credits was not significantly related to the HESI critical thinking in nursing score. The hypothesis related to critical thinking was partially supported as age and nursing program GPA were positively correlated with HESI Exit Exam critical thinking score while the number of college/university credits was not.

Table 8

Correlations with HESI Critical Thinking Scores

Variables	Correlation	N
Age	.351* (Spearman Rho)	108
Nursing GPA	.426* (Pearson)	108
Credits Completed	.109 (Spearman Rho)	108

* $p < .01$

Although the number of college/university credits did not correlate with the HESI Exit Exam score of critical thinking in nursing, this researcher went on to further question whether students with a baccalaureate degree had significantly higher critical thinking scores than those who were only completing their ADN degrees. Sixteen (15%) of the 108 participants had earned baccalaureate degrees. An analysis of covariance (ANCOVA) was completed controlling for both age and nursing program GPA comparing the students who were just obtaining their ADN to those who held previous non-nursing baccalaureate degrees. Critical thinking scores of those who had baccalaureate degrees were not found to be significantly higher when the effects of age and nursing program GPA were controlled ($F(1,104) = .671, p < .415$). Education level was not significantly correlated with critical thinking in this study.

Research Question and Hypothesis 3

To what degree is there a relationship between the level of reflective judgment of ADN students nearing the end of their program and their nursing program GPA, age and number of college/university credits?

Hypothesis 3: Scores on the measure of reflective judgment (RCI test) will correlate positively with nursing program GPA, age and number of earned college/university credit hours.

As was the case with critical thinking, both age and nursing program GPA were found to have a significant positive correlation with the RCI test score as the measure of reflective judgment (see Table 9, Age $p < .05$, Nursing GPA $p < .01$) while the number of college/university credits was non-significant in relation

to level of reflective judgment (RCI score). Hypothesis 3 was also only partially supported by the data. Nursing program GPA and age positively correlated with reflective judgment as measured by the RCI test but the number of earned college/university credits was not correlated with reflective judgment.

Table 9

Correlations with Reflective Judgment Scores

Variables	Correlation	N
Age	.247* (Spearman Rho)	108
Nursing GPA	.360** (Pearson)	108
Degree/Credits Completed	.172 (Spearman Rho)	108

** $p < .01$. * $p < .05$.

As was questioned in relation to critical thinking in nursing, this researcher again questioned whether the senior ADN students nearing graduation who had previous baccalaureate degrees would have higher scores on the measure of reflective judgment (the RCI test) than the students who were completing their ADN as their first college degree. Again, an ANCOVA was completed controlling for both age and nursing program GPA comparing the students who were finishing their first ADN to those who held previous non-nursing baccalaureate degrees. Reflective judgment scores of those who had earned baccalaureate degrees were not significantly higher when the effects of age and nursing program GPA were controlled ($F(1,104) = .783, p < .378$). This is in contrast to previous reflective judgment research which has found that levels of reflective judgment increase with levels of education (King & Kitchener, 1994, 2002; Wood, et al., 1993).

Summary

The results from this study have supported a modest positive correlation between reflective judgment and critical thinking. Results have further supported positive correlations among reflective judgment, critical thinking and individual student age and nursing program GPA. There was no correlation between the number of college/university credits with either reflective judgment or critical thinking nor was there a positive correlation between an earned baccalaureate degree reflective judgment or critical thinking when controlling for age and nursing program GPA. These results, the demographic information, reliability of the tools plus the educational implications and indications for future research are discussed in Chapter Five.

CHAPTER FIVE

SUMMARY AND DISCUSSION

This study was primarily designed to evaluate the relationship between reflective judgment and critical thinking in ADN students who are nearing the end of their program of study. The significance of exploring this relationship lies in allowing educators to develop a deeper understanding of how to better prepare newly graduated nurses to competently practice in today's complex, fast-paced, healthcare environment laced with ill-structured problems and dilemmas. A second focus of the study was to examine the relationship of reflective judgment and critical thinking to the individual student variables of age, GPA in nursing courses and number of college or university credits completed. The expectation was that increasing the understanding of how these variables interact with the development of both reflective judgment and critical thinking might be utilized by nurse educators to explore pedagogies that promote the development of and/or refinement of reflective judgment and critical thinking skills so graduates of ADN programs are better prepared to meet the expectations of tomorrow's practice realities. The three research questions and hypotheses are discussed individually along with implications for nurse educators as well as suggestions for possible future research. In addition this chapter includes limitations impacting the generalizability of the findings.

Previous researchers in nursing and allied health education who have used the reflective judgment model to explore the relationship between reflective clinical judgment and critical thinking (Boyd, 2005; Navedo, 2006; Nickerson,

1991; Owen, 2005; Pittman, 2006; Sakalys, 1982; Saltzberg, 2002) have reached a similar conclusion to this researcher, new graduates must develop reflective judgment skills as an outcome of their educational experience if they are to become successful, competent healthcare practitioners (Rogal & Young, 2008; Seldomridge & Walsh, 2006). Educators need to model and mentor students in the use of reflective judgment skills that facilitate their abilities to deal with true, ill-structured patient-care situations. A clearer understanding of students' reflective judgment skills in their final semester will give nurse educators a better understanding of where to target teaching pedagogies to support continued development of these skills.

The first research question inquired about the overall relationship between reflective judgment and critical thinking in the ADN students nearing the end of their program of study. It was hypothesized that there would be a positive correlation between reflective judgment and critical thinking in this participant group. The modestly positive correlation between the HESI Exit Exam as a measure of critical thinking and the RCI as the measure of reflective judgment is in keeping with other research related to reflective judgment and critical thinking (Brabeck & Wood, 1990; King & Kitchener, 1994; King, et al., 1990; Mines, et al., 1990; Navedo, 2006; Pittman, 2006). The overall findings suggest that, while related, reflective judgment and critical thinking are different constructs in that the ADN students are at an acceptable level in their mean critical thinking scores but at a level of Quasi-Reflective Judgment in their mean reflective judgment scores indicating a comparative delay in that skill. They seem to have the skills

necessary for critical thinking as measured by the HESI Exit Exam which are those that serve to solve well-structured problems but are lacking in those skills of reflective judgment which have been defined earlier as necessary to solve ill-structured problems. The message to nurse educators is that we need to explicitly teach both critical thinking skills *and* reflective judgment if we want our students to be able to function competently with both abilities in complex healthcare environments.

