Exploring Critical-Care Nurses’ Perceptions About Critical Thinking

Lynn M. Varga, B.Sc.N. (Hons)

Department of Graduate and Undergraduate Studies in Education

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Faculty of Education, Brock University
St. Catharines, Ontario

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Abstract

The influx of nurses to the critical-care environment is continuous. In many workplaces, the nurses who are new to critical care are also newly graduated nurses. These new critical-care nurses and their critical-care nursing colleagues, who may have worked in critical care for many years, need to demonstrate expert judgment in order to optimize the potential for positive patient outcomes. The purpose of this study was to explore critical-care nurses’ perceptions about critical thinking and expert nursing judgment. Using grounded theory research design, I collected data from 11 critical-care nurses through focus groups, an interview, and postparticipation questionnaires. I have articulated a Critical-thinking Model for Expert Nursing Judgment. The educational model is directly relevant to practicing critical-care nurses and nursing leaders who guide critical-care nursing practice. The Critical-thinking Model for Expert Nursing Judgment contributes to educational theory by objectifying the substantive topic of critical thinking and expert judgment. The model has broad applicability within the domain of education and specific applicability within the domain of nursing education.
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Last, I send a very special message to my boys, Liam and Aidan:

I’m really finished… really, really!
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CHAPTER ONE: THE PROBLEM

Critical thinking is required for clinical judgment. But what does critical thinking mean to critical-care nurses who are looking after sick patients in busy Intensive Care Units (ICUs) that are often staffed with too few expert critical-care nurses? How do critical-care nurses define critical thinking? How is critical thinking related to nurses’ expert clinical judgment?

These are the questions that form the basis of this study of critical-care nurses’ perceptions about critical thinking. I will use educational and nursing theory to focus this thesis on the interconnectedness of critical thinking, knowledge, and experience that results in the outcome of clinical judgment for critical-care nurses.

Registered Nurses who work in ICUs provide complex care to patients who are critically ill. These nurses have an exciting yet challenging accountability for patient care outcomes. Critical-care nurses assess, plan, implement, and evaluate care for patients who have highly acute, complex, and diverse needs. Often patients are experiencing life and death situations. Despite an interdisciplinary team approach to patient care, it is the registered nurses who holistically manage patient care in the ICU. Using their judgment, nurses determine when to manage the care independently and when the condition of the patient requires them to report their assessment findings to other professionals on the team, including physicians.

The College of Nurses of Ontario (CNO) is the regulating body for all registered nurses and registered practical nurses in Ontario. The CNO protects public interest through defining requirements for entry to nursing practice and maintenance of competence. The CNO defines nursing competence as “the nurse’s ability to use her/his
knowledge, skill, judgment, attitudes, values and beliefs to perform in a given role, situation and practice setting” (College of Nurses of Ontario Professional Standards, 2002, p. 5). These components of competence are relevant to varying degrees at different points throughout this study.

Patients are admitted to ICUs because their acute illness necessitates access to the sophisticated monitors and treatments that are available in this environment. In addition to technology, critically ill patients also require critical-care nurses who are knowledgeable and who have expert clinical judgment. It is thought that the most important aspect of critical-care nursing is overall high-level clinical judgment (Chase, 1997). According to N. Facione and Facione (1996), the three essential requirements for the development of expertise in clinical judgment are critical thinking, content knowledge, and practice experience: “Critical thinking is increasingly being recognized as the cognitive engine driving the processes of knowledge development and professional judgment in a wide variety of professional practice fields” (p. 129). Kintgen-Andrews (1991) reports that the interrelationship of critical thinking and clinical judgment is complex and not clearly articulated. However, the author also reports that it is logical to accept that critical thinking is the basis for clinical judgment. Critical-care nurses use critical thinking to formulate nursing judgments about patient conditions, to make decisions about treatment interventions, and to evaluate the effectiveness of those interventions (Chase). Oermann (1998) states:

Critical thinking is an important cognitive skill for nurses to develop for practice in any setting, but it is even more essential for critical-care nurses, who must often weigh multiple possibilities and arrive quickly at a decision...critical thinking
enables nurses to analyze complex data about patients, make decisions about their problems and alternate possibilities that exist, evaluate each problem further to rule it in or out, and decide on the most appropriate interventions considering the particular situation. (p. 322)

Critical thinking is an essential component of critical-care nurses’ clinical judgment.

The demands and expectations on nurses in all settings are significantly increasing:

Some of the changes facing nursing today are a result of the expansion in technology, consumer demand for quality care, pressure for cost containment, decreased length of stay in hospitals, an ageing population, complex disease processes and increased patient acuity. (Simpson & Courtney, 2002, p. 89)

The increasing expectations on nurses in general directly apply to critical-care nurses. In fact, the implications for patients in ICUs may be more significant given their high level of acuity. It is essential for nurses to be confident in recognizing complex clinical situations, and using critical thinking, to achieve the best possible outcome for patients (Tommie, Nelms, & Lane, 1999). Critical-care nurses require critical-thinking abilities to formulate expert clinical judgment to meet the demands for high-quality patient care.

Richard Paul is an American scholar, educator, and a leader in the critical-thinking movement. He is the Director of Research and Professional Development at the Center for Critical Thinking and Chair of the National Council for Excellence in Critical Thinking. Paul identifies that the educational paradigm shift that espouses the need for critical thinking tangibly began in the 1940s. As Paul reported more than 15 years ago, "the critical-thinking movement is beginning to have a palpable effect on the day-to-day
life of American schooling” (Paul, 1990, p. 1). Over the past decades, the critical-thinking movement has infiltrated the educational foundations of many clinical disciplines, including nursing. However, Paul (2004) recently identified:

Short-term reform can do no more than foster surface change. Deep change takes time, patience, perseverance, understanding, and commitment. This is not easy in a world saturated with glossy, superficial, quick fixes, a world plagued by a short attention span. (p. 11)

Despite the decades of efforts to clarify the concept of critical thinking, within nursing and other clinical disciplines there still appears to be no common understanding about what is meant by critical thinking (Seymour, Kinn, & Sutherland, 2003). From my experience, critical-care nurses identify the importance of critical thinking in their setting, yet I question the extent to which the existing education and nursing theories related to critical thinking are utilized in the practice setting. According to Meleis and Price (1988), theories that espouse critical thinking are either nonnursing in nature or can be perceived as too academic to have clinical relevance:

Theories that evolved from the domain of nursing are not studied at all, studied but forgotten immediately after, or studied but not well utilized in practice or research. Nursing theories have also been deemed either too grand for application or too esoteric for clinicians. (p. 593)

In her doctoral thesis, Maynard (1991) identified that “the question of accurate measurement of critical thinking that is consistent with nursing practice would appear to be the key, an issue yet to be resolved” (p. 93). In addition, Paul (2004) recently reported “studies demonstrate that most college faculty lacks a substantive concept of
critical thinking. Consequently they do not (and cannot) use it as a central organizer in the design of instruction” (p. 2). Despite much work in the area of critical thinking, the complexity of transforming student knowledge and behavior remains a challenge. Noreen Facione and Peter Facione have jointly published about critical thinking, and as individuals they bring a nursing and a philosophy base to their work. They suggest “a more basic relationship should be examined: the cognitive and epistemological integration of critical thinking and clinical judgment embedded in clinical practice and the development of nursing knowledge” (N. Facione & Facione, 1996, p. 129).

It is important to gain insight into how the educational concepts of critical thinking, nursing clinical judgment, and the development of knowledge are related. Through this study, I will attempt to fill this critical thinking theory-practice gap by developing a critical-thinking model that is grounded in the perceptions of critical-care nurses.

Expert clinical judgment is a complex, ill-defined concept. Critically ill patients will receive the highest quality of care and attain the best possible outcomes if nurses with expert clinical judgment care for them. Expert practitioners are essential in nursing, teaching, and other disciplines that require complex human interactions and not simply procedural skill (Paul, 1984). Although the need for experts is acknowledged, there is no established means of identifying experts and definitely no established means of creating them (Bereiter & Scardamalia, 1993). Benner (2001) describes the novice-to-expert continuum as it applies to nursing. Benner’s model is highly recognized and supported in the nursing literature, and it is the inspiration for and the foundation of this study. However, I believe that Benner’s model is limited because the nursing stages are based on years in the profession and
descriptions of experience. The model does not clearly account for expert practice. Experience is definitely required for expert practice, but years of experience do not always equate to becoming an expert practitioner. A unique and subtle combination of knowledge and experience in the context of the discipline is required to bring practice to an expert stage (Adams et al., 1997). Referring to the teaching profession, Bereiter and Scardamalia identify “the problem is not how to turn novices into experts faster or with less work. The problem is how to ensure that novices develop into experts rather than into experienced non-experts” (p. 18). I believe that critical thinking and the clinical judgment abilities of experts are intertwined. Through this study, I will attempt to elaborate the relationship between critical thinking and expert clinical judgment as it applies to nurses.

Although experience alone does not make an expert practitioner, experience is most definitely required. Unfortunately, the number of experienced critical-care nurses is declining quickly. Canada is currently facing a national nursing shortage. This shortage is due to an ageing and retiring workforce and concurrent challenges of recruiting to the nursing profession due to the fact that the traditionally female nursing workforce has more diverse career alternatives than ever before (Baumann et al., 2001). A study conducted in 2003 by the Canadian Institute of Health Information and the University of Toronto reported that at the time of the study, of the approximately 232,000 practicing registered nurses in Canada, 30,000 to 65,000 senior nurses would be lost through retirement by 2006 (Jeans & Holgate, 2004). This national shortage directly influences nursing resource availability in nursing specialty areas (Baumann et al.) including critical care. Compounding the critical-care nursing shortage is an increased demand for patient
access to ICUs as the baby boomer generation advances in age. The recruitment and retention of critical-care nurses is core to improving patient access and quality care in Ontario ICUs (Final Report of the Critical Care Nurse Training Standards Task Group, 2006). However, recruitment of nurses to ICUs and retention of nurses in ICUs is more difficult for all of the reasons explained previously. In order to meet the demand for critical-care nurses, managers are extending employment opportunities to nurses without critical-care experience and to nurses with less overall nursing experience, including newly graduated nurses (Smith-Blair & Neighbors, 2000). Therefore, given the overall decrease of experienced nurses in ICUs, this translates to fewer nurses with expert clinical judgment providing patient care and mentoring less experienced nurses in ICUs. However, positive patient outcomes demand expert clinical judgment from nurses, regardless of years of experience.

Registered nurses graduate from nursing programs as generalists; critical-care specialty training is completed at the post-basic level and orientation is based on the needs of the ICU (Final Report of the Critical Care Nurse Training Standards Task Group, 2006). It is essential that the critical-care orientation and ongoing specialty education of critical-care nurses is able to meet the learning and development needs required for high-quality patient care. Critical-care orientation is very costly because of the length of time and the resources required to provide education to nurses who are new to the specialty. Time is also at a premium, given the severity and immediacy of the nursing shortage; nurses with expert judgment are needed now. Critical-care leaders need to be able to meet the demands of patient care in ICUs in a timely and fiscally responsible way. The development and utilization of critical thinking in making sound clinical
judgments based on scientific knowledge is the desired outcome of the critical-care orientation (Smith-Blair & Neighbors, 2000). During orientation, and more crucially on an ongoing basis, the more experienced critical-care nurses must be able to effectively mentor critical thinking and expert clinical judgment in their less experienced nursing colleagues. It is these experienced nurses who have the responsibility of preparing the next generation of critical-care nurses. However, the clinical judgment abilities of the experienced critical-care nurses differ; as does their ability to mentor new critical-care nurses differ. Bereiter and Scardamalia (1993) cite a similar situation in education:

People actually engaged in the business of producing experts are limited by lack of the very theory we would like to educate from them. In areas where understanding of expertise is severely limited, this situation represents a real and serious impasse. Efforts to train more expert teachers, for instance, often amount to insisting that trainees receive more and more coaching and instruction from people who may or may not be expert themselves but who in any case are likely not to have the slightest idea of what it takes to produce an expert teacher. (p. 40)

In summary, critical thinking is required for clinical judgment. The complex patient care needs in ICUs demand expert clinical judgment. There are fewer experienced critical-care nurses at the bedside and, compounding this shortage, not all experienced critical-care nurses have developed expert clinical judgment that is required to meet patient care needs. This current circumstance requires critical-care nursing administrators and educators to implement strategies directed at fostering critical thinking and the development of expert clinical judgment. In order to learn more about the relationship of
critical thinking and expert clinical judgment, the perspectives of critical-care nurses are important and relevant.

Purpose of the Study

The purpose of this study is to explore critical-care nurses’ perceptions about critical thinking.

Objectives

The first objective of this study is to answer the question, “How do critical-care nurses define critical thinking?” The second objective of this study is to explore the question, “How is critical thinking related to nurses’ expert clinical judgment?”

Rationale

New nurses are being hired to ICUs continuously. As explained previously, the mounting nursing shortage is hastening the need to hire newly graduated nurses and nurses without critical-care experience; in ICUs, the need for expert clinical judgment is immediate but not immediately present at the time of entry to practice into critical care. In addition, years of experience in critical care do not necessarily result in a nurse with expert clinical judgment. To maintain consistent high-quality patient care, critical-care nursing leaders have a responsibility to identify and implement educational strategies to bridge the gap between nonexpert and expert practice. The educational goal in appreciating critical thinking and its relationship to nurses’ expert clinical judgment is to contribute to successful integration of nonexpert nurses in the critical-care setting and to ideally facilitate their progression to expert nurses.
Background, Biases, and Assumptions

In my 9-year career as a nurse educator in critical care and as a nurse manager in critical care for the past 6 years, I directly observe and hear about the strain on expert and nonexpert nurses. Nurses frequently question me about critical thinking. The nurses distinguish critical-thinking ability as crucial to being a good nurse, yet they consistently identify that critical thinking is very difficult and imprecise to describe. Nurses ask for guidance about how to teach and mentor critical thinking, yet it is unrealistic to facilitate these educational objectives when the nurses have not defined critical thinking in a manner that is relevant to their practice. As a nursing leader in critical care, I have struggled with the educational dilemma of how to support and guide others in the crucial area of critical thinking. It is regrettable that critical thinking is highly valued and yet difficult to characterize. Paul justifies the rationale for needing to understand critical thinking:

If we understand critical thinking substantively, we not only explain the idea explicitly to our students, but we use it to give order and meaning to virtually everything we do as teachers and learners. We use it to organize the design of instruction. It informs how we conceptualize our students as learners. It determines how we conceptualize our role as instructors. It enables us to understand and explain the thinking that defines the content we teach…we must teach content through thinking, not content, and then thinking…properly understood, it [critical thinking] leads to a framework for institutional change.

(Paul, 2004, p. 4)
Paul describes critical thinking as the foundation of education. He identifies that learning comes about through critical thinking; critical thinking is not additional to the process of learning. It is important to articulate a model of critical thinking to elucidate expert clinical judgment.

