

CLINICAL REASONING ON AN ASSIGNMENT: PERCEPTIONS OF THIRD YEAR
BACCALAUREATE NURSING STUDENTS

by

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Abstract

Baccalaureate nursing students must develop strong clinical reasoning skills during their undergraduate program in order to be able to make sound clinical judgments regarding patient care. How students understand the evolution and application of their own clinical reasoning skills is of interest to nurse educators as they seek to improve these skills. In a qualitative study, eight third-year nursing students were interviewed about their perceptions regarding the use of clinical reasoning skills on a Clinical Judgment Exercise (CJE). An overarching theme of *Over Time* emerged from the data along with two themes: *Understanding of Clinical Reasoning* and *Making Sense of the Assignment*. The sub-themes that emerged were the same for each theme and were identified as *not knowing*, *knowing*, *applying knowing* and *valuing knowing*.

Conclusions were that student participants: 1) understood their clinical reasoning skills to have progressed from year to year in their educational program, 2) perceived that their understanding of the patient's problem and the required nursing actions deepened over the time of writing the assignment, 3) were challenged by never having had a patient as complex as the one described on the assignment, 4) perceived they were able to apply learning from the CJE to their nursing practice, and 5) perceived writing the CJE to be a stressful experience.

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Chapter One: Introduction and Background

Nurses are challenged to make clinical judgments that impact the lives of patients on a daily basis (Chabeli, 2007). In order to make these clinical judgments, clinical reasoning must be employed (Tanner, 2006). Clinical reasoning is “the process by which nurses collect cues, process the information, come to an understanding of a patient problem or situation, plan and implement interventions, evaluate outcomes and reflect on and learn from the process” (Levett-Jones et al., 2010, p. 515). Nurse educators aim to prepare students to use clinical reasoning skills for the purpose of clinical decision making in order to provide excellent patient care (Marchigiano, Eduljee, & Harvey, 2011). Baccalaureate nursing education in Canada is responsible for providing “the foundation for sound clinical reasoning and clinical judgment, critical thinking, and a strong ethical comportment in nursing” (Canadian Association of Schools of Nursing (CASN), 2011, p. 1). Considerable literature exists regarding the acquisition of clinical reasoning skills in nursing students. What has been less well studied is how students understand their ability to apply clinical reasoning to patient care. The purpose of this qualitative study was to explore the clinical reasoning skills of students who, during their third year of their baccalaureate nursing program, applied the nursing process to complete a Clinical Judgment Exercise (CJE) assignment.

Background

The literature concerning the acquisition and use of clinical reasoning skills by nurses and nursing students exists under a variety of terms. The more widely used, but less well defined, term of critical thinking was used in many earlier studies and continues to appear even in the most recent literature. In attempting to define critical thinking, the literature often referred to Facione’s (1990) Delphi report and its consensus definition of critical thinking as “purposeful,

self-regulatory judgments, which result in interpretation, analysis, evaluation and inference”

(p.3). In addition to the definition of critical thinking, Facione (1990) proposed the existence of both critical thinking skills (CTS) and critical thinking dispositions (CTD), the aptitude for the skills. The measurement of these skills and dispositions, as possessed by nursing students, has been important in determining how they are developed and fostered through nursing education (Profetto-McGrath, 2003). Information on CTD has also been correlated with assignment performance and with traits such as age and prior education (Paans, Sermeus, Nieweg & Vander Schans, 2010; Profetto-McGrath, 2003; Wangensteen, Johansson, Bjorkstrom & Nordstrom, 2010).

In addition to understanding the critical thinking skills and dispositions of students, nurse educators have also been interested in the impact of educational interventions on clinical reasoning skills. The teaching of the nursing process has remained central to many of these educational strategies designed to improve clinical reasoning. Difficulties have been identified in the literature in both the teaching and the learning of the nursing process (Chabeli, 2007; Lee & Brysiewicz, 2009; Palese, Silvestre, Valoppi, & Tomietto, 2009; Thompson & Stapley, 2011). As a result of these difficulties, there exists a wide body of literature pertaining to educational interventions designed to address how the nursing process might be taught differently in order to facilitate development of clinical reasoning in students (Burns, O'Donnell, & Artman, 2010; Lee & Brysiewicz, 2009; Marchigiano et al., 2011; Paans et al., 2010). Additionally, several authors have contributed models designed to expand on the nursing process and facilitate the development and acquisition of clinical reasoning skills (Chabeli, 2007; Kuiper & Pesut, 2004; Pesut & Herman, 1998; Tanner, 2006).

Finally, although there are some qualitative studies that have described the student experience of clinical reasoning either in practice or through clinical assignments, the perceptions of these experiences are not well understood. Marchigiano et al. (2011) found that “little information is available regarding how students perceive their abilities to think and process information related to their delivery of patient care” (p. 145). Marchigiano et al. (2011) also stated that the use of qualitative methods may “provide information about how an assignment affected thinking skills within a nursing process framework” (p. 150). This study addressed a gap in the literature by providing qualitative data with respect to student thinking on an assignment.

Definitions

The following definitions will define the terms used in this study.

Nursing process. “A systematic, creative approach used to identify, prevent and treat actual or potential health problems; identify patient strengths and promote wellness” (Wilkinson, 2012, p. 8). The nursing process includes the phases of assessment, diagnosis, planning, implementation and evaluation. It is a cognitive process involving analysis, problem-solving and decision making (Burns et al., 2010).

Critical thinking. Facione’s (1990) definition of critical thinking is the most widely cited definition in the literature. It is defined as “purposeful, self-regulatory judgments, which result in interpretation, analysis, evaluation and inference” (p.3). Critical thinking is difficult to define largely because individuals construct a definition based on their own understanding and their own perspective (Cassum, Profetto-McGrath, Gul, Dilshand & Syeda, 2013). Benner, Sutphen, Leonard and Day (2010) assert that critical thinking has become a term used to describe all types of thinking in nursing and has become over-used and of limited value.

Clinical judgment. “An interpretation or conclusion about a patient’s needs, concerns or health problems, and/or the decision to take action (or not), use or modify standard approaches, or improvise new ones as deemed appropriate by the patient’s response” (Tanner, 2006, p. 204).

Clinical reasoning. The process utilized to make clinical judgments. The process includes generating alternatives, weighing them against the available evidence and choosing the best alternative (Tanner, 2006). Clinical reasoning is “the ability to reason as a clinical situation changes, taking into account the context and concerns of the patient and family” (Benner et al., 2010, p. 85).

Triple-jump assessment. A student assessment designed to measure problem-solving abilities (Lee & Brysiewicz, 2009). The assessment consists of three phases. In the first phase, students are given a problem scenario and they are expected to ask questions, formulate assessments, diagnoses and interventions. The second phase is a time of independent study to increase understanding and evaluate the diagnosis and interventions. The final phase is the creation and submission of the nursing care plan (Lee & Brysiewicz, 2009).

Clinical Judgment Exercise (CJE). An assignment based on the concept of the triple-jump assignment designed to be completed once in each year of a four-year baccalaureate nursing program at a small regional college. Students are given a brief patient scenario and are expected to “brainstorm” appropriate assessments, group the available data and create and prioritize a problem list. Following a pre-determined time of independent study, the students submit a patient specific care plan at the end of that time.

Description of Assignment

The assignment referred to as the Clinical Judgment Exercise (CJE) is administered to students once in each of the first three years of a four-year Bachelor of Science in Nursing

program in Western Canada. Students are provided with a patient scenario and are expected to independently brainstorm questions about the patient and identify, prioritize and address the patient's problems. The assignment is leveled across the three years of the program.

In first year, students are required to develop and research a priority question about their patient scenario and write about how they would apply their learning to the nursing care of their patient. Second year students are required to apply the nursing process by developing a traditional nursing care plan, beginning with choosing and composing one appropriate nursing diagnosis to address their prioritized patient problem. Third year students are presented with a more complex acute care patient scenario and are required to identify three key nursing diagnoses, determine a priority diagnosis with rationale and develop a thorough nursing care plan for that diagnosis. While the first and second year students have several days to complete the assignment, the third year assignment is due 24 hours after the students receive the scenario. The shortened time frame requires the third year students to use their clinical reasoning skills more efficiently than they did in years one and two of the program.

The CJE assignments are graded with a marking rubric included in the syllabus for the seven-week course. The assignments are part of the final grade for a classroom (tutorial) course in a Context Based Learning (CBL) program (see Appendix A for an example of a third-year CJE assignment). The course instructor provides summative, written feedback on the assignment. Although not the focus of this study, third-year students in this program also complete a clinical concept-map assignment aimed at improving clinical reasoning.

Clinical Reasoning

In nursing education, there has been significant movement away from the use of the term *critical thinking* and a shift toward using *clinical reasoning* to describe nurse thinking in terms of

patient care. Clinical reasoning attends more to the context of the patient care situation as well as the unfolding nature of patient problems (Benner et al., 2010). As students are being instructed to use their critical thinking in a nursing context for the benefit of the case study patient, clinical reasoning is an appropriate term for the thinking process being applied to the CJE assignment.

Although critical thinking is a useful term and a well-studied concept, clinical reasoning is a term utilized in the literature to represent the specific nursing thinking skills that lead to clinical judgment. According to Pesut and Herman (1998) clinical reasoning in nursing practice includes thinking that is reflective, concurrent, creative and critical. Banning (2008) further develops the concept of clinical reasoning by stating that it is an “essential feature of health care practice that focuses on the assimilation, analysis and differentiation of health care evidence” (p. 8). The concept of reflection is also incorporated into clinical reasoning. Both cognition and metacognition (reflection) are required for sound clinical reasoning (Kuiper & Pesut, 2004).

The concept of clinical reasoning has been significant enough to attract the development of at least three models to support teaching and learning of the process. Pesut and Herman (1998) proposed the Outcome-Present State-Test (OPT) reasoning model, which was proposed as a third generation modification of the nursing process model, focusing on reflection, outcome specification and testing in the context of the patient narrative. Tanner (2006) described clinical reasoning as the process used by nurses to make clinical judgments. Tanner’s Clinical Judgment Model introduced process aspects such as noticing, interpreting, responding and reflecting. Levett-Jones et al. (2010) proposed a Clinical Reasoning model depicted as a cycle through the processes of collection, description, selection, inference, synthesis and verification.

Clinical reasoning is seen to be essential for nursing practice. “The goal of nursing education is to develop independent, purposeful critical thinkers who can support the clinical reasoning necessary for practice” (Ellermann, Kataoka-Yahiro & Wong, 2006). Marchigiano et al. (2010) also affirmed that the thinking skills required for clinical reasoning must be developed through nursing education. Clinical reasoning is essential to providing excellent patient care and in recognizing and intervening in the case of deteriorating patients (Levett-Jones et al., 2010; Tanner, 2006). In summary, clinical reasoning allows nurses to perform the complex analysis of multiple client conditions that are present in the nursing practice setting (Pesut & Herman, 1998).

Purpose and Research Questions

The purpose of this study was to explore the clinical reasoning skills of students who, during their third year of their baccalaureate nursing program, applied the nursing process to complete a Clinical Judgment Exercise (CJE) assignment. This study addressed students' perceptions of how they applied the nursing process to demonstrate clinical reasoning on the CJE assignment, how prior knowledge and experiences informed their clinical reasoning and how their experience with the CJE impacted clinical reasoning on future written assignments or with respect to patient care.

Research Questions:

1. What are the third year baccalaureate nursing students' perceptions of how they apply the nursing process to demonstrate clinical reasoning on the CJE assignment?
2. What are the third year baccalaureate nursing students' perceptions of how prior knowledge and experience informs their clinical reasoning?
3. How do third year baccalaureate Nursing students describe the impact of the CJE

assignment on future clinical reasoning with respect to other written assignments or patient care?

Method

A qualitative research method was used to better understand the perceptions of the nursing students' clinical reasoning skills as they applied the nursing process to complete a Clinical Judgment Exercise (CJE) assignment during the third year of a baccalaureate nursing program. The method used was Interpretive Description (Thorne, 2008), which uses inductive reasoning and begins with specific observation followed by an open exploratory manner to develop broad generalizations. Eight nursing students who had completed this CJE assignment participated in this study. Data collection employed semi-structured, individual face-to-face interviews. Data analysis involved coding of verbatim transcripts followed by immersion in the data and identification of emerging themes.

Outline of Thesis

This thesis is organized into six chapters. Chapter One introduces the topic, provides background information and definitions as well as outlining the purpose and method of the study. Chapter Two provides a review of the literature relevant to the study including the search and retrieval strategies used. Chapter Three reviews the research methodology and describes the sample, data collection and analysis, attention to scientific quality and ethical considerations. The findings from the study are described in Chapter Four and the findings are discussed in relation to the current literature in Chapter Five. Chapter Six provides conclusions for research and education.

Chapter Two: Literature Review

The search and retrieval strategies used to perform the literature review for this study will be described in this chapter. The findings of the literature review are presented and gaps in the literature are identified in order to substantiate the need for this research.

Search and Retrieval Strategies

This literature review consisted of a preliminary and a secondary search. A preliminary review of the literature was carried out to inform the study in terms of critical thinking and clinical reasoning in nursing students or newly graduated nurses. The Matrix Method was used to search for, organize and synthesize relevant literature on the topic (Garrard, 2011). A systematic search was performed using CINAHL and MEDLINE. The terms nurs* and student were used and synonyms for student were included using the Boolean operator “or.” These terms were baccalaureate or undergraduate or associate degree or education. Because the CJE is a nursing process based assignment, the terms nursing process or nursing diagnosis were added. The terms critical thinking, clinical judgment or clinical reasoning were added to the search string. Finally the terms assessment or assignment were added (see Appendix B).

Studies were selected for the literature review if they pertained to student nurses’ or new graduate nurses’ critical thinking, clinical reasoning or clinical judgment. The time frame selected was 1990-2014 in order to capture the history of the literature on this topic and with the knowledge that the often-cited work of Facione was published in 1990. Facione (1990) was a seminal work that defined critical thinking and its associated skills and dispositions as well as giving rise to standardized assessment tools that measure critical thinking. Additional studies were added to the literature review as they came to light in the course of reading the selected

studies. The Matrix Method was utilized to abstract the relevant studies and create a comparison table (Garrard, 2011) (see Appendix C).

A search of the grey literature was undertaken including nursing associations, associations of nursing schools and licensing bodies. The relevant documents found on the initial search referred to the importance of critical thinking or clinical reasoning, but did not contain substantive information on the topic and were excluded. Several theses and dissertations were retrieved based on abstracts, but none were selected for inclusion in the primary literature review.

A secondary search of the literature was performed in order to locate studies related to the emerging themes as well as to identify more recent literature related to the findings. A search was conducted in CINAHL and MEDLINE using the original search terms. In addition, the search included textbook resources, grey literature and studies suggested by colleagues and my thesis supervisor. Within the grey literature, two documents authored by CASN were reviewed based on their statements regarding the importance of clinical reasoning in nursing education.

Literature Review

This literature review provides an overview of the available literature on critical thinking, clinical reasoning and clinical judgment as it pertains to nursing students or new graduates within the context of nursing education. Each of these terms were defined in Chapter One. For consistency and ease of understanding, the term clinical reasoning will be used in this chapter, except when referring directly to the work of specific authors, when the authors' term will be used. This review includes literature that provides historical context for the study of students' clinical reasoning within nursing education. It also includes literature that describes models proposed to explain or develop the clinical reasoning of nursing students. Studies attempting to

measure the effectiveness of educational interventions designed to improve clinical reasoning skills in nursing students are also included in the review. Finally, three qualitative studies were found that described the student experience of clinical reasoning, and they are also included in this literature review.

Historical context. Several seminal works were included in this literature review as they were cited frequently within the current literature and served as a reference point when considering the clinical reasoning of nursing students. The earliest work included was the Delphi report credited to Peter Facione (1990). The Delphi report was a result of the work of an interdisciplinary panel of experts brought together to identify the best possible conceptualization of critical thinking. This definition of critical thinking emerged throughout the current literature on the topic. Facione's initial report had clear implications for education in general, but Facione and Facione (1996) linked critical thinking to both clinical nursing and nursing education. Building on this link, Profetto-McGrath (2003) studied the critical thinking skills (CTS) and critical thinking dispositions (CTD) of baccalaureate nursing students. Profetto-McGrath's (2003) work has been cited frequently and internationally in nursing literature concerning critical thinking (CT), clinical judgment and clinical reasoning. Additionally, this was a study of Canadian nursing students, making it especially relevant to the similar context of this study.

Various types of literature reviews were included to provide comprehensive background knowledge for this study. Kuiper and Pesut (2004) conducted an integrative review of the clinical reasoning and reflective thinking literature extending back 20 years. This literature was used to illustrate the importance of both cognitive and metacognitive skills in the process of clinical reasoning. Tanner (2006) extended an earlier review to a yield of nearly 200 studies on clinical judgment and clinical decision-making. Tanner utilized this review to propose a Clinical

Judgment Model, which was useful in understanding how clinical reasoning skills are applied in the exercise of clinical judgment. Cappelletti, Engel and Prentice (2014) extended Tanner's review and added an additional conclusion regarding the impact of educational strategies on clinical judgment. Finally, Thompson and Stapley (2011) searched all major databases from 1960 onward for quantitative studies aiming to improve nurses' clinical judgments using educational interventions. Twenty-four studies were included in the systematic review, the majority of which involved undergraduate nursing students. Overall, study quality and content reporting were found to be poor. The educational interventions performed in the studies were not described in sufficient detail or clarity to allow replication. In addition the lack of transparency in the reporting of assessment methods made evaluation of the studies complicated (Thompson & Stapley, 2011). One of the conclusions of the systematic review was that "interventions work only some of the time, only in some circumstances and with no consistently positive results" (Thompson & Stapley, 2011, p. 891)

Theoretical models. A significant number of studies focused on the introduction or application of models designed to enhance or facilitate clinical reasoning in nursing students. Ellerman et al. (2006) discussed the use of logic models, Tanner (2006) advocated for the use of a Clinical Judgment Model and Chabeli (2007) proposed a model integrating critical thinking and the nursing process. The Outcome-Present State Test (OPT) model proposed by Pesut and Herman (1998) was described as a third generation nursing process model that used the facts of the client's story "to frame the context and content for clinical reasoning" (p. 31). Bartlett et al. (2008) utilized the OPT model to improve clinical reasoning in undergraduate nursing students through practice with application of the model to patient care situations. Finally, Levett-Jones et al. (2010) proposed the linking of a Clinical Reasoning model to the "five 'rights' of clinical

reasoning” (p. 517). The focus of the majority of these studies was on expanding the nursing process model to allow for less linear and more complex thought processes.