The acceptable HESI mean score (848.92) supports the inconclusive nature of previous research on critical thinking in nursing education. Despite the fact that critical thinking is an outcome of nursing educational programs, the results from this study are just barely below the customary benchmark of 850 indicating that these students would only have an average chance of passing their NCLEX exam (Nibert, et al., 2002). Nurse educators are focused on teaching critical thinking as evidenced by program outcomes and yet this outcome is not fully realized as reflected in these scores. In addition, questions persist as to whether the instruments or assessments used are actually measuring critical thinking at all. At the heart of this measurement issue is how they define the concept of critical thinking either as a discipline specific or general construct (Adams, et al., 1996; Brunt, 2005a; Walsh & Seldomridge, 2006). This research contributes to the topic of critical thinking in nursing education and the investigation of the unique relationship between reflective judgment and critical thinking. The results provide nurse educators with evidence of the need to examine teaching strategies and pedagogies as they

relate to both reflective judgment and critical thinking to identify teaching approaches that foster attributes related to reflective judgment and critical thinking. Approaches that focus on critical thinking skills such as case studies, logic problems, Socratic-type questioning *plus* the strategic introduction of ill-structured problems/issues will encourage concurrent development of reflective judgment skills. Nurse educators need to begin to focus on teaching higher-level thinking and nursing concepts. “Cover less content so the nursing students learn more” (Pittman, 2006, p. 83).

Just as the level of critical thinking demonstrated by the HESI Exit Exam mean score in this study fell just slightly below the goals generally set by nurse educators as an outcome of a nursing program of study, the RCI of 4.7755 also failed to meet the goal for college students to gain reflective judgment set as an outcome of post-secondary education (King & Kitchener, 2004). Someone within this primarily lower Quasi-Reflective range understands that true knowledge is uncertain yet declarations about knowledge are idiosyncratic and unique to the individual. People in this stage will see their beliefs as having as much weight and credence as an expert and will recognize only that particular evidence that substantiates their own views; other evidence is dismissed. People in Stage 4 will justify their personal beliefs by arguments of their own choosing even when their arguments are flawed or may not make logical sense to others. They are confident with their personal justifications because they feel everyone has a right to personal opinion. They do not recognize the qualitative differences between the judgments of experts and others. At a level in the RCI range of 4.7755, while

there is an understanding that knowledge is uncertain, neither the level of reflective judgment nor the justification for beliefs is sufficient for making true, authentic reflective judgments. Individuals at this level may instead seek ways to justify their knowing or to argue against others views if they do not match their own (King & Kitchener, 1994, 2002). The concern for new graduate nurses who are Quasi-Reflective in their judgments is that they may fail to accurately seek out or assess evidence, or fail to give the appropriate weight to data from the credible experts in making patient-care decisions.

The majority of the participants (85%) are completing their ADN which would make them college sophomores. In light of that, their mean reflective judgment score on the RCI (4.7755) was equivalent to the mean score of a group of 718 sophomore students (RCI=4.80) at a Midwestern university (Wood, et al., 2003). This is disappointing when the hope is that the outcome of a program of nursing education is simultaneous, coordinated development of skills of reflective judgment and critical thinking. It is disconcerting that the participant group would barely reach the accepted HPM benchmark on the measure of critical thinking in nursing and yet still demonstrate a positive correlation with the measure of reflective judgment. This Quasi-Reflective level of reflective judgment (4.7755) is below the level of reflective judgment necessary for competent healthcare practitioners to construct knowledge and justify their beliefs about the validity of the evidence necessary to resolve ill-structured problems or dilemmas (King & Kitchener, 1994, 2002).

Based on characteristics and justifications of thought, this researcher believes that the minimum level of reflective judgment necessary for competence in newly graduated nurses is *at least* that of Stage 6 Reflective Thinking (see Figure 4). Individuals able to think at this level are able to construct knowledge based on current data and use trustworthy evidence which directly relates to evidence-based practice (King & Kitchener, 1994, 2002). Research has demonstrated that nursing students are not reaching this level of reflective thinking (Miller, 2001; Navedo, 2006; Nickerson, 1991; Pittman, 2006; Sakalys, 1982; Saltzberg, 2002). Reflective judgment must be included as part of the curriculum for it to be an educational outcome.