Nursing programs and nursing continuing education programs have established critical-thinking content within their curricula. However, the successful development of critical-thinking skills for academic purposes does not necessarily mean that these skills are used in practice in relation either to research or clinical decision-making. This suggests that the transferability of critical-thinking skills is less than straightforward. Indeed, there has been little narrowing of the research-practice gap since students started to learn critical thinking for academic purposes. (Seymour et al., 2003, p. 288)

As in other disciplines, it is essential for critical-care nurses to have critical-thinking abilities. Oermann states, “critical thinking enables nurses to reason and arrive at judgments about patients” (1998, p. 322). Whiteside argued, “critical-thinking skills ultimately translate into nurses who are able to function at a high level and provide better patient care at the bedside” (1997, p. 161). Dobrzykowski states, “because of the challenges that face all nursing specialties, it is imperative that more professionals become expert critical thinkers” (1994, p. 274). Critical-care nurses require meticulous mentoring in the practice setting in order to build expert clinical judgment. Critical thinking is related to expert clinical judgment. Critical-care nurses with expert judgment optimize outcomes for patients and families.
As cited previously, Paul (2004) purports that despite much effort to shift the foundation of educational practice to critical thinking, students are not overwhelmingly becoming critical thinkers and teachers are not necessarily teaching for critical thinking. In agreement, Stephen Brookfield, an adult educator and guru of the critical-thinking revolution, states “there is no clear evidence that any of the skills of critical thinking learned in schools and colleges have much transferability to the contexts of adult life” (1987, p. 4). The perspectives of these two renowned educators in critical thinking validate that the practice of critical thinking throughout life and throughout all disciplines remains elusive despite change efforts.

The rationale for exploring critical thinking and expert clinical judgment crosses all disciplines. In the following chapter, I will describe critical-thinking literature that is rooted in educational theory and also literature that is specific to the discipline of nursing. I have tried to select literature that is most relevant. There is a vast inventory of critical-thinking and clinical-judgment literature, and in no way is the literature presented in this thesis exhaustive of the topics. Despite the past decades of intense research, I conduct this study on the premise that the critical-care nurses’ perspectives about critical thinking and expert clinical judgment are needed. I believe additional efforts to explore critical thinking at the level of the practitioner are required. Paul (1992) stressed the importance of articulating and teaching critical thinking within the context of the specific discipline. In addition, Meleis and Price (1988) cite:

It makes more sense to students, clinicians and potential theory consumers to teach theory in relation to the domain and the discipline’s central questions as
well as in relation to the consumers' own questions than to attempt to teach theory in isolation and abstraction. (p. 599)

There is much insight and accuracy to be gained through listening to critical-care nurses define critical thinking and explore their beliefs on how critical thinking is related to expert clinical judgment.

A conception of critical thinking in nursing that is based on the logic of the discipline and particularly on the knowledge embedded in the clinical practice of nursing could be developed by exploring the processes used by expert nurses when they manage patient care. (Shank-Pless & Clayton, 1993, p. 427)

Through this study, critical-care nurses will define critical thinking and describe how critical thinking is related to nurses' expert clinical judgment. The educational goal in appreciating critical thinking and its relationship to nurses' expert clinical judgment is to contribute to successful integration of nonexpert nurses in the critical-care setting and to ideally facilitate their progression to expert nurses.

As I analyze the nurses' perceptions from a broader educational context, I will develop a model that contributes to demystifying the elusive concepts of critical thinking and expert clinical judgment. More specifically, I will develop a critical-thinking model that is relevant to critical-care nurses that may lead to critical-care nursing curriculum and practice transformation. Transformation strategies may also have broader applicability outside critical-care nursing and even outside the discipline of nursing. However, it is expected that this model for critical thinking and expert clinical judgment will have most relevance to practicing critical-care nurses, because it will come from them. Seymour et al. (2003) referenced a 1996 recommendation that a
nursing-based critical-thinking tool was required that would reflect critical thinking in the clinical setting. They indicate “examining critical thinking in the context of practice may provide insight into how best to develop it for the purposes of educating nursing students and furthering research-based practice” (Seymour et al., p. 291). The immediate rationale for this study is the current nursing shortage and the resulting dilution of the experienced and possibly expert pool of critical-care nurses that will directly influence patient outcomes. Insight into critical thinking is needed to push the development of expert clinical judgment for critical-care nurses.

Theoretical Framework

As indicated previously, clinical judgment is a component of nursing competence (College of Nurses of Ontario Professional Standards, 2002). Nurses do not demonstrate expert clinical judgment abilities immediately upon graduation, and years of experience also do not guarantee expert clinical judgment abilities. According to Benner (2001), nurses move through different stages of practice: novice, advanced-beginner, competent, proficient, and expert. The stages Benner identifies apply to nurses in all areas of practice. Critical-care nurses would identify with each of Benner’s stages in a context that reflects the specific knowledge, skill, and judgment of their specialty. The stages of nursing practice identified by Benner are not intended to be prescriptive or absolute. Nurses, when encountering a clinical situation, apply knowledge and skill and judgment in accordance with their stage of nursing practice. Informed and accurate nursing judgment will contribute to a beneficial outcome for patients. It is important to appreciate the diversity of the practice abilities of nurses that Benner describes. The recognition of the novice and advanced-beginner stages is significant within nursing practice and
nursing education. The lack of experience of these nurses and the subsequent lack of relevant practical knowledge that they have translates to a potential that patients will receive less than optimal care. This continuum of novice to expert and the resulting practice differences will always be a reality in nursing and indeed in all other disciplines. Strategies and opportunities are required for mentoring of less expert critical-care nurses by more expert critical-care nurses. However, as indicated previously, novice to advanced-beginner nurses are being hired to ICUs, and there are fewer opportunities for these nurses to be mentored by expert critical-care nurses. Very simply put, when many nurses on the team require guidance and there are few nurses available to provide this guidance, the outcomes of patients may be adversely affected, and expert nurse preceptors face tremendous strain and anxiety as they attempt to sustain a high quality of patient care. Preceptors who are frequently assigned to this role are at risk of burnout (Final Report of the Critical Care Nurse Training Standards Task Group, 2006). Because of this added stress on the expert nurses, there is an even greater potential for them to leave their specialty or leave the nursing profession altogether, creating a vicious circle of imbalance that continues to result in fewer expert critical-care nurses and possibly less than ideal patient outcomes.

Benner’s representation of the novice to expert continuum validates the educational and practice dilemma I have just described. However, Benner does not articulate the role of critical thinking within nursing judgment. Benner does not directly reference critical thinking at all. However, I uphold that critical thinking is related to nurses’ clinical judgment. Through this study, critical-care nurses will define critical thinking and describe how critical thinking is related to nurses’ expert clinical judgment.
The educational goal in appreciating critical thinking and its relationship to nurses' expert clinical judgment is to contribute to successful integration of nonexpert nurses in the critical-care setting and to ideally facilitate their progression to expert nurses.

It will be helpful to consider critical thinking within the context of Benner's model of expertise.

Methodological Approach

I used grounded theory design for this research and included the qualitative data collection techniques of focus group, interview, and follow-up questionnaire. Using the grounded theory approach of emerging design (Creswell, 2002), I analyzed data soon after it was collected and then utilized the data to determine subsequent data collection. I chose this research methodology with the anticipated goal to obtain significant, substantive data in order to generate a practical critical-thinking theory.

Scope and Limitations of the Study

This study is limited in scope to the exploration of critical thinking and expert judgment in critical-care nurses. First, critical thinking is one process leading to the outcome of judgment. I acknowledge that judgment is complex, and in limiting the focus of this study to critical thinking specifically, I have not intended to minimize that complexity. Second, knowledge is most certainly linked to one's ability to think critically. However, I will not detail the intricacies of knowledge acquisition and translation in this study. Third, reflection on practice contributes to the development of critical-thinking abilities. In this study, I will not delve into the complex tenets that constitute reflective practice. Last, although the Canada-wide shortage of critical-care
nurses has been identified as supporting rationale for this research, I will not further develop the concepts of quality nursing work life nor recruitment and retention of nurses.

Outline of the Remainder of the Document

I review relevant prestudy and poststudy literature consultation in Chapter Two. I provide details of the grounded theory research methodology in Chapter Three. I report findings of the study in Chapter Four. I present a summary of the study findings, conclusions, and educational and practice implications of the study in Chapter Five. Consistent with grounded theory research, through this study I have developed a model for critical thinking and expert clinical judgment that is directly applicable to critical-care nurses.
CHAPTER TWO: REVIEW OF RELATED LITERATURE

Fitting with grounded theory methodology, it is necessary to review relevant literature in preparation for the study and to review relevant literature subsequent to data collection and analysis in order to pursue the various themes that emerge from the data. My initial literature review focused on critical thinking, clinical judgment, and Benner’s continuum of novice to expert nursing practice, as these topics were the focus of the study. Following data collection and analysis, I began to postulate the critical-thinking model. The need to explore the areas of knowledge, emotional intelligence, critical reflection, and the educational construct of expertise was evident as these themes emerged from the data. In this chapter, I present a complex and diverse literature review that emphasizes both nursing and educational literature. At the end of the chapter, I have provided a concise synopsis of what I deem to be the most relevant highlights of the literature review.

Critical Thinking

Critical thinking has been studied extensively over the past 25 years. Paul (2004) reports “faculty agree almost universally that the development of students’ higher order intellectual or cognitive abilities is the most important educational task of colleges and universities” (p. 3). However, changes in teaching and learning have not been substantive despite what is known about the concept of critical thinking and despite acknowledgement of the importance of critical thinking (Paul). Paul cites there are serious obstacles to essential, long-term institutional change, for only when administrative and faculty leaders grasp the nature, implications, and power of a robust concept of critical thinking – as well as gain insight into the negative
implications of its absence – are they able to orchestrate effective professional development. (p. 1)

In addition, there is no universally accepted or correct definition of critical thinking, and not all definitions are equally credible or relevant (Bailin, Case, Coombs, & Daniels, 1999). Paul (1990) agrees:

Because of the complexity of critical thinking—its relationship to an unlimited number of behaviors in an unlimited number of situations, its conceptual interdependence with other concepts such as the critical person, the critical society, a critical theory of knowledge, learning, and literacy, and rationality, not to speak of the opposites of these concepts—one should not put too much weight on any particular definition of critical thinking. (p. 30)

However, Paul clarifies that continued attempts to explore the complex concept of critical thinking are useful to maintain insight into the various dimensions of critical thinking and to also develop insight into the limitations of each dimension. On this premise, Paul’s definition of critical thinking is:

Critical thinking is disciplined, self-directed thinking which exemplifies the perfections of thinking appropriate to a particular mode or domain of thinking. It comes in two forms. If the thinking is disciplined to serve the interests of a particular individual or group, to the exclusion of other relevant persons and groups, I call it sophistic or weak sense critical thinking. If the thinking is disciplined to take into account the interests of diverse persons or groups, I call it fair-minded or strong sense critical thinking. (Paul, 1990, p. 33)
More tangibly, Paul identifies the basic skills of critical thinking to include "the ability to clarify questions; gather relevant data; reason to logical or valid conclusions; identify key assumptions; trace significant implications, or enter without distortion into alternative points of view" (Paul, 2004, p. 3). Paul emphasizes the importance of a supportive learning environment to critical thinking. Characteristics of a supportive learning environment include flexibility, creativity, support for change, and risk taking (Paul, 1984).

Similarly, in the context of nursing, Kataoka-Yahiro and Saylor emphasize "environments that demand perfection or reinforce the status quo constrain the critical thinking climate necessary among colleagues for excellent nursing judgment" (1994, p. 355).

Individual qualities are also essential for critical thinking in any field. Paul (1990) identifies seven interdependent traits of mind that individuals need to have to cultivate critical thinking: intellectual humility, intellectual courage, intellectual empathy, intellectual integrity, intellectual perseverance, faith in reason, and an intellectual sense of justice. The critical-thinking definition and traits that Paul describes are broadly applicable across disciplines, including the discipline of nursing.

Commercially available quantitative tools exist to measure and evaluate critical thinking. These quantitative tools include (a) The Watson-Glaser Critical-thinking Appraisal (Watson & Glaser, 1980); (b) The California Critical-thinking Skills Test (P. Facione, 1990a); (c) The Ennis-Weir Critical-thinking Essay Test (Ennis & Weir, 1985); and (d) The Cornell Critical-thinking Test (Ennis, Millman, & Tomko, 1985).

Validity and reliability have been demonstrated with these tools, yet all have varying applicability to assess critical thinking in nurses (Howell-Adams, Whitlow,
Stover, & Williams-Johnson, 1996). Despite the availability of tested interdisciplinary quantitative tools to measure critical thinking, “more investigation is needed to determine appropriate ways of measuring critical-thinking abilities in practicing nurses, as current measures do not appear to adequately capture the construct” (Hicks, Merritt, & Eelstein, 2003, p. 176). Additionally, P. Facione (1990b) cautions that the complexity of critical thinking cannot be limited to quantitative methods: “Due caution should be exercised regarding how to interpret technical measures of test-form reliability in the case of paper and pencil critical-thinking assessment instruments” (p. 17). While there may be appropriate uses for specific tests that measure critical thinking, the use of tests alone as a measure of critical thinking cannot capture the depth and complexity of its tenets.

The American Philosophical Association published the Delphi Research project on critical thinking (P. Facione, 1990b). A Delphi research project is conducted by bringing content experts together for discussion and consensus recommendations. The purpose of this project was to build an interdisciplinary definition of critical thinking. The definition that was determined is:

We understand critical thinking to be purposeful, self-regulatory judgment which results in interpretation, analysis, evaluation, and inference, as well as explanation of the evidential, conceptual, methodological, criteriological, or contextual considerations upon which that judgment is based. Critical thinking is essential as a tool of inquiry. (P. Facione, 1990b, p. 2)

In addition to the definition of critical thinking as a cognitive skill contributing to judgment, the expert panel also came to consensus that someone who practices critical thinking possesses a “critical spirit” consisting of particular traits or dispositions.
The ideal critical thinker is habitually inquisitive, well-informed, trustful of reason, open-minded, flexible, fair-minded in evaluation, honest in facing personal biases, prudent in making judgments, willing to reconsider, clear about issues, orderly in complex matters, diligent in seeking relevant information, reasonable in the selection of criteria, focused in inquiry, and persistent in seeking results which are as precise as the subject and the circumstances of inquiry permit.

(P. Facione, 1990b, p. 2)

While this American Philosophical Association Delphi research project provides useful clarification about critical thinking that is transferable to the discipline of nursing, there was no nursing representation on the expert panel. Although the project produced a valuable definition of critical thinking, there may be unique subtleties about critical thinking within nursing that are not represented by this definition. More specifically, this interdisciplinary consensus description of critical thinking may not be relevant to nurses who provide direct patient care. The practical value of theory that emerges from a purely academic focus is unknown; theory that emerges from practice may be more relevant to practicing nurses.

Sheffer and Rubenfeld (2000) replicated a Delphi study utilizing nurse experts from 10 countries. Critical thinking was defined as:

an essential component of professional accountability and quality nursing care.