Assessment of critical thinking. The most prevalent type of study represented in the literature were quantitative studies seeking to discern what impacted or improved critical thinking in nursing students. Profetto-McGrath (2003) demonstrated that critical thinking mean scores of nursing students increased from years one to four of their program with the exception of year three. Palese et al. (2009) showed that nursing care plans increased in complexity and use of accurate diagnostic language between years one and three of a three year program. New graduates were also found to describe a self-reported improvement in their critical thinking over time (Ellerman et al., 2006). Findings such as these were useful when studying the effectiveness of an educational program and/or attempting to differentiate the effects of teaching and learning from maturity or prior educational experience. Both Wangenstein et al. (2010) and Newton and Moore (2013) for example, found that subjects with prior university education had higher CT scores than those who did not. It was proposed that critical thinking develops with time and experience and that students with previous university education would have benefitted from their additional time and experience spent in an academic environment (Newton & Moore, 2013; Wangenstein et al., 2010).

Several quantitative studies utilized the California Critical Thinking Disposition Inventory (CCTDI) to determine an individual’s willingness to utilize critical thinking. Using this tool, Profetto-McGrath (2003) showed a difference in the disposition of systematicity, with first and second year nursing students scoring lower than third and fourth year students. The lowest mean score achieved in this study was for truth-seeking and the highest scores were for inquisitiveness and open-mindedness. Wangenstein et al. (2010) demonstrated similar results in

their study of newly graduated nurses, showing highest mean scores on inquisitiveness and lowest on truth-seeking. Paans et al. (2010) showed differing results, finding that students in their study scored lowest on the open-mindedness domain, but similar results as they scored highest on inquisitiveness. Additionally, Wangensteen et al. (2010) showed that 80% of their subjects showed a positive disposition to CT, similar to Profetto-McGrath's 85.5 %. Student CCTDI scores were found to have no impact on students' ability to apply accurate nursing diagnoses on an assignment (Paans et al., 2010). Also of relevance are the low scores on truth-seeking, indicating a reluctance of students and new graduates to look for and evaluate new information (Wangensteen, 2010).

Educational interventions. A number of studies in the literature review studied the effects of educational interventions designed to improve clinical reasoning in students. Abel and Freeze (2006) found that concept map scores increased throughout a year of study with instruction and clinical supervision. Statistically significant differences were found between scores on early and later maps (Abel & Freeze, 2006). Similar results were reported by Bartlett et al. (2008) where significant differences were found between pre-test and post-test scores after receiving feedback on weekly OPT assignments. Lee and Brysewicz (2009) reported their incorporation of a nine-step problem solving process to have positively impacted tasks such as data gathering and concluded that their intervention was moderately effective in improving students' ability to apply the nursing process in a triple-jump assignment (Lee & Brysewicz, 2009). Paans et al. (2010) found that students were unable to operationalize available knowledge sources such as nursing diagnoses textbooks and resources to assist them in deriving accurate nursing diagnoses.

Several studies collected self-reported data from students about their critical thinking. Burns et al. (2010) revealed statistically significant self-reported gains in students' critical thinking skills as a result of participation in a nursing process simulation. Marchigiano et al. (2011) also used self-report questionnaires to collect their data and found that students had significantly more confidence in their critical thinking when implementing a journal format assignment compared with a standard care plan format. Ellerman et al. (2006) similarly showed that self-reported critical thinking of students improved with the addition of logic models into their program. Taken together, these findings provided insight related to the impact of educational interventions on both objectively measured and self-perceived critical thinking of students.

Perceptions of students and new graduates. Few qualitative studies were found in the literature search. Four qualitative or mixed methods studies were included in the literature review. Duchscher (2003) used a phenomenological and a feminist process to conduct in-depth interviews with five newly graduated nurses. Using a constant comparative approach to data analysis, Duchscher described the development of critical thinking (CT) in new graduates in their first six months of practice as moving from no reflection and unable to see beyond the task, to CT being woven into the nursing process, keeping an open mind, generating various perspectives and finally to coping with uncertainty. This contributed to the present body of knowledge by demonstrating the development of CT over time as well as the use of the nursing process as a tool for developing CT.

In the second study, Di Vito-Thomas (2005) utilized a qualitative approach to explore students' perspectives on learning to think like a nurse. A Grounded Theory approach was used to analyze the written responses of nursing students to two questions about their critical thinking.

Students identified their thinking as a cognitive process developing through experience in practice (Di Vito-Thomas, 2005). The third study by Ellerman et al. (2006) also collected qualitative data and asked students how they made decisions about care in the clinical setting. Content themes such as identifying priorities, assessing causes and solutions, logical thinking and using the nursing process were identified.

Finally, a study by Wotton, Davis, Button, and Kelton (2010) was included because of its attention to the collection of qualitative data from third-year undergraduate nursing students regarding their perceptions of the process of clinical reasoning during high-fidelity simulation. The authors surveyed 300 students collecting both likert-type scale data and answers to open-ended questions. Within the data, students related that the simulation scenario caused them to experience some feelings of confusion, to have to think and make decisions quickly and to see a connection between symptoms and outcomes in a patient.

Clinical reasoning process. Several authors in the recent literature have described the clinical reasoning process in either experienced nurses or student nurses. Goudreau, Boyer, and Letourneau (2014) collected data in a “think aloud” study from first, second and third year nursing students as well as new graduates and experienced registered nurses (RNs). Each of the 66 participants was invited to “think aloud” while working through five patient scenarios. The data was recorded, transcribed and analyzed for meaning resulting in a narrative for each of the five groups (first, second, third year students, new graduates and experienced RNs). The findings revealed processes which were characteristic of each level of experience and the authors proposed developmental stages of clinical reasoning, milestones of these stages and a cognitive learning model of clinical reasoning (Goudreau et al., 2014). In a similar study with 30 experienced pediatric nurses, Forsberg, Ziegert, Hult and Fors (2014) collected “think aloud”

data as the nurses worked in pairs to solve two or three virtual patient cases. The authors found that nurses try to consolidate a hypothesis by seeing a pattern and that experience with similar cases was important in decision making. Finally, Ramezani-Badr, Nasrabadi, Yekta and Taleghani (2009) conducted individual semi-structured interviews with 14 experienced Intensive Care Unit (ICU) nurses in order to explore reasoning strategies and criteria for clinical decision making in patient care. The three themes to emerge from the data concerning reasoning strategies were intuition, recognizing similar situations and hypothesis testing (Ramezani-Badr et al., 2009).

Chapter Summary

In this chapter the literature related to critical thinking, clinical reasoning and clinical judgment with respect to both student and practicing nurses was reviewed. A historical perspective was provided describing the initial studies related to defining and assessing critical thinking in nursing students. Educational intervention studies were reviewed for both the types and effectiveness of the interventions. The limited literature addressing student and newly graduated nurses' perceptions of critical thinking or clinical reasoning were described. Finally, studies whose purpose was to understand the process of clinical reasoning in students or experienced nurses were also explored. A qualitative research study seeking to have students reflect on their clinical reasoning processes during a specific type of assignment has the potential to add to the field of nursing knowledge on this topic. The description of the research design, methods and procedures used in this project will be the subject of Chapter Three.

Chapter Three: Research Design, Methodology and Procedures

The purpose of this study was to explore the clinical reasoning skills of students who, during their third year of their baccalaureate nursing program, applied the nursing process to complete a Clinical Judgment Exercise (CJE) assignment. This study addressed students' perceptions of how they applied the nursing process to demonstrate clinical reasoning on the CJE assignment, how prior knowledge and experiences informed their clinical reasoning and how their experience with the CJE may have impacted clinical reasoning on future written assignments or with respect to patient care.

Research Questions:

1. What are the third year baccalaureate Nursing students' perceptions of how they apply the nursing process to demonstrate clinical reasoning on the CJE assignment?
2. What are the third year baccalaureate Nursing students' perceptions of how prior knowledge and experience informs their clinical reasoning?
3. How do third year baccalaureate Nursing students describe the impact of the CJE assignment on future clinical reasoning with respect to other written assignments or patient care?

This chapter describes the research process undertaken in this study. Study design, sampling, data collection and data analysis are outlined. Scientific quality, limitations and ethical considerations are addressed.

Study Design and Methodology

A qualitative research method was used in order to better understand the nursing students' perceptions of their clinical reasoning skills as they applied the nursing process to complete a Clinical Judgment Exercise (CJE) assignment during the third year of a baccalaureate nursing

program.

The method used was Interpretive Description, which uses inductive reasoning and begins with specific observation followed by an open exploratory manner to develop broad generalizations (Thorne, 2008). This approach was selected to enable the generation of new insights from the participants with respect to understanding clinical reasoning around CJE assignments, allowing application of these insights to practice in nursing education. Newton and Moore (2013) suggested that a qualitative approach to this topic could provide new information about student thinking processes and allow educational interventions that are more targeted to student needs.

Sampling

A sample size of six to twelve participants was required to provide sufficient data for this study. In consultation with my supervisor it was determined that fewer than six participants was unlikely to provide sufficient data and greater than twelve participants would make the study unfeasible for a single novice researcher. Convenience sampling was the sampling method used. The risk of bias in convenience sampling is acknowledged, however it was determined a convenience sample of adequate size would still provide valuable insights relevant to this specific population at this particular point in time. As Thorne (2008) states, “the group of people who are closest at hand may well be an excellent source of insight about a phenomenon” (p. 89).

Participants were recruited from a cohort of nursing students who had completed three full years of study in a four-year baccalaureate program at one college. Students were recruited from both the accelerated group (a group of students beginning their fourth year courses in the spring/summer session) as well as students entering their fourth year of studies at the regular time of intake for the fall semester.

An information letter describing the study and inviting participation was given to the instructors for the course in which the students were enrolled, to distribute. Students wishing to participate were instructed to contact the researcher directly by phone or email. One student from the accelerated group contacted the researcher in August and an interview was arranged. Five students from the regular fall intake group contacted the researcher in September and interviews were arranged. One reminder was issued to the instructors via email, requesting students be reminded about the opportunity for participation in the study. Two more students contacted the researcher after this reminder and interviews were arranged. All of the students met the inclusion criteria for the project. No further students contacted the researcher.

Description of Sample

Eight students comprised the sample. All eight of the students described themselves as Caucasian with three of these students adding that they were from European ancestry. Five of the students were 19-24 years of age, two were 25-30 years of age and one student identified as being 31-40 years of age. Seven of the students identified that they had taken some college/university courses prior to entering this baccalaureate-nursing program. One student indicated no prior post-secondary education.

Data Collection

Data was collected through the use of semi-structured, individual face-to-face interviews. Interview questions were developed in consultation with Dr. Astle and were revised after the first and second interviews, resulting in a change from eight to nine questions (see Appendix D). The additional question was “how do you think the nursing process stimulates critical thinking or clinical reasoning?” This question was added to explore the perceived connection between these concepts. The prompts for several questions were also revised to improve clarity and encourage

depth in responses. An example of an added prompt was “how do you get to a place where you can do this?” in reference to a question about how the participant had used their clinical reasoning in patient care. This prompt helped to increase the depth of responses to this question.

The interviews took place between August and October, 2014. The interviews were between 25 minutes and 52 minutes in length and occurred at a location mutually agreed upon by the participant and the researcher. All of the interviews took place at the college attended by the participants. Six of the interviews were conducted in empty classrooms or meeting rooms and two were conducted in the office of the researcher. These locations provided for the privacy and confidentiality of the participant and minimized distractions.

Prior to beginning each interview, the purpose of the study and the research questions were reviewed with the participant. The consent form was read with the participant, drawing attention to the assurance of confidentiality and the right to withdraw. Consent forms were signed by both the participant and the researcher, and one copy was provided to the participant (see Appendix E). At the onset of the interview, the recording device was tested and recording was explained to the participant and initiated by the researcher. The interviews began with a question asking the participant to describe how their critical thinking had developed or evolved over their time in the nursing program. The term critical thinking was used in the interview questions as this was a more familiar term for the students than clinical reasoning. This “grand tour” question provided an introduction to the interview topic and an opportunity for reflection prior to asking questions about specific types of thinking. Questions from the interview guide were asked in a manner that corresponded with the flow of conversation in each interview. Prompts were used to elicit more depth in responses as required.

Interviews came to a close when students appeared to have completed their thoughts on the

final questions. After the interview guide questions had been exhausted, students were asked if they had anything else to add. The majority of the students took this opportunity to speak about the difficulties they had with the assignment and suggestions for improvement. After the recording was stopped students were asked debriefing questions about their experience during the interview and what they had gained from the experience of being interviewed. Most students stated they appreciated the opportunity to reflect on their own critical thinking.

Data Analysis

All interviews were recorded on a password-protected computer using “Garage Band” software. The researcher transcribed each interview verbatim. Field notes were written after each interview and saved in a file with each transcript. In keeping with the methodology of interpretive description, concurrent data collection and data analysis was employed (Thorne, 2008). Data analysis began after transcription of the first interview. The first transcript was read and re-read several times in order to achieve immersion in the data before beginning the coding process. The first transcript was coded in consultation with Dr. Astle. After the first two interviews, a preliminary code-book was developed in consultation with Dr. Astle (see Appendix F). Each subsequent transcript was coded separately using the established code-book and then compared across the whole data set looking for relationships among instances in the data (Thorne, 2008). Immersion in the data was achieved over the course of several weeks. Initially, two broad categories were established, followed by their associated sub-categories. Patterns and themes were identified for the purpose of interpreting meaning. In discussion with Dr. Astle, an overarching theme encompassing both broad categories emerged from the data. After further immersion in the data, two themes emerged as well as several sub-themes. The emergence of the sub-theme of “not knowing” was pivotal to allowing deeper analysis of the data. Once all of the

sub-themes were clarified, a thematic summary was constructed to describe the findings. These findings are described in Chapter Four.

Scientific Quality

Steps were taken to ensure the credibility and integrity of the findings of this study. Data was transcribed as accurately as possible through careful and timely transcription of audio recordings. Field notes were recorded immediately after each interview and included a description of the participant's "demeanor and behaviors" during the interview (Polit & Tatano Beck, 2012, p. 591). These field notes were used to augment the interview transcript by providing an additional source of information. The participant responses to the debriefing questions were contained within these field notes. In addition to field notes, several logs were kept in order to document decisions as they were made during the project. An audit trail documented all decisions as they were made in the course of the research process. A reflexive journal was kept to document how the researcher was situated within the process. Any preconceived ideas and biases that I may have brought into the study were identified and regularly examined with my supervisor to ensure they were not influencing the process (Thorne, 2008). This reflexivity was especially important in terms of my recognizable position as an instructor in the nursing program as well as a researcher. Finally, a research log was kept throughout the project, which documented each step in the process.

Limitations

Limitations of this study are a small sample size and data collection from one institution at a single point in time. These three factors limit the transferability of the findings. Findings may have been different if a larger number of participants had been interviewed. Additionally, all of the participants were female and identified themselves as Caucasian, which did not allow the

inclusion of variation in terms of gender or ethnicity within the data. Collection from one institution at a single point in time did not allow for space or time triangulation, which may have improved study quality by “providing a more complete and contextualized portrait of the phenomenon under study” (Polit & Tatano Beck, 2012, p. 590).

Ethical Considerations

Ethical approval was received from the Trinity Western University (TWU) Research Ethics Board (REB) (see Appendix G). Ethical approval was also received from the Research Ethics Board of the college attended by the student participants. The researcher (a nurse educator) did not have a current direct teaching relationship with any of the potential participants and it was not anticipated that she would teach them in the future. If a faculty member has a direct teaching relationship with student participants, a power-over position may exist (Ferguson, Yonge, & Myrick, 2004). Seeking student participants for whom they do not have a direct teaching relationship may result in having “less power with regard to these students” (Ferguson et al., 2004, p. 5). Students interested in participating in the study contacted the researcher directly by email to ensure confidentiality. The study was explained to each interested participant and each participant signed a consent form, which included an explanation of the right to withdraw and assurance of anonymity (see Appendix E). A participant number was assigned to each interviewed participant and only this number appears on recoded or transcribed data. All recordings and transcribed data were kept on a password-protected computer. Electronic data will be kept for five years after the completion of the study. Any paper copies of data have been shredded. Access to data was exclusive to my thesis committee. The name of the educational institution attended does not appear in any of the electronic or written submissions.

Chapter Summary

The purpose of this study was to explore the clinical reasoning skills of third year baccalaureate nursing students in the context of writing an assignment known as the CJE. The research questions were related to how the students perceived their ability to apply the nursing process to demonstrate clinical reasoning on the assignment, how they used experience and prior knowledge to inform their clinical reasoning and how the assignment impacted subsequent clinical reasoning opportunities. A qualitative design was used with Interpretive Description as the method. A convenience sample of eight third year baccalaureate students was obtained from one college. Recruitment took place through the distribution of an information letter in their fourth year classes. The instructors for the classes distributed the letter on behalf of the researcher. Students contacted the researcher directly and interviews were arranged.

The face-to-face, semi-structured interviews with the students were conducted over a period of eight weeks in the fall of 2014. An interview guide was utilized and modified after the first and second interviews. The interviews were transcribed verbatim by the researcher and field notes were written. Data collection and data analysis occurred concurrently. Coding was done with the first interview and a preliminary code-book was established after the second interview and was utilized with all subsequent interviews. Immersion in the data occurred over the weeks of data collection with reading and re-reading of transcripts. Patterns and themes were identified in the data. In consultation with my supervisor, one overarching theme emerged as well as two themes and several sub-themes.

Scientific quality was assured by careful and timely transcription, writing of field notes, maintaining an audit trail, a research log, a reflexive journal and contact with my Supervisor. Limitations of the study were small sample size and the collection of data from students at one

institution at a single point in time. Ethical considerations were dealt with by obtaining ethical approval at Trinity Western University as well as at the institution attended by the students. Confidentiality and anonymity of participants was assured and informed consent was obtained from each participant. The next chapter will describe the findings from these student interviews.