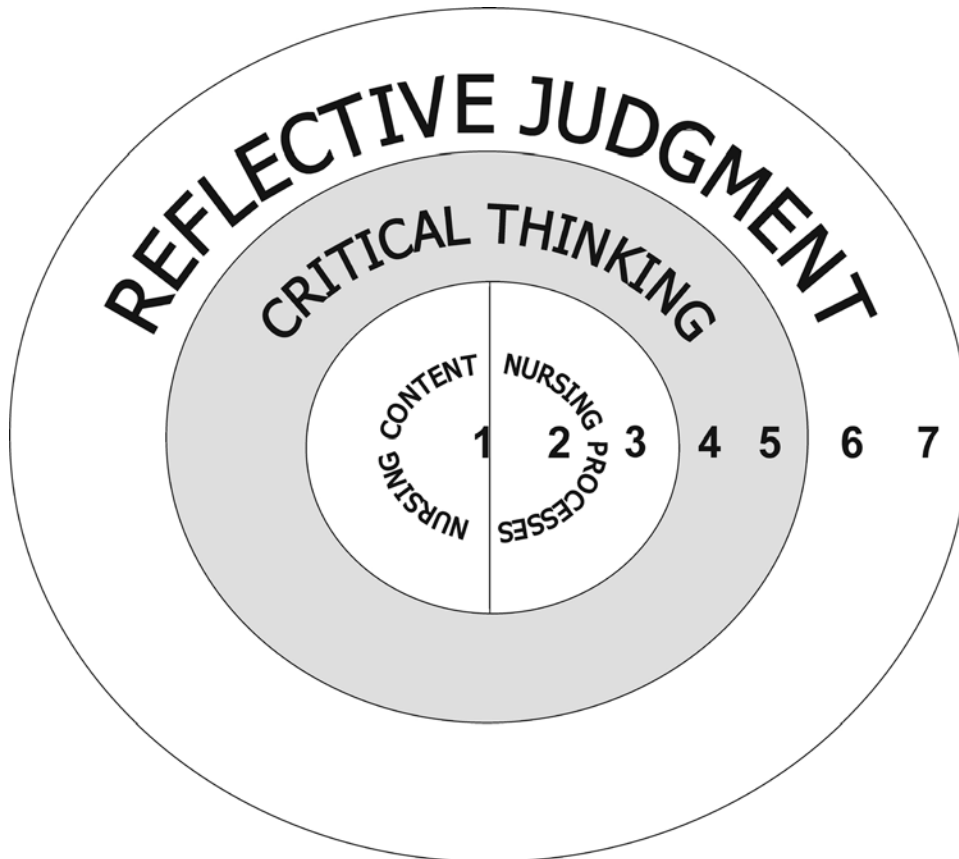


Figure 4. Fit of the Seven Stages of Reflective Judgment within Study Model

Although it was not statistically significant, the mean RCI score for the study participants completing their ADN was 4.688 while the mean score for the 16 participants with previous bachelor degrees was 5.277. This difference between students with and without baccalaureate degrees has implications related to the question of entry into practice and the educational competencies of BSN versus ADN nurses including their abilities to solve ill-structure problems. The ADN students with previous non-nursing baccalaureate degrees had mean reflective judgment scores that were 0.589 points higher than those who were completing their first associate degrees. In addition, the 5.277 RCI score of the participants with previous baccalaureate degrees is comparable to seniors (5.34) in the aforementioned study (Wood, et al., 2003) leading to the speculation that the increase in reflective judgment is related to the achievement of the baccalaureate degree as a whole independent of discipline effect.

There were three topic areas from which the overall RCI score was averaged, workforce (4.7476), immigration (4.5958) and alcoholism (4.9775). The nursing student participants scored highest in the alcoholism scenario. This is in keeping with research related to a main effect of psychology topic versus non-psychology (Wood, et al., 2003) but it also beckons the question of a discipline effect. The nursing students would have been exposed to this content in their program of study and so may have had a chance to think about this issue previously. This content would have been included in the nursing program of study. The alcoholism topic was potentially less of an ill-structured problem in

that this participant group would have had some prior knowledge and understanding of and exposure to the content.

The second research question was concerned with the relationship between individual students' critical thinking scores and their age, nursing program GPA and number of earned college/university credits. Age was found to be moderately correlated with critical thinking, meaning that the older the student, the higher their score on the HESI Exit Exam. Reed (1998), in her quasi-experimental dissertation work, specifically examined whether age had an effect on critical thinking in a sample population of community college students in a history course and found it not to be significant. There were no specific studies related to age and critical thinking in nursing education but while the literature related to education level or class (e.g., freshman, sophomore) and critical thinking is inconsistent it does show minimal change over time in a nursing program of study (Adams, 1999; Pittman, 2006). However, despite the fact that research may not be able to put a specific age on the development of critical thinking, Elder and Paul (1996) consider the development of critical thinking to be a stage related process much like the development of reflective judgment. Also, much like reflective judgment, critical thinking skills can be fostered in students having implications for teaching pedagogies.

The statistically significant age/critical thinking relationship may be partially related to the statistically significant correlation between critical thinking nursing program GPA. The correlation between nursing program GPA and critical thinking was stronger than that between age and critical thinking.

Literature related to critical thinking in nursing education has linked it with both GPA and success on the NCLEX examination (Rossignol, 1997). It is possible that both age and nursing program GPA were higher in students who ultimately had higher scores on their HESI Exit Exams in an interplay related to that of age and reflective judgment as they share some conceptual attributes. In addition, because the content for the HESI exam is discipline specific, it therefore makes sense that the nursing program GPA would significantly correlate with this measure of critical thinking in nursing.

The third variable explored in relation to critical thinking was the number of earned college/university credits. This relationship was found not to be significant. The researcher then went on to ask whether participants with a previous bachelor degree had higher critical thinking scores than those participants who did not while controlling for both age and nursing program GPA. The participants with prior baccalaureate degrees in a topic other than nursing failed to show significantly higher critical thinking scores than those without previous degrees. This supports previous studies which found that a nursing program of study did not significantly improve critical thinking (Adams, 1999; Daly, 2001). This also supports studies with post-secondary students which showed that the only thing that has consistently led to an increase in critical thinking scores was a course in critical thinking or logic (Paul & Elder, 2000; Reed & Kromrey, 2001; Walsh & Hardy 1999).

The third inquiry explored a possible relationship among reflective judgment and individual participant age, nursing program GPA and number of

college/university credits. There was a weak correlation between age and reflective judgment which was consistent with other studies regarding age and reflective judgment where no reliable conclusions can be drawn (Boyd, 2005; King & Kitchener, 1994; Pittman, 2006). The belief is that there is interplay between age and education that leads to increases in reflective judgment and is perhaps related to an increased level of patience, tolerance, ability, capacity or perhaps life experience that allows some individuals to accept some uncertainty regarding ill-structured problems. These relationships would need further exploration before any assumptions can be made.

The moderate correlation between reflective judgment and nursing program GPA indicates that participants with higher nursing program GPAs also exhibit better scores on the RCI test which measures reflective judgment. As was true with critical thinking, age and GPA, it is also possible that in some participants an interaction between age, GPA and reflective judgment contributes to this positive correlation. Pittman's research (2006) with nursing students also found a positive correlation between GPA and overall RCI. Nursing exams are generally similar to the NCLEX; the items are written at the higher cognitive levels so there is typically a parallel between grades in nursing courses, GPA and critical thinking and reflective judgment. Pittman suggested, and this researcher agrees, that an implication of this finding is that, "if educators utilize teaching methodologies proven to be effective at increasing RJ, they may also facilitate raising students' GPA" (Pittmann, 2006, p. 75). The skills of a reflective thinker include the ability to construct knowledge, reason abstractly and

synthesize evidence to make judgments (King & Kitcheners, 1994, 2002). Teaching students in ways that increase skills of reflective judgment may consequently allow them to apply these same reflective judgment skills (which also include the skills of critical thinking) to their course work simultaneously increasing GPA.

As was the case with critical thinking, the number of earned college/university credits was not a significant factor in relation to reflective judgment. Also not significant in relation to reflective judgment was having earned a previous baccalaureate degree in a topic other than nursing when controlling for both age and nursing program GPA. Previous research has found increased levels of reflective judgment related to earned degrees (King & Kitchener, 2002; Wood, et al., 2003) but the small sample size with baccalaureate degrees ($n = 16$) for this study may have limited the findings. Wood (1997) has shown previously that when the sample size is too small, there is not adequate statistical power to find differences between educational levels, especially undergraduate levels. Pittman (2006) experienced the same phenomena. However, as mentioned previously, although the differences between the students just getting their first ADN and those with previous baccalaureate degrees were not statistically significant, their mean RCI scores were over half a point different. The 92 students getting their first ADN had mean scores of 4.688 while those with previous baccalaureate degrees had mean scores of 5.277; 0.589 higher. The participants completing their first ADN degrees had RCI mean scores corresponding with college sophomores while the

participants who had previous non-nursing baccalaureate degrees had RCI mean scores corresponding with college seniors (Wood et al., 2003). This has implications for future research and relates to the question of ADN versus BSN entry into practice.