Critical thinkers in nursing exhibit these habits of the mind: confidence, contextual perspective, creativity, flexibility, inquisitiveness, intellectual integrity, intuition, open-mindedness, perseverance, and reflection. Critical thinkers in nursing practice the cognitive skills of analyzing, applying standards,
discriminating, information seeking, logical reasoning, predicting and transforming knowledge. (Sheffer & Rubenfeld, 2000, p. 7)

This nursing definition echoes the American Philosophical Association definition with the additions of creativity and intuition. The additions of creativity and intuition within nursing are sound, given that the situations nurses deal with are often not clear and nurses do not have access to endless resources; hence creativity of thinking is frequently required (Staib, 2003). However, I support that the qualities of creativity and intuition are also broadly relevant within other disciplines and are not unique to nursing, reinforcing that most aspects of critical thinking will cross disciplines. Most certainly, the nurses participating in this Delphi study had educational qualifications that may deem them experts in their respective fields; there were a total of 55 participating nurses, 41 (74.5%) educated at a doctorate level, 13 (23.6%) educated at a master’s level, and I participant with the sole RN designation following her name. I am very respectful of the high levels of education of the nurses participating in this study. However, registered nurses can be involved in direct practice, administration, education, and research roles (College of Nurses of Ontario Professional Standards, 2002). While the study participants were highly credible, I cannot ascertain if these academic nurses participate in direct patient care. From my personal experience in the field, I would argue that nurses with higher educational degrees are less likely to have primary roles in direct patient care. If the nurses in the Delphi study were not involved in direct patient care, although the nursing critical-thinking definition generated is highly valuable, hearing the perspectives of nurses who are directly caring for patients remains beneficial.
Bette Case is a doctorate-prepared registered nurse with a specialty in staff education and development. Case (1994) described nurses' critical thinking as a cognitive skill that involves manipulating knowledge, organizing, clustering, assembling evidence, discriminating, comparing, contrasting, evaluating against criteria, and developing criteria for evaluation. This description of critical thinking echoes the description by Paul. Case emphasizes the need to consider all perspectives of a problem or situation as the essential first step of the critical-thinking process. She acknowledges that past experiences influence assumptions and perceptions of new situations. I will discuss reflection on past experiences later in this chapter. Additionally, Case recognizes the importance of interpersonal exchanges in critical thinking. Getting input from others, sharing, and critiquing with others expands one's individual perspective, which is essential in critical thinking. Expanding perspectives contributes to collaborative conflict resolution. Case likens collaboration to interpersonal critical thinking and recognizes the ability to collaborate as an essential ingredient for success in one's profession. The ability to collaborate with others requires qualities of emotional intelligence. Qualities of emotional intelligence are required for critical thinking and will be discussed further in this chapter.

Brookfield (1987) describes critical thinking as a process of productive and positive activity that involves being actively engaged and aware of diverse values and behaviors. He describes a five-phase process of critical thinking. The first phase begins with the identification of a “trigger event,” which is a problem or a situation that requires improvement. The second phase of critical thinking is the “appraisal” phase, which involves a period of reflection and analysis of the problem or situation. In the third phase
of “exploration,” an individual begins to seek change or accept the situation as it is. The fourth phase of critical thinking, developing alternative perspectives, involves discovering new ways of thinking and acting that make sense for the situation. Brookfield identifies that thinking differently requires honest critical reflection and is extremely challenging for most adults.

A common tendency is to hang on to the assumption or behavior, but to try to modify it to fit the situation more closely. This may be a perfectly appropriate response in some situations. We may decide that the benefits we derive from a relationship, work situation, or political arrangement are sufficiently valuable for us to consider protracted negotiation or compromise. (p. 27)

A person’s ability to meet the challenge of developing alternative perspectives requires a strong component of willingness to adapt to change and educational growth. The qualities of effective critical thinkers described previously are important in a person’s individual capacity to develop alternative perspectives, and these qualities may be cumulatively perceived as emotional intelligence. Emotional intelligence will be discussed further in this chapter. The fifth and final phase of critical thinking identified by Brookfield is integration. In this phase, an individual has found an acceptable solution to the situation. The resolution may be tentative or highly satisfactory.

Brookfield (1987) identifies additional traits of critical thinking. Humility is required to appreciate that “others in the world have the same sense of certainty we do—but about ideas, values and actions that are completely contrary to our own” (p. 5). It is difficult to find examples of critical thinking because individuals demonstrate critical thinking differently in different contexts. Critical thinking can take place internally, with
minimal external evidence of the process. Alternatively, critical thinking can take place outwardly, resulting in obvious words or actions that identify the critical-thinking activity (Brookfield). Critical thinkers ask tough questions. Critical thinkers engage in "reflective skepticism" when they challenge the assumptions that are otherwise taken for granted, and attempt to identify alternative ways of being and acting.

Simply because a practice or structure has existed for a long time does not mean that it is the most appropriate for all time, or even for this moment. Just because an idea is accepted by everyone else does not mean that we have to believe in its innate truth without first checking its correspondence with reality as we experience it. (Brookfield, p. 9)

Critical thinkers also recognize that all situations must be considered within their unique contexts that change with time, place, and people (Brookfield, 1987). The very nature of caring for patients in a manner that meets their unique needs necessitates that nurses are able to imagine and explore alternatives every day. "Dealing with questions of quality of life and death, nurses are continually weighing alternatives, looking at reasons for choosing one alternative over another in an open, flexible and attentive manner and considering what actions to follow" (Simpson & Courtney, 2002, p. 95).

The education-based critical-thinking theories described by Paul and Brookfield and the nursing-based theory described by Case are highly relevant across clinical disciplines, including nursing. The clinical disciplines of teaching and nursing have many similarities when considering the requisite for critical thinking. There is a diverse knowledge base required within both disciplines. Complex interactions with people are
required within both disciplines. Last, both teachers and nurses constantly face a dynamic situation in which quick judgment is needed (van Manen, 1995).

Clinical Judgment

In the introductory chapter, I acknowledged the College of Nurses of Ontario statement that nursing competency is based on knowledge, skill, clinical judgment, attitudes, values, and beliefs (College of Nurses of Ontario Professional Standards, 2002). It is not clear to me where critical thinking fits within this competency statement. Clinical judgment is complex and not well understood in practice. Throughout this section, I will present literature that asserts that clinical judgment is the outcome of critical thinking.

In a review of the literature related to clinical judgment in nursing from 1966 to 1986, Tanner (1987) outlined a definition of clinical judgment that incorporates observation, diagnosis, and management. Tanner suggested that the terms clinical problem solving, clinical decision making, and the nursing process are all equivalent to the term clinical judgment. As a result of this study, I disagree that these terms are equivalent. I view judgment as an outcome and problem solving, decision making, and the nursing process as methods to arrive at a judgment. However, whatever method is used to arrive at judgment, the quality of the judgment is dependent on the quality of that method and the common requirement for effective judgment is critical thinking.

Many investigators have attempted to demonstrate factors that may be associated with clinical judgment proficiency. Although Tanner (1987) reports that the evidence is weak, correlation factors for clinical judgment proficiency include: level of education, years of nursing experience, critical-thinking ability, type of conceptual model used in the
undergraduate nursing program, and the personality profile of the nurse. I am focusing only on critical thinking as a factor in clinical judgment proficiency. Case identifies that nursing judgment involves "selecting and organizing pieces of data to support conclusions" (1994, p. 101), and these components of judgment mirror the hallmarks of critical thinking. Oermann states, "Critical thinking enables nurses to reason and arrive at judgments about patients" (Oermann, 1998, p. 322). Paul (1984) describes that reasoned judgment depends on dialectical knowledge, developed through engaging in critical thought. Facione and colleagues (N. Facione, Facione, & Sanchez, 1994) report that "the Delphi definition of an ideal critical thinker, upon scrutiny, also describes the attributes of a nurse with ideal clinical judgment" (p. 345) and, "defined as purposive, self-regulatory judgment, critical thinking is a construct that greatly overlaps the conceptual boundaries of the process nurses call clinical judgment" (p. 349). In addition, "critical thinking, content knowledge and practice experience are the three essential components of the development of expertise in clinical judgment" (p. 131). Alfaro-LeFevre (1995) defines clinical judgment as critical thinking in a clinical area and emphasizes that nurses must be critical thinkers in order to practice sound clinical judgment. Providing the opportunity for critical-care nurses who directly care for patients to explore critical thinking will elucidate relevant data regarding effective clinical judgment.

Kataoka-Yahiro and Saylor (1994) reveal a critical-thinking model for nursing judgment. I interpret the more specific term "nursing judgment" to be clinical judgment within the domain of nursing. The authors propose that their model defines nursing judgment as the outcome of critical thinking. The model identifies five components of critical thinking for nursing judgment: knowledge, experience, competencies, attitudes,
and standards in nursing. The authors indicate that knowledge provides the data for critical thinking and that nursing judgment is the outcome of critical thinking. Additionally, the authors identify that development of critical thinking can be limited by lack of practical experience. This concept validates the idea that critical thinking may differ between nonexperts and experts. In the model, the authors identify three levels of critical-thinking ability. The three levels of critical thinking are basic, complex, and commitment. In the next session of this chapter, I will elaborate on these levels of critical thinking and connect them with the novice to expert continuum. In addition to defining levels of critical thinking, Kataoka-Yahiro and Saylor also identified three distinct formats of critical thinking. They described general critical thinking as multidisciplinary and pertaining to nonclinical problems, clinical critical thinking also as multidisciplinary but pertaining to clinical problems, and last, critical thinking unique to nursing. I do not believe that these categories of critical thinking shed any light on the definition of critical thinking. However the authors’ identification of critical thinking unique to nursing does provide validation for nurses to define critical thinking that is relevant to their practice. The authors indicate, “the nursing process provides a systematic, rational method of planning, providing, and evaluating nursing care using higher order thinking processes” (p. 354). This description of critical thinking is very abstract, limiting its relevance to nurses and to professionals in any clinical discipline.

Benner’s Continuum from Novice to Expert Nursing Practice

Dr. Patricia Benner’s work was groundbreaking for the profession of nursing. In her inaugural research, Benner’s goals were “to study experiential learning in nursing practice, examine skill acquisition based on clinical learning, and articulate the
knowledge embedded in nursing practice” (2001, p. 5). Benner provided the following rationale for exploring these goals: “Clinical expertise has not been adequately described or compensated in nursing, and the lag in description contributes to the lag in recognition and reward. Adequate description of practical knowledge is essential to the development and extension of nursing theory” (p. 11).

As introduced in Chapter One, Benner developed a nursing model originally published in 1986 that represents the continuum of nursing practice. Benner’s model arose from the broad skill acquisition theory developed by Stuart Dreyfus, a mathematician and system analyst, and Hubert Dreyfus, a philosopher. Benner continues to describe her replication of the Dreyfus model as a skill acquisition model, yet Benner qualifies that the term skill does not pertain to the acquisition of psychomotor skills but rather to “skilled nursing interventions and clinical judgment skills” (2001, p. 14). I will refer to Benner’s continuum of nursing practice. I believe this terminology more clearly describes the continuum and removes the risk of misinterpretation of the terminology skill acquisition. In addition, my personal experience tells me that the term stage may be more pleasing to nurses because it has a less hierarchical connotation than the term level. Therefore, I will substitute the term stage for the term level to describe each position along the practice continuum throughout the remainder of this document.

Benner has cited the same five stages that were originally described in the Dreyfus model: novice, advanced-beginner, competent, proficient, and expert. The Dreyfus model and the Benner model classify the stages of the continuum according to key differences in three areas of performance (a) a learner’s progression from having only abstract principles to guide practice to using past experiences to guide practice; (b) a
learner’s progression from viewing a situation as a grouping of equally important bits to viewing a situation as a whole with only some relevant components; and (c) a learner’s progression from “detached observer to involved performer” (Benner, p. 13).

Benner has mirrored the Dreyfus model within the context of the clinical discipline of nursing. However, the stages of practice identified in the Dreyfus model are broadly applicable to other clinical disciplines. It is the unique application of the specific discipline that creates relevance to the model. For example, the practice stages of novice, advanced-beginner, competent, proficient, and expert would have relevance to teachers, to social workers, to physicians, to respiratory therapists, to dieticians; the model may apply to most professions and trades. Benner also identifies that the practice stages are intended to reveal strengths in practice capacities and not deficits.

At each stage of experiential learning, clinicians can perform at their best. For example, one can be the best novice ever. One can be the most responsible and engaged clinical inquirer and experiential learner whatever the stage...what one cannot do is be beyond experience, or be responsible for what has not yet been encountered in practice. (Benner, 2001, p. x)

Benner’s emphasis on the concept that it is not possible for a learner to practice beyond what has been experienced supports the rationale for this thesis. Inexperienced critical-care nurses do not have expert clinical judgment. To maintain consistent high-quality patient care, critical-care nursing leaders have a responsibility to identify and implement educational strategies to bridge the gap between nonexpert and expert clinical judgment and practice. The educational goal in appreciating critical thinking and its relationship to nurses’ expert clinical judgment is to contribute to successful integration
of nonexpert nurses in the critical-care setting and to ideally facilitate their progression to expert nurses.

According to Benner (2001), novice nurses have no experience of the situations in which they are expected to perform. These nurses know objective attributes, measurable parameters, and context-free rules to guide action. Benner describes the performance of nurses at the novice stage as limited by "principles and theory learned in a classroom rather than context dependent judgments and skill that can be acquired only in real situations" (p. 21). Benner describes "any nurse entering a clinical setting where she or he has no experience with the patient population may be limited to the novice stage of performance if the goals and tools of patient care are unfamiliar" (p. 21). Benner attributes the novice stage to those nurses with minimal experience to contribute to clinical judgment. Considering the current nursing shortage, the fact that critical-care nursing teams have many new critical-care nurses who are novice practitioners necessitates an appreciation of the limitations of novice practitioners. The presence of novice practitioners within a discipline is a reality and not unique in nursing. van Manen (1995) also describes a similar predicament in the discipline of education with novice teachers: "Beginning teachers often seem to feel the tension or the poor fit between what they learned about teaching and what they discover is required in the practice of teaching" (p. 37). Beginning teachers may be identifying the gap between theory and practical experience required to exercise good judgment. According to Benner, nurses are incapable of practicing beyond what they have encountered in practice. This theory practice gap in nursing may have significant implications for patient outcomes.
Benner’s next stage of nursing practice is the advanced-beginner stage. These nurses “can demonstrate marginally acceptable performance, ones who have coped with enough real life situations to note, or to have pointed out to them by a mentor, the recurring, meaningful situational components that are termed aspects of the situation” (Benner, 2001, p. 22). Aspects differ from the objective attributes, measurable parameters, and context-free rules necessary to the novice. Advanced-beginner nurses are able to recognize aspects of a situation because of prior experience and the ability to be comparative. Benner identifies that much time needs to be spent by new nurses, preceptors, and mentors on aspect recognition and judging the relative importance of the various aspects of a situation. For example, being able to correctly identify normal and abnormal breath sounds would be considered aspect recognition. From this first learning goal, it is then important to be able to judge the context and therefore the implications of normal and abnormal breath sounds. Benner acknowledges,

the major implication here...is that advanced beginners need support in the clinical setting. They need help, for instance, in setting priorities, since they operate on general guidelines and are only beginning to perceive recurrent meaningful patterns in their clinical practice. Their nursing care of patients needs to be backed up by nurses who have reached at least the competent level of skill and performance, to ensure that important patient needs do not go unattended because the advanced beginner cannot yet sort out what is most important. (pp. 24-25)

Again, Benner emphasizes the importance of safety in the practice setting—support for advanced beginner nurses is essential to safe patient care and also essential to
opportunities for building appropriate clinical judgment abilities that will advance the nurse along the continuum of practice. Benner (2001) identifies newly graduated nurses in their first year of practice or nurses new to a clinical specialty within the first year of practice as advanced-beginner nurses. I refer you back to Chapter One where I indicated that the critical-care nursing shortage has resulted in the hiring of newly graduated nurses in critical care. Recall also that the specialty of critical-care nursing has previously required extensive postgraduate education and experience. Benner identifies the advanced-beginner nurse as either newly graduated or new to a specialty. Based on my own experience in the field, I believe that newly graduated nurses working in a specialty area such as critical care are more accurately at the novice stage of practice, progressing to the advanced-beginner stage of practice through integration of experiences that are supported by a preceptor, mentor, and leaders in critical care. The patient safety implications and the educational implications of nurses integrating to critical care when they are both newly graduated and new to the specialty are significant, reinforcing the rationale for this study.