Chapter Four: Findings

The purpose of this study was to explore the clinical reasoning skills of students who, during their third year of their baccalaureate nursing program, applied the nursing process to complete a Clinical Judgment Exercise (CJE) assignment. This chapter describes the findings from the interviews conducted with eight students who had completed this assignment. During data analysis one overarching theme emerged from the data: *Over Time*. During the interviews, students reflected on how they had come to understand the evolution of their own clinical reasoning. This understanding of clinical reasoning was described as taking place over years one, two and three of their four year baccalaureate nursing program. Theme One emerged from the data as: *Understanding of Clinical Reasoning*. Students also described their clinical reasoning process as they reflected on writing the CJE assignment. They described the initial phase of figuring out what to do with the data provided to them and described how they worked to complete the assignment within the allotted time frame. Theme Two emerged from the data as: *Making Sense of the Assignment*. The sub-themes that emerged within Themes One and Two reflected a progression of “knowing” as students described the evolution of their understanding with respect to the development of their clinical reasoning abilities and with respect to the use of clinical reasoning on the CJE assignment.

Overarching Theme: Over Time

Throughout the data, it was evident that students returned repeatedly to reflecting on how their clinical reasoning had evolved from the beginning of year one, through to the completion of the third year of a four-year baccalaureate nursing program. The students spoke about the growth of their clinical reasoning, comparing their abilities at earlier points in time with their present capabilities. What emerged from the data appeared to be more than a description of

clinical reasoning that developed over time, but a recognition that their *understanding of clinical reasoning* had deepened over time. As the students reflected upon their earlier experiences with clinical reasoning, they became aware of the learning that had occurred over the past three years.

Over Time also emerged as an overarching theme from the data that described the writing of the CJE assignment. Students spoke about how they used their clinical reasoning skills to make sense of the assignment in a progression of increasing knowledge and understanding that took place over the time it took to complete the assignment.

Under the overarching theme of *Over Time*, two themes and several sub-themes were identified through careful critical data analysis of the eight interview transcripts. Theme One was identified as *Understanding of Clinical Reasoning* and refers to the student perceptions that their clinical reasoning abilities progressed from *not knowing* in year one, *knowing* in years two and three, *applying knowing* at the end of year three and *valuing knowing* in terms of readiness for independent practice at the onset of year four. Theme Two, emerging from the data, was *Making Sense of the Assignment*. As in the first theme, a progression of knowing over time was evident in the data. Students moved from a place of *not knowing* in the initial phase of the assignment to *knowing*, as steps were taken to understand and engage with the assignment, *applying knowing* as experience and prior knowledge were applied to the assignment and finally *valuing knowing* as students prepared to move the nursing process into practice. The sub-themes for Themes One and Two are intentionally the same. Although the sub-themes for Theme One reflect a growing understanding over the course of years, and the sub-themes for Theme Two reflect a growing understanding over the course of the time period for completing the assignment, the phases of knowing were seen to be very similar.

Theme One: Understanding of Clinical Reasoning

Students were asked to describe how they had seen their clinical reasoning develop or evolve over their first three years in the program. The data revealed rich descriptions of an understanding of clinical reasoning that developed over time. In the beginning, students perceived they were unaware of both the definition and the practice of clinical reasoning. Once a foundational understanding of clinical reasoning was established, they perceived that additional knowledge could be added in order to increase understanding and begin application of clinical reasoning skills to nursing practice. Finally, clinical reasoning was perceived as valuable and essential to provide excellent patient care. The sub-themes identified captured the students' perceptions through the past three years of the nursing program as well as their current place and view to independent practice in the near future. The sub-themes are anchored in time and describe a progression from *not knowing*, *knowing*, *applying knowing*, through to *valuing knowing*.

Not knowing. Students described their clinical reasoning in the first year of the nursing program as not knowing. They described not knowing what to look for or what to do for the patient (1), not knowing what to do with the information (2), not knowing what is relevant (2) and not knowing what clinical reasoning was (7). They also talked about a gap in being able to apply what they were learning. One student spoke about an inability to relate information to actual patients: "in first year...you don't have any patient care experiences to relate it to" (3). Another student related her experience in this way: "being able to critically look at another person and be like, what do they need, was kind of difficult for me" (5). She described herself as staring at the patient like "a deer in the headlights" (5). Finally, another student summed up her

first year experience as being “very much about learning the language of the general framework of how nurses think” (8).

Knowing. In contrast to first year, students described second year as a time of acquiring knowledge and developing an ability to apply the information. One student described acquiring knowledge this way: “second year you kind of get into the beginning pathophysiology of all the information” (1) and another student stated she experienced a deepening of her knowledge regarding the “inner workings of the human body” (8). This student also indicated that knowledge was essential to clinical reasoning because “if I don’t understand how it works, the big picture doesn’t come clear” (8). Several students described a noticeable turning point in their thinking between years two and three. One student asked herself “at what point does all the information come together and make sense to us?” She responded by stating “it clicked for me between second and third year” (2). Another student described the transition point coming at the end of second year and the beginning of third year as having more independence and confidence. She explained the difference as moving from “you don’t know what to do, go look it up” to “you don’t know what to do, think about it for a minute, because the information is there” (4). Finally, one of the students stated that prior to second year she “may have been able to kind of piece together a linear, or logical steps in helping somebody” but “second year really took me from just that kind of simple linear thinking to a deeper level of understanding” (8).

Applying knowing. After completing three years of study, the majority of students perceived they could now apply their clinical reasoning skills to patient care. The three clinical reasoning skills the students’ described were 1) being better able to put things together, 2) having a curiosity about why things are happening and 3) being able to see the relevant data in a situation. Three of the students stated they were now able to put things together. One of these

students described third year as a time to “take all the information from ‘patho’ and nursing and pull it all together” (1), another student affirmed that by third year she was better able to put things together (2) and a third student stated “(I) just couldn’t put things together (in first year) as well as I could now” (3).

In addition to putting things together, several students indicated that they had now developed a curiosity that helped them with their clinical reasoning. One student described an example of an elderly patient with a bladder infection not being prescribed antibiotics and her desire to understand why this was the case:

(She) didn’t have any signs of or symptoms of a urinary tract infection, but was beginning to become confused and delirious, and so I was asking why she hadn’t been put on antibiotics because like often in the elderly, they present with confusion before anything else. (1)

A second student spoke about the development of her curiosity as part of learning clinical reasoning. She described a situation when a patient was showing signs of distress, which she initially dismissed and then recognized further enquiry was needed: “you have to be more on that...just in a simple act of being curious, like are you ok? What’s going on with that?” (5). A third student stated that her “want to know things” (6) had positively impacted the development of her clinical reasoning.

Finally, some students also addressed being better able to see the relevant information in a patient care situation. One student described this as being able to “pick out the pertinent knowledge” (2) and another stated she is now able to use the nursing process to pull out the pertinent pieces and understand why they were pertinent (8).

Alongside putting things together, curiosity and identifying relevant information, the majority of students identified that clinical reasoning had become easier with time. They used expressions such as “natural” or “common sense” to describe their clinical reasoning after the completion of third year. Clinical reasoning was described as “second nature” (1), “automatic” (2) and “starting to come more naturally” (3). One student described her clinical reasoning as her “new nursing common sense” (5). Another student stated her perception is that “you always use the nursing process, but may not notice you’re using it” (4). A third student described the process of going into a patient’s room, finding something is not right and acting on that as being “very easy” at this stage (6). In summation, one student stated clinical reasoning “would just come more naturally, compared to first year” (7).

Valuing knowing. The student nurses who were interviewed were beginning their fourth year studies and their anticipation of transition to independent practice was evident in the data. They spoke about the importance of being able to think critically for the benefit of the patient. Throughout the data there was a sense of having reached a point in their nursing education and nursing practice where they would need to think and act quickly, being able to draw on ready knowledge in order to attend to a patient with urgent care needs. Several students described clinical reasoning abilities at this stage as being able to think on your feet with no time to “look things up” (5). Another student summarized her perception of the need for clinical reasoning at this stage:

(If you) have a patient who all of a sudden goes sour right in front of you, you have to be able to think your way through it, you’re not going to have your textbooks to rely on and you know, if you’re in the situation and something does happen and you can’t critically think your way through it, something bad is going to happen. (6)

In addition to moving toward being able to think and act quickly, some of the students also described developing an appreciation of increased complexity of patient presentation, particularly through assignments. Students described how concept-mapping assignments had helped them uncover complex connections in patients they had cared for. “(The) concept map (assignment) makes connections like a big knot of yarn, seeing how all these things are connected, more complex than I initially thought” (5).

A third and final aspect of *valuing knowing* was being able to anticipate what could happen with a patient in their care. One student described a situation where a preceptor encouraged her to consider what would be happening if the patient developed a widening blood pressure. She stated “I could clinically reason myself through and think what would happen if I saw this” (6). Another student expressed the concept of anticipation this way: “We have to be able to think like in the future, not just now, what’s taking place, but what could happen” (7).

In summary, the theme *Understanding of Clinical Reasoning* emerged from the data. The first sub-theme to emerge was *not knowing* in which students spoke about not knowing what to do for a patient or how to apply what they had learned. The second sub-theme was identified as *knowing*. *Knowing* represented the understanding of clinical reasoning in second year and was described by the acquisition and beginning application of knowledge. The third sub-theme, *applying knowing*, captured the increased level of understanding of the students at the end of third year. Students saw themselves as increasingly able to put things together, possessing a necessary curiosity and having an ability to attend to relevant information within the context of patient care. As they prepared for independent practice at the beginning of their fourth year, students were *valuing knowing*. The students expressed a perception that timely action is required for urgent needs, an understanding of the complex connections in a patient’s

presentation and a recognition of the need to anticipate possible outcomes in their patient scenario.

Theme Two: Making Sense of the Assignment

The third year students who participated in this study were asked questions during the interview about how they approached a specific assignment, known as the Clinical Judgment Exercise (CJE). As described in Chapter One, the CJE was an assignment in which students utilized the nursing process to demonstrate clinical reasoning. This type of assignment was given once in each of the first three years of the baccalaureate nursing program and was leveled accordingly for the expected competencies of first, second and third year students. The students in this study described the writing of the third year CJE, as this was their most recent experience with the assignment.

The third year CJE assignment for these students began when they were given a description of a patient scenario. Within this description, they were given patient-specific data, which they were then expected to organize and prioritize, resulting in the choice of priority diagnoses. Students then developed and completed a nursing care plan based on these diagnoses. The assignment was due 24 hours after receiving the patient scenario. During the interviews, students reflected on their own thought processes as they recalled working through the patient scenario. They reflected on the strategies they used to identify the main problem, as well as their utilization of the nursing process to establish a prioritized plan of care. There was a clear arc of time over the process of making sense of the assignment, which was similar to the progression of knowing seen in Theme One.

The first sub-theme that emerged from the data was *not knowing*. Students spoke about their initial response of not understanding what was going on with the patient in the scenario.

This recognition of *not knowing* was followed by an intense period of figuring out, in order to progress in the assignment. Expressions of stress related to not having enough time to do the assignment, worries about meeting expectations and feeling that the assignment did not mimic a real life situation were included in the sub-theme of *not knowing*. *Knowing* emerged as a sub-theme that described the second phase of the assignment as students used strategies to make sense of the data, utilized written resources and collaborated with peers to understand the scenario and make the necessary clinical judgments. *Applying knowing* emerged as a third sub-theme and captured the students' descriptions of how they were able to apply their experience and prior knowledge to the completion of the assignment. Finally, *valuing knowing* represented students' thoughts on how they were now able move the nursing process into practice.

Not knowing. Students described receiving the patient information and initially *not knowing what was going on with the patient*. They talked about how they worked through this situation, as well as describing the stressors associated with the assignment and identifying them as *not enough time, meeting expectations* and *not like in real life*.

Not knowing what was going on with the patient. Prior to beginning the assignment, students did not know what type of patient scenario they would receive. Once they received their scenario, students talked about 'trying to figure things out' as their first step in making sense of the situation. Part of figuring out what was going on with the patient was to identify and prioritize the patient problems. Students were asked to elaborate on how they prioritized the problems of the patient in the scenario. The majority of students stated they prioritized by using the learned emergency management sequence of airway, breathing and circulation (ABC/CAB). Students were also concerned with their scenario patient's stability and ensuring that the most acute concern was dealt with first. One student stated: "I made my priority diagnosis just based

on the highest acuity potential problem that this client has” (8). Determining the main problem was another way of figuring things out that occurred simultaneously with prioritizing. Students described their process as “deciding on which information was relevant” (4), what was most important (5) and “what do these signs and symptoms portray” (8). One student summed up this phase by saying “it’s a lot of pondering” (4).

In addition to prioritizing and determining the main problem, the majority of students spoke about traveling a short way down many possible paths before coming to a decision about their choice of nursing diagnoses. One student stated “there’s just so many avenues that the patient can take...it really depends on their presentation, your assessment” (1). They talked about changing their diagnoses many times and wrestling through the difficulties in choosing just one priority. One student described her process this way:

It was difficult because I had these two diagnoses that, well, both were very important... I had a really had a tough time with that one, I remember I ended (up) copy and pasting them back and forth I don’t know how many times, because...I just could not, could not decide. (5)

Only one student talked about the actual construction of the nursing diagnosis as being pivotal to the choice of goals and interventions. She stated “I knew at that point what my diagnosis was, but the wording, and which signs and symptoms were the most important to support my diagnosis...that was the toughest part of the whole assignment” (4).

The process of figuring out what was going on with the patient was challenging for all students, however one student described bypassing this phase entirely. When asked about how she decided on the main problem, she talked about the assignment being so stressful that instead of thinking through the possibilities she chose “the first thing that was in the textbook...the first

thing that they said to focus on, that's what I focused on just because I didn't have time to look through it" (7). In response to probing questions about sorting out which parts of the patient data were important, she responded that she chose "just what I found interesting" (7).

Not enough time. Students spoke about having to have the assignment completed in less than 24 hours. The majority of them spoke about how having to work quickly caused them stress as well as the discomfort or fear of having to work into the night to complete it. The quotes that illustrate how students felt under the time pressure evoked vivid images: "I get very stressed out when I'm rushed...I feel like as if somebody were breathing down my neck" (5), "I don't like to feel like I'm pressured inside a little box" (5), "I was just scared I wasn't going to come up with anything before the due date, so I went to my textbooks and just wrote what they had in there" (7), "(I felt) terrible...I didn't even grasp anything, I was just worried about the time" (7) and "if I would have been able to keep it simple and not over think it, I would have had no problem, but because I fret, sometimes I really put myself through the wringer" (8). One student summed up what it was like to have to use the night time hours to work on the assignment: "that's hard, trying to write that, I know a lot of us didn't get any sleep. We wrote through the night, that's not fun" (6).

Meeting expectations. Emerging from the data, it became apparent that students were also concerned about meeting the expectations of the assignment. Several students identified that they had tried to find ways of documenting that they had considered all avenues. "I want them to know that I've considered that somehow" (5) and "I included everything because...I want to display ...all these things that I had thought about" (8). Another student stated that she had tried to write the assignment to mimic the instructor's preferences: "If your instructor is very

‘patho’ driven then you will try to...give your instructor what they’re looking for,” “It was like what does she want instead of what do I want out of this assignment?” (7).

Part of the stress involved meeting the expectations of the assignment, was a sense that there was a right answer and a fear of choosing the wrong one. Students spoke about being “so scared to make the wrong diagnosis” and being afraid of putting something down that was “completely wrong” (4). One student summed up her worries by stating: “what if I put two and two together and it was the wrong four?” (5).

During the interviews, nearly every student mentioned feeling stress during the writing of the assignment. Upon further probing, some students spoke even more about the stressful nature of this assignment. One student in particular described what it was like for her to anticipate and to write the assignment: “it’s a huge stress, I couldn’t sleep the night before” and “it’s stressful to the point that I, just kind of afterwards, I’m like thank God that is over and I walk away from it” (5).

Not like in real life. Students expressed some frustration with elements of the assignment that did not mimic how clinical reasoning would take place with real patients. Students expressed that the assignment forced them to depict their actions sequentially, when in reality they would be “doing more than one thing at once” (1). Several students commented that not having a visual representation of the patient limited the assessment data they had access to. “(It’s) hard to visualize when you’re given symptoms, but you can’t see them (the patient)” (4). Another student spoke about the difference between the assignment and real life being that in real life the patient talks to you, tells you what they’re feeling (7).

A second way in which the CJE does not function as a real patient scenario is that no additional information is available to the student during the course of the assignment. Students

described this as being forced to make assumptions. One student described her frustration with not knowing if she should assume there was a medication order for the scenario patient:

I can't, as a nurse, just give nitro without an order and it doesn't say in my scenario that there's a nitro order, so how can I put that as one of my interventions, even though I feel it's really important and that would be one of my first interventions? (5)

Another student stated: "we only get information to a certain point and I find that to be the hardest part of the CJE, is when do you make assumptions about when you're correct and when do you stop and say I don't know if I'm right at any point?" (8). Students identified that being expected to complete the assignment in isolation did not reflect real life. When at a decision point in clinical reasoning in a real patient setting, there would be other people around to validate the decision or to seek advice from (4 & 5).

The discussion of the findings regarding the stressful nature of the assignment was intentionally placed within the sub-theme of *not knowing*, as students spoke primarily about their stress in anticipating the assignment and their worries about selecting the wrong diagnoses. It should be noted however, that feelings of stress were seen to persist throughout the period of writing the CJE assignment.

Knowing. Students described their thinking as they progressed in the assignment and the theme of *knowing* emerged from the data. *Knowing* involved making sense of the data once the main problem was determined and the priority diagnoses were identified. The students were able to reflect on and describe some of the strategies they had employed in order to better understand the patient scenario. These strategies included writing things out and making concept maps. The utilization of written resources was also found to be a significant part of *knowing*. Students took time to access information from written resources in order to increase and confirm their

knowledge. While students described their independent work in making sense of the data and using written resources, *knowing* also involved comparing their ideas with those of their peers. This “checking with others” was a strategy to relieve some of the uncertainty involved in making their decisions independently.

Making sense of the data. Students described how they made sense of the data in the patient scenario. They used strategies such as writing everything out (1), going through everything (1), writing it down in point form (3) and doing a “head to toe on paper” (4). One student described herself as a systematic in her approach: “I go through it very systematically, write down the first, second, third thing I’ll do in order of priority” (6). Several students used this strategy of writing everything out to put all the possibilities on the table and then trying to eliminate the less significant ideas.