Recommendations for Nurse Educators

Because reflective judgment and critical thinking have been classified as two distinct but related concepts, the work for nurse educators becomes planning curricula and learning activities that will allow the synchronized development of both skills in nursing students. This researcher is unaware of any nursing program that currently includes both reflective judgment and critical thinking. Reflective judgment and critical thinking are not elements of nursing curricula unless they are explicitly included, taught and assessed. Including both in programs of nursing education in tandem has the potential for gains in both. The focus should be on innovations in pedagogies that foster the development of reflective judgment along with critical thinking skills.

According to Elder and Paul (1996), the first thing that must be done in teaching critical thinking is to challenge students when there are inconsistencies noted in their thinking. To think critically students must be further encouraged to identify the purpose of their thinking, make inferences and challenge assumptions, ask appropriate questions and consider multiple points of view (Elder & Paul, 1996). Teaching critical thinking skills means focusing on the concepts rather than the content. Students must be pushed to think logically and precisely while considering the worldview.

Assignments and assessments that can help improve critical thinking skills include discourse strategies (Rossignol, 1997), concept maps, mental models (Krejci, 1997), collaborative testing (Lusk & Conklin, 2003; Mitchell & Melton, 2003) and NCLEX type testing as in this study (Morrison & Free, 2001). Many strategies that encourage reflective judgment, such as case studies, debates, writing research papers and journaling, can also improve critical thinking skills in that they encourage students to think about their thinking (Paul, 1993).

There are multiple strategies that can be used to improve reflective judgment but these approaches will also work best when they are built into a curriculum or adopted as the learning approach of an entire faculty group as opposed to being the work of one or two persons (King, 2000; King & Kitchener, 1994). Suggestions for faculty in all disciplines who want to foster reflective judgment begin with showing respect for students no matter what developmental reflective judgment level or epistemological assumptions/justifications they may be exhibiting (King, 2000; King & Kitchener, 1994). The classroom should be a safe environment in which to challenge students to stretch their thinking without fear of ridicule or repercussions.

Regular discussions of controversial issues and ill-structured problems including analyzing issues from multiple points of view will subsequently improve skills of reflective judgment. Faculty can teach students how to evaluate evidence and arguments including examining their assumptions about knowledge (King, 2000). Students need timely, ongoing feedback, including cognitive and emotional support to have the confidence to grow in their thinking. Depending on

the student, activities one student might see as engaging and challenging another may see as threatening (Pittman, 2006). Educators should focus their teaching across multiple stages of reflective judgment to appropriately engage and challenge individual students.

Specific to nursing education, faculty can expose students to ill-structured problems specific to nursing in ethical/ legal questions, clinical dilemmas or research topics needing further investigation or deeper understanding. Nursing faculty engaged in clinical teaching and clinical practice have a limitless supply of ideas for learning activities and realistic learning activities and simulations. King (2000) suggests providing the contextual support to promote reflective judgment. Contextual support is a powerful teaching strategy to foster reflective judgment in which teachers explicitly prompt, analyze and practice the reflective judgment skills they want to see in their students (Kitchener, Lynch, Fischer & Wood, 1993). Essential to culturally competent care is developing tolerance for multiple viewpoints and lifestyles. Effective faculty are able to model and mentor students in this type of tolerance and reflective thinking in both the classroom and the clinical setting by thinking out loud when appropriate. Faculty can also create opportunities for students to explain their thinking out loud in a safe, supportive environment. Nursing faculty must focus on process rather than content whether teaching about research, evidence-based practice or complex content such as congestive heart failure (Sakalys, 1984).

Assignments and assessments that can help improve reflective judgment include reflective journals, guided essays, problem-based learning, unfolding

case studies, clinical simulation, brainstorming activities and listing personal reasons for particular points of view. Students can also participate in debates or taking turns advocating for each side of an issue. Research papers can help students learn more about ill-structured problems or controversial issues when they must support the information in the paper with facts and data. Small group activities promote higher-level thinking and peer feedback. When faculty present an intellectual challenge to a student or group of students, it is important that there is emotional support for what is being requested of the student. That is many times a new concept to faculty, considering that the students may need emotional support to take an intellectual risk (King & Kitchener, 1994).

Sometimes the priority concept for faculty to grasp in fostering reflective judgment in their students is an appreciation that students must first acknowledge that ill-structured problems, without straightforward answers, truly exist. Students sometimes believe their faculty have all the answers. In addition, faculty need to assess and evaluate anticipated reflective judgment skills as part of their courses and programs. The change must come from faculty, if students are successful in their college and university courses using elementary reasoning skills and memorization alone why would they do more (Wood, et al., 2003)? Evidence of reflective judgment skills needs to become part of the expected course outcomes.

While the strategies, classroom and clinical approaches to foster reflective judgment and critical thinking can be listed and suggested, fostering reflective judgment is going to take fundamental changes in pedagogical planning and

design. Additionally, this type of change will require dissemination of information and research regarding the importance of reflective judgment in nursing education. Presentations at programs of faculty professional development that inspire belief in the need for change in the ways in which educators approach assessment and teaching will be important for inclusion in local, state and national nursing educational conferences. Nursing faculty and administration need to be in sync in their plans for inclusion of reflective judgment in curricula for the changes to be consistent and encompassing for students in nursing programs. .

Recommendations for Future Research

The areas for future research are multiple beginning with the aforementioned longitudinal study of the relationship between the development of reflective judgment and critical thinking in nursing students and continuing to practicing nurses. In addition to longitudinal information, research relating to reflective judgment and critical thinking in students in different types of entry level nursing programs; studying the differences between ADN, BSN and diploma students would add to the database of information. With more sophisticated measures, this study could also be expanded to graduate nursing students. A student's work history could be included in the examination of the development of reflective judgment. In light of the differences in the mean RCI score between students completing their ADN and those with a previous non-nursing baccalaureate degree, further investigation of the relationship of previous educational degrees on levels of reflective judgment is warranted.

The HESI Exit Exam is a measure of critical thinking in nursing that uses a model of the standardized, multiple choice test with higher-order test items to get a HPM Score that relates to the probability of passing the NCLEX-RN. There are other similar critical thinking standardized, multiple choice exams designed for the end of entry level nursing programs of study available that could potentially be used in synchronization with the HESI Exit Exam to better quantify and evaluate critical thinking in nursing in this population.