Nurses at the competent stage are described as having roughly 2-3 years of experience with similar situations. However, Benner states that experience is not just the passage of time but is rather the "refinement of preconceived notions and theory through encounters with many actual practical situations that add nuances or shades of differences to theory" (2001, p. 36). Fitting with Benner’s perspective on experience, critical reflection became evident as a central phenomenon in the data and will be discussed further on in this chapter. The competent nurse is not likely to be fast or to have a flexible approach. However the competent nurse,
begins to see his or her actions in terms of long-range goals or plans of which he or she is consciously aware. The plan dictates which attributes and aspects of the current and contemplated future situation are to be considered most important and those which can be ignored. (Benner, pp. 25-26)

In Benner’s description of the competent stage of nursing practice, I hear the first indication of critical thinking. I am not suggesting that Benner considers nurses at the novice or advanced beginner stages to be incapable of critical thinking. However, Benner is acknowledging that nurses at these previous stages cannot independently exercise judgment beyond their experience. To reiterate, Benner does not explain critical thinking and does not declare how critical thinking is related to expert clinical judgment. The first objective of this study is to answer the question, “How do critical-care nurses define critical thinking?” The second objective of this study is to explore the question, “How is critical thinking related to nurses’ expert clinical judgment?”

The next stage of nursing practice on Benner’s continuum is the proficient stage. These nurses typically have 3-5 years of experience with similar situations, although again, it is important to note that the number of years of experience is very tenuously attached to the stage of nursing practice. The proficient nurse can now perceive situations as wholes rather than in aspects. Benner uses the term maxims to describe the big picture of a situation.

Maxims reflect what would appear to the competent or novice performer as unintelligible nuances of the situation; they can mean one thing at one time and quite another thing later. Once one has a deep understanding of the situation,
however, the maxim provides direction as to what must be taken into consideration. (Benner, 2001, p. 29)

Proficient nurses have learned from experience what typical events to expect in a given situation and how plans of care need to be modified in response to these events.

According to Benner, "the proficient nurse considers fewer options and hones in on an accurate region of the problem" (p. 29). At the proficient stage, Benner may be describing nurses' ability to be focused in their critical thinking.

Benner describes expert nurses as having enormous backgrounds of experience and deep understanding of situations that are described as "fluid and flexible" (p. 34). In addition, Benner describes that an expert nurse

has an intuitive grasp of each situation and zeroes in on the accurate region of the problem without wasteful consideration of a large range of unfruitful, alternative diagnoses and solutions. Capturing the descriptions of expert performance is difficult, because the expert operates from a deep understanding of the total situation. (Benner, 2001, p. 32)

Benner acknowledges that expert nurses often have difficulty articulating how or why they know what they know. It is possible that the intuitive perceptions of expert nurses contribute to their ease of critical thinking. However, Benner acknowledges

not all nurses will be able to become expert...when experts can describe clinical situations where their interventions made a difference, some of the knowledge embedded in their practice becomes visible. And with visibility, enhancement and recognition of expertise becomes possible. (p. 35)
Similarly, Shank-Pless and Clayton (1993) note that, "finding out what the expert nurse does with knowledge will help us to articulate a conception of critical thinking that can then be used as a springboard for various teaching strategies" (p. 428). Gaining insight into the critical thinking of expert nurses and the relationship of critical thinking to their judgment is of interest and value to the nursing profession and potentially has broad educational implications across disciplines.

The three levels of critical thinking identified by Kataoka-Yahiro and Saylor that I reviewed earlier in this chapter can be aligned with Benner's stages of nursing practice (see Appendix A). A nurse at the basic level of critical thinking assumes that authorities have the right answers for everything (Kataoka-Yahiro & Saylor, 1994). This description of the basic level of critical thinking seems to fit with Benner's novice and advanced-beginner stages of nursing practice. A nurse at the complex level of critical thinking, according to Kataoka-Yahiro and Saylor, has the ability to detach, analyze, and examine alternatives systematically. The description of the complex level of critical thinking seems to be most similar to Benner's competent and proficient stages of nursing practice. A nurse at the commitment level of critical thinking anticipates the necessity of personal choices. The commitment level of critical thinking may coincide with Benner's expert stage of nursing practice. While I have endeavored to align the critical-thinking levels of the Kataoka-Yahiro and Saylor model with Benner's nursing practice stages, overall I view these levels as dynamic and acknowledge that a prescriptive alignment to Benner's stages is not helpful. There is more likely to be overlap between critical-thinking levels and nursing-practice stages.
Knowledge

Bereiter and Scardamalia (1993) identify that knowledge is too narrowly defined; knowledge does not exist in filing cabinets in the brain, but rather knowledge is a very complex process unto itself. Knowledge is both formal and tacit. Formal knowledge consists of concrete information that exists and is taught; essentially it is inert and not used to solve problems on a daily basis. Formal knowledge becomes skill when used to solve problems involving procedure. Tacit knowledge is hidden knowledge that cannot specifically be observed. Tacit knowledge includes three forms of knowledge: informal knowledge, impressionistic knowledge, and self-regulatory knowledge. First, informal knowledge is learned through experience. Formal knowledge becomes informal knowledge when it is used to solve problems that require understanding. Second, impressionistic knowledge is associated with feelings. According to Bereiter and Scardamalia, the feeling connections we make with knowledge are crucial in enabling us to remember formal knowledge. Intuition is thought to be impressionistic knowledge. I will discuss intuition later in this chapter. Last, self-regulatory knowledge is the final type of tacit knowledge, and it is interesting when considering critical thinking. Self-regulatory knowledge refers to the temperament or habits of an individual toward learning; it is the ability to “sustain methodical problem solving under severe conditions” (Bereiter & Scardamalia, p. 58). The description of self-regulatory knowledge as a habit of learning is similar to the description of the habits of an ideal critical thinker that I described earlier in this chapter. Self-regulatory knowledge is highly individual in that what works for one person does not necessarily work for another. Bereiter and
Scardamalia also argue that possessing self-regulatory knowledge is vital for expert practice.

Paul (1984) cites that the knowledge and logic required to fix technical or procedural problems is very different from the knowledge and logic required to fix dialectical or principled problems that arise in situations of complex human interaction. Individuals in clinical disciplines such as nursing and teaching encounter problems both procedural and principled in nature. However, the educational dilemma that supports the rationale for this thesis is not about teaching the knowledge that results in competency with critical-care procedural skills. The educational dilemma that forms the rationale for this thesis is the need to guide the capacity of individuals to become experts by logically thinking through the dialectical or principled problems such as those that Paul identifies. Paul claims that the “most important knowledge we have is the result of integrative acts of the mind...dialectical thought is the master principle of all rational experience and human emancipation. It cultivates the mind and orients the person, as technical training cannot” (p. 14).

The thesis objectives of having nurses define critical thinking and explore how critical thinking is related to nurses’ expert clinical judgment are definitely focused on a problem that is principled and not procedural in nature. Paul (1990) also identifies that the premise of critical theory is that knowledge requires individual thinking:

Knowledge and truth can rarely, and insight never, be transmitted from one person to another by the transmitter’s verbal statements alone; one cannot directly give another what one has learned – one can only facilitate the conditions under
which people learn for themselves by figuring out or thinking things through. (p. 22)

Paul's insights provide strong rationale for the role of preceptors, mentors, and organizational leaders to provide supported experiences in environments that foster learning.

Bereiter and Scardamalia and Paul have shed light on the complex concept of knowledge. In connecting their ideas, I equate formal knowledge and procedural knowledge with theory that can be easily identified, taught, and learned in a classroom setting through practical education. Tacit knowledge includes (a) informal knowledge, which develops through experience; (b) impressionistic knowledge, which is the feeling knowledge of intuition; and (c) self-regulatory knowledge, which is an individual’s ability to stay focused to learn. I consider the three forms of tacit knowledge identified by Bereiter and Scardamalia collectively as the principled knowledge identified by Paul.

Case cites “a pertinent knowledge base precedes critical thinking...the broader one’s knowledge base, the greater one’s capacity for critical thinking” (1994, p. 104). I agree with Case that a broad knowledge base is important for critical thinking. However, as a result of data collection and analysis in this study, I do not interpret Case’s statement that “knowledge precedes critical thinking” in an absolute way. I believe that knowledge builds critical thinking and critical thinking builds knowledge and that practice experience provides the foundation for these interdependent processes to take place. These concepts will be elaborated on in Chapter 4 when I reveal the grounded theory outcome of this study.
Benner (2001) acknowledges the interrelatedness of practical knowledge of “knowing how” and theoretical knowledge of “knowing that.” I consider the practical knowledge described by Benner equivalent to the tacit knowledge described by Bereiter and Scardamalia and the principled knowledge described by Paul. Benner identifies that enhanced problem solving results from the “know how” acquired through experience and describes the resultant “knowing that” as being “knowledge embedded in clinical practice” (p. 2). I believe that Benner is identifying that knowledge and experience are inextricably linked. Additionally, as a result of data collection and analysis in this study, I believe that critically thinking through experiences fuels knowledge development. Benner also recognizes that practical knowledge is not only achieved through clinical practice but is also extended through theory-based and scientific research. Benner records and passes on the “know how” of nurses through the use of exemplars or stories that nurses tell. Through rich narrative stories, insight is gained into the principled, tacit, or practical knowledge that guides the clinical judgment of nurses. The value of narrative data fostered by Benner provides additional support for the use of grounded theory research in this work.

Emotional Intelligence

Recall Benner’s description from earlier in this chapter, that expert nurses have enormous backgrounds of experience and deep understanding of situations that are described as “fluid and flexible” (Benner, 2001, p. 34). In addition, Benner identifies that it is expert nurses who have true intuition. What is intuition? Qualitative investigators have studied the reflections of expert teachers to explore what contributes to their
exemplary practice. An educator, Max van Manen, elaborates on a concept that he calls pedagogical tact that may be similar to nursing intuition:

Tact can neither be reduced to some kind of intellectual knowledge base nor to some set of skills that mediates between theory and practice. Rather, a third option is offered in the realization that tact possesses its own epistemological structure. (van Manen, 1995, p. 43)

Tact may be attributable to the personal style of individuals. The qualities of perceptiveness, understanding, and feeling are required for “thinking attentiveness” (van Manen, 1995, p. 44). I equate these qualities with emotional intelligence. Earlier in this chapter as well, I presented Brookfield’s (1987) five phases of critical thinking. The fourth phase involved developing alternative perspectives. An individual’s ability to adapt to change and to experience educational growth requires emotional intelligence.

Linda Elder is an educational psychologist. She is currently the Executive Director of the Center for Critical Thinking and President of the Foundation for Critical Thinking. She defines emotional intelligence as

a measure of the degree to which a person successfully (or unsuccessfully) applies sound judgment and reasoning to situations in the process of determining an emotional or feeling response to those situations…a person with a high degree of emotional intelligence would be one who responded to situations with feeling states that “made good sense”, given what was going on in those situations.

(Elder, 1996, p. 1)

Elder insists that emotion is not separate from cognition. “The truly intelligent person is not a disembodied intellect functioning in an emotional wasteland, but a deeply
committed mindful person, full of passion and high values, engaged in effective reasoning, sound judgment, and wise conduct" (Elder, 1996, p. 2). Critical thinking is the link between intelligence and emotions for an emotionally intelligent individual (Elder). Through critical thinking, an individual draws on both emotional and logical thoughts to make good judgments. Through critical thinking, individuals “learn from new experiences through the process of continual self-assessment. Critical thinking, then, enables us to form sound beliefs and judgments, and in doing so, provides us with a basis for a rational and reasonable emotional life” (Elder, p. 2).

Elder also identifies that the human mind can have conflicting tendencies to be either egocentric or nonegocentric. Egocentric thinking is focused on self-interest and is often marked by “rigid, inflexible habits of thought” (Elder, 1996, p. 4). According to Elder, some common egocentric emotions include defensiveness, irritability, arrogance, anger, apathy, indifference, alienation, resentment, and depression. Nonegocentric thinking is more fair-minded and rational. Elder describes nonegocentric thinking as empathetic, kind, generous, considerate, and thoughtful. Elder states:

The result is a kind of dualism in us: our selfish, egocentric side, on the one hand, and our capacity to recognize higher values on the other. These two sides each can have a role in influencing our thoughts, feelings, and desires. What is more, because we become facile self-deceivers, it is often not clear to us when we are acting in an egocentric manner. (p. 4)

There is a tendency to label these conflicting thinking states of the mind as either “emotional” or “intellectual.” The reality is that thoughts are both emotional and intellectual at the same time and cannot be separated. As Elder (1996) argues,
Nonegocentric emotional thinking is part of, not separate from, intellectual thinking.

Nonegocentric critical thinking is necessary at the stage of the expert practitioner.

Paul (1984) is also speaking of emotional intelligence when he states:

The principles of comprehensive reason do not involve external authority, ego-identification, or technical expertise but require a free and open mind and the willingness to listen to and empathize with all contending perspectives on an issue without presupposing any connection between the truth and any preselected line of reasoning. (p. 12)

Paul (1990) also states:

It is not of the nature of the human mind to think critically...it has no built-in drive to question its innate tendency to believe what it wants to believe, what makes it comfortable, what is simple rather than complex, and what is commonly believed and socially rewarded...it takes a special intervening process to produce the kind of self-criticalness that enables the mind to effectively and constructively question its own creations. (p. 30)

Paul and Elder agree that individuals typically do not recognize their own lack of critical-thinking abilities, furthering the challenge to educators who are trying to nurture such abilities (Paul, 1984).

Previously in this chapter I revealed the various descriptions of the individual qualities required to be an effective critical thinker. Recall that Paul (1990) identifies seven interdependent traits of mind that individuals need to have to cultivate critical thinking: intellectual humility, intellectual courage, intellectual empathy, intellectual integrity, intellectual perseverance, faith in reason, and an intellectual sense of justice.
Additionally, P. Facione (1990b) acknowledges the “critical spirit” and cites the following traits as necessary for critical thinking:

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

Emotional intelligence aptly describes the qualities or traits required of a critical thinker.