In contrast to these linear strategies, several students also described using concept mapping strategies. Students spoke about having a little map (1), mapping it out in your head (2) and arranging the data into signs and symptoms, making a concept map (4). One student explained her concept map in more detail:

I had a big piece of paper...had sepsis, infection, drug use...lab values scribbled down and the relevant vitals beside each diagnosis.... I had sticky notes so I could move it around...it’s kind of how it ended up making sense. (4)

Finally, one student articulated a combined approach: “I kind of looked at the whole scenario, wrote everything down, tried to make as many connections as I could and then thought, which one is the big flashing red one?” (8).

Use of written resources. Use of written resources was a significant part of *knowing*. How the students used these resources was revealed in the data. Several students related an

iterative process of working on the assignment and checking with the literature. They would have an idea about the problem and then “look it up” and perhaps find a more appropriate diagnosis (4) or “see if the book has the same data and how it would apply to the patient on the CJE” (6). Most students indicated that their diagnoses came from a book. The nursing diagnosis handbook required for the course was both a starting point and a source to check back with. Only one student described using journal studies to find rationale to support her ideas (3).

Another source of written information deemed useful by the student participants were the resources accumulated when studying patient scenarios in the Context Based Learning (CBL) curriculum. These resources were referred to as “check out a resource provided by another student,” (4), “rely heavily on what I learned from previous scenarios” (6) and “think back to similar scenarios in the CBL classroom” (8).

Checking with others. Although the CJE is intended to be an independent assignment, most of the student participants stated that ideas were shared between classmates. Expressions used were: huddling as a group and passing around ideas (4), figuring out the diagnoses together (5), debating what is most important (5) and discussing things outside the classroom (8). One student in particular stated that it doesn’t make sense to do the assignment in isolation because in reality, the workplace is a collaborative environment (5). Checking with others was seen to be a significant part of the sub-theme of *knowing* because the students indicated such a strong drive to check in with one another to make sure they were on the right track.

Applying knowing. Students were aware they had accumulated a certain level of experience and prior knowledge over their three years in the program. They were able to reflect on how they applied knowledge gleaned from clinical experiences and previously learned information to the construction of the care plan for the patient on the CJE assignment. They also

expressed an awareness of being challenged by a lack of experience with the type of patient described on the CJE assignment.

Applying experience. During the participant interviews, students were asked to tell the researcher about how they used their own experiences with patients to inform their thinking about the patient on the CJE. In general, students found that they were able to reflect on previous patient care experiences in order to imagine what the patient would look like. One student indicated experience made it easier to imagine the patient (1). Another student added the specific example of reading a patient's lab values and making the data meaningful by visualizing the patient. "Labs don't really mean anything until you can picture that person in your head or remember that person who was sick" (4). One student in particular had had a real life experience similar to the patient described on the CJE and she stated "When I read through the scenario, I was thinking hey, this is what that guy looked like and I just thought to myself ok, what did we do?" (6).

As well as visualizing previous patients in order to help with the assessment and diagnoses portion of the CJE, students related visualizing themselves treating actual patients as a strategy to assist with the generation of interventions. Students described thinking back to what they did for previous patients and having ideas for interventions from experience (5). One student stated "I'm going to do this because it just logically makes sense and fits, like I could imagine myself doing that in real life" (8). Reflecting back on past interventions also assisted students in deciding what to do for the CJE patient. "I did literally put myself in my imagination back in that room and sit and queried myself, what did I do?" (8).

Many of the participants described their clinical experiences as being very helpful in completing the CJE assignment, however, some expressed another perspective. Several students

stated that at the time of writing their third-year CJE, that they had never had a patient with the acuity of the patient on the CJE. Throughout their years in the program, they found the patient on the CJE to be more complex than the patients they had cared for up to that point. One student remembered writing her first year CJE and being unable to relate it to any actual patients and being dependent on the textbook (1). Another student stated: “(I) felt kind of at a loss because I hadn’t really dealt with the type of patient that we had for our CJE” (5). Because of their lack of experience the students felt confined to other sources of information. They described “going off of books and references and talking to people” (4), “all you’re going off of is theory” (5) and “I had to rely on my book learning” (8).

Applying prior knowledge. Students identified using both experience and previously learned information to draw conclusions about the patient (1). One student stated: “you use what you already know, experiences that you already have, to try to picture in your head what this person may be like” (2). Students identified this prior knowledge as understanding anatomy and physiology, knowing how to prioritize, how to use the nursing process and using previously acquired knowledge from CBL scenarios (1 & 3). One student described in detail an example of how she was able to draw on previously learned information and apply it to the patient scenario on the CJE assignment. She described hearing her lab instructor mention that elevated temperature is not an essential symptom for a diagnosis of sepsis and then asserted “I made a little pocket for it in my brain... because I would’ve never thought of that” (4). During the assignment, sepsis was a possible diagnosis for the patient, and she was able to use this piece of information to contribute to her clinical reasoning. One student spoke about comparing things she had learned in her clinical experiences with what she was discovering in the textbooks when writing the CJE: “Some things (things I had learned in clinical), when I was going through my

books, some things surprised me, it was like, well maybe that's more important, you know?"

(5). This quote illuminates the process of drawing on prior knowledge and testing that knowledge before applying it to the current patient.

Valuing knowing. After describing their experience of completing the CJE assignment, students spoke about applying their learning from the assignment to their nursing practice and the impact of the assignment on their clinical reasoning skills. As the CJE is a nursing process based assignment, they also were able to articulate what the nursing process was beginning to look like in their own nursing practice. The students recognized both clinical reasoning and using the nursing process as important elements in clinical judgment. *Valuing knowing* emerged as the final sub-theme from the data and represents where the students are currently at in their journey of knowing in relationship to the CJE assignment. They have had some opportunities to put their newly minted clinical reasoning skills into clinical practice and recognize the importance of sound clinical judgment in providing excellent patient care.

Recognizing the learning from the assignment. Students described that the CJE helped them to apply their classroom learning to a real patient (1) and that the "template" used on the assignment is "what we're going to use in real life" (2). Another student described that the CJE allowed a deeper look at the phases of the nursing process as applied to the patient (3). Another student echoed this idea of a deeper look, stating that she was now able to "dig a little deeper" into a patient's presentation (5). This same student also indicated that the CJE helped her to be "a bit quicker." She described her previous self as "just like a deer in the headlights" but now sees herself as able to recognize a situation that requires action (5).

Recognizing the nursing process as a tool for clinical reasoning. Students described how they used the nursing process to assist their clinical reasoning in practice. Students used the

acronym ADPIE (Assessment, Diagnosis, Planning, Intervention, Evaluation) as a way of referring to the nursing process during the interviews. One student stated that using ADPIE helped “guide my clinical judgment, it helped me determine what I needed to do next and where I needed to go with it” (5). The nursing process was seen as pivotal in moving the nurse beyond the assessment phase: “you have to quickly assess your patient first, so if you don’t have knowledge of ADPIE then you...kind of stop there. If you do have knowledge of ADPIE then you can work your way through it step by step” (6). This student also offered a reflection on using her clinical reasoning: “being able to walk into a patient’s room, see that something’s not right, think about what needs to happen or what am I seeing” (6). Another student expressed her clinical reasoning within the nursing process this way: “every step of it there are certain questions like trigger questions that you should be asking yourself...from your assessment data...does this make sense? Is this painting a picture I’ve seen before, is there more to this?” (8).

In summary, a theme of *Making Sense of the Assignment* emerged from the data. Students described a turbulent time of *not knowing* at the onset of the assignment. Initially, they did not know what was going on with the patient and sought to figure things out by prioritizing, determining the main problem and recognizing the many avenues the scenario patient could take. In addition to the initial feelings of not knowing about the patient, students described the stressful elements of the assignment as not enough time, concerns about meeting expectations and frustration that the assignment did not mimic real life. The period of *not knowing* was followed by a phase of *knowing* during which students made sense of the assignment by writing things out and using concept maps. During this time they also made use of written resources and checked with others. A third phase was identified as *applying knowing*, when students revealed

how they were able to apply previous experience and prior knowledge to the patient scenario on the assignment. The students also described being disadvantaged by a lack of experience with that type of patient. The final sub-theme was *valuing knowing*. Students recognized their learning from the assignment and described how they used the nursing process as a tool for clinical reasoning in nursing practice.

Chapter Summary

The intent of this research was to understand the perceptions of third year baccalaureate nursing students with respect to their use of clinical reasoning on a nursing process based assignment. During the interviews, students related how they had seen their clinical reasoning develop over time and also explored their experience of writing the assignment. *Over Time* became an overarching theme, as students were able to look back and describe an increasing ability to understand their own clinical reasoning and an ability to make sense of the assignment.

Understanding of Clinical Reasoning was identified as the first theme emerging from the data. *Understanding of Clinical Reasoning* was seen to take place over time as students spoke about their progress from year to year in the nursing program. The sub-themes of *not knowing*, *knowing*, *applying knowing* and *valuing knowing* emerged from the data. Students described moving from a state of bewilderment in the absence of knowledge pertaining to clinical reasoning and patient care, through acquisition and application of knowledge, coming to a point of *knowing*. According to the data, students described *applying knowing* as being able to put things together, developing a curiosity about why things are happening and determining the relevance of information. Students described clinical reasoning as becoming easier and more natural with time. Finally, the sub-theme *valuing knowing* emerged, describing how students saw themselves at the end of their third year of education. They saw clinical reasoning as

necessary for the benefit of the patient, they recognized the importance of being ready to respond quickly in an urgent situation and they appreciated the complexity of a patient's presentation and understood the importance of being able to anticipate complications. Students described their understanding of their own clinical reasoning as improving over time to the point of being practice-ready.

The second theme emerging from the data was: *Making Sense of the Assignment*. Students revealed their experience with the assignment and the sub-themes were seen to be similar to Theme One. A sub-theme of *not knowing* emerged as students recalled beginning to work on the assignment. They expressed an initial sense of not knowing what was going on with the scenario patient. This was followed by a time of figuring things out, which included prioritizing, determining the main problem and recognizing the many avenues that the patient could take. Students also revealed that they found the assignment stressful in that they did not have enough time, were concerned about meeting expectations and that the assignment did not mimic real life. In the second sub-theme, *knowing*, students made sense of the data by writing it out or using mapping strategies. They made use of written resources and checked in with their peers. In the third sub-theme, *applying knowing*, students described applying what they already knew to the scenario patient by reflecting on previous experience and using ready knowledge learned from classes. Lack of specific experience with the type of patient in the scenario was seen to be a liability when working on the assignment. *Valuing knowing* emerged as a final sub-theme in the data. Students recognized the learning from the assignment and recognized the nursing process as a significant tool for mobilizing clinical reasoning both on the assignment and in actual clinical practice with their patients.

In Chapter Five, these findings will be discussed in relationship to the existing literature. Theme One will be explored in the context of studies referring to the development of clinical reasoning in nursing students. Theme Two will be explored in relationship to studies that attempted to understand cognitive processes related to clinical reasoning and those designed to improve clinical reasoning through educational interventions. Finally, the findings will be more closely compared with a recent study regarding stages in the development of clinical reasoning as well as comparing the findings regarding *Making Sense of the Assignment* with Tanner's seminal literature review on clinical judgment.

Chapter Five: Discussion

This chapter provides a discussion of the themes that emerged from the data as they were presented in Chapter Four. The findings will be explored in the context of the existing literature on the topic. Theme One: *Understanding of Clinical Reasoning* will be examined alongside studies in the literature that have shown that clinical reasoning develops over time and how students have perceived the development of their clinical reasoning over time. As the writing of the CJE assignment was a phenomenon of interest in the study, the use of an assignment as a tool for exploring clinical reasoning skills will also be looked at in the context of the literature. Theme Two: *Making Sense of the Assignment* will be discussed with respect to studies that highlight how both student nurses and experienced nurses utilize clinical reasoning skills. Some of the earlier literature on this topic pertains specifically to critical thinking rather than clinical reasoning. Both of these terms have been defined in Chapter One. For the purposes of this discussion, critical thinking, when used in the context of patient care, will be considered equivalent to clinical reasoning.

Both Themes One and Two will be examined in comparison to the findings of Goudreau, Boyer and Letourneau (2014), who propose stages of clinical reasoning as well as a cognitive learning model to explain the development of clinical reasoning. The findings related to Theme Two will also be examined in the context of Tanner's (2006) conclusions regarding clinical judgment based on her review of the literature. Cappelletti et al. (2014) extended Tanner's review and their additional conclusion will be included in the discussion. Clinical judgment was defined in Chapter One and is clearly and consistently described as the outcome of clinical reasoning.

Comparison with Existing Literature

Theme One: Understanding of Clinical Reasoning. One of the key findings of this study was the emergence of the sub-themes of *not knowing*, *knowing*, *applying knowing* and *valuing knowing*. These sub-themes demonstrated that the student participants perceived their own clinical reasoning as evolving through stages. In the primary literature review completed, there were several studies that looked at the progression of either critical thinking or clinical reasoning skills. The authors of these studies were seeking to demonstrate whether or not these skills improved as students moved through their educational program. In one of the seminal works on this topic, Profetto-McGrath (2003) found, using the California Critical Thinking Skills Test (CCTST), that critical thinking skills in nursing students increased from year one to year four, with the exception of year three. Other studies measured changes in assignment scores over time and equated these with changes in clinical reasoning skills. An example of this type of study was a retrospective study of student care plan assignments that showed “students develop progressively in their ability to write a care plan using the North American Nursing Diagnosis Association (NANDA-1) Taxonomy” (Palese et al., 2009). The results of this study revealed an increase in the variety, accuracy and comprehensiveness of nursing diagnoses over years one, two and three of the program. By the end of year three, students demonstrated an awareness of the risk of complications and an improved ability to evaluate (Palese et al., 2009). Similarly, Abel and Freeze (2006) found that the concept map scores of advanced degree nursing students increased with progression through the curriculum over the course of one year. These studies lend support to the concept that clinical reasoning develops over time. The student participants in the present study were able recognize the evolution of their own clinical reasoning skills over time.

Several other studies in the literature sought to discover how students perceived the development of their own critical thinking or clinical reasoning. A qualitative study by Di Vito-Thomas (2005), found that nursing students in a baccalaureate program described their own critical thinking as something that “was not polished, but would improve in time with opportunities to practice” (p. 134). Ellerman et al. (2006) found that students graduating from a four-year program rated their clinical reasoning at the beginning of their program significantly lower than they rated their clinical reasoning at the end of the program. Both of these studies report findings similar to those of the present study in which some of the student participants perceived their clinical reasoning had improved over time.

One additional interesting finding in this study was that some student participants described they were aware of having developed a curiosity about their patients’ situation. They described this newly recognized curiosity as having a positive impact on their clinical reasoning skills. This concept of developing curiosity was not overtly found in the literature. The potentially related concept of “inquisitiveness” was one of the Critical Thinking Dispositions identified by Facione (1990). Several studies found that students had relatively high scores for this disposition (Paans et al., 2010; Profetto-McGrath, 2003; Wangenstein et al., 2010). The student participants may have been expressing a recognition that they possessed “inquisitiveness,” but they were also aware of a willingness to act in order to find out more about what was going on with their patient.

Although there is alignment between the existing literature and the findings of this study with respect to the improvement of clinical reasoning over time, Newton and Moore (2013) identified a gap in the existing literature, stating: “there is little in the nursing literature that describes critical thinking developmentally or as an evolutionary process” (p. 154). One study

was found that supported this concept, stating that “the stages (of clinical reasoning) are distinct and complement each other and they all build on the preceding ones” (Goudreau et al., 2014, p. 10). The sub-themes of *not knowing*, *knowing*, *applying knowing* and *valuing knowing* would suggest a developmental process where each stage builds on the one before it.

Using a written assignment to promote clinical reasoning. Written assignments completed by students have been a useful tool for research in the area of clinical reasoning. Assignment scores have been used to demonstrate improvement in critical thinking over time (Abel & Freeze, 2006) and to show improvement in clinical reasoning after an educational intervention (Bartlett et al., 2008; Lee & Brysiewicz, 2009). Different styles of critical thinking assignments have also been compared with respect to student confidence in using specific thinking constructs (Marchigiano et al., 2011). Allen, Rubenfeld and Scheffer (2004) designed a study in which students were asked to write about how they applied one of the 17 dimensions of critical thinking (analyzing, creativity, logical reasoning etc.) either in a patient based scenario or in clinical practice. They were able to show that the students’ understanding and use of the dimension could be assessed with high reliability (Allen et al., 2004). This type of assignment asked the students to reflect on their own critical thinking and to overtly describe how they were using certain thinking skills in patient related scenarios. Although this study was primarily focused on inter-rater reliability, the concept of having students consider how they applied specific critical thinking skills to a patient scenario bears some similarity to the purpose of the present study, which asked student participants to reflect on the thinking skills they used to write the CJE assignment. Having students reflect on their use of thinking skills during an assignment appears rarely in the clinical reasoning literature.

Several of the students in this study talked about using the written summative feedback provided by the instructor or returning to the instructor after receiving a grade to discuss their use of clinical reasoning on the assignment. They had a desire to review the judgments they had made during the writing of the assignment and to discover why certain choices were better than others. One student participant commented that only doing one CJE per year was detrimental as the students who did poorly did not have a chance to learn from their mistakes and improve on the next assignment (3). These findings may be examined in the context of Bartlett et al. (2008) who used the Outcome-Present State Test (OPT) model to assess the clinical reasoning skills of undergraduate nursing students. The OPT model is a “nursing process model designed to help students develop clinical reasoning skills” (Bartlett et al., 2008). Each student in the study completed a weekly OPT model on their client in the clinical setting. “Students were given written feedback on their models, including direction on how to improve the models” (Bartlett et al., 2008, p. 342). Students completed an OPT model and a clinical reasoning web on a case study patient before and after this educational intervention. Pre-test and post-test scores were found to be significantly different. Bartlett et al.’s results suggest that formative feedback may play a role in the improvement of clinical reasoning on an assignment.

Theme Two: Making Sense of the Assignment. Student participants were asked to describe how they completed the CJE assignment. The sub-themes of *not knowing*, *knowing*, *applying knowing* and *valuing knowing* emerged from this data. Each of these sub-themes will be explored within the context of the existing literature and findings will be compared.

The first sub-theme of *not knowing* reflected how the student participants described their thinking at the beginning of the assignment. They described having to figure things out, having to determine the main problem and recognizing the many avenues the patient could take. They

also spoke about their feelings of stress during the writing of the assignment. Several studies were found in the secondary search of the literature that contributed to the analysis of these findings and the findings will be explored in relationship to these studies.