Teaching strategies to foster both reflective judgment and critical thinking could be implemented under controlled situations and the results reported. It will be important to conduct research examining reflective judgment, critical thinking and other related concepts, metacognition, clinical reasoning, clinical judgment using quantitative and qualitative measures. Due to the developmental nature of reflective judgment, interventions and measurements would most likely need to be continued over more than one academic year for significant change to occur. Besides specific strategies, curricula could be investigated to examine for improved reflective judgment including courses specifically related to research and evidence-based practice in nursing. In all studies related to reflective judgment, it is suggested that the development of dilemmas specific to healthcare or nursing might yield more accurate results in this specific population. Longitudinal studies should to be designed to continue as entry-level nurses continue and enter practice to examine how the development of reflective development continues within the practice environment.

Using the RCI as the quantitative measure in a plan for mixed method qualitative research design has implications for nursing education. A mixed method could be used to examine new teaching innovations and pedagogies. Classroom and clinical observations would add important data to a study on the subject of reflective judgment and clinical competence. With the recent addition of dedicated educational units, these units become another area for specific research design.

Limitations

There were limiting factors that must be acknowledged in this study design. The first limitation that affects the generalizability of the results was the small, purposive, voluntary sample from nursing programs in central Illinois. The size of the sample also has potential implications for the possible low correlations obtained. Additionally, the sample size was too small to pursue the significance of other population variables such as ethnicity, race and gender.

That the sample was purposive (ADN programs in central Illinois that used the HESI Exit Exam to which this researcher had access) and consisted of students who agreed to volunteer (with a \$5 incentive and chance for a gift card) are also limiting factors. A full data set from these programs is absent because of the voluntary nature of participation so the picture of the full student group for the five colleges is incomplete. In addition, there are many variables that could be confounding but were not controlled for within the scope of this study. These variables include differences in nursing curricula, faculty qualifications and experience, accreditation status (colleges three, four and five are accredited by

the National League for Nursing Accrediting Commission), learning outcomes, teaching styles as well as many other factors that might impact the development of reflective judgment and critical thinking skills in ADN students.

Again, because this study proposes a one-time measure only, the results must be considered as only a functional, as opposed to optimal, snap shot of reflective judgment abilities of the participants. This study will add to the research data base and give information for further study rather than provide definitive answers regarding the relationship between reflective judgment and critical thinking in this population.

The variability in the data was noteworthy between colleges for demographic variables, the student population at college one is primarily Hispanic and the student population at college three has a higher mean age (38.9), but the two colleges with demographic variability also comprised a small percentage of the participants, 13% and 9% respectively. More troublesome to the overall picture of the results was that participants at college one (13%) had a mean HESI Exit Exam score that was 85 points higher than the study mean score while the participants at college two (27%) where the HESI Exit Exam is not a graduation requirement had a mean Exit Exam score 90 points below the study mean. Despite these two colleges' data irregularities, because the college one mean was high and the college two mean was low, the mean scores overall for the HESI Exit Exam still nearly fit a normal bell curve with one score from college two as an outlier.

The instruments used to measure reflective judgment and critical thinking including the inherent reliability and validity of each are potential limitations of this study. There are always questions as to whether instruments are actually measuring the construct they purported to measure. This is further confounded by the fact that the HESI Exit Exam is a nursing discipline specific measure while the RCI test is a general measure of reflective judgment; an atypical correlation between a discipline specific measure of critical thinking and a non-specific measure of reflective judgment. While the HESI Exit Exam had an acceptable level of reliability, the RCI test did not. The Cronbach's Alpha for the RCI test was .586 which is below the usual acceptable level of .70 (Ferketich, 1991; Knapp & Brown, 1995). Because the students' RCI scores are the average of their three dilemma scores, the RCI score is a function of only three items thus decreasing the reliability (Ferketich, 1991). In addition, when items are similar, the reliability of an instrument can be improved and when items are different from each other as in the case of the dilemmas on the RCI, the reliability will be adversely affected (Knapp & Brown, 1995). Consultation with Tamilyn Bakas, PhD regarding concerns about the RCI test reliability revealed questions about instrument difficulty and readability (T. Bakas, personal communication, November 9, 2010). Other issues identified included a possible fatigue factor for students as they read each of the three dilemmas of the RCI test, response bias as they got further into the instrument with each dilemma and differences in the demographics of this study sample as opposed to the RCI test norming sample

where more acceptable reliabilities were found (T. Bakas, personal communication, November 9, 2010).

Conclusion

This study set out to examine the relationship between reflective judgment and critical thinking in senior ADN students. The hypothesis was that there would be a positive correlation between these two important educational outcome variables, reflective judgment and critical thinking. This researcher believes that both reflective judgment and critical thinking are necessary to function as safe, competent practitioners in complex, clinical situations. The results supported a moderate positive correlation between reflective judgment and critical thinking in this population of senior ADN graduates. However, the level of the measure of critical thinking was just at the traditional benchmark for the HESI Exit Exam while the level of reflective judgment was in the Quasi-Reflective range, lower than essential for precise reflective judgment but in keeping with college sophomores and other nursing student populations who have been studied. Because the HESI Exit Exam mean score for this study population was at the acceptable benchmark on this measure of critical thinking in nursing and because the mean score for reflective judgment was only at the level of a Quasi-Reflective Thinker, therefore, the data from this study supports the fact that these students were *not* developing reflective judgment skills in synchronicity with their critical thinking skills. Their skills of reflective judgment are lagging behind their skills of critical thinking supporting the need for the

inclusion of reflective judgment in nursing program curricula if the expectation is to see simultaneously development of both skills.

The importance of the positive correlation found in this study between reflective judgment and critical thinking is in its meaning for educational and pedagogical planning. It is important that educators understand that although related, critical thinking and reflective judgment are two different concepts that should be explicitly taught as part of curricula. It is the cognitive outcome of the relationship between reflective judgment and critical thinking that leads to clinical competence. If we are not preparing graduates with the skills of both critical thinking and reflective judgment, are we fully preparing them for practice? Further investigation of this relationship and the ability to function in clinical complexity makes this study and continuing this investigative path of ultimate importance.