Critical Reflection

The process of reflection is required for critical thinking to contribute to knowledge and clinical judgment. Critical reflection is thinking critically while reflecting (van Manen, 1995). van Manen identifies three types of reflection: (a) retrospective reflection, which involves thinking about past experiences; (b) anticipatory reflection, which involves thinking to plan for future experiences; and (c) contemporaneous reflection, which involves thinking in the moment of acting. The term “engaged immediacy” is described as making decisions in the moment, with limited opportunity for reflection on past experiences or reflection on potential impact in the future (1995). Many work environments require engaged immediacy. Most certainly teachers, nurses, and also individuals in countless other roles need to function with engaged immediacy. However, van Manen disputes his concept of reflecting in action:

Many teachers have given me testimonials that are at odds with the concept of teaching as deliberate reflection in action…teachers admit that they must be
making countless decisions throughout the day. But when you ask the same teacher how much reflective thinking really went into each of these many ‘decisions’, the teacher will equally readily admit that in actual fact you do not really make decisions in that sense. Rather, you say and do what is appropriate in a thoughtful kind of way. (p. 39)

If spur-of-the-moment decisions are not knowingly made using the process of contemporaneous reflection, further exploration of reflection on past experiences for learning for future experiences is required.

Thinking about one’s thinking is essential to learning. Paul acknowledges that the dialectical thinking that is required to build knowledge must happen at the level of the individual learner. “The art of thinking well illuminates the art of learning well. The art of learning well illuminates the art of thinking well. Both require intellectually skilled metacognition” (Paul, 1984, p. 7).

Metacognition involves thinking about one’s thinking. Critical thinking is a method of metacognition that requires the capacity to reflect critically for learning to occur. Individuals must be able to critically evaluate their own thinking or else they would view their thinking as right, no matter how egocentric.

Paul also states that critical reflection by each learner is required to generate knowledge:

Right-answer inculcation is not a preliminary step to critical thought. It nurtures irrational belief and unnecessarily generates a mindset that must be broken down for rational learning and knowledge acquisition to begin. The structure of our lifelong learning generally arises from our early cognitive habits. If they are
irrational, then they are likely to remain so. There are twin obstacles to the development of rational learning: 1) being told and expecting to be told what to believe (belief inculcation) and 2) being told and expecting to be told precisely what to do (the over-proceduralization of thought). Together they fatally undermine independence of thought and comprehension. (1990, p. 428)

Paul’s ideas emphasize the importance of early exposure through the educational curriculum and life in general to critical thinking for knowledge acquisition. Paul’s ideas also emphasize that critical thinking for knowledge acquisition is germane within any clinical discipline, including nursing.

Critical reflection involves becoming aware of specific perceptions, meanings, behaviors, or habits of seeing, thinking, or acting (Mezirow, 1981). In his critical theory of adult education, Mezirow classified three domains of learning: learning for task-related competence, learning for interpersonal understanding, and learning for perspective transformation. Mezirow argues that despite the interrelatedness of these learning domains, each requires its own different way of knowing, and therefore different educational strategies are also appropriate. For learning in the task-related domain, Mezirow cites appropriate and practical educational approaches such as behavioral objectives, needs assessment, competency-based education, task analysis, skill training, accountability, and criteria-referenced evaluation. The domain of learning for interpersonal understanding is also referred to as the social interaction domain (Mezirow). To “teach” for this domain of learning, educators can facilitate adult learners to “develop empathy and to develop confidence and competence in such aspects of human relations as resolving conflict, participating in discussion and dialogue,
participating and leading in learning groups, listening, expressing oneself, asking questions, and philosophizing” (Mezirow, p. 18).

Perspective transformation is the third learning domain detailed by Mezirow. Perspective transformation is unique to adults and can be obtained through self-reflection. In perspective transformation, “new experience is assimilated and transformed by one’s past experience” (Mezirow, 1981, p. 6). “Perspective transformation fills an important gap in adult learning theory by acknowledging the central role played by the function of critical reflectivity” (Mezirow, p. 11). Again, a unique educational approach is required for perspective transformation in adult learners. Mezirow emphasizes the need to explore “dilemmas with contradicting rules and assumptions rooted in areas of crucial concern to learners” (p. 19) in small-group settings to challenge “habituated ways of perceiving, thinking, feeling, and behaving” (p. 19). A supportive, nonjudgmental environment is crucial to foster the critical reflexivity required for perspective transformation.

Although the domains of learning are interconnected, it is obvious that they are very different, each requiring specific educational strategies. Critical thinking is not in the task-related domain of learning. I suggest that the process of critical thinking overlaps the social interaction and perspective transformation domains of learning, depending on the focus of the critical thinking and its meaning to the individual.

Expertise

Bereiter and Scardamalia (1993) confirm “study and practice build up the knowledge that make one an expert” (p. 11) and “knowledge embedded in expert systems is largely informal knowledge” (p. 52). They further argue:
The career of the expert is one of progressively advancing on the problems constituting a field of work, whereas the career of the nonexpert is one of gradually constricting the field of work so that it more closely conforms to the routines the nonexpert is prepared to execute. (p. 11)

Experts engage in critical thought to expand on the problems within their field of work. As a result of this study, I believe that using emotional intelligence, or more specifically, the qualities of an effective critical thinker, individuals engage in nonegocentric critical thinking to formulate accurate judgments.

The National Institute for Literacy in Washington (DC) has developed an educational program called Equipped for the Future (EFF). The EFF program is based on a constructivist theory of knowing and learning to build expertise. The premise of this theory is that learners integrate their existing knowledge and experiences with prior knowledge and past experiences to build new knowledge (Gillespie, 2002). I view that expert practitioners have established expertise within their discipline or within a specialty of their discipline. The concepts related to building expertise that are inherent within the EFF framework are:

1. Acquiring expertise is a complex developmental process in which new knowledge is built on prior knowledge.

2. To develop expertise, learners need a richly structured knowledge base. They need to learn cognitive and metacognitive strategies for using and applying new information.
3. Scaffolding instruction helps learners to develop their fluency, independence, and range of performance as they move along a developmental continuum from novice to expert. (Gillespie, p. 3)

The first EFF principle is very comprehensive. Evolving to an expert practitioner is a complex developmental process—it does not just take time, it is the quality of the time through experiences that is important. New knowledge expanding from prior knowledge is essential. Even new formal knowledge, gleaned in a classroom setting, is incorporated into an existing knowledge base where meaning is found. The second EFF principle informs me that while knowledge is a prerequisite to expertise, it is the process of thinking, and thinking about the thinking, that builds the knowledge base of the expert practitioner. These concepts of expertise are aligned with the knowledge literature I revealed previously in this chapter from Bereiter and Scardamalia, Paul, Case, Mezirow, and Benner. The third EFF principle highlights scaffolding. Scaffolding instruction is based on the work of Russian psychologist Lev Vygotsky, who proposed that the social environment must provide the scaffold or support system for a learner to continue to build competencies in a similar manner that a painter uses a scaffold to obtain access to areas that are otherwise out of reach (Gillespie). The EFF report highlights:

There is now strong evidence that experts do not just know more facts. They are not "smarter", nor do they necessarily have better memories than other people. Rather, they have developed a more complex, richly structured knowledge base related to their field. (Gillespie, p. 2)

Gillespie recognizes that experts use good cognitive and metacognitive learning strategies. Cognitive strategies assist memory by organizing content information. For
example, the ability to read and understand a broad concept and then break that broad concept down into categories or classifications that facilitate understanding is a cognitive strategy. Metacognitive strategies include being aware of cognitive strategies and one's own thinking process. “Good metacognitive strategy users engage in an ongoing process of identifying what their prior knowledge of a topic is, what they don’t know, and what they need to learn” (Gillespie, 2002, p. 3). Gillespie also recognizes that these cognitive and metacognitive strategies can be explicitly identified and taught to novice learners. “Vygotsky found that new capabilities in a novice learner are first developed during collaboration with teachers or more competent peers and then internalized to become part of the individual’s mental model of the world” (Gillespie, p. 4).

The value of preceptors and mentors to support the learners’ needs echoes previous literature I reported from Paul. Vygotsky defined the “zone of proximal development” as the space between what a learner can achieve independently and what the learner can achieve with the assistance of someone more advanced (Gillespie, 2002). According to Vygotsky, it is the role of education to provide learners with guided experiences within their zone of proximal development. Within the common model of critical-care nursing orientation, more competent peers are assigned the role of preceptors to guide the learning of nurses in critical care. This orientation is typically ill structured, with poorly defined learning objectives. Benner indicates that the ideal nursing preceptor is one or two stages above the learner on the novice-expert continuum, as this nurse is most likely to be able to provide support geared to the learner (Benner, 2001). It is beyond the scope of this thesis to explore the strategies that the EFF program purports
will build expertise; however the strategies may certainly be helpful within the context of nursing education.

Chapter Summary

The development of critical thinking is recognized as a substantive educational goal across clinical disciplines. In this chapter, I presented critical-thinking descriptions from numerous theorists including Paul, Kataoka-Yahiro and Saylor, N. Facione, P. Facione, Sheffer and Rubenfeld, Case, and Brookfield. While the definitions of critical thinking vary somewhat, universally their theories describe critical thinking as a complex process that requires individuals to have qualities of emotional intelligence and the ability to reflect critically on experiences. Knowledge is also complex, develops through experiences, and is required for critical thinking. Judgment is the outcome of critical thinking.

Benner’s (2001) model of nursing practice, from novice to expert, accurately represents the continuum of nursing practice and provides the framework for this thesis. It emphasizes that experiences are integral to nurses’ development. The model also articulates the practice limitations of less experienced nurses. This is important within the context of the shortage of critical-care nurses. Quality patient care and positive patient outcomes must be maintained while supporting opportunities for nurses to develop expert clinical judgment. A nurse may progress from the novice stage of recognizing objective attributes, measurable parameters, and context-free rules to guide action; to the advanced-beginner stage of recognizing aspects of a situation because of prior experience and the ability to be comparative; to the competent stage of recognizing his or her actions in terms of long-range goals or plans of which he or she is consciously aware; to the
proficient stage of perceiving situations as wholes rather than as aspects; and finally to the expert stage of having enormous backgrounds of experience and deep understanding of situations that are described as “fluid and flexible.” Critical thinking has a role in the evolution of clinical judgment from novice to expert. Experts demonstrate emotional intelligence and engage in critical thinking to expand on problems within their field of work to formulate accurate judgments. Through this study, nurses define critical thinking and how critical thinking relates to expert clinical judgment.

The purpose of this study is to explore critical-care nurses’ perceptions about critical thinking. The first objective of this study is to answer the question, “How do critical-care nurses define critical thinking?” The second objective of this study is to explore the question, “How is critical thinking related to nurses’ expert clinical judgment?” The educational goal in appreciating critical thinking and its relationship to nurses’ expert clinical judgment is to contribute to successful integration of nonexpert nurses in the critical-care setting and to ideally facilitate their progression to expert nurses. Through this study, learning from experiences will emerge as fundamental to critical thinking and the development of expertise. Mezirow (1981) identifies the educational importance of making experiences meaningful:

Helping adults construe experience in a way in which they may more clearly understand the reasons for their problems and understand the options open to them so that they may assume responsibility for decision making is the essence of education. (p. 20)

This citation emphasizes the value of this thesis. Facilitating the nurse participants to explore critical thinking and expert judgment through their experiences will elucidate
knowledge about these complex concepts that will make a contribution to educational theory.
CHAPTER THREE: RESEARCH DESIGN

I used grounded theory methodology to explore nurses’ perceptions about critical thinking. I have divided this chapter into eight sections: grounded theory methodology, site and participant selection, ethical considerations, research procedures, data collection and analysis techniques, methodological assumptions, establishing credibility, and limitations of the research.

Grounded Theory Methodology

Grounded theory research design is a “systematic, qualitative procedure used to generate a theory that explains, at a broad conceptual level, a process, an action, or interaction about a substantive topic” (Creswell, 2002, p. 439). The use of grounded theory to explore critical thinking in nurses was selected because the process of critical thinking is a substantive topic that requires development of relevant theory in order to effectively contribute to the practice of critical-care nurses.

Central to grounded theory research design are the components of studying an interaction or a process, using theoretical sampling, analyzing the data through identification of categories, determining a central phenomenon, and generating a theory (Creswell, 2002). Grounded theory design has its roots of origin in symbolic interactionism.

Symbolic interactionism is a down-to-earth approach to the scientific study of human group life and human conduct. Its empirical world is the natural world of such group life and conduct. It lodges its problems in this natural world, conducts its studies in it, and derives its interpretations from such naturalistic studies. (Chenitz, 1986, p. 224)
Grounded theory design supports generating theory through actively listening to the nurses. The premise with grounded theory is that the researcher must understand and articulate the process as the participants understand it to be in their world (Chenitz, 1986). In order to develop a relevant critical-thinking definition and theory that appreciates the complexity of critical thinking within the practice setting, it is important to listen to critical-care nurses' perceptions about critical thinking. Grounded theory design supports this objective.

Site and Participant Selection

I selected a 16-bed adult critical-care unit in a 365-bed urban community hospital in the Greater Toronto area to conduct this study. At the time of the research and presently, I am the Nurse Manager in this critical-care unit. This site was easily accessible to me as a researcher, and the nurses in this unit had diverse nursing experience and critical-care nursing experience and were willing and interested to participate.

Eleven nurses participated in this study (see Appendix B). They were all women in the age groups from 20-30 years (2 participants), 31-40 years (2 participants), 41-50 years (5 participants), and 51-60 years (2 participants). The nurses ranged in years of nursing experience from 2 years to 33 years. The years of critical-care nursing experience within the group ranged from 1 year to 29 years. In regards to formal nursing education, 4 of the nurses had nursing diplomas, 3 nurses had nursing degrees, 3 nurses had both diplomas and degrees, and 1 nurse had a master's level nursing education. Ten of the 11 nurses had taken critical-care specialty continuing education courses. Three of the 11
nurses had completed certification with the Canadian Nurses Association in the specialty field of critical-care nursing.

**Ethical Considerations**

I encountered ethical challenges with potential for conflict of interest in my role, scheduling of the data-collection sessions, and the lack of anonymity for participants.

The major ethical consideration for this study was to deal with my dual role as researcher and manager at the study site. In my formal position of authority as Nurse Manager in the critical-care unit where the nurses were employed, the potential for conflict of interest was present.

The hospital Research Ethics Committee had accepted my proposal and was satisfied with my acknowledgement of potential conflict of interest and my strategies to minimize concerns. However, my initial application to the Brock Research Ethics Board (REB) for expedited review was denied, and a full board review was scheduled. The first concern Brock REB had was with my recruitment strategy. I planned to identify nurses with similar years of critical-care experience and approach them directly with a request to participate in a focus group. I intended to combine participants into specific focus groups based on their experience. This purposive sampling strategy is consistent with grounded theory procedure. The Brock REB was concerned that a targeted method of recruitment could be perceived as coercive. The second concern identified by the Brock REB was with my initial procedure to have the nurses self-assess their stage along Benner’s (2001) continuum of nursing development. The purpose of this procedure was to correlate the nurses’ self-assessed stage of nursing development and their perceptions about critical thinking. The Brock REB was concerned that the nurses’ self-assessment of their stage of
nursing practice using Benner’s model was consistent with performance appraisal, thus bringing my dual roles of manager and researcher into conflict.