The student participants described initially not knowing what was going on with the patient described in their CJE scenario. Wotton, Davis, Button and Kelton (2010) studied the perceptions of third-year undergraduate nursing students regarding the implementation of high-fidelity simulation in a clinical course. The authors noted a similar finding as students described experiencing “confusion as to what was actually wrong with the patient” (p. 636). The authors also found that the majority of the students participating in the high-fidelity simulations felt lost at some point during the experience, that the experience of confusion was transient and that the confusion may have suggested the level of complexity of the scenario was too high (Wotton et al., 2010). The authors also suggested that this confusion was “expected in light of students’ developing level of reasoning and unfamiliarity with different clinical situations” (Wotton et al., 2010, p. 637).

In order to figure out the main patient problem on the assignment, some of the student participants mentioned they used prioritization strategies. These findings are supported by the work of Goudreau et al. (2014) who gathered “think aloud” data from third year nursing students working on a patient case scenario and found they were “ordering concepts by priority and generating hypotheses” (p.8). In addition to prioritizing, much of what the student participants described in terms of trying to determine the main problem could be seen as hypothesis generation. They spoke about asking themselves what the patient’s signs and symptoms portrayed, considering the patient’s presentation combined with assessment data and trying to choose between two important possible diagnoses. Ramezani-Badr et al. (2009) similarly found

that the critical care nurses interviewed in their study “generated hypotheses after a preliminary examination and considering the cues and the patient’s condition” (p.354). Additionally, Forsberg et al. (2014) used a “think aloud” strategy to understand the clinical reasoning patterns used by experienced pediatric nurses as they worked through virtual patient scenarios. They found that nurses “try to consolidate a hypothesis by seeing a pattern and judging the value of signs, symptoms, physical exams, laboratory tests and radiology” (p. 538).

Hypothesis generation was found to be a significant clinical reasoning strategy for both students and experienced nurses in the literature (Forsberg et al., 2014; Goudreau et al., 2014; Ramezani-Badr et al., 2009). These findings support the clinical reasoning strategies described by the student participants. Although the student participants were able to engage in hypothesis generation, a significant difference between undergraduate students and experienced specialty nurses may be in ease of pattern recognition. Lack of clinical experience is likely to make pattern recognition a less intuitive skill in student nurses and may have contributed to some of the frustration and stress expressed by students during the time of *not knowing*. The impact of this lack of experience will be further discussed with respect to the sub-theme of *applying knowing*.

Student participants described their feelings of stress as being related to not having enough time to complete the assignment. This finding was supported by the comments of the students in the study by Wotton et al. (2010) who described their experience by stating that there was “a lot to cover in a short amount of time” and that this contributed to their confusion in some parts of the simulation scenario (p. 635). In addition to time pressure, some student participants thought the CJE assignment was unrealistic, as it did not allow an opportunity for students to consult with one another when trying to make decisions about the best way to care for the

patient. The student participants thought that student-to-student consultation would be very helpful in working through the CJE assignment. This finding is supported by Ramezani-Badr et al. (2009) who described that their experienced nurse participants used “consulting with colleagues” as part of their decision-making criteria (p. 354).

A study by Glynn (2012) provided further support for the benefits of students working together with respect to learning clinical reasoning. The authors found that nursing students who participated in structured, reflective narrative sessions during which students heard their peers present actual patient experiences “were able to gain insight and apply other students’ acquired knowledge to their own development of clinical judgment” (Glynn, 2012, p. 137). Additionally, Van Horn (2000) designed a study in which students reflected on their clinical judgments regarding care of their patients in the clinical setting in both unpaired and paired journal assignments. The author found that there appeared to be benefits from the paired students reflecting together in a guided reflection journaling process (Van Horn, 2000). Similarly, Forsberg et al. (2014) used virtual patient scenarios in a “think aloud” study to investigate how experienced pediatric nurses used clinical reasoning. The authors stated that it “looked to be beneficial to let them work in pairs, which also made it more natural for them to think aloud/discuss” (Forsberg et al., 2014, p. 541). Finally, Parsons and Teel (2013) explored student perspectives on “double testing.” Double testing is an education strategy in which students complete a test independently and then take the same test as a member of a small group. The group-testing situation allowed students to address complex patient care issues using dialogue between students. Students reported satisfaction with the double testing in their course and also experienced reduced stress during testing (Parsons & Teel, 2013).

Student participants were also concerned about not being able to see or question the patient or to request additional information about the patient scenario during the writing of the assignment. Some studies found the modalities of high-fidelity simulation and virtual patient simulation addressed these types of concerns. Students who participated in high-fidelity simulation scenarios intended to promote clinical reasoning stated it was helpful to visualize patient symptoms and outcomes (Wotton et al., 2010). The use of virtual patients allowed nurses to visualize their route to a clinical decision as the virtual patient (VP) system (software) displayed their actions, decisions and priorities (Forsberg et al., 2014). The use of a virtual patient system also allowed the nurse to request lab work or patient history data as the case study unfolded (Forsberg et al., 2014).

Most of the student participants spoke about how understanding increased as they thought about and worked through the various phases of the nursing process in the CJE assignment. The second sub-theme of *knowing*, involved making sense of the data, using written resources and checking with others. A study by Marchigiano et al. (2011) was helpful in connecting the student descriptions of their process with clinical reasoning skills acknowledged in the literature. Marchigiano et al. (2011) collected data from 51 third year baccalaureate nursing students, asking them to rate their confidence in using each of seven “thinking skills for nursing practice” on two journal and two care plan assignments. The seven thinking skills were: analyzing information, determining relevance, making connections, setting priorities, selecting appropriate information, applying relevant knowledge and evaluating outcomes (Marchigiano et al., 2011). These thinking skills were derived by synthesizing Facione’s (1990) critical thinking skills and the phases of the nursing process.

Marchigiano et al.'s "thinking skills for nursing practice" can be recognized in the student participants' description of their thinking skills and problem-solving strategies used during the writing of the CJE assignment. In order to make sense of the patient data on the assignment, student participants described their strategies as writing everything out and/or making a concept map. Both of these strategies would incorporate the thinking skills of "analyzing information," "determining relevance" and "making connections."

The thinking skill identified by Marchigiano et al. (2011) as "selecting appropriate information" relates directly to the data from this study with respect to the student participants' description of their use of written resources. The student participants identified seeking out written resources such as textbooks and class notes from previous scenarios to guide them in their reasoning. This finding was also supported by Tanner's (2006) review of the clinical judgment literature. Tanner (2006) found that while experienced nurses used intuition in clinical reasoning, beginning nurses were dependent on textbook knowledge. In contrast to this, Paans et al. (2010) studied students' use of available written resources during a clinical reasoning assignment and found that students were unable to "operationalize knowledge sources to derive accurate diagnoses" (p. 232). The present study was not designed to determine the degree of student success on the CJE assignment, however students clearly indicated that their source of nursing diagnoses was their textbooks.

"Applying relevant knowledge" and "evaluating outcomes" were the final two thinking skills for nursing practice as identified by Marchigiano et al. (2011). "Applying relevant knowledge" aligns closely with the third sub-theme of *applying knowing*. The student participants discussed how they were able to apply knowledge gained from experience to the writing of the CJE assignment. They spoke about visualizing a previous patient with similar

symptoms or lab values and how this helped them to consider both diagnoses and interventions for the patient described in the CJE scenario. They related how they applied the knowledge they had learned from books and tutorials as well as thinking back to a CBL scenario patient and using that knowledge on the assignment. Student participants also spoke about “evaluating outcomes” as a skill that was made easier with experience. Student participants who had cared for a similar patient were able to reflect on the criteria they had used to evaluate the interventions they had performed.

Some student participants also spoke about being challenged by a lack of patient care experience in writing the CJE. They talked about the CJE patient being more acutely ill than any patient they had yet cared for. Some students expressed they were unfamiliar with the condition indicated by the patient’s symptoms. The effect of limited clinical experience on clinical reasoning was addressed in several studies in the literature. Di Vito-Thomas (2005) analyzed the written responses of 134 junior and senior nursing students in baccalaureate programs. The responses were to the question “What were the most important teaching/learning strategies in the development of your clinical judgment?” (Di Vito-Thomas, 2005, p. 134). The data from the students indicated “no strategy was perceived as more important from the data than the desire for ‘more clinical time and experience’” (Di Vito-Thomas, 2005, p. 135). Paans et al. (2010) hypothesized the reason students in their study failed to use inference and deductive skills was that they could not rely on their intuition due to their lack of experience. Finally, Forsberg et al. (2014) found in their study with experienced nurses that experience with similar cases was a key component of clinical decision-making. They also found that if nurses did not have experience with similar cases they were less certain of what to do (Forsberg et al., 2014). The student

participants in this study clearly stated that having experience with similar cases was an advantage, while a lack of experience made the assignment significantly more difficult.

Valuing knowing was the fourth and final sub-theme to emerge from the data in Theme Two: *Making Sense of the Assignment*. Student participants spoke about using their learning from the CJE assignment to improve clinical reasoning with respect to patient care. They also recognized their use of the nursing process in thinking systematically and analytically about patient care. Within the literature, two studies were found that described students' (or new graduates') perceptions of their use of the nursing process in clinical decision-making. The newly graduated nurses interviewed by Duchscher (2003) stated they perceived critical thinking as being woven into the nursing process. Additionally, a study by Ellerman et al. (2006) found that all of their student participants selected the nursing process as one of their clinical decision-making methods. As a recommendation for further research, Marchigiano et al. (2011) speculated that the "use of qualitative and mixed methods may provide added information about how an assignment affected thinking skills within a nursing process framework" (p. 150). Knowing more about how the student participants used their learning from the CJE to apply the nursing process in practice may help to fill the gap in the literature identified by Marchigiano et al. (2011).

Comparison with Goudreau, Boyer and Letourneau (2014)

A recent Canadian study by Goudreau et al. (2014) specifically addressed the development of clinical reasoning over time. The authors developed a cognitive learning model describing stages and critical milestones in clinical reasoning using a "think aloud" approach. They recorded data from students in each year of a three-year program as well as newly graduated and experienced nurses. The study reported a total of 66 participants with 11-14

participants in each of the five groups. Each participant was given a patient scenario and then asked to “think aloud” about the patient problem. “Five patient scenarios were used for each participant during one interview session” (Goudreau et al., 2014, p. 4). From the data, the authors identified five stages in the development of clinical reasoning. The first four stages identified by Goudreau et al. (2014) reveal some similarity with how the student participants in this study described their thinking in each year of their program.

The first stage described by Goudreau et al. (2014) was “I need to know what to do” (p.9). First year students searched for missing information, they realized they didn’t know and must somehow find out (Goudreau et al., 2014). Comparably, the student participants in this study spoke about the first year of their nursing program as a time of *not knowing*. Additionally, in Theme Two: *Making Sense of the Assignment*, student participants related that their first step in writing the assignment was to figure out what was going on with the patient. Although they did not speak specifically about searching for missing information, clearly they were experiencing a “need to know what to do” (Goudreau et al., 2014, p.9).

The second year students in this comparison study were said to be in a stage described by “I need to justify my interventions using evidence-based resources” (Goudreau et al., 2014, p. 9). The sub-theme *knowing* emerged from the data in Theme One and described the student participants’ understanding of their clinical reasoning in second year. The sub-theme *knowing* was illustrated by student participant comments about second year being a time of acquiring knowledge. There is a common thread between Goudreau et al. and this study regarding the perceived need of second year students to use credible resources to acquire knowledge. Within the sub-theme of *knowing* in Theme Two, the student participants discussed creating nursing diagnoses using textbooks, collaborating with each other and using the information from their

CBL classes. This is closely aligned with using resources to justify interventions (Goudreau et al., 2014).

The third stage in the comparison study was “I adapt my interventions to each clinical situation” (Goudreau et al., 2014). The student participants provided data that led to the emergence of *applying knowing* as a sub-theme describing how they perceived their clinical reasoning in third year. *Applying knowing* was characterized by nurturing curiosity, noticing connections and attending to relevant data. Some students mentioned they were careful to watch for “exceptions to the rule.” Each of these perceived skills would be utilized in making decisions within unique clinical situations. The sub-theme of *applying knowing* pertaining to how the student participants managed the CJE assignment through the application of experience and prior knowledge to the scenario also aligns with this third stage. Deciding what to do based on specific patient presentation requires that the student go beyond possessing general knowledge to the application of that knowledge for the benefit of a particular patient.

Finally, Goudreau et al. (2014) defined the fourth stage as “I adapt my interventions to the unit’s routines” (p. 9). The authors found that students in this stage of clinical reasoning attend to rules of practice, routines and protocols more than hypothesis generation when making clinical judgments (Goudreau et al., 2014). Although the findings of Goudreau et al. do not align with the fourth sub-theme of *valuing knowing*, the student participants did have some comments about using clinical reasoning in the context of the nursing unit, particularly with respect to the use of standing orders and the use of situation, background, assessment, recommendation (SBAR) as a tool for talking to physicians. They talked about using their reasoning skills to prioritize the needs of multiple patients and to manage staff mix and delegation as they prepared for independent practice.

In using Goudreau et al.'s (2014) study for comparison, it is valuable to see that an objective analysis of "think aloud" data resulted in identification of stages that were comparable to the student participants' perceptions of their own clinical reasoning at similar junctures in their nursing education. If nurse educators are provided with varying types of evidence that clinical reasoning takes time to develop and that a preceding level of understanding must be solidified in order to build on the next stage, it may have an impact on how and when clinical reasoning content is delivered in the curriculum. It is also of interest that students who have completed three years of study, approach the CJE assignment using the same stages in the compressed amount of time available to them. This may impact the nurse educators' understanding of the leveling of the CJE assignment. For example, if second year students are only capable of *knowing*, or are concerned only with justifying their interventions with resources, nurse educators may want to consider how clinical reasoning in this stage might be assessed and how much application could be expected on an assignment.

Comparison with Tanner (2006) and Cappelletti et al. (2014)

Tanner's (2006) work in the area of clinical judgment in nursing was explored with the intention of deepening the understanding of Theme Two: *Making Sense of the Assignment*. Clinical judgments are the end result of the clinical reasoning process (Tanner, 2006). In seeking to understand how nurses make clinical judgments, it is the process of clinical reasoning that is being explored. In 1998, Tanner critically reviewed 120 studies on clinical judgment in nursing. Her second review in 2006, added an additional 71 studies. From her extensive review of the literature, Tanner (2006) drew five conclusions with regard to clinical judgment in nursing. Although the literature review focused on data from experienced nurses, Tanner used her conclusions from the review to formulate her Clinical Judgment Model, which was explicitly

recommended for use in nursing education. Tanner's five conclusions were recently supported in a literature review of fifteen studies published since 2006 in a study by Cappelletti et al. (2014). From this review, a sixth conclusion was proposed in response to the prevalence of studies regarding educational interventions. These six conclusions will be utilized to increase the depth of understanding of the findings from the present study.

The first conclusion was "clinical judgments are more influenced by what nurses bring to the situation than the objective data about the situation at hand" (Tanner, 2006, p. 205). Student participants in the present study brought their prior knowledge and experience to the CJE patient. They described the source of their knowledge (textbooks, peers, class notes, instructors, nurses on the unit) and the source of their experience (clinical placement, work as an Undergraduate Nurse Employee (UNE), life experience). They discussed how and when they accessed this information in order to put it to use in reasoning to make decisions about the CJE patient. This description of clinical reasoning by the students is supported by Tanner's contrasting of the intuition used by experienced nurses with the novice's reliance on analysis:

The beginning nurse must reason things through analytically; he or she must learn how to recognize a situation in which a particular aspect of theoretical knowledge applies and begin to develop a practical knowledge that allows refinement, extensions and adjustment of textbook knowledge. (p. 206)

The second conclusion was "sound clinical judgment rests to some degree on knowing the patient and his or her typical pattern of response as well as an engagement with the patient and his or her concerns" (p. 206). This conclusion from the literature draws attention to the limitations of the CJE assignment. Students in the present study expressed that the CJE

assignment did not mimic a real-life situation in that the patient could not be visualized or questioned.

The third conclusion was “clinical judgments are influenced by the context in which the situation occurs and the culture of the nursing care unit” (Tanner, 2006, p. 206). Although the clinical judgments that occurred on the CJE assignment did not occur with a real patient in the context of a nursing unit, context was a significant contributing factor to the quality of the clinical reasoning on the assignment. Students described the context of the assignment as being stressful in relation to the limited time, having to meet expectations and the scenario not having the same elements as a real-life situation. All of the student descriptions of stress during the writing of the assignment were negative in nature and some students associated this stress with poor performance. The culture of the student cohort writing the assignment also influenced how clinical judgments were made on the assignment. The students described the culture in which the assignment was written to be one in which checking with peers was expected even though they understood the assignment was meant to be completed independently.

Tanner’s fourth conclusion from her literature review was that “nurses use a variety of reasoning patterns alone or in combination” (p. 207). She explored three patterns of clinical reasoning used by experienced nurses: a) analytic processes, b) intuition and c) narrative thinking. Analytic processes are applied when essential knowledge is lacking. Such is often the case with student nurses. Beginning nurses perform an assessment and then compare the assessment data with signs and symptoms listed in the textbook (Tanner, 2006). Student participants in the present study reported that they did just that. They looked at the assessment data provided and then began to compare what they were seeing with what was in the textbook. The student participants also described their struggle to make a decision when they recognized

that there were several possibilities to choose from. In order to make a decision they used strategies such as using criteria for prioritizing, writing everything out and making a concept map. Similarly, Tanner described that nurses use analytic processes when there are multiple diagnoses or interventions to choose from and the pros and cons of each must be weighed out in order to make a decision.

Intuition was the second clinical reasoning pattern used by experienced nurses (Tanner, 2006). Although the intuition of student nurses is constrained by their lack of experience, several of the student participants in the present study were able to describe how they used their experience with similar patients to enhance their clinical reasoning when writing the CJE assignment. Pattern recognition was cited in the literature review as being part of intuition (Tanner, 2006). Some of the student participants described visualizing themselves caring for a similar patient and used this reflection to generate interventions for the CJE patient.

Narrative thinking was the third reasoning pattern used by experienced nurses (Tanner, 2006). This pattern requires being able to enter into the patient's story in order to make sense of the particular case (Tanner, 2006). As mentioned previously, this element is nearly absent in the CJE assignment. Students found this to be one of the stressful elements of the assignment and described it as being "not like in real life."