In addition to considering the relationship between reflective judgment and critical thinking, this researcher also examined the relationship between both those variables and individual student age, nursing program GPA, and number of college/university credits. The ADN students' age and nursing program GPA were found to be positively correlated with both critical thinking and reflective judgment while the number of college/university credits was not significantly related to either variable. An understanding of how reflective judgment, critical thinking and GPA are related may have further positive curricular implications. As research continues in both reflective judgment and critical thinking, this research can add to the database as nurse educators continue to advance how

we teach and assess critical thinking and how we begin to employ teaching strategies to foster reflective judgment. Nurse educators need to take advantage of the pedagogical enhancements that may be possible by designing curricula that foster reflective judgment along with critical thinking to advance progression in programs of study, improve the outcome of new graduate competence and ease the transition into practice.

APPENDIX A

THE REASONING ABOUT CURRENT ISSUES TEST

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The Reasoning about Current Issues Test

Demographic and Academic Information

- Student ID Number:
- Birthdate:
- Are you (check one) Female Male

IV. If you can recall, please provide:

- Your ACT composite score:
- Your ACT composite percentile rank:
- Your SAT Total score (Verbal + Quantitative)
- Your SAT percentile rank:

V. Racial/Ethnic Classification:

- American Indian/Native American
- Asian
- Black
- Hispanic Latino/Latina
- White/Caucasian
- International Student
- Other: Specify:

VI. Based on the number of current credit hours toward your degree, would you describe yourself as a:

- Freshman
- Sophomore
- Junior
- Senior
- Beginning Graduate Student (having completed less than three years of graduate coursework)
- Advanced Graduate Student (having completed three or more years of graduate coursework)

Part II: Reasoning About Current Issues

Instructions: Because this questionnaire is aimed at understanding how people like you think about various current issues, it asks not only what you think but why you hold the opinions you do.

The Task: You will be shown five short descriptions of some current issues. These issues are similar because people sometimes disagree about the best answer. For each issue, you will be asked to consider four general questions.

Question 1: In Question 1, you will be asked for your personal opinion about the issue. Please indicate it in the space provided.

Question 2: For some issues you will be asked: Why experts disagree. For other issues you will be asked: Why you believe the way you do.

Take a moment to consider your opinion about the question. Write down your response to the question in a few sentences in the space provided. (Do not, for example, write down "I think experts disagree." or "I think that food additives are safe." Instead indicate in a few sentences why experts disagree or why you believe the way you do.

Please give the best answer **you** have to each question,

Question 3. You will be shown statements taken from interviews with people like yourself. Please indicate which statements are most similar to your own views by darkening the appropriate square.

Boxes VS, S, D, and are used to indicate whether your response is Very Similar, Similar, Dissimilar, or Very Dissimilar to your own thinking.

For example, if you read sentence A below and decided that it was similar your views, you would darken the box labeled S as follows:

VS S D VD M A. Researchers who are honest will not disagree about whether a particular artificial sweetener is harmful.

It may be that your views on a topic do not exactly match the ones presented here. Please indicate a few statements for each issue which are at least somewhat similar.

A Check on Reading: Because we have found that some people do not read the statements carefully, we have included some statements that should not make sense to you. When you encounter such statements, mark them as "Meaningless" by darkening the **M**.

Question 4. You will be asked to indicate your first, second, and third choices for which statements are like how you think.

Try to rank the top three statements for each issue, even if the statements do not exactly match your views. If only one or two statements are similar to your views, check the "none of these" box in the appropriate rankings.

Please mark only one statement per ranking.

Artificial Sweeteners

People often have to make decisions that may affect their health such as deciding whether to eat foods or drink beverages that contain artificial sweeteners. There have been conflicting reports about the safety of these additives. For example, some studies have indicated that even in small amounts, artificial sweeteners (such as Nutrasweet) can cause health problems, making foods containing them unsafe to eat. Other studies, however, have indicated that even in large amounts; artificial sweeteners do not cause health problems, and that the foods containing them are safe to eat.

1. Please indicate your personal opinion on this issue: I think that artificial sweeteners:

Are not safe for people to eat

I do not know/cannot decide

Are safe for people to eat.

2. How is it possible that researchers in the same field disagree about whether a particular artificial sweetener is harmful? (Please write your answer on the lines provided.)

3. Many people have heard about disagreements among researchers about this, and they suggest different reasons why that might happen. How similar is each of the following reasons to your own understanding of why researchers disagree?

VS= Very Similar, S= Similar, D= Dissimilar, VD= Very Dissimilar, M= Meaningless

VS S D VD M A. Researchers who are honest will not disagree about whether a particular artificial sweetener is harmful.

VS S D VD M B. Researchers disagree about this issue because, like everyone else, they are confused about the safety of artificial sweeteners. Therefore it is my perspective that what they conclude is just their opinion.

VS S D VD M C. Researchers disagree whether enough studies have been done that show artificial sweeteners are safe or that these chemicals are not safe:

VS S D VD M D. Researchers disagree because of the different ways they were brought up and/or the different schools they attended.

VS S D VD M E. Researchers disagree because they approach the issue with different opinions already in mind about whether additives are safe. As a result, they conduct studies to support their view.

VS S D VD M F. Researchers arrive at different conclusions because the evidence itself is complex and they examine it from several perspectives. They arrive at a decision by synthesizing their knowledge, experiences, and expert opinions.

VS S D VD M G. Researchers might say that one view about the safety of a sweetener was better, but they would also say that this viewpoint is relative to a particular way of understanding this issue.

VS S D VD M H. Researchers disagree because the premeditated hard evidence is synthesized into available belief systems about different comprehensive factual analyses.

VS S D VD M I. Researchers disagree because they are really studying different facets of the issue and the best ways to address one facet of the issue are different than the best ways to address other facets.

VS S D VD M J. Researchers disagree because their evaluation of the evidence leads them to defend different conclusions. Some researchers conclusions are more reasonable, however, and reflect a more comprehensive synthesis of the available information.

4. Please rank the statements above (A, B, C., etc.) that are most similar to your thinking. Please check only one statement per line. If no statement beyond one or two is at all like your thinking, check the box labeled "None of These" on the appropriate line(s).

Statement A B C D E F G H I J IS most like how I think.

Statement A B C D E F G H I J, none of these, is second most like I think.

Statement A B C D E F G H I J, none of these, is third most like I think.

APPENDIX B
IRB APPROVAL



INDIANA UNIVERSITY
OFFICE OF RESEARCH ADMINISTRATION

Date: March 27, 2009

To: Dr. Donna Boland
Nursing NU 117

From: Regina Winger
Research Compliance Administration, IUPUI
UN 618

Subject: IUPUI/Clarian Institutional Review Committee- Exempt Review of
Human Study

Study Number: EX0903-58B

Study Title: “An Evaluation of the Relationship Between Critical Thinking and
Reflective Judgment in Senior Associate Degree Nursing Students.”