I acknowledged that my dual role as researcher and manager had significant implications for conflict of interest, and I had identified potential areas of concern prior to submitting my proposal for ethics clearance. However, prior to the Brock REB full review, I reconsidered the potential conflict and voluntarily made significant changes to my research procedures in order to minimize potential conflict. I changed my recruitment procedure to open invitation only. I removed the procedure to have the nurses self-assess their stage on Benner’s continuum. I deemed that neither of the planned procedures was essential to the outcome of the research. I clearly articulated the ethical considerations of my dual role of researcher and manager in the informed consent letter and in my interactions with the nurses throughout the study and afterwards. After I communicated the changes in my research procedures, I continued to have ethics clearance from the hospital research committee and I received ethics clearance from the Brock Research Ethics Board (see Appendix C).

A second ethical challenge that I identified was when and how to schedule the focus groups in a way that was respectful of the nurses’ working and home schedules. I made every attempt to plan the focus groups when the nurses were working; however this did not work out consistently. Some nurses attended a focus group on a break during their work shift, while other nurses elected to come in on a day off or prior to their shift in order to be included in the focus group. I ensured that all nurses were aware that their scheduled attendance at the focus group could be deferred for any reason.
A third ethical challenge that I encountered during the study was that in some situations the choice of nurses to participate in the study was known by their peers either through disclosure by the nurse or because of the nurse’s request for a specific break time to attend a focus group. The nurses were aware of the need for confidentiality of information shared in the focus groups and that anonymity of data needed to be maintained. All nurses had access to the study procedures and consent form prior to volunteering for the study. Nurses were also informed that they could withdraw from the study at any time without penalty. There were no concerns raised regarding the disclosure of some of the nurses who were participating in my study.

Each nurse who volunteered to participate was given a written explanation of the research in advance of the focus group and provided consent to participate. Time was taken at the beginning and the end of each focus group or interview to discuss the research process, subsequent requirement of the nurses for the member check, postparticipation questionnaire, and any questions from the nurses.

Research Procedures

I introduced my research through an open letter inviting nurses to participate in a focus group related to critical thinking. I distributed this invitation electronically through the hospital computer system to all nursing staff in the critical-care unit. I also posted the letter on the bulletin board in the staff lounge. I hoped that broad communication of the purpose, objectives, and methods of my research would stimulate interest amongst the nurses and encourage them to participate. I did not approach the nurses with a direct request to participate in my research with the rationale that a nurse might feel obligated to
participate if I asked directly. Within days of the invitation, the nurses began to approach me to participate.

Two weeks following the release of the initial invitation, I held the first focus group with 4 critical-care nurses. Two weeks later, I held the second focus group with 3 participants. At that time, no additional nurses had volunteered to participate. Therefore, on the same day as the second focus group, I sent an electronic reminder invitation to all nurses in the critical-care unit requesting their participation in a third focus group. Shortly thereafter, 3 additional nurses expressed interest in participating in the third focus group. I held the third focus group approximately 8 weeks after the second focus group. The delay with the third focus group occurred because of the December holiday season and also because I required time to complete axial coding of the existing data. Axial coding involved comparing data between focus group 1 and focus group 2 in preparation for focus group 3. This procedure is known as sequential data collection and is fundamental to grounded theory methodology (Charmaz, 2000). Eight weeks following the completion of the final focus group, I completed the only interview. The interview participant was a nurse involved in critical-care education and direct practice. The interview participant was not in a focus group. The interview provided an opportunity to reconcile the focus group data. In total, 11 critical-care nurses participated through three focus groups and one interview.

In addition, each participant completed and returned a postparticipation questionnaire intended to seek data related to expert nursing practice. In the questionnaire, I described each stage of Benner's (2001) model: novice, advanced-beginner, competent, proficient, and expert. Also in the questionnaire, I listed the critical-
thinking themes that I identified in the data from the focus groups and interview. Each nurse was asked to indicate to what extent each of the themes of critical thinking applied generally to a nurse at each stage of Benner’s model (see Appendix D). For example, to what extent would the data theme “able to make decisions” apply to a novice nurse? The rating options were not applicable, weak, moderate, or strong. The nurses responded for each data theme by considering nurses at each of Benner’s stages. All 11 nurses completed and returned a postparticipation questionnaire.

Data Collection and Analysis

I collected data through three focus groups, one interview, and the postparticipation questionnaire to all participants.

Each face-to-face data-collection session was 60 minutes in length and was audiotaped. I received assistance with transcription from an individual who was subject to the same confidentiality requirements as the participants and I were.

For each focus group, I used the same procedures to collect data related to perceptions about critical thinking. To begin each focus group, I posed a discussion starter question (Morgan, 1997) for consideration. This question was, “What does critical thinking mean to you?” I provided 2 minutes of quiet time for nurses to write down their thoughts regarding the question. I informed the nurses that it was not required for them to share exactly what was written on their paper. Rather, their thinking about the question would prepare them for the open discussion that would follow. Upon completion of this thinking time, I requested that one person volunteer to start the discussion. I conducted the focus group in an open format, taking a facilitative role only if the group was straying far off topic or if the discussion was becoming circular and not progressing. Discussion in
the group flowed from topic to topic. When required, I asked refocusing questions that emerged from the discussion at hand. However, minimal facilitation was used in order to enable the nurses to identify and explore topics that were relevant to them. As the 1-hour pre-set time frame for each focus group approached, I drew the session to a close by asking each participant to respond to the question, “What is the most important point about critical thinking that you want to leave me with?” This discussion closer question gave an opportunity for each nurse to provide a response that was personally most relevant about critical thinking.

The grounded theory technique of purposive sampling permits intentional participants to be selected for the purpose of clarifying and expanding on underdeveloped ideas in the data (Creswell, 2002) and to sample specific issues and look for precise information to better inform the emerging theory (Charmaz, 2000). With this strategy in mind, I selected one individual to be interviewed, and I conducted this interview after all focus group data had been collected and analyzed. The interview participant had also volunteered for the study. My relationship with the interview participant was different from the nurses in the focus groups in that the interview participant did not report to me in my manager role. Our collegial relationship created a comfortable, informal interview session. Additionally, I specifically requested an interview with this individual because of her unique role in both critical-care education and direct practice. I anticipated that the interview would serve to validate, clarify, and expand on data identified through the focus groups.

I began the interview with the same discussion starter question that I used in the focus groups. This question was, “What does critical thinking mean to you?”
Unfortunately, a technical error with my recording equipment resulted in not having audiotape of this important first impression question. Luckily, I noticed and resolved the problem approximately 5 minutes into the interview, and subsequent data were not lost. The participant was able to restate her opening perspective on the question; however the spontaneity of the first response was lost. Similar to the structure of the focus groups, following the discussion starter question, the conversation flowed from topic to topic. My responses were at times facilitative reflections of the nurse’s words and at other times spontaneous questions aimed at validating data themes that had been established from the focus groups. Throughout the interview, I used the techniques of restating and probing for meaning to facilitate data collection. For example, “So when you think about it that way, what qualities in a nurse are needed to be able to see that do you think?” and “So you are identifying that knowledge specific to a certain area of nursing helps with critical thinking?” and “You said that colleagues draw on one another. What is the team’s role in critical thinking?” I did not probe for discussion regarding expert nursing judgment in the focus group sessions. However, in the interview, I specifically directed the discussion to expert nursing judgment. The participant acknowledged awareness of Benner’s model, and I then asked the question, “What thoughts come to mind about the expert nurse?” I closed the interview with the identical summary question as the focus groups, “What is the most important point about critical thinking that you want to leave me with?” I view this question as key in summarizing what the participant valued most about critical thinking after an interactive session when many concepts were identified and discussed.

I used the grounded theory format of collecting and analyzing data simultaneously and sequentially (Creswell, 2002). In grounded theory methodology, the first stage of
analyzing data is referred to as open coding (Creswell). Following each focus group, the assistant transcribed the audiotape of the focus group into a text document. I then compared the audiotaped data and the transcribed document for accuracy and made corrections where necessary. At this time, I also assigned a pseudonym for each participant so that the identities of the nurses would be confidential in the transcripts. Following completion of this initial review for each transcript, I began the process of open coding. I transferred relevant chunks of data from the original transcript into an Excel spreadsheet (Microsoft, 2000) that provided the format to organize, analyze, and compare the data. True to its qualitative foundation, assigning codes to data in grounded theory design provides the link to staying connected with the participant views (Charmaz, 2000). Charmaz also identifies the importance of assigning codes that accurately represent the meaning of the data. The codes together then form the theory that explains the data and also directs further data gathering. As I transferred each transcript into the open coding spreadsheet, I separated and assigned a relevant code to each chunk of data. I often assigned codes that were the actual words of the nurses, also known as in vivo codes (Creswell, 1998). Examples of in vivo codes from this initial open coding include “thinking outside the box,” “you can alter your path,” and “putting things together.” Additionally, Charmaz recommends the use of action words or phrases to code data. Examples of action codes that I identified from the open coding include “making a decision” and “reflection.” I completed this open-coding process following each focus group, prior to holding the next session.

For the next phase of analyzing the open coding, I used the copy and paste function in Excel to transfer the entire “open coding” column of cells into a second
spreadsheet specific to each session. I then used the “sort” function in Excel to group the codes together (see Appendix E). This action enabled me to easily identify the frequency and number of open codes within the data for each session. Focus group 1 contained 226 chunks of data and 84 open codes. Focus group 2 contained 254 chunks of data and 89 open codes. Focus group 3 contained 182 chunks of data and 67 open codes. The interview contained 108 chunks of data and 24 open codes. Many codes were noticeably redundant, some labeled with exact terminology, while others obviously were representing the same concept but were coded with different terminology. Of course the frequency of each code varied within the data for each session. At the conclusion of data analysis for each session, in order to verify that no data were lost, I multiplied the final number of codes by the frequency of occurrence of each code, and this number was equal to the originally identified number of data chunks for each of the sessions.

Within 3 weeks of each session, nurses were provided with the transcript of the preliminary open coding data as a member check (Creswell, 1998). In this member check, nurses were asked to review the transcript and validate or identify any discrepancies between their interpretation of the data and the open code that I assigned to the data chunk. Ten out of 11 member checks were returned, with one document being lost by the participant. This participant however identified that she had reviewed the document and did not require any changes. She preferred not to receive a duplicate member check. Two nurses requested one coding change each for their specific portion of the transcript. In addition, 2 nurses expanded on the transcript without requesting any recoding of the data.

Following open coding, the next phase of grounded theory design is axial coding, which involves comparison of open codes in order to identify categories or themes in the
data. For this next phase of data analysis, I analyzed the full transcript of each session in a consistently structured manner to ensure the data had been well captured. I completed the axial coding after each session, prior to the next session occurring. Again using Excel, I devised a spreadsheet to organize the data from each session (see Appendix F). To permit me to easily compare the data, I inserted all same codes in the same row of the spreadsheet. I populated the spreadsheet with the open code data from individual responses from the opening discussion starter question and the closing summary question and group responses from the body of the session. Visualizing the open code data in this way, I was able to determine the common themes in the data. I did not identify any new data in the responses to the closing summary question. From focus group 1, 15 themes emerged. From focus group 2, 11 themes emerged. From focus group 3, 18 themes emerged. From the interview, 23 themes emerged. Of note is that the third focus group and the interview both had the fewest number of data chunks, and yet both had the higher number of themes. There are a couple of rationales for this observation. In the interview, I facilitated the discussion in a much more structured manner than I did with the focus groups. In addition, I intentionally used the interview as a forum to put forward data that had emerged from the focus groups for feedback from the interview participant. I also used this facilitative process to a certain extent for the third focus group. There were obvious patterns emerging in the data by the time of the third focus group. Thus, while I still primarily used an open group format in focus group 3, my approach was more structured for this last focus group. I facilitated more with questions to expand on the data that were being identified and to prompt consideration of data that had already emerged from focus groups 1 and 2. I do not believe that this slight change in approach limited the
data in any way. Such a change in technique is appropriate within the emerging design of grounded theory methodology (Creswell, 2002).

I chose terms for themes based on what made sense to describe the data. At times, a code was upgraded to a theme. For example, “making a decision” was a code that was consistent throughout the data, and therefore I upgraded this code to a theme. In other situations, I changed the name of the theme to more comprehensively describe the coded data. For example, I formulated the theme “expansive thinking” from open codes that included “thinking outside the box” and “thinking big picture.”

As the research proceeded, I used constant comparison (Creswell, 2002) to examine data from the focus groups and interview as each session occurred. Constant comparison is a procedure used in the grounded theory method to compare occurrences, with other occurrences leading to identification of themes and connections between themes. The intention of going back to the data is to ensure that the themes are grounded in the data (Creswell). Clear patterns in the themes of the first and second focus group were also obvious in the third focus group and the interview. I compared the themes from the axial coding of the first and second focus groups while analyzing the open coding data of the third focus group. During analysis of the interview, I compared themes of all focus groups to the themes that emerged from the interview data. This procedural approach is consistent with the emerging design of grounded theory format and the practice of collecting and analyzing data simultaneously and sequentially (Creswell).

I continued data comparison by expanding, collapsing, and refining categories and themes. I determined after the analysis of the data from the third focus group that no new themes were identified. Saturation of the data had been reached (Creswell, 2002). At this
time, I also began to piece together a very raw critical-thinking model from the data. Creswell advises that a subcategory may be used in the situation where more detail is required to describe a category. Two categories emerged, which I labeled as “factors that contribute to critical thinking” and “factors that impede critical thinking.” With these descriptions used to describe the categories, I labeled the attributes or factors identified by the nurses as subcategories. For example, I identified the subcategory of “intimidation” under “factors that impede critical thinking” and the subcategory of “open-mindedness” under “factors that contribute to critical thinking.” The subcategory of “motivation” fit under both categories, dependent on the context in which the participant identified it.

I used identical processes to analyze focus group and interview data. First, I reviewed the transcript of the interview with the audio recording for accuracy, clarified voice and terminology, and assigned a pseudonym for the participant. Completing this detailed review also helped me to become immersed in the data. I then engaged in open coding, which required segregating the full interview transcript into relevant chunks of data and transferring them into an Excel spreadsheet for ease of organization and analysis. The overlap of categories was evident, similar to findings during the analysis of the third focus group. The overlapping of the data validated the saturation of the data and the interconnected categories of the data, creating a smooth progression from open coding to axial coding. I also returned the transcript to the interview participant as a member check after axial coding to validate the collapse of codes into the categories, as I had done with the focus group nurses.
The accumulation of data to the point of saturation is necessary given that the end objective of grounded research is to generate a theory that is grounded in the data (Creswell, 2002). This comprehensive and grounded approach to data collection and analysis formed the basis for exploring nurses’ critical thinking.