Tanner's fifth and final conclusion regarding clinical judgment in nursing was "reflection on practice is often triggered by a breakdown in clinical judgment and is critical for the development of clinical knowledge and improvement in clinical reasoning" (p. 207). This conclusion applies to the present study in that reflection on practice may be compared to reflection on the process of writing the CJE assignment in terms of having used clinical reasoning to make clinical judgments about a patient scenario. Student participants described a

variety of ways in which their learning was solidified by reflection on breakdowns in clinical judgment. Some students reviewed their clinical reasoning processes with their instructor; some discussed their choices and rationale with their peers both inside and outside the classroom. They spoke about discovering what they did wrong, or why certain choices would have been better than others. Other students did not wish to reflect on their writing of the assignment and chose to “walk away” or “didn’t think they learned anything.” One student in particular, stated she had done well on the assignment and that she only received “check marks” on her assignment, so she did not reflect on her thinking. This would support Tanner’s conclusion that reflection is often triggered by a breakdown in clinical judgment. If there is no perceived breakdown (no errors are recognized), reflection may be limited.

Nurse educators may wish to consider their methods of providing both positive and constructive feedback on clinical reasoning assignments in the light of these study findings and Tanner’s fifth conclusion. With respect to the CJE assignment, only summative feedback was received. Consideration might be given to providing formative feedback in order to increase reflective opportunities. Receiving feedback prior to the completion of the assignment may also reduce student stress related to not knowing if they were “on the right track”. This might be accomplished if the assignment was submitted in two parts or if several shorter assignments were given instead of a single, high-stakes CJE.

In addition to reflecting on decisions made during the CJE assignment, students also reflected on incidents in practice when they had used their clinical reasoning skills. They described a variety of examples, some of the examples highlighted times when their clinical reasoning had resulted in a positive outcome, some students described a situation where they needed further input to come to a conclusion and some described having to reflect on a

breakdown in clinical judgment. One example of having to reflect on a breakdown in judgment was a student who stated: “lots of times unfortunately, things that didn’t go good are the things that I remember” (7).

A sixth conclusion emerged from the work of Cappelletti et al. (2014) who, based on Tanner’s (2006) review, conducted a recent review of the clinical judgment and clinical reasoning literature. The sixth conclusion was that “education strategies to improve clinical judgment may influence what a nurse brings to the situation” (p. 453). This conclusion was proposed in order to reflect a number of recent studies that investigated education strategies such as simulation, concept-based learning and cognitive maps to improve clinical judgment in beginning nurses (Cappelletti et al., 2014). Student participants were asked, during the interviews, about what had had an impact on their clinical reasoning skills. Most of the students indicated Context Based Learning (CBL) had impacted their clinical reasoning. They cited class discussion and thinking through scenarios as increasing clinical reasoning skills. Simulation was also mentioned as a type of experience that had helped them to work on their reasoning skills. Additionally, clinical experience was described by most students as being essential to the development of reasoning skills. Finally, students highlighted a variety of assignments that had helped them to make connections and see the relationships between concepts. A concept map assignment pertaining to a real patient in the clinical area, a concept paper requiring the comparison of two nursing concepts as well as the leveled CJE assignments were named as educational interventions that had positively impacted clinical reasoning skills.

The exploration of both Tanner’s (2006) and Cappelletti et al.’s (2014) conclusions about the nature of clinical judgment contributed to a deeper understanding of the findings of this study. Clinical judgment, even when exercised by third year students during a patient scenario

assignment, is a complex process that is influenced by more than the related cognitive processes. What the student brings to the assignment, the context in which the assignment is written and the learning that occurs upon reflection were all hidden elements of clinical judgment that were exposed by examining the conclusions derived from the synthesis of the literature. The limitations of the CJE assignment were also more fully understood by realizing that elements of clinical judgment such as knowing the patient, use of intuition based on experience and the ability to enter into the patient narrative were unavailable to the student participants. Finally, it was valuable to consider the sixth conclusion that education strategies may influence what the nurse brings to the situation (Cappelletti et al., 2014). It may be of interest to nurse educators that the education strategies proposed in the literature are the same strategies that the student participants named as being helpful to them in the development of their clinical reasoning skills.

Chapter Summary

This chapter provided a discussion of the study findings as they were presented in Chapter Four. The discussion began with a comparison between the study findings and what was found in the existing literature regarding the clinical reasoning of nursing students. Theme One: *Understanding of Clinical Reasoning* was explored in the context of other studies that demonstrated clinical reasoning improves over the time spent in a nursing education program and with studies that discussed how students perceived the development of their clinical reasoning over time. The concept of using an assignment to promote clinical reasoning was also examined in the context of the existing literature. Theme Two: *Making Sense of the Assignment* was explored by looking at each of the sub-themes with respect to the findings of others. The experience of *not knowing* was found to be similar to students who experienced confusion during an unfamiliar simulation experience, third-year students who demonstrated prioritizing and

hypothesis generation and students who experienced stress when working under time pressure (Goudreau et al., 2014; Wotton et al., 2010). Concerns identified by student participants about having to work independently and not having access to additional patient information were explored in the context of the clinical reasoning literature pertaining to working in pairs and the use of high-fidelity and virtual patient simulation. The sub-themes *knowing* and *applying knowing* were compared with Marchigiano et al.'s (2011) "thinking skills for nursing practice" and similarities were noted between the strategies related by the student participants and the "thinking skills" identified by the authors. *Valuing knowing* was found to be an element identified in two other studies that described how beginning nurses recognized the importance of the nursing process in their practice.

The study findings were also compared to the findings of Goudreau et al. (2014) who proposed stages of clinical reasoning as a result of their "think aloud" study with students, newly graduated nurses and experienced nurses. Similarities were found between the student participants' description of their thinking during each year of their program and what was present in the "think aloud" data from Goudreau et al. (2014). Goudreau et al.'s fourth stage of clinical reasoning, describing newly graduated nurses, did not align with the sub-theme of *valuing knowing* identified in this study. Finally, the findings from Theme Two were explored in relation to Tanner's (2006) five conclusions from her review of the clinical judgment literature as well as the sixth conclusion offered by Cappelletti et al. (2014). A deeper understanding of the study findings was achieved by considering the major factors that impact clinical judgment. Chapter Six will offer conclusions and recommendations based on the understanding of the research findings.

Chapter Six: Conclusions and Recommendations

The purpose of this study was to explore the clinical reasoning skills of students who, during their third year of their baccalaureate nursing program, applied the nursing process to complete a Clinical Judgment Exercise (CJE) assignment. In addition, how the students perceived the development of their clinical reasoning skills over time was explored. Chapter Six will consist of a summary of the study, a presentation of conclusions drawn from the findings and implications and recommendations for nursing research and nursing education.

Summary of the Study

Eight students who had completed their third year of study in a four-year baccalaureate nursing program at a college in western Canada were interviewed with respect to their use of clinical reasoning skills on an assignment. One overarching theme emerged from the data: *Over Time*. Under this overarching theme, two themes emerged from the data: Theme One: *Understanding Clinical Reasoning* and Theme Two: *Making Sense of the Assignment*. The sub-themes were *not knowing*, *knowing*, *applying knowing* and *valuing knowing*. The sub-themes that emerged from the data were the same for both Themes One and Two.

Conclusions

The following conclusions were derived from this study:

1. The student participants understood their clinical reasoning skills to have progressed through developmental stages corresponding to their years in the program. In reflecting on their first year, they expressed an awareness of their lack of understanding, while their second year brought an acquisition of information, which increased understanding. Third year was characterized by having developed a curiosity about why things are happening, an ability to put things together and to see the relevant data in a patient situation. The

final stage was characterized by an appreciation for the importance of excellent clinical reasoning skills to patient care as they anticipated independent practice.

2. The writing of the Clinical Judgment Exercise (CJE) assignment by the student participants involved application of clinical reasoning skills to figure out what was going on with the patient, to make sense of the data, make use of resources to increase understanding and to apply prior knowledge and experience to assist in making clinical decisions with respect to the patient scenario. The student participants perceived that their understanding of the patient's problem and the required nursing actions deepened over the time of writing of the assignment.
3. Some student participants perceived that although they were able to utilize their learning from clinical experiences in the writing of the CJE, they were challenged by never having had a patient with the same condition or similar acuity as the one described on the assignment. The literature suggests that pattern recognition is a primary clinical reasoning strategy used by experienced nurses.
4. Student participants perceived they were able to apply their learning from the CJE and other types of assignments in order to use the nursing process as a tool for carrying out clinical reasoning in practice.
5. The CJE was perceived as a stressful experience because of the limited time provided to complete it (24 hours), the expectation that it be completed independently and not having access to additional patient information such as the availability of medication orders.

Implications and Recommendations

The recommendations that follow are focused on the nursing domains most relevant to this study: nursing education and nursing research. The recommendations are derived from the findings of this study, but are substantiated by the existing research.

Implications for nursing research. One of the limitations of this project was the small sample size. Additionally, all of the participants were students from one college. All of the participants were female and Caucasian. A larger sample size may have increased the variability in the data, for example, the inclusion of male students or students from other cultural backgrounds may have provided alternate perspectives. Additionally, only one student participant expressed that she had not attempted to use clinical reasoning on the assignment because she was so worried about not having enough time to complete the assignment. With a larger sample size, there may have been more data from struggling students who were not able to engage with the assignment.

One of the major findings that emerged from this project was that the student participants perceived their understanding of clinical reasoning had developed over time as they progressed through their nursing program. Further qualitative research may yield a greater understanding of this phenomenon. Using a method that includes data collection from focus groups may add an element of synergy, increasing the richness of the data. Further research might also involve exploring the perceptions of clinical reasoning abilities of students in different years of their nursing program. The perceptions of students in the earlier years of their program may be different than those of third or fourth year students reflecting on their thinking in previous years.

Another major finding that emerged from the data was the students' description of how they used clinical reasoning in order to write the CJE assignment. Research methodologies other

than semi-structured interviews may yield additional perspectives on how nursing students use clinical reasoning. For example, studies using a “think aloud” methodology are prevalent in the literature seeking to describe the thinking of nurses as they employ clinical reasoning to a patient scenario. The collection and analysis of “think aloud” data from students working through a scenario or a written assignment may contribute to the understanding of the clinical reasoning skills being employed during the process.

Further research using a variety of methodologies is recommended to substantiate the work of researchers such as Goudreau et al. (2014) who have suggested that clinical reasoning develops through identifiable stages characterized by specific types of thinking. If developmental stages of clinical reasoning were described in the literature it would have implications for nursing education with respect to leveling of expectations of student performance. This knowledge would also contribute to understanding how nursing education would assist students to move from one stage to the next.

Implications for nursing education. The Canadian Association of Schools of Nursing (CASN) (2014) recognizes clinical reasoning as an essential component of nursing education. The National Nursing Education Framework: Preliminary Report states that baccalaureate programs prepare the student to demonstrate the use of clinical reasoning, nursing knowledge and other evidence to inform decision-making in diverse practice situations (CASN, 2014). The findings of this study contribute to understanding how students perceive the development of their clinical reasoning skills and how they perceive their application of clinical reasoning skills to a patient scenario on a written assignment.

An understanding of how students view the evolution of their own clinical reasoning is important to nurse educators as they develop curriculum and design classroom and clinical

experiences to promote the development of clinical reasoning skills. As more becomes known about the development of clinical reasoning, educators may be more able to level learning and assessment strategies to specific cohorts of students (Newton & Moore, 2013). If nurse educators are aware of how students in different years of the program perceive their clinical reasoning abilities, targeted educational strategies could be employed to best meet the needs of the students. Educators may also wish to utilize educational approaches that promote a variety of problem-solving strategies. For example, some student participants described their preference for systematic, linear processes, while others described success with creating a concept map. Additionally, some studies in the literature found students preferred journaling assignments with a clinical reasoning component.

Understanding how the student participants used clinical reasoning to complete the CJE assignment may give some insight to nurse educators about the benefits and drawbacks of using such an assignment as a strategy to promote or assess clinical reasoning. According to the findings of this study, the student participants did find the CJE assignment to be beneficial. They stated that it helped them to be “a bit quicker” in their reasoning process and they were better able to put the nursing process into practice in clinical situations. In reflecting on their clinical reasoning process after the assignment, some students identified they were able to learn from their mistakes. Nurse educators may wish to consider giving written or verbal summative feedback that assists the student to identify their errors in clinical reasoning on the assignment.

One of the findings of this study was that students found writing the CJE assignment to be stressful. One of the stressful elements was writing the assignment in 24 hours. Providing more time to write the assignment may decrease this stress. Student participants also expressed frustration about having to complete the assignment independently. Perhaps designing the

assignment to be completed in pairs or small groups would increase synergy and decrease concerns about not being able to check with others. As described in Chapter Five, several studies found benefits when experienced nurses or students worked in pairs or small groups on clinical reasoning scenarios (Forsberg et al., 2014; Glynn, 2012; Parsons & Teel, 2013; Van Horn, 2000). Finally, students expressed concerns about not being able to access additional information about the patient such as whether medication orders were available or not.

Adjustments could be made to the information provided to the students in the scenario in order to reduce points of confusion. Modifying the progression of the written assignment to include formative feedback from the instructor regarding decision points might also enrich the learning experience. Simulation or virtual patient scenarios could be considered as an alternative to the written CJE assignment as these strategies have the visual and unfolding elements not available in the written assignment.

Chapter Summary

This chapter provided a summary of the study and five conclusions drawn from the findings. The conclusions were as follows: 1) The student participants understood their clinical reasoning skills to have progressed through developmental stages corresponding to their years in the program. In reflecting on their first year, they expressed an awareness of their lack of understanding, while their second year brought an acquisition of information, which increased understanding. Third year was characterized by having developed a curiosity about why things are happening, an ability to put things together and to see the relevant data in a patient situation. The final stage was characterized by an appreciation for the importance of excellent clinical reasoning skills to patient care as they anticipated independent practice. 2) The writing of the Clinical Judgment Exercise (CJE) assignment by the student participants involved application of

clinical reasoning skills to figure out what was going on with the patient, to make sense of the data, make use of resources to increase understanding and to apply prior knowledge and experience to assist in making clinical decisions with respect to the patient scenario. The student participants perceived that understanding of the patient's problem and the required nursing actions deepened over the time of writing of the assignment. 3) Some student participants perceived that although they were able to utilize their learning from clinical experiences in the writing of the CJE, they were challenged by never having had a patient with the same condition or similar acuity as the one described on the assignment. The literature suggests that pattern recognition is a primary clinical reasoning strategy used by experienced nurses. 4) Student participants perceived they were able to apply their learning from the CJE and other types of assignments in order to use the nursing process as a tool for carrying out clinical reasoning in practice. 5) The CJE was perceived as a stressful experience because of the limited time provided to complete it (24 hours), the expectation that it be completed independently and not having access to additional patient information such as the availability of medication orders.

Implications for nursing research were reviewed and recommendations for further research regarding understanding of the development of clinical reasoning were made. Implications for nursing education were discussed with respect to the findings and recommendations were made regarding leveling of assignments to target the appropriate stage of clinical reasoning for the group of students. Additional recommendations were made regarding completing the assignment in pairs or small groups to improve learning and decrease stress and the incorporation of virtual patient or high-fidelity simulation to improve the visual and unfolding elements of a patient scenario based clinical reasoning assignment.

The purpose of this study was to explore the clinical reasoning skills of students who, during their third year of their baccalaureate nursing program, applied the nursing process to complete a Clinical Judgment Exercise (CJE) assignment. Although the sample was limited in size and variability, the findings may have implications for nursing research and nursing education as suggested in this chapter.

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Appendix A: Example of Third Year CJE Assignment

Clinical Judgment Exercise Assignment

In alignment with the third year nursing focus of caring for clients experiencing more acute variances in health, this exercise will give you the opportunity to implement the nursing process within an acute patient scenario. You are the RN who is the primary care giver to the client outlined in the scenario.

Please answer the following questions in your assignment:

- What assessments would be necessary to complete for your client in this scenario? Include your rationale.
- Identify the **3 key** nursing diagnoses for your client in this scenario.
- Out of the 3 key nursing diagnoses, what would your **priority** nursing diagnosis be? Provide your **rationale** for choosing that as your priority.
- What is the expected outcome for your client, related to the priority nursing diagnosis?
- What are the **5 most important** nursing interventions required to address the priority nursing diagnosis? Provide **rationale** for these interventions.
- How would you evaluate the expected outcome related to the priority nursing diagnosis you have chosen?

GUIDELINES:

- Please attach **the entire assignment package (including brainstorming, scenario & paper)** when you hand in this assignment.
- Be sure to put your name on the **scenario** and your **type written** answers.
- APA format (6th edition) is to be used to cite your title page as well as any references. A **minimum of three references** is required including at least one relevant peer reviewed journal article. Incorporate a minimum of three (3) different types of credible sources, such as; books, journal studies, and Web Pages. Writing and presentation style **must** utilize APA format.

The page limit is to be **no more than five pages** (1000-1200 words), excluding the title page, references and any appendices. It is highly recommended to place charts and/or tables as appendices if utilized.

Scenario

Patient History:

Shawna is a 66 year old female who has presented to the emergency room. Her husband Bill tells you that she looks really bad. You note that Shawna is moderately obese, Caucasian, who appears unkempt and is wearing a soiled night gown. At a glance you notice that she has deep even respirations and is relaxed but drowsy. Upon talking to her you observe that she is confused and has a foul odor about her. Bill reveals that the last week or so she has not taken her insulin regularly because she has not been eating. He also stated that Shawna had a left heel spur removed 6 weeks ago and was diagnosed with IDDM 15 years ago.

Shawna's chart tells you:

Hgb: 160 (Normal 135-145)

K: 5.8 (Normal 3.5-5.5)

Na: 110 (Normal 135-145)

Gluc: 35 mmol (Normal 3.5 -7.0)

Vital Signs: HR: 120 regular, BP: 88/64, T: 39.5 ° C, R: 28 deep and even

Confused x 12 hours

Has needed help with toileting x 3 days

Abd pain x 3 wks with nausea and emesis

Pain to Lt heal x 3 wk

Your assessment reveals:

Shawna's skin is flushed, hot and dry. Her mucous membranes are dry and she has poor skin turgor. You note she has a decreased level of consciousness and only arouses to gentle shaking. Her bowel sounds are hypoactive, and her abdomen is soft. She has a 7 cm open wound to the Lt heal, with a foul odor. The wound is painful to the touch and when you move her heel she moans.