Your application for approval of the study named above has been accepted as meeting the criteria of exempt research as described by Federal Regulations [45 CFR 46.101(b), paragraph 2]. A copy of the acceptance is enclosed for your file.

Although a continuing review is not required for an exempt study, prior approval must be obtained before change(s) to the originally approved study can be initiated. When you have completed your study, please inform our office in writing.

If the research is conducted at or funded by the VA, research may not be initiated until approval is received from the VA Research and Development Committee.

Please contact the Office of Health Care Billing and HIPPA Programs at 317-278-4891 for information regarding a Data Use Agreement, if applicable.

Enclosures: ∅

Phone: 317-274-8289 . Fax: 317-274-5932 . Email: resrisk@iupui.edu . Website: <http://research.iupui.edu>

APPENDIX C

STUDENT INFORMED CONSENT FORM

You are invited to participate in a study designed to learn more about the both the critical thinking skills of senior associate degree (AD) nursing students and their reflective judgment. This consent form will describe more about the study including your rights, benefits and any possible risks of participating in the study. This study is being conducted by Cynthia Maskey RN, MS, CNE, a doctoral student at Indiana University under the supervision of Dr. Donna Boland in the Indiana University School of Nursing.

Title

An Evaluation of the Relationship between Critical Thinking and Reflective Judgment in Senior Associate Degree Nursing Students

Background and Research Questions

It is becoming increasingly apparent to nurse educators that successful nursing students need more than traditional nursing knowledge and critical thinking skills for clinical success. Nursing students who are equipped with only content knowledge and critical thinking skills are missing a crucial element to function as competent practitioners in real life, uncertain clinical situations. That element is reflective judgment. The purpose of this study is to evaluate the relationship between critical thinking as measured by the *HESI/Evolve Exit Exam* and reflective judgment as measured by the *Reasoning About Current Issues* test in senior AD nursing students.

Study Description and Your Participation

As a senior AD nursing student in a program that uses the *HESI/Evolve Exit Exam* as part of the curriculum your participation would include providing consent, some confidential demographic data and then going online to do the *Reasoning About Current Issues (RCI)* test. Completing the RCI takes 20-30 minutes. There will be assistance in the computer lab when you complete the RCI.

Risks and Benefits

There are no risks anticipated with this study. Your confidentiality will be maintained and all personal identifying information will be removed. Your participation or refusal to participate will not affect your grade or standing in the nursing program in any way. You may withdraw at any time with no repercussions or risk to your standing in the nursing program.

It is hoped that a better understanding of the relationship between critical thinking and reflective judgment will have positive implications for teaching and learning in nursing education at all levels. Each participant will receive \$5 for participating in the study. In addition, a drawing for a \$25 gift card will be held among the participants in each nursing program used in the study.

Contact information: Questions or Comments:

Cynthia Maskey
Nursing Department
5250 Shepherd Rd.
PO Box 19256
Springfield, IL 62794-19256
217.786.2436
Cynthia.Maskey@ilcc.edu

Informed Consent

I, _____, agree to participate in this study as outlined above. I understand that I may withdraw without any penalty or obligation.

Signature

Date

Demographics

Name of College of ADN Program:

Age:

Gender: Circle Male or Female

Nursing GPA: This will need to be individualized to College/Program

Approximate number of accumulated college/university credits: _____

APPENDIX D

INVITATION TO PARTICIPATE

Attention 2009 ADN Graduates needed
For a Study about Critical Thinking
And Reflective Judgment!
Please Help!

When: Specific to each college
Where: Computer Lab
How long will it take: 30-40 Minutes or less
What's in it for you?: \$5 for participating plus a chance to win a \$25 Visa gift card!

What do you need to know?:

You will be asked to first give your permission for the school to share your HESI/Evolve Exit Exam score (your privacy will be protected). Then, you will be asked some basic questions about your age, grades in your nursing classes and previous college education. Finally, you will complete a short online questionnaire to assess how you think about a few current social issues. It is not a test of factual or content knowledge about these issues. No need to study!

Cynthia Maskey, Doctoral Student
Indiana University School of Nursing

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- Wood, P., Kitchener, K. S., & Jensen, L. (2002). Considerations in the design and evaluation of a paper-and-pencil measure of epistemic cognition. In B. K. Hofer, & P. R. Pintrich (Eds.), *Personal epistemology: The psychology of beliefs about knowledge and knowing* (pp. 277–294). San Francisco, CA: Lawrence Erlbaum Associates.
- Wood, P. K. (1983). Inquiring systems and problem structure: Implications for cognitive development. *Human Development*, 26, 249–265.
- Wood, P. K. (1997). A secondary analysis of claims regarding the reflective judgment interview: Internal consistency, sequentiality, and intra-individual differences in ill-structured problem solving. In J. C. Smart (Ed.), *Higher education: Handbook of theory and research* (pp. 243–312). Edison, NY: Agathon Press.
- Wood, P. K., Kitchener, K. S., & Jensen, L. L. (2003). *College students' epistemological assumptions regarding open-ended controversies*. Unpublished manuscript.

CURRICULUM VITAE

Cynthia L. Maskey

EDUCATION

- PhD 2011 Indiana University
Indiana University Purdue University Indianapolis
Major: Nursing Science Minor: Nursing Education
- MS 1988 University of Illinois Chicago
Peoria, IL Campus
Major: Community Health Nursing
- BS 1982 Northern Illinois University
DeKalb, IL
Major: Nursing
- AS 1981 Lincoln Land Community College
Springfield, IL
- AAS 1980 Lincoln Land Community College
Springfield, IL
Associate Degree Nursing

PROFESSIONAL EXPERIENCE

- July 2009-Present Dean of Health Professions, Lincoln Land Community College (LLCC)
- July 2007-July 2009 Associate Dean Health Professions, Nursing, LLCC
- May 2006-July 2007 Interim Department Chair Nursing, LLCC
- January-August 2006 Interim Assessment Coordinator for LLCC
- 1988-Present Professor of Nursing
Lincoln Land Community College
Springfield, IL
- 1986-1988 Staff Nurse (part-time while MS student)
St. John's Hospital- Pediatrics
Springfield, IL

1985-1986 Community Outreach Nurse
United Cerebral Palsy, Land of Lincoln
Springfield, IL