When I completed data analysis of the focus groups and the interview, I determined that the research question, “How do critical-care nurses define critical thinking?” was well answered. However, the second research question, “How is critical thinking related to nurses’ expert clinical judgment?” was not well answered. I made a conscious decision prior to conducting the focus groups to have an open format discussion with minimal facilitation so as not to direct the nurses’ perspectives. I believe this was a valuable and necessary approach for the data to emerge from the nurses with minimal intervention. In reviewing the audiotaped focus groups, I identified that the term “expert” or “expertise” was identified in every focus group and with particular emphasis in one focus group. However, the data were broad, and the connection to how critical thinking was related to expert nursing remained unclear. I chose not to interrupt the flow of ideas in the focus group at the time and did not redirect the groups back to discuss the topic. In hindsight, it would have been beneficial to urge further exploration of expert and expertise during the focus groups. In the more relaxed setting of the interview, I did ask a pointed question about expert nurses’ ability to be critical thinkers, and the response was “that expert knows the critical thinking. They know that piece. They know how to put the pieces of the puzzle together.” I did not collect similar detail about the connection between critical thinking and expert nursing practice in the focus group sessions.
After the focus groups and interview analysis, I made the decision to seek additional data. I had included the possibility of a postparticipation questionnaire in the participant consent form. I developed a questionnaire to specifically focus on the relationship of critical thinking to expert nursing practice (see Appendix D). I connected each of the 22 themes of critical thinking that the nurses identified through the focus groups and interview to Benner’s stages: novice, advanced-beginner, competent, proficient, and expert. I provided a brief description of each of Benner’s stages in order to assist the nurses to conceptualize each of the stages. In the questionnaire instructions, I asked the nurses to rate the degree to which each of the critical-thinking components (as defined through the focus groups and interview) applied to a nurse practicing at each of Benner’s stages as 0 (not applicable), 1 (weak), 2 (moderate), and 3 (strong). In this manner, I was able to quantitatively analyze the nurses’ perceptions about how critical thinking is related to nurses’ expert clinical judgment. All nurses completed the questionnaire independently and returned the document within 2 weeks.

Methodological Assumptions

Through this study, I have qualitatively explored critical thinking. The words and stories used by the nurses to communicate their perceptions provide rich data that illustrate the complexity of critical thinking.

In grounded theory research, a data analysis procedure called constant comparison is used to compare codes identified in the data, to broaden the specific codes to themes or categories, to compare categories, and to generate new categories (Creswell, 2002). The researcher selects a core category or central phenomenon as the foundation of the theory. The theory generated in grounded theory research is described as middle-range theory
(Creswell). The determination of the central phenomenon in grounded theory may be related to factors including its interconnectedness with other categories, its frequency of occurrence, its quick and easy saturation, and its clear implications for development of theory. Because the theory is grounded in the specific data collected, it does not have wide applicability or scope (Creswell). The grounded theorist’s analysis tells a story about people, social processes, and situations. The researcher composes the story; it does not simply unfold before the eyes of an objective viewer. This story reflects the viewer as well as the viewed (Charmaz, 2000). Through grounded theory research, I have developed a theory that articulates critical-care nurses’ critical thinking and the relationship between critical thinking and nurses’ expert clinical judgment.

Establishing Credibility

I strove to increase credibility of the research through triangulation of data collection, discriminate sampling for the interview, and rich narrative description (Creswell, 1998).

To accomplish triangulation of data, I used diverse data-collection methods that included focus groups, an interview, and the postparticipation questionnaire. By repeatedly comparing data transcripts and organizing the coded data using Excel spreadsheets, I attained a highly effective systematic approach for analyzing the data.

As I analyzed data, identified themes, and postulated an initial theory, I used discriminate sampling to validate the theory development (Creswell, 1998). Using this procedure, I returned to the data looking for dialogue that either supported or contradicted the proposed themes or the theory in order to establish credibility that the theory is representative (Creswell). After I reconciled the data from the interview, I returned to the
full transcripts of all three focus groups searching for connected and disconnected themes.

I used member checks to substantiate the data analysis. Member checks provided the opportunity to take data back to the nurses to validate the accuracy of the data interpretation (Creswell, 1998). Within 3 weeks of each data-collection session, each study participant received a copy of the full transcript of the focus group or interview in which they had participated. They were asked to provide feedback about the accuracy of the transcript and my interpretation of their contribution. For focus groups 1 and 2, the transcript reflected the open-coding stage of data analysis for nurses’ verification or dispute. Of the 7 nurses involved in the first two focus groups, all seven member checks were returned; 3 nurses requested one coding change each, and 4 nurses agreed with the transcripts as provided. For nurses in focus group 3 and the interview, the transcripts reflected axial coding and the synthesis of codes into broader categories or themes. This change in the member check provided an opportunity for both validation and challenge of a more advanced stage of data analysis by nurses. Of the 4 nurses involved in these later data-collection stages, one member check was not returned, 1 participant identified one coding change, and 2 nurses agreed with the transcript as provided. The member check process was identified as an important technique for establishing credibility (Creswell), and it was valuable in this study.

The research findings are described in Chapter Four. Data themes are described and connected using rich details quoted directly from the nurses.
Limitations

I collected data for this study from only one research site. All participants were employed in the same 16-bed adult medical surgical and coronary critical-care unit. The sample size was small and all were female. A total of 11 critical-care nurses participated in either a focus group or an interview, and all completed and returned the postparticipation questionnaire. There is potential that the data may have been affected by my authority position as the Nurse Manager in this critical care unit. However, I am confident that voluntary recruitment and open facilitation of the focus groups contributed to robust qualitative data. The theory generated is directly applicable only to the nurses who participated in the study. However, some research findings may be widely transferable to critical-care nursing overall, and the nursing profession in general. In addition, there is the potential for broad applicability of this educational theory across professional disciplines.
CHAPTER FOUR: PRESENTATION OF FINDINGS

The purpose of this study was to explore what critical thinking means to critical-care nurses. The first objective of this study was to answer the question, “How do critical-care nurses define critical thinking?” The second objective of this study was to explore the question, “How is critical thinking related to nurses’ expert clinical judgment?”

The study population consisted of critical-care nurses employed in a 16-bed adult critical-care unit in a 365-bed urban community hospital in the Greater Toronto area. I conducted three focus groups and one interview with a total of 11 critical-care nurses participating. All 11 participants also completed a postparticipation questionnaire related to expert nursing practice. I used grounded theory methodology for this study in order to obtain open and thorough exploration of the topic and analyze data in a manner to keep it grounded in the views of the participants. Using the grounded theory techniques of open coding, axial coding, and constant comparison, I analyzed data to identify codes, compare categories, and eventually determine themes about critical thinking.

In this chapter, I first describe the critical-thinking model that directly represents the perspectives of the critical-care nurses in this study. This critical-thinking model is the grounded theory outcome of this study. I have described the model prior to revealing the data in an effort to provide a solid context for the reader to relate to the detailed findings. After describing the critical-thinking model and theory that I have developed, throughout the remainder of this chapter, I will provide descriptions of the critical-thinking themes and examples of rich narrative data that contributed to the development of the model.
The Critical-thinking Model for Expert Nursing Judgment

Consistent with grounded theory methodology, I have developed a model relevant to critical thinking and expert clinical judgment that is grounded in the data that are the nurses’ perspectives (see Figure 1).

The nurses identified that critical thinking is a complex process that requires expansive thinking and is necessary for quality patient care. All components of the model combine together to represent critical thinking as a complex process. The nurses repeatedly recognized that knowledge and experience continuously develop throughout a person’s life and career. The model describes the critical-thinking process that, when practiced, contributes to the development of an educative experience. I use the term “educative experience” to describe years of experience that are spent engaged in the process of critical thinking compared to years of experience that merely accumulate with the passage of time. Educative experiences build knowledge that contributes to enhanced critical thinking, reflection, and overall high-quality judgment. It is engagement in educative experiences that may lead to expert judgment.

The model illustrates the critical-thinking process identified by the nurses in the study. The arrows connect the two primary elements of the critical-thinking process. The first element is knowledge, which I interpret as the foundation of critical thinking. The second element of the model is experience. Knowledge and experience constitute nursing practice. Critical thinking is required in nursing practice.

Nursing judgment is the outcome of critical thinking in nurses and is illustrated at the base of the figure, arising out of experience. Nursing judgment is clinical judgment within the domain of nursing. The data came from nurses, and therefore the critical-
thinking model is most applicable to nurses, hence nursing judgment. This critical-thinking model could be broadly applicable within other clinical domains, with clinical judgment being the outcome of critical thinking. The nurses identified that nursing judgment includes prioritizing, knowing what to expect, making decisions, taking appropriate action, and consulting interdisciplinary team members at any point in making judgments.

In the centre of the figure, I have depicted the central phenomena of the critical-thinking model: core critical-thinking qualities, collaboration, and reflection. Consistent with literature described in Chapter two, the nurses identified specific personal qualities as necessary for an individual to engage effectively in critical thinking. These personal qualities include being humble, open-minded, inquisitive, motivated, and calm. The qualities are not depicted in any particular order in the figure. The core critical-thinking qualities are required at an individual level; however these qualities are also required at the team level to facilitate critical thinking.

The nurses identified collaboration at the team level as essential to critical thinking. Nurse-to-nurse collaboration as well as interdisciplinary collaboration contribute to effective reflection, effective nursing judgment, and positive patient outcomes. I have illustrated the oval that encloses the core critical-thinking qualities as a dashed line in order to demonstrate that the core critical-thinking qualities are required by individuals and also required for effective team collaboration and nurturing of a nonthreatening environment.
Figure 1. The critical-thinking model for expert nursing judgment.
From the data, I identified that critical thinkers use reflection consistently and effectively. Knowledge is gained through reflection on past experiences. By reflecting on past experiences, individuals reconstruct, modify, and add to their knowledge. This new knowledge then informs present judgment. I believe that reflection on experiences is cumulative, difficult to separate into distinct occurrences. However, in order to clearly illustrate the concept that reflection is important both prejudgment and postjudgment, in the model, I have separated the reflective process into “reflection for judgment” and “reflection on judgment.” Reflection is an essential component of critical thinking and creating educative experiences both at an individual level and at a team level; hence I have connected the ovals of the reflective process into the oval of collaboration. I have acknowledged the importance of reflection by positioning the ovals of the reflective process within the knowledge/experience cycle in order to represent that both times of reflection are integral to the critical-thinking process that results in nursing judgment.

I have connected the oval of intuition to knowledge at the top of the model to represent that intuition arises from knowledge gained through the practice of educative experiences.

Nurses have potential to become expert practitioners by consistently engaging in the critical-thinking process I have documented in the Critical-thinking Model for Expert Nursing Judgment (see Figure 1). The nurses indicated that it is through consistent engagement in educative experiences over the course of their careers that individuals have potential to become expert practitioners.

Throughout the remainder of this chapter, I will provide examples of the narrative data obtained in the focus groups and interview, and I will present the postparticipation
questionnaire data that have formed the basis for the *Critical-thinking Model for Expert Nursing Judgment* (see Figure 1).

**Narrative Data**

In the following section, I will provide selected quotations from the transcript data that will describe the components of the *Critical-thinking Model for Expert Nursing Judgment* (see Figure 1). I have blocked all quotations in the text for easier identification of the direct words of the participants.

**Critical Thinking as a Process**

Critical thinking was identified in each session, focus groups and interview, as a complex process that requires expansive thinking and is continuously developing. Several nurses likened the action of using critical thinking to putting a puzzle together:

How are all the pieces fitting together? You tell me and let’s put those pieces together as we go on. What else can we look at? What else becomes important? You know, creating that whole patient.

Sort of a little puzzle, this is a small piece to the big picture.

Critical thinking was also described as following a path, with new information and resultant decisions changing the direction of the path:

It follows a logical path, it’s a way of getting to where you want to go by following this pathway that you kind of develop over time, it’s not something that you can just put your finger on and just do automatically. You kind of have to practice and you find your own pathway to get there. And it’s a way of getting to the most correct way of doing something...but it’s also flexible, you can change,
change doesn’t throw you off, if something changes you can also alter your path to get to where you want to go.

Last, critical thinking was described as thinking outside the box:

Responding to the response of the patient is thinking outside of the box. When I think of inside the box it’s say, a lot of procedures...this probably isn’t what the patient wants or it’s not working, so now you have to go outside the box. You might have it all planned, but when you walk in the room you know it’s a different story.

I determined that the perception that critical thinking requires continuous learning and development was also a repetitive theme throughout the data-collection sessions. The data excerpts that follow illustrate the need for continuous learning to develop critical thinking:

I don’t believe critical thinking has a finite spot. I think it continually evolves, it continually grows, and I just don’t think it’s a process that can stop...always going to be something that’s changed, that’s new, that’s different that will make me question and keep going.

You need to build up, you don’t get it, you don’t like go to a book and read it...ah, I’m a critical thinker today. I read this book. It does not do that. You need to build up...experience, work with it.

You have to feed it, you have to nurture it.

Critical thinking needs to be polished, by experience, by exposure to situations...these people graduate from the same base but they don’t have the knowledge because some of them didn’t want to polish it or not improve it.
A willingness to learn, to keep going back and learning, to seek out information and share information all become important in critical thinking.

In summary, the nurses consistently described critical thinking as a complex process, requiring expansive thinking and continuous development.

*Knowledge*

The nurses consistently identified knowledge in all data-collection sessions. Knowledge was cited as vital to one’s ability to think critically. It is interesting however that all references to knowledge also included the importance of experiences as well. For example:

I think your knowledge is your base...a lot of things stem out of [your knowledge]...your critical thinking, your experience.

I think the knowledge part of it is the most important thing that we are talking about, combining your knowledge with your experiences.

It [critical thinking] is knowledge based but I think it is a very strong combination of the experience but also the evidence-based practice in that I actually understand the physiology behind what I’m doing, I’m not just following a set of words that I am used to or I have experience doing.

We all have the knowledge basically from school, probably privately, you know taking courses or searching the net or doing things like that, but the implementation of the knowledge is the important thing and of course the critical thinking...you see people who are implementing the knowledge differently like before and then you learn from that when you are exposed to that situation.
I observed that nurses consistently made connections with knowledge and experience; supporting the educational concept that one’s knowledge and one’s experience are inextricably linked.

Experience

Aside from its combination with knowledge, I identified three additional concepts in the data regarding experience and critical thinking. These concepts are the importance of broad life experiences, repeated experiences building nurses’ ability to think critically, and the importance of reflection on past experience for learning to occur. I will review the theme of reflection in more detail further on in this chapter. First, the following examples depict that broad life experience is important in critical thinking:

Life experience can translate into a broader repertoire of critical-thinking skills...I think the broader life skills, life experiences you’ve had and your ability to reflect back on them meaningfully is a big thing if somebody is going to become a good critical thinker. Somebody who is new and starting out may think of themselves as a good critical thinker but it’s more narrowly defined. Because, that’s all they’ve got in front of them is a very narrow, a more narrow set of circumstances and experiences.

There’s a correlation between critical thinking at work and critical thinking in life...I think that’s a quality that a person already has and it just develops.

I also found descriptions in the data that experiences are important in building critical thinking and that repeat exposure to similar situations is beneficial, especially when there has been opportunity for reflection and learning from past experiences:

Part of it is when you get your own experiences and process it.
You need experience; you need the knowledge exposed to it. First time you may not be able to handle it, and then second time I remember from the last time, you know so that helps.

We all remember the first time whenever patients crashed on us and how over our heads we felt and how the next time it happened it came easier. So that’s experience, or you were able to meet the situation easier and that’s experience as well. That you’ve been in this sort of situation before and got through it and now you have a greater idea of what to do or how to go about it...being able to meet the great challenges easier because you had past experience of being successful or not successful and then learning from it.

From the data, I also identified a perspective that having experience alone does not result in critical thinking or expert nursing judgment. The example below provides insight into the diversity that experience can present.