You insert a large bore IV to Rt arm and a Foley catheter to urometer and await further Doctors' orders

Appendix B: Table Outlining the Literature Review

Date	Database searched	Key words used	Result
Oct. 2013	CINAHL search conducted to find studies for a graduate course assignment on an issue in nursing education.	Nursing diagnosis And problem solving And nursing students	19 retrieved 1 selected
Dec. 9/13	CINAHL and Medline	Nurs* And undergraduate or baccalaureate or education or degree And faculty or instructor or student And nursing process or nursing diagnos* And learn or understand or develop or create And clinical reasoning or clinical judgment or clinical judgement or critical thinking	38 studies retrieved. 4 selected
Feb. 28/14	CINAHL and Medline	nurs* And student or baccalaureate or undergraduate or associate degree or faculty 140,451 And nursing process OR nursing diagnosis 7974 And “critical thinking” or “clinical judgment” or “clinical judgement” or “clinical reasoning” (195 CINAHL) (MEDLINE 299) And assessment or assignment (CINAHL 71) (MEDLINE 48)	71 studies retrieved. 7 studies selected.

Appendix C: Literature Review Matrix

Author/Title/Journal	Year	Purpose	Definitions	Research Questions	Method	Results	Relationship to Capstone	Body of Literature
Facione/Critical thinking: A statement of expert consensus for purposes of educational assessment and instruction. Research findings & recommendations/ American Philosophical Association	1990	The identification of a clear and correct conceptualization of CT	-Classic CT -Ideal critical thinker -CT core cognitive skills and sub-skills		Qualitative method known as Delphi Method, an international panel of experts worked toward a consensus on the role of CT in educational assessment and instruction. 46 scholars, educators and leading figures in CT.	Recommendations address cognitive skill dimension of CT, dispositional dimension of CT & recommendations for instruction and assessment including curriculum. Discussion of CT assessment tools.	Seminal document to define and discuss critical thinking	Delphi Report Description of CT skills and the ideal critical thinker
Facione & Facione/Externalizing the critical thinking in knowledge development and clinical judgment/Nursing Outlook May/June	1996	To explore the consensus definition's value for describing the skill and disposition needed for competent clinical judgment in the nurse clinician. To demonstrate where CT is embedded in nursing education	CT		Discusses CT relative to clinical judgment in nursing and offers 3 examples: Holistic Critical Thinking Rubric, a Framework for Externalizing CT in a Presentation, Pedagogical Guide for modeling CT (case study)		Uses the language of CT to highlight to students the demonstration of CT required in the assignment. (identify, explain, conjecture, open-mindedness, application of reason, tolerance of different points of view.	Links initial work in critical thinking to a nursing context
Profetto-McGrath/The relationship of critical thinking skills and critical thinking dispositions of baccalaureate nursing students/Journal of Advanced Nursing 43(6) 569	2003	To investigate the CTS and CTD of students in a baccalaureate nursing program	CT CTS CTD	What are the CTS and CTD of nursing students? Do students' CTS and CTD scores differ according to # of years in program? Is there a relationship between CTS and CTD scores?	Cross-sectional design. Data collected during classes. N=649 n= 228 students from all 4 years. Completed CCTST, CCTDI & background questionnaires. Used descriptive and inferential statistics.	CT mean scores increased from years 1 to 4 with exception of year 3. Differed in systematicity subscale. Sig. relationship between overall CTS and CTD scores. No difference in CTD scores. 38% of students had adequate levels of CTS 85.5% had adequate levels of CTD.	Seminal research into Critical Thinking specifically related to nursing students. Compares disposition to skills.	Quantitative research on CT skills and dispositions in baccalaureate nursing students and looks for relationships between CTS and CTD and changes overtime.
Duchscher/Critical thinking:	2003	To explore the	CT	How do nurses	Qualitative.	Knowledge	Defends a	Qualitative study

Perceptions of newly graduated female baccalaureate nurses/Journal of Nursing Education 42(1)		development of thinking in five newly graduated baccalaureate RNs		perceive critical thinking?	Combined phenomenological and feminist process. Purposive sampling: 5 new grads. 2 in-depth interviews each, at 2 months and 6 months after graduation. Audio taped. Constant comparative member checking. Participants kept reflective journals	development: Initially mapping what they had learned, little confidence in their own voices, relying on rules and judgments of others. Develop responsibility for judgments and able to disagree with authorities, recognize inherent knowledge and multiple truths. Development of critical thinking: no reflection, unable to see beyond the task, CT perceived as woven into the NP, keeping an open mind, generating various perspectives, coping with uncertainty.	qualitative approach to the issue. Literature review includes outcomes of prior studies. (Canadian) Discusses implications for nursing education.	about thinking processes. Also explores whether nursing practice influences critical thinking.
Allen, Rubinfeld, Scheffer/Reliability of assessment of critical thinking/Journal of Professional Nursing 20 (1) 15	2004	-Used 2 kinds of writing assignments: student response to a clinical vignette describing how the student would apply specific CT dimensions OR write about how they have used a CT dimension in recent clinical activities. -Purpose is to measure reliability of evaluation of these assignments	CT as composed of 17 Dimensions	What is the reliability of the instrument? (scoring rubric)	2 instructors at different BSN programs were trained to administer and evaluate assignments of 38 senior students. Instructors sent in copies of responses and scores, responses graded by 2 authors.	254 essays evaluated for 8 CT dimensions. Cross tabs and chi square for 2 authors scores showed reliability at .75	-Described assignment. -Vignette: use of NP to demonstrate critical thinking vs identify and apply specified elements of CT -leveled rubric and scores	Educational intervention and assessment of CT
Kuiper & Pesut/Promoting cognitive and metacognitive reflective reasoning skills in nursing practice: Self-	2004	Explore the impact of self-regulated learning theory on reflective practice	-Self-regulated learning theory -CT -Reflection	What does the literature say about CT and reflective thinking?	Integrative literature review. 20 years - Database search for clinical reasoning,	Need to add the influence of reflection to critical thinking, the 2	Does thinking during the CJE tap into cognition and reflection? Some	Theory: self-regulated learning theory -Historical journey:

regulated learning theory/Journal of Advanced Nurs 45(4) 381		in nursing and to advance the idea that both cognitive and metacognitive skills support the development of clinical reasoning skills.			cognition, critical thinking, metacognition, reflection, reflective practice, self-regulation and thinking.	come together through the use of self-regulated learning prompts. Interventions such as guided reflection improved reflectivity.	info about results of qualitative studies -id perception of student-teacher relationship as a confounding variable.	WGCTA, IP, Benner, NP, CCTDI, lack of context, influence of reflection (Dewey, 1933), levels of reflexivity
Di Vito-Thomas/Nursing student stories on learning how to think like a nurse/Nurse Educator 30(3) 133	2005	To understand nursing students' perspectives about the phenomenon of critical thinking and what they believed to be the most helpful teaching- learning strategies in developing those thinking skills.	CT		Participants: 134 nursing students (Jr. and Sr.) from 4 universities. Recruited by written invitation. Analysis of written responses to 2 questions using a constant-comparative approach (Grounded Theory). Results expressed in narrative statements of the story, grounded in the data. Student exemplars provided.	Descriptions of the experiences of nursing students in response to the study questions. "Students described their thinking as a cognitive process, developing through experience in practice, will improve with time and opportunities, need for real life situations, mind picture of pt. problems...."	Gives examples of student responses to the question "How would you describe how you think?" Qualitative methodology.	Qualitative study asking nursing students to describe their thinking when making clinical judgments. Narrative description of what was done and the results found.
Abel & Freeze/Evaluation of concept mapping in an associate degree nursing program/Journal of Nursing Education 45(9) 356	2006	To evaluate concept mapping as a clinical teaching-learning activity that reflects CT by promoting id of nonlinear relationships among the components of the nursing process.	-Concept Map -CT -NP	-Can ADN students demonstrate CT and use of the NP in a concept map to describe the care of hospitalized clients? -Can concept maps measure purported changes in CT ability over time? -How do ADN students and faculty evaluate the use of concept maps as a clinical learning activity?	28 ADN students each completed 4 concept maps. - Partial replication of previous study -Study takes place over one year. -each map is scored -students received instruction on concept mapping and clinical supervision from the same 2 instructors throughout the year. -inter-rater reliability established in a pilot study	Map scores increased with progression through curriculum, -different types of map scores were compared, differences between early maps and later maps were statistically significant. -no differences between clinical placements	-how students utilize knowledge on an assignment -using the nursing process in a nonlinear way -students commented on their learning through the assignment -hierarchical concept maps	-Educational intervention -Concept maps to promote CT and evaluate CT -leveling off of CT improvement near end of program
Ellerman, Kataoka-Yahiro & Wong/Logic models used to enhance critical thinking/Journal of Nursing	2006	To share one school's experience of integrating logic in the curriculum	-Logic models -Concept mapping	Did students' self-reported CT improve over time? What did students	33 graduating (4 th year) students completed a questionnaire to	-self-reported CT improved over time -contribution of logical thinking to	-non-linear -the NP needs to be supplemented with the logic model	-Logic Model -Educational Interventions -concept map, case

Education 45(6) 220		as a means of enhancing the development of critical thinkers.		report as their method for making clinical decisions? What did students say about how they make decisions and the role of logic?	evaluate the effects of teaching logical reasoning to support CT. In-class survey. -t tests Qualitative content analysis used to analyze narrative data and identify themes (answers to open-ended Q)	CT (6.9/10) -all students selected NP as one of their clinical decision making methods. 84% chose logical reasoning	-students rated their CT development over time.	studies, simulation, concept paper, community project.
Tanner/Thinking like a nurse: a research based model of clinical judgment in nursing/Journal of Nursing Education 45(6)204	2006	To review the growing body of research on clinical judgment in nursing and to present an alternative model of clinical judgment based on these studies.	-NP -CJ -CR		Review of nearly 200 studies, drawing 5 conclusions. -Update of a 1998 review of 120 studies. -CINAHL: CJ, CDM, English, nsg. Journals. Additional 71 studies found.	-Literature related to theoretical perspectives -nurse brings patient -context -variety of reasoning patterns -reflection	-NP fails to describe nursing judgment	Clinical Judgment Model -noticing -interpreting -responding -reflecting -reviewing
Chabeli/Facilitating critical thinking within the nursing process framework: A literature review/ Health SA Gesondheid 12(4)69	2007	To describe how critical thinking of nurse learners can be facilitated using the framework of the nursing process. The purpose is realized by the description of the critical thinking core cognitive thinking skills, their related sub-skills and the affective disposition within the phases of the nursing process.	-CT -NP	-Which critical thinking skills does the nursing profession need to render excellent care to patients? -RQ: how can critical thinking of nurse learners be facilitated using the nursing process framework?	Literature review. Used textbooks and studies to synthesize NP and CT core cognitive skills. No description of how the literature was searched.	Detailed description of how the nursing process requires the utilization of the core cognitive thinking skills.	Definitions of NP and examination of critical thinking concepts.	Lit. review of NP and CT. Developed theory for integration.
Banning/The think aloud approach as an educational tool to develop and assess clinical reasoning in undergraduate students/ Nurse Education Today	2008	To examine the use of the think aloud approach as an exemplar of a teaching and learning strategy that can be employed to	-Clinical reasoning -Think aloud				Explores clinical reasoning. Talks about cognitive strategies	Describes how a think aloud approach may impact clinical reasoning. More of a lit review on clinical reasoning.

		develop nurses' ability to clinically reason.						
Bartlett, Bland, Rossen, Kautz, Benfield & Carnevale/Evaluation of the outcome-present state test model as a way to teach clinical reasoning/Journal of Nursing Education 47(8)	2008	To determine whether students in an undergraduate psych/MH nursing course could learn to complete the cognitive activities used with CR webs and the OPT model.	-Clinical reasoning		43/45 students in one course. Students complete the OPT model worksheet using info from their patient, following instructions. One case study before and after clinical experiences and one OPT model on their assigned client each week. All models scored using a rating tool. Used descriptive statistics, correlations and t tests.	Significant difference found between pre-test and post-test scores (intervention was providing feedback on weekly opt care plans in-between pre and post-tests). 14/43 students did not achieve the criterion score of 65/74 on 3 models. No correlations with demographic variables or time to complete.	Discusses the use of the NP to develop clinical reasoning (via the use of the OPT model). Use of multiple episodes of feedback as an intervention to improve learning. OPT model improves the use of NANDA, NIC & NOC Talks about measures for CR and leveling.	OPT model as an educational intervention for improving clinical reasoning. Assumes higher scores on OPT models is equivalent to improved clinical reasoning (but this requires further research) Equates increasing complexity with increasing CR. Does not measure quality of responses.
Lee & Brysiewicz/Enhancing problem solving and nursing diagnosis in year III bachelor of nursing students/Nurse Education Today 29, 389.	2009	To implement a change in the clinical nursing course in the third year of the BN program and determine if this change improved students' problem solving and care planning	-Nursing diagnosis -triple jump in context of NP	Is there a significant difference between the control and treatment group in triple jump (problem solving) scores? Null hypothesis identified.	Third year students in 2006 were exposed to a 9 step problem solving process and were instructed on how to formulate nursing dx. Triple jump marks from third year 2005 (n=39) were compared with marks from 2006 (n=31). -Quasi-experimental -Qualitative student data reported in a different study. -Comparison also between semesters I and II for 2006 group.	140 triple jump scores were compared on total and individual item scores. Chi square tests were used to compare changes in scores. The intervention was seen to be moderately effective	Triple jump and student difficulties with it.	Educational intervention: 9 step problem solving process.
Palese, De Silvestre, Valoppi & Tomietto/A 10-year retrospective study of teaching nursing diagnosis to baccalaureate students in Italy/International Journal of Nursing Terminologies and	2009	To evaluate the impact of teaching nursing process to students at different levels of baccalaureate education using		Study focus was on the types of patients students chose for their care plans. Unclear how accuracy or increased critical	3784 Nursing care plans written between 1996 and 2006 by 284 students who completed a course in NP at a university	An average of 6.3 problems identified in each care plan, of these 5.1 were related to nsg. dx concerning a problem or risk. 1.2	Accurate use of NANDA taxonomy is acquired over time. "No comparable data in the literature that explain students'	Retrospective study of written assignments. Care plans. Talk about types of actual patients as related to care

Classifications 20(2) 64		NANDA taxonomy		thinking was demonstrated.	in Italy. Variables are dichotomous, continuous and qualitative. Chi square tests. Analysis of variance and t tests, odds ratios.	dx were concerned with collaborative problems or complications. Significant improvements in identification of NANDA dx. were noted as the students progressed through years 1,2&3.	decision making in planned interventions” Evaluation criteria and evaluation are lacking. Learning to write a care plan takes at least 3 years.	plans, some discussion of improvement with progression.
Ramenzani-Badr, Nasrabadi, Yekta & Taleghani/ Strategies and criteria for Clinical decision making in critical care nurses: A qualitative study.	2009	To explore the reasoning strategies and criteria for clinical decision making used by Iranian critical care nurses	Reasoning strategies, criteria for clinical decision making.		Qualitative design, purposive sampling. 14 critical care nurses from 4 hospitals in Iran. Nurses had at least 3 years of critical care experience and a bachelor’s degree in nursing. In-depth semi-structured interviews.	3 themes emerged concerning reasoning strategies: intuition, recognizing similar situations and hypothesis testing. 3 themes emerged regarding criteria for decision making: patients’ risk-benefits, organizational necessities and complementary sources of information.	Qualitative study about clinical reasoning. Asked experienced nurses how they found out the patient has a problem, what ways they used to reach the decision they made and how they selected their option for care.	The themes add insight into the reasoning strategies used in clinical decision-making.
Levett-Jones, Hoffman, Dempsey, Yeun-Sim Jeong, Noble, Norton, Roche, Hickey/The ‘five rights’ of clinical reasoning: An educational model to enhance nursing students’ ability to identify and manage clinically ‘at risk’ patients/Nurse Education Today 30 515	2010	To explain the proposed clinical reasoning model: look, collect, process, decide, plan, act, evaluate, reflect	Clinical Reasoning			Describes the model: right cues, right patient (recognition of deteriorating pt.), right time, right action, right reason	Comes from work on identifying thinking strategies of novice and expert nurses in practice	Creation of a clinical reasoning model, which can be applied in an education setting as well as clinical practice
Paans, Sermeus, Nieweg & Vander Schans/Determinants of accuracy of nursing diagnoses: Influence of ready knowledge, knowledge sources, disposition toward critical thinking and reasoning skills/Journal of	2010	To determine how knowledge sources, ready knowledge and disposition toward critical thinking and reasoning skills influence the	-Nursing - Diagnosis -Ready knowledge	RQ What is the effect of knowledge sources? What is the influence of knowledge? What is the influence of disposition toward	Pilot study 100 3 rd and 4 th year students. Randomized to groups. RCT to determine the influence of knowledge sources	Students were unable to operationalize knowledge sources to derive accurate diagnoses and did not effectively use reasoning skills.	Students were assigned to interview a diabetes or a COPD standardized pt. and make dx. -Analyticity may contribute to	What contributes to student success in critical thinking? Where are students struggling/ having low scores? Specific to ND

<p>Professional Nursing 26(4) 232</p>		<p>accuracy of student nurses' diagnoses.</p>		<p>CT? What is the influence of reasoning skills?</p>	<p>on accuracy of ND. 2 groups of students formulate ND for standardized pt. one group was allowed knowledge sources, the other was not. Video taped. Questionnaires knowledge inventory (4 multiple choice, case related Q) CCTDI & HSRT Inter-rater reliability tested -group means/sd, Mann-Whitney & Kruskal-Wallis, Chi square.</p>	<p>Students who scored high on the analysis domain of the HSRT scored sig. higher on accuracy of dx.</p>	<p>formulating an accurate nsg. Dx.</p>	
<p>Burns, O'Donnell & Artman/High-fidelity simulation in teaching problem solving to 1st-year nursing students: A novel use of the nursing process/Clinical Simulation in Nursing 6 e87-e85</p>	<p>2010</p>	<p>To determine the efficacy of using high-fidelity simulation to facilitate 1st yr. nursing. students learning of problem-solving skills. (In addition to lecture)</p>	<p>NP</p>	<p>Hypothesis: that adding high fidelity simulation to traditional lecture is an effective method of facilitating 1st yr. nursing. Students' knowledge of the NP</p>	<p>Knowledge and attitude changes were evaluated using pre and post tests. 84 1st year students enrolled in a course at one university. Knowledge improvement measured with multiple-choice tests re NP and specific pt. states. 114 students: Attitude measured with 14 item instrument. (domains) Wilcoxon's signed rank test, paired t test. Students indicated a higher level of understanding of and comfort with the nursing process.</p>	<p>82% of students showed a significant gain in knowledge -Some qualitative data obtained from end-of-course evaluations: indication of satisfaction -Attitude: students gained in 6 of 14 survey items No control or comparison group, no comparison with other education approaches.</p>	<p>NP Simulation for students with no previous clinical experience. Limitations include expense and availability of human and tech resources.</p>	<p>Use of Simulation to teach critical thinking. Educational Intervention</p>
<p>Wangensteen, Johansson, Bjorkstrom & Nordstrom/Critical thinking dispositions among newly</p>	<p>2010</p>	<p>To describe critical thinking dispositions among newly graduated</p>	<p>CT CCTDI table</p>		<p>Cross-sectional descriptive study. Participants; newly graduated, working</p>	<p>80% of respondents reported a positive disposition to critical thinking.</p>	<p>Critical thinking competence has been designated as an outcome for</p>	<p>Quantitative study of demographic characteristics associated with</p>