1982-1984 Staff Nurse
Brokaw Hospital- Pediatrics/Obstetrics
Normal, IL

1981-1982 Staff Nurse (part-time while BS student)
Kishwaukee Community Hospital- Pediatrics/Out Pt.
DeKalb, IL

1980-1981 Staff Nurse
St. John's Hospital- Pediatrics
Springfield, IL

PROFESSIONAL MEMBERSHIPS

American Nurses Association/Illinois Nurses Association (ANA/INA)

Council for the Advancement of Nursing Science

Illinois Council for Nursing Resources (ICNR)- 2010 Board Member

Illinois Organization for Associate Degree Nursing (I-OADN)

IOADN Nominating Committee Spring 2008

IOADN Board of Directors April 2008-present

National League for Nursing (NLN)

National League for Nursing Accreditation Commission (NLNAC)

National League for Nursing Evaluation Review Panel (NLNAC ERP)

National Organization for Associate Degree Nursing (N-OADN)

N-OADN Convention Planning Committee 2010

Sigma Theta Tau International Nu Pi Chapter (STT)

PROFESSIONAL DEVELOPMENT

October, 2001, NCLEX-RN Item Writer

September 2002, NLN Education Summit 2002

October 2002, Served as an NLNAC Program Evaluator at SUNY- College of Technology at Canton

March 2003, Served as an NLNAC Program Evaluator at Cumberland County College in Vineland, NJ

October 2003, Faculty Workshop, The New NCLEX Questions: How to Write Them and What to Write Them On in St. Louis, MO

October 2003, Served as an NLNAC Program Evaluator at Big Bend Community College in Moses Lake, WA

November 2003, Accepted as examination item development panel member for the National Council of State Boards of Nursing November 2003, Took the GRE as part of application to IUPUI

October 2004, LLCC Sexual Harassment Workshop

October 2004, LLCC Professional Development Day -The mentally ill student in the classroom

December 2004, Teaching Critical Thinking Skills Across the Curriculum

February 2005, Improving confidence in the results of classroom multiple-choice exams

April 2005, Midwest Nursing Research Society Conference in Cincinnati, OH

September 2005 NLN Education Summit in Baltimore, MD

October 2005, IOADN Critical Thinking and Test Construction in Bloomington, IL

March 2006, Served as NLNAC Program Accreditation Evaluator Los Angeles Valley College

May 5, 2006, Attended the Illinois Board of Nursing Business Meeting in Springfield, IL

September 2006, Educational Leadership Sponsored by the ISBE in Springfield, IL

September 2006, NLN Education Summit in New York, NY

October 2006, Illinois Community College Faculty Association Teaching and Learning Excellence Conference, Springfield, IL

October 2006, NLNAC Program Evaluator Forum including Chair Pilot Study in Orlando, FL

February 2007, Chair of the NLNAC Program Evaluation Team to Cincinnati Technical State and Community College

Summer 2007, Cognitive Coaching Training Days 1-4 in Tinley Park, IL

September 2007, ICCB Forum for Excellence Conference in Springfield, IL

September 2007, Education NLN Summit in Phoenix, AZ

October 2007 Heartland Community College IOADN Nursing Educators Conference The Clinical Evaluation Process for the Deficient Student & Holding Students to Professional Behaviors and Competencies

October 2007, Chair of the NLNAC Program Evaluation Team to Weatherford College in Weatherford, TX

November 2008, N-OADN Convention in Las Vegas, NV

January 2008, NLN Faculty Leadership Conference in Orlando, FL

February 2008, Applying Fair Use in Higher Education: Clearing Up the Confusion- Audio Conference LLCC

March 2008, Emergency Evacuation Training LLCC

March 2008, Midwest Nursing Research Conference in Indianapolis, IN

June 2008, Traumatic Brain Injury: The Road to Recovery in Springfield, IL

September 2008, Criminal History Record Information Training LLCC

September 2008, ICCB 2008 Forum for Excellence in Springfield, IL

January 2009, NLN Faculty Leadership Conference in New Orleans, LA

January 2009, St. John's Hospital Meditech Computer Training in Springfield

February 2009, Chair for the NLNAC visit to Trinity Valley Community College, Kaufman, TX

September 2009, NLN Education Summit in Philadelphia, PA

October 2009, PIN Annual Conference, Coeur de' Alene, ID

October 2009, LLCC Sexual Harassment Training LLCC

February 2010, Chair for the NLNAC visit to Cuyahoga Community College

October 2010, NLN Education Summit in Las Vegas, NV

October 2010, Chair for the NLNAC visit to Cleveland State Community College in Cleveland, TN

November, 2010, N-OADN in Atlanta, GA

PUBLICATIONS

Contributor: Nursing Interventions & Clinical Skills (2nd & 3rd ed.)
Elkin, Perry & Potter
Mosby, Inc. 2000

Maskey, C. (2008). The coordination of clinical and didactic learning experiences to improve critical-thinking skills and academic performance. *Teaching and Learning in Nursing*, 3(1), 11-15.

Maskey, C. (2009). Cognitive coaching has an exciting place in nursing education. *Teaching and Learning in Nursing* 4(2), 63-65.

AWARDS

Included in Who's Who of American Women

NLN Doctoral Student for the 2006 and 2009 NLN Education Summit

2008 National Organization for Associate Degree Nursing Research Grant

Fall 2009 wrote and received a \$350,000 DCEO Grant for the ADN Program

CERTIFICATIONS

January 2005, Renewal 2010, NLN Certified Nurse Educator

November 2006, ICS 100 Introduction to the Incident Command Center

January 2007, ICS 200 Initial Action Incidents, ICS 700 National Incident Management System

January 2008, Certificate of Completion in Cognitive Coaching

PRESENTER

September 2005, Portfolio Development for Assessment-LLCC

November 2005, Using portfolios for program assessment Spoon River
Community College

November 2006, Undergraduate Assessment Symposium- Using Portfolios to
Assess General Education, North Carolina State University

May 2006, Co-Presenter Student Outcomes Assessment at the Meeting of the
Board of Trustees LLCC

March 2007, Co-Presenter of the results of the Higher Learning Commission
response to the 2006 Monitoring Report LLCC

October 2008, Presenter "Cognitive Coaching in Nursing Education" at the
I-OADN Nursing Educators' Networking Conference, Bloomington, IL

April 2010, Co-Presenter for the ADN Dean/Director/I-OADN Group at the
Illinois Summit for Nursing Education in Illinois

November 2010, Poster presentation on dissertation study at N-OADN
Convention, Atlanta, GA