<p>graduated nurses/Journal of Advanced Nursing 66(10)2170</p>		<p>nurses in Norway and to study whether background data had any impact on critical thinking dispositions.</p>			<p>nurses from 27 universities in Norway. N=2675 Background questionnaire and translated CCTDI mailed out. Response rate of 33% n=614. Dropout analysis done. Chi square analysis</p>	<p>Highest mean score was inquisitiveness and lowest was truth seeking. Nurses with high CT scores were older than 30 years, had prior university education and worked in community health care.</p>	<p>judging the quality of nursing education programs and for the development of clinical judgment. Prior healthcare experience did not contribute to critical thinking. Will age, and prior education influence thinking on CJE? What role does truth-seeking play in the assignment?</p>	<p>CCTDI scores.</p>
<p>Wotton, Davis, Button & Kelton/Third –year undergraduate nursing students’ perceptions of high-fidelity simulation/Journal of Nursing Education 49(11) 632</p>	<p>2010</p>	<p>Evaluate nursing students’ perceptions of their experiences with 3 HF Simulations in a clinical nursing course.</p>	<p>HFS</p>		<p>300 students participated in 3 simulations and completed an evaluation form with 11 Likert scale questions and 3 open-ended Q. SPSS to analyze data.</p>	<p>90% of students agree/strongly agree: with evaluation questions ie enjoyment, challenge, curiosity 45% of students agree that they were feeling lost. Also qualitative data collected in response to the same questions. Themes (10) ie; confidence, rationale, knowledge, understood more.</p>	<p>Student perceptions on a SIM as compared to on an assignment. Some qualitative responses about thinking.</p>	<p>SIM CT Some qualitative data.</p>
<p>Thompson & Stapley/Do educational interventions improve nurses’ clinical decision making and judgment? A systematic review/International j of nursing studies 48(p. 881</p>	<p>2011</p>	<p>To synthesize and summarize the comparative evidence for educational interventions to improve nursing judgments and clinical decisions.</p>			<p>A systematic review. Searched all major databases for studies published since 1960 reporting any EI aimed to improve nurses clinical judgments or decision making. Quantitative Studies assessed for relevance and quality. Data extracted for design,</p>	<p>5262 citations, 24 studies included in review. Study quality and content reporting was generally poor. Wide use of pedagogical theories, rare use of decision theory, efficacy and effectiveness of interventions was mixed.</p>	<p>Provides a broad look at educational interventions (including PBL) for decision and judgment skills in nursing. Range of countries, experience, and settings. Identifies gaps in the literature ie not enough good quality studies.</p>	<p>A systematic review of the effectiveness of educational interventions</p>

					setting, participants, skills/theory, type of decision, efficacy or effectiveness. Narrative approach. Students and PD included.			
Marchigiano, Eduljee & Harvey/Developing critical thinking skills from clinical assignments: A pilot study on nursing students' self-reported perceptions/Journal of Nursing Management 19(1) 143.	2011	To examine students' perceived levels of confidence for using thinking skills when completing two types of clinical assignments. To determine whether students noted a difference between the 2 formats in relation to promoting and using thinking abilities.	Clinical reasoning CT NP		Pilot study. Quantitative. Descriptive cross-sectional design. Theoretical framework of CT within the NP framework. Third year Undergraduate students (n=51) completed surveys indicating their confidence in using 7 thinking skills for nursing care. Demographic variables were explored to see if they contributed to the differences. Paired t tests, Wilcoxon matched pairs, bivariate analyses.	Students indicated significantly more confidence when implementing the journal format as compared with the care plan format when analyzing information, determining relevance, making connections, selecting appropriate information, applying relevant knowledge and evaluating outcomes. Did not look at age differences, all students 20-22.	Explore an educational strategy and assess nursing student's self-reported perceptions of developing thinking skills for clinical reasoning in the management of patient care when completing a clinical assignment. The survey instrument may be valuable for my interview guide. Suggests including faculty perceptions of assignments.	Compared 2 types of assignments to determine which one student's find increased their CT skills. Uses Facione's cognitive dimensions and sub-skills. Metacognition
Newton & Moore/CT skills of basic baccalaureate and accelerated second degree nursing students/Nursing Education Perspectives 34(3)	2013	To describe the critical thinking skills of basic BSN and ASD students newly admitted to one large Midwestern BN program and to discuss the education implications of the findings.	CT	What are the CT abilities of basic-BSN and accelerated second-degree nursing students at program entry? Do the CT abilities of basic BSN and ASD nursing students differ?	Exploratory descriptive method. Sample: 4 cohorts of 1 st semester BSN students (2 basic BSN and 2 ASD). n=283 Tool: Critical Thinking Assessment: Entrance (CTAE). Basic and ASD students take the CTAE in the 1 st month of the program. Scored by ATI the developer of the tool. Reports are generated for each student. Analysis	ASD students had higher CT scores on quantitative CT assessments at program entry than basic BSN students. (Students who had previous degrees before entering the nursing program had higher CT scores) Significant difference for 4/6 competencies. Lowest: inference Highest: self-regulation	Need for a discipline specific outcome measure for CT for nurses. Is the CCTDI may not be measuring CT with respect to nursing (Stewart & Dempsey, 2005) Is inference a higher order CT skill that requires education beyond BSN or is the Delphi report written at a level higher than most freshmen	Compares CT of Basic & ASD students. Educational implications: educators need to adapt students' theoretical and clinical experiences to better match their actual CT skills and abilities. Further research into nursing students' critical thinking is warranted especially how CT is manifested in

					used t tests to compare scores.		sophomores in college today can comprehend? Conclusion calls for more research examining CT from an evolutionary perspective across educational tracks.	clinical practice. A more qualitative approach to assessing nursing students' CT abilities may be needed to help develop teaching-learning strategies appropriate to the different cohorts of students,
Forsberg, Ziegert, Hult & Fors/Clinical reasoning in nursing, a think-aloud study using virtual patients- a base for an innovative assessment/Nurse Education Today 34/538-542	2014	To investigate how experienced pediatric nurses reason regarding complex virtual patient (VP) cases and how they make clinical decisions.	CR VP Think-aloud (TA)	RQ	30 pediatric RNs in Sweden. Think-aloud method, content analysis. Nurses, in pairs, were invited to solve 2-3 VP cases, asked to think aloud during the problem solving process as if the had encountered a real patient. The TA sessions and a follow-up interview were tape-recorded, transcribed, read, coded and compared between 2 authors.	Nurses try to consolidate a hypothesis by seeing a pattern and judging the value of signs & symptoms, physical exams, lab tests, radiology. Showed high specific competence but experience with similar cases was important in clinical decision-making.	Ch. 6. VPs are a useful method for assessing CR	Alternatives to CJE for assessment of CR
Goudreau, Boyer & Letourneau/Clinical nursing reasoning in nursing practice: A cognitive learning model base on a think aloud methodology/Quality Advancement in Nursing Education 1 (1) Art. 4	2014	To develop a cognitive learning model of Clinical Reasoning in Nursing (CRN) based on the results of a TA exercise performed by undergraduate nursing students and RNs. To determine CRN's developmental stages to identify critical milestones of these stages.	CRN		TA used to generate verbal data. Sample was 1st, 2 nd and 3 rd year students, new grads and experienced RNs (N=66). Participants invited to think aloud during 5 scenarios in an individual interview. Participants asked for their initial thoughts, adding information and thinking again. Interviews transcribed & imported into QDA	1 st year students "I need to know what to do" 2 nd yrs. "I need to justify my actions using evidence-based resources, 3 rd yrs. "I adapt my interventions to each clinical situation" new grads: "I adapt my interventions to the unit routines" experienced: "I adapt my interventions to a specific nursing domain."	The stages are related to study sub-themes in progression of knowing. The difference is that study data came from student reflection. "The stages are distinct and complement each other and they all build on the preceding ones." p. 10	Canadian study, studies undergraduate nurses, qualitative data.

					Miner 3.0. Analysis of sentences, meanings and scripts followed. One descriptive narrative was written for each of the 5 groups. Integration and interpretation of narratives resulted in a chart.	Milestones and a cognitive learning model were developed.		
National Nursing Education Framework: Preliminary report/Canadian Association of Schools of Nursing (CASN)	2014	To articulate core expectations within and across degree levels. Its purpose is to provide schools of nursing with national consensus based guidelines that may be used in developing, reviewing, evaluating, or modifying programs.			Domain 3: Nursing Practice. Guiding Principle: Programs provide practice learning experiences to develop safe, competent, compassionate, ethical and culturally safe entry-level nurses. Essential components: The program prepares the student to demonstrate: 2. the use of clinical reasoning, nursing knowledge and other evidence to inform decision-making in diverse practice situations.			
Cappelletti, Engel & Prentice/Systematic review of clinical judgment and reasoning in nursing/Journal of Nursing Education 53(8) p. 453-458	2014	To update the body of knowledge, specifically on clinical judgment and reasoning in nursing, since Tanner's review (2006)	Clinical judgment CR	RQ	4 electronic databases searched for studies pertaining to clinical judgment and CR in nursing from 1980-2012	Initial search: 2353 papers. 15 papers used for synthesis. 7 quantitative, 7 qualitative. Data was abstracted into a table and analyzed using Tanners 5 conclusions from 2006. A 6 th conclusion was recommended: "education strategies to improve CJ may influence what a nurse brings to the situation" p. 3	Tanner and Recent studies conclude: experienced nurses respond intuitively, beginning nurses rely on textbook knowledge.	Systematic review

Appendix D: Interview Questions

1. Tell me about how you have seen your critical thinking develop/evolve over the three years you have been in this nursing program?

2. What has had an impact on the development of your critical thinking skills?

Prompt: that is very interesting – tell me more about the example you’ve just shared with me...

3. I understand you have completed several clinical judgment exercises in the course of your studies in the nursing program. In thinking about your last CJE, walk me through your thought processes as you approached each phase of the assignment?

Prompt: What was your first response after reading the patient information?

Prompt: How did you decide which information was important?

-Relevant vs irrelevant, what to pay attention to

Prompt: With all this information you were considering, how did you put it all together, how did it all connect?

4. As you know this is a two-part assignment: the exam-room part and the take home part. As you worked on the take-home part, describe how you began to create the care plan.

Prompt: Tell me how you decided on the goals,

Tell me how you decided on the interventions,

Tell me how you decided on the evaluation

5. Tell me about how your previous patient care experiences influenced your thinking about the “patient” in the CJE assignment? How were you able to use your prior knowledge on the assignment?

6. In what ways has the CJE assignment helped you with your critical thinking skills on other assignments?
7. How do you think the nursing process stimulates critical thinking or clinical reasoning?
8. Describe how you have used your critical thinking skills to make decisions about patients you have cared for?
9. Prompt “How do you get to a place where you can do this?” * (added after Interview 3)
10. What are your thoughts about why nurses need these types of critical thinking/clinical reasoning skills?
 - I’m very interested in hearing about some examples you might have of why nurses need these skills

Appendix E: Copy of Consent Form

Approval Date: July 8, 2014

Consent Form**Clinical Reasoning on an Assignment: Perceptions of Third Year Baccalaureate Nursing Students**

Principal Investigator: Karen Oostra, Graduate Student, Masters of Science in Nursing, Trinity Western University.

Supervisor: Dr. Barbara Astle, Associate Professor, School of Nursing, Trinity Western University.

This research is part of a Capstone Project submitted in partial fulfillment of the requirements for the degree of Masters of Science in Nursing at Trinity Western University.

Purpose: The purpose of this research is to explore the clinical reasoning skills of third year baccalaureate nursing students as they apply the nursing process to complete a Clinical Judgment Exercise (CJE) assignment.

Research Questions

1. What are the third year baccalaureate nursing students' perceptions of how they apply the nursing process to demonstrate clinical reasoning on the CJE assignment?
2. What are the third year baccalaureate nursing students' perceptions of how prior knowledge and experience informs their clinical reasoning?
3. How do third year baccalaureate nursing students describe the impact of the CJE on future clinical reasoning with respect to written assignments or patient care?

Procedure: If you agree to participate, you will be interviewed for 45-60 minutes by the Principal Investigator at a mutually agreed upon time and location. The interview will be audio recorded. After the interview there will be a short debriefing session. You will receive a copy of the consent form to take home. A summary of research findings will be available to participants by contacting the Principal Investigator.

Risks: Depending on your experience with the assignment it is possible you may have feelings of frustration anger or disappointment during the interview. If you feel at any point you need to withdraw from the study, please know you can do so with no negative consequences.

Benefits: The benefit you may receive from participating in this study is the opportunity to reflect on your critical thinking/clinical reasoning processes. This may help you in future academic work or with future patient care. There is no direct benefit, physical or monetary from participation in this study.

Confidentiality: Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission or as required by law. Research materials will be identified by a participant number and kept in a secure digital file stored on a password-protected computer. A key code (linking participant

names to participant numbers) will be stored in a separate secured electronic file, apart from the data. All hard copy documents will be stored in a locked filing cabinet. Research participants will not be identified by name in any reports of the completed project. Data recordings and transcripts will be kept for five years after the project is completed in a password protected electronic file. After this time period, they will be destroyed. Hardcopies will be shredded after the completion of this project.

Remuneration/Compensation: A \$5.00 coffee card will be provided as a “thank you” for participating in the study, and you will receive it after the interview is completed. If you withdraw from the study at a later stage, you may keep the coffee card.

Contact information about the study: If you have any questions or desire further information with respect to this study, you may contact Karen Oostra (the Principal Investigator)

Contact information about the rights of participants: If you have any concerns about your treatment or rights as a research study participant, you may contact the Office of Research, Trinity Western University at 604-513-2142.

Consent: Your participation in this study is entirely voluntary and you may refuse to participate or withdraw from the study at any time without any negative outcomes to you; related to your work or this study. If you wish to withdraw at any time, please let the Principal Investigator know of your decision not to continue and your answers and information will be removed from the study and destroyed. Any written material will be shredded and recorded data destroyed. No information that you have given will be included in the study.

Signatures: Your signature indicates that you have had all questions about the study answered to your satisfaction and have received a copy of this consent form for your own records.

Your signature means that you consent to participate in this study and that your responses will be kept anonymous and destroyed after the completion of this study.

 Research Participant Signature

 Date

 Printed Name of the Research Participant signing above

 Researcher Signature
 Karen Oostra

 Date

Appendix F: Code-Book

1. Thinking has changed
 - a. Influence of Context Based Learning (CBL)
 - b. Exploring multiple perspectives
 - c. New ideas
 - d. Trying to “figure things out”
 - e. Putting things together
2. Impact on critical thinking
 - a. Influence of the instructor
 - b. Arrival in third year (Steps to learning)
 - c. Application
 - d. Clinical experience
3. Navigating the Clinical Judgment Exercise (CJE)
 - a. Prioritizing based on presentation
 - b. Looking for exceptions
 - c. Making connections
 - d. Difficulty choosing one priority
 - e. Not like in real life
 - f. Generating questions about required data
 - g. Recognizing many avenues
 - h. Need time to reflect
 - i. Looking for the right answer
 - j. Using the experience of others

- k. Stressful
- l. Looking deeper
- 4. Developing the Care Plan
 - a. Reflection
 - b. Collaboration
 - c. Use of resources
 - d. Use of common sense
- 5. Impact of patient care experiences on CJE
 - a. Easier to imagine the patient
 - b. Support interventions with experience
 - c. Reality differs from the “textbook”
 - d. Have not yet had that type of patient
- 6. Impact of prior knowledge on CJE
 - a. Link prior knowledge to current thinking
 - b. Learning from others
- 7. Impact of CJE on patient care (nursing practice) or other assignments
 - a. Helped to create goals
 - b. A lot to consider
 - c. Prioritizing the correct information
 - d. Not clear cut
 - e. Providing rationale
 - f. Coming up with a plan
 - g. Moving the nursing process into practice

8. Critical thinking to care for patients
 - a. Asking questions
 - b. Challenging the status quo
 - c. Distinguishing abnormal from normal
 - d. Critical thinking and advocacy
9. The value of critical thinking in nursing
 - a. Nursing set apart from other disciplines
 - b. Nurses demonstrate clinical reasoning
 - c. Importance of reflection
10. Evaluating the CJE
 - a. Helps to apply the information
 - b. CJE becomes more realistic over time
 - c. Forced to make assumptions
 - d. A conversation would be better

Appendix G: Trinity Western University Research Ethics Board Approval

TRINITY WESTERN UNIVERSITY
Research Ethics Board (REB)
CERTIFICATE OF APPROVAL

Principal Investigator: Karen Oostra
Department: Master of Science in Nursing
Supervisor (if student research): Dr. Barbara Astle
Co-Investigators: None

Title: Clinical Reasoning on an Assignment: Perceptions of Third Year
Baccalaureate Nursing Students

REB File No.: 14G08
Start Date: July 8, 2014
End Date: January 31, 2015
Approval Date: July 8, 2014

Certification

This is to certify that Trinity Western University Research Ethics Board (REB) has examined the research proposal and concludes that, in all respects, the proposed research meets appropriate standards of ethics as outlined by the "Tri-Council Policy Statement: Ethical Conduct of Research Involving Humans".

REB Coordinator

REB Chair

This Certificate of Approval is valid for one year and may be renewed.
The REB must be notified of *all* changes in protocol, procedures or consent forms.
A final project form must be submitted upon completion.