Although we look at experience and age as a positive thing for the most part, it can also be a bad point in that if you are an expert you may not be willing to accept that novice opinion...I think the bias in that direction though is a hindrance to critical thinking...a hindrance to both. To that person who is starting out, who maybe doesn’t have the experience, it will be a hindrance to that person because they’re not going to be able to pick up on anything from the more experienced nurse because she’s not willing to share it, and so it goes both ways. Neither one can pick up from the other.

The nurse in the above example succinctly identifies a complex limitation that exists in regards to the sharing of knowledge and experience. She identifies how
competition and undervaluing the perspective of others can adversely affect critical thinking. I believe this limitation can involve nurses of varying stages of practice or similar stages of practice, or it could involve members of the interdisciplinary team. However it exists, the implication is that the lack of open-mindedness regarding the contributions of others can only limit critical thinking and therefore not optimize patient outcomes. A lack of insight regarding the value contributed by diverse team members is not consistent with expert nursing practice.

**Intuition**

Some nurses identified intuition in their discussions about critical thinking. I did not observe this theme to be obviously pervasive in the data; however it was identified directly on several occasions. Examples of data excerpts regarding intuition are:

I think too critical thinking is having that gut feeling and being able to articulate it. Put it into work. So you know a patient crashing or you see a patient who is starting to spiral down, you have that gut feeling, but at this point in time, you have nothing to say talk to a doctor about, like your vital signs are still fine, whatever, but you have that gut feeling that things are not going well. So it’s the ability to then say to the doctor or your charge nurse or someone else, I’m not liking this situation and this is why.

I think sometimes, we probably don’t realize we are doing it [critical thinking]. That’s what makes it easier to do and takes a lot of pressure off is when things become automatic.

The very concept of intuition or intuitive action may preclude it from being directly identified. For example, when nurses describe their actions, the actions seem
automatic or effortless. As stated previously, I believe that intuition is a component of knowledge that is not tangible and that arises from educative experiences.

Reflection

I identified in Chapter One that due to the complexity of the process of reflection, a thorough exploration of reflection is outside the scope of this study. However, I will depict reflection within the critical-thinking process. The nurses identified three concepts regarding how reflection is crucial in critical thinking. They acknowledged how reflection on both positive and negative experiences is necessary for growth, how reflection contributes to self-awareness of personal qualities, and how the capacity of individual nurses to reflect varies. First, examples from the data that depict the importance of reflection on both positive and negative experiences:

Critical thinking is the ability to rethink some things after the fact, or to reintegrate it into what’s happened so you move forward in maybe a slightly different direction, or to reframe it or to expand your repertoire of abilities... and if you are a good critical thinker you can actually dissect out what you were thinking at the time and what your available options are for the future so that you are continually remodeling.

It’s really a fine line, what’s wrong, what’s right, really. You make a decision, but then after you analyzed what you’ve done and you think about it, you think, well... could it have been better if I had done this... I think it’s very valuable to be able to do that and accept the fact that there isn’t just one way of looking at things... and being willing to see that maybe you were wrong too.
I think to me the most important aspect of critical thinking would be learning from past experiences, be those successes and mistakes. Learning from them. Make them your own.

From the data, I identified that nurses engage in reflection after an event and they subsequently use the insight gained from this reflection to redefine what they know. The new knowledge is then applied to the next event at the time that it is occurring. In the Critical-thinking Model for Expert Nursing Judgment (see Figure 1), I defined these complementary processes as reflection on judgment and reflection for judgment. It is likely that nurses are not always able to separate these reflective occurrences. New knowledge may not always be directly attributable to a specific event. However, as I have indicated in the model, it is the cumulative critical-thinking process that contributes to educative experiences.

The second concept that the nurses identified as important in reflection is the importance of critical personal reflection and truthful awareness of personal qualities. Examples from the data that illustrate this concept are:

You are able to recognize your own abilities and strengths and your own skills...recognize that in fact you are able to make decisions and you are able to do certain interventions without having to ask.

I had to learn to look more at my values and beliefs and how it was affecting my nursing.

The personal qualities identified by the nurses as important in critical thinking are represented in the Critical-thinking Model for Expert Nursing Judgment (see Figure 1) and are described further in the next section of this chapter.
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Last, the nurses identified that individual nurses vary in their capacity for reflection and that this alters the critical-thinking process. Examples from the data depicting this concept are:

Not everybody reflects at the same level.

I think some people; their own innate personality causes them to reflect more than others. And I think with other people, again, we have to figure out a way, and this is probably the toughest part, is putting value on being able to do that reflective process. And I'm not sure if we always do that. We do from a physiological point of view, let's reflect on what medication we gave, and when, what happened following that? But we all don't always do it from a psychosocial point of view and that can be because of our own discomfort...because of the vulnerability that's associated with it...it's hard as a human to be able to do that, not just as a nurse.

I recognize from the data that the nurses' descriptions of differences in individual capacity to reflect are congruent with descriptions of differences in individual capacity to think critically.

I think that everyone has the ability to [think critically] but I don't think that everyone does...it has to do with awareness, coupled by experience...where you have so much ability to do so much more but they are not able to recognize that within their role.

In this section, I have summarized the nurses' perspectives on how reflection is important in critical thinking.
Nursing Judgment

As reviewed in Chapter Two, the College of Nurses of Ontario identifies judgment as a key standard in nursing competency (College of Nurses of Ontario Professional Standards, 2002). One nurse gave the following perspective that describes judgment in relationship to critical thinking.

Judgment is that critical thinking...so I can have the knowledge as to why to defibrillate. I can have the skill to actually defibrillate. But my judgment part would be is this the appropriate situation, should this be somebody I’m doing it on, and if it doesn’t go right what do I do next...taking the whole picture in a snapshot and being able to go, can I do it?

I identified that the nurses often used the term "common sense." I believe that common sense describes a form of nursing judgment that is most likely intuitive judgment and that arises from educative experiences. In one of the data-collection sessions, a nurse described a scenario in which she used "common sense." The nurse stated, "I used my common sense at that time and I felt really comfortable that he was able to drink that cup of tea." Prior to this statement, the nurse described a scenario in which a patient was not permitted to take anything by mouth because he had had his breathing tube removed earlier in the shift and it was not safe for him to ingest anything by mouth at that point. The patient desperately wanted a cup of tea. The nurse was open-minded to consider the patient’s perspective and was open to meeting his needs. She did not permit the patient to have a cup of tea at the immediate time he had requested it because her theoretical knowledge informed her of the risks. In addition to using her theoretical knowledge, she inevitably reflected on her previous experience and she made
a decision about the appropriate time to permit the patient to have the cup of tea. The result of this action could have been positive or negative for the patient. Following this action, the nurse would reflect on this experience and, depending on the specific outcome for the patient following her decision, the reflection on her judgment would modify the nurse's knowledge and experience base. As indicated previously in this chapter, critical thinking may seem to occur effortlessly, yet it is a very complex process consisting of knowledge informing judgment that contributes to educative experience.

Nursing judgment is the outcome of critical thinking. In the model, I describe that nursing judgment is comprised of the subcategories of prioritizing, knowing what to expect, making decisions, taking appropriate action. I have situated consult in the center of these nursing judgment components in order to acknowledge the importance of utilizing team members throughout the judgment process. Later in the chapter, I will present collaboration in detail.

Prioritize, know what to expect, make decisions, and take appropriate action. It is impossible to separately describe the subcategories of prioritizing, knowing what to expect, and taking appropriate action. The following examples demonstrate that these subcategories are intertwined.

When you are prioritizing, you are always thinking one step ahead of what could happen, what could potentially happen, okay, I’m going to get ready for this, something as simple as pulling out fentanyl and versed when you know that they’re going to have a line inserted and maybe knowing that they’re borderline blood pressure, so let’s get some dopamine just on standby. Little things like that.
You have to have that knowledge base to be able to assess and prioritize your care; that is the critical thinking.

One participant offered a very decisive perspective about critical thinking:

Critical thinking is the ability to make the most appropriate decision.

Another participant simultaneously described planning ahead for what to expect and making decisions as components of critical thinking. This participant also again likened the process of critical thinking to traveling a path:

Things start to happen and you’re thinking ahead, and you know maybe that happens and maybe it doesn’t, and then maybe your path goes in another direction and you make further decisions, so you’re constantly making decisions I guess but it’s not out of the blue…it’s what you are always doing in order to decide what path you’re going down.

Decision-making may also include not making a decision or not taking action, as indicated by the example:

Critical thinking doesn’t have to necessarily lead to a decision. Sometimes you can just think things through, and it’s part of your acquisition of knowledge as well. Something happens, you can think about it and store it there for future reference.

The nurses I have quoted in the following data excerpts substantiate the connection between knowledge and experience:

In that snap decision-making that you have to be able to do, you have to use your critical-thinking skills in order to just jump in there and do what you have to do, be ready for what’s coming next…and a lot of that comes from experience.
You’re anticipating, you’re watching, you’re monitoring. As you are doing that you are thinking about what your next step is going to be or what you are going to do, or you know something needs to be done.

This next excerpt describes a very common scenario regarding a nurse making the decision whether or not to notify the physician. These data reinforce that patient care is dependent on the nurse’s ability to think critically and make decisions appropriately, including the very primary decision of whether or not to consult with a member of the interdisciplinary team, including the physician:

You need critical-thinking skills in order to make decisions in critical care...there are times when you could think, well maybe I should call the doctor. Well, let me think this through first, and maybe you’ll think through what’s going on and think okay, I can wait until he calls in, you know, just simple things like that even...or you’ll think to yourself, if I call the doctor what do I want to hear? You know, what am I expecting him to order, or even what do I want him to answer?

The following data excerpt provides an excellent example of critical thinking in action. The nurse describes a patient assessment finding “coffee grounds,” which is a quality used to describe emesis that is suggestive of the possibility of internal bleeding. She took the autonomous action of sending a blood sample for a complete blood count (CBC) to determine if the patient was actively bleeding and at the same time decided to also send the sample of blood to begin the cross-match process just in case the patient was bleeding and required a blood transfusion.
Maybe we should do a CBC... he has some coffee grounds... then you think ahead, you prepare, you have the blood ready and then say, yes, we do have to give him blood. Hey, no problem, we have him already group and cross-matched.

Taking the above type of action is quite common for critical-care nurses. Appropriately, this nurse is very casual about describing it. Critical thinking is difficult to describe. Examples of critical thinking may be difficult to find because the actions seem so obvious and uncomplicated to those who know. Yet when I dissect the above example, it is apparent to me that the nurse’s judgment that resulted in the decision to take this action came about through a complex process. Being aware of an assessment finding called coffee grounds and its implications for hidden bleeding required theoretical knowledge.

I believe Benner (2001) would call this assessment finding an objective attribute, which a novice nurse may be knowledgeable about. Knowing about an objective attribute in theory and recognizing it in practice are very different. Again recalling Benner (2001), aspect recognition requires past experience. Benner identifies that in order to achieve aspect recognition, a nurse is minimally at an advanced-beginner stage of practice. So, coffee ground emesis can be recognized in a situation with a patient. At a proficient stage of nursing practice, you will recall that Benner identifies that nursing practice is driven by maxims. A maxim is a situation that presents itself as a whole to the proficient nurse based on past experience and the present situation. The action on the part of the nurse seems obvious because this nurse is not required to analytically think through the situation step by step. The proficient nurse acknowledges the potential implications that coffee ground emesis means that the patient is bleeding internally and carries out the
appropriate action effortlessly, sending the blood sample to confirm the possible implication that will then lead to appropriate treatment for the patient. Last, the expert nurse has a deep understanding of the whole situation and very quickly and effortlessly narrows in on the problem and acts accordingly. The expert nurse intuitively trusts her assessment of the patient that most likely included other assessment findings in addition to the coffee grounds emesis. The expert nurse foresees the likelihood that this patient will require a blood transfusion and simultaneously and effortlessly foresees the risk to the patient if the internal bleeding continues. In order to avert the further deterioration of the patient, the expert nurse has proactively sent the blood sample, anticipating transfusion, and has moved on to care for the patient, who will inevitably have additional physiologic problems and high requirements for care. As I refer back again to the above example, the nurse’s critical thinking led to judgment, and the resulting action saved precious time for this patient. I acknowledge that this is not a complicated example. However, it is an example of quality patient care that resulted from the nurse’s critical-thinking process and judgment. Additionally, most certainly when considered as one small component in the overall process of caring for the patient, it is an example of expert nursing judgment.

Core Critical-Thinking Qualities

In addition to describing what critical thinking is, throughout all sessions nurses also identified personal attributes that influence critical thinking. This observation is consistent with the critical-thinking literature previously cited in Chapter Two that described dispositions or qualities of effective critical thinkers. The nurses consistently identified five personal attributes that contribute to critical thinking. These qualities
include being humble, open-minded, inquisitive, motivated, and calm. The nurses also acknowledged that engagement in the critical-thinking process is not continuously sustainable. Variations in the ability of individuals to engage in the critical-thinking process are likely.

Being humble. One attribute identified by the nurses is being humble. I have identified the following data excerpts to cite how being humble contributes to critical thinking.

You have to have a certain amount of humility if you are a good critical thinker, because you will never always be right.

[Feeling like you know it all]--that’s a concept people have to overcome. And that’s part of the critical thinking because you are criticizing, not criticizing yourself, but you are thinking well, I really don’t know.

If people walk in and have a deficit in that knowledge but they are not making themselves acknowledge...but they present as well, I’ve seen it, I’ve seen it done once, that’s good, I know, that prevents them from going further on into critical thinking. Because they have already put in a block for themselves to advance.

The personal quality “being humble” keeps an individual open to critical personal reflection and therefore open to learning.

Being open-minded. The second attribute identified by the nurses as important in critical thinking is being open-minded. I have cited the following example from the data to represent the necessity of being open-minded to be an effective critical-thinker.

Even if you are at the expert level, you can learn from the novice as well...you have to be open-minded enough to pick up on that and be able to integrate that
into your critical thinking as well. So I think open-mindedness is a huge asset to critical thinking.

Being open-minded is essential to realize the possibility of obtaining growth through new or different ideas.

*Being inquisitive.* The third attribute that the nurses identified as being valuable for critical thinking is being inquisitive. The following data excerpt specifically illustrates the importance of stimulating an inquisitive nature during the initial orientation to critical care.

I believe your preceptor needs to be the person who asks many questions so that it encourages people “let’s ask questions, let’s look for answers.” And I think that will help develop bringing that classroom thought into what’s going on with this patient. So that when a physician orders a medication instead of just going, okay “I’m going to give his medication, how do we mix it up?” “How do we put it in the bag? How do we prime the bag? How do we program the pump?” They go and say to the preceptee, “why do you think we’re starting this medication?”

Being inquisitive is an essential quality in critical thinking as it is the basis of finding new ideas and answers.

In addition to illustrating the quality of being inquisitive, the above example also introduces a concept that I will describe later on in this chapter regarding the difference between focusing on the task that is to be accomplished, mixing the medication and programming the pump, and the importance of thinking through why the medication is being given and all that its administration means for the patient. This example highlights Paul’s (1984) differentiation between procedural knowledge and principled knowledge.
In addition, the above example also highlights the challenge of knowledge transfer from classroom theory to application of that knowledge at the bedside. Knowledge transfer is an educational challenge of its own that I am not addressing in this research. However, I acknowledge the significance of knowledge transfer in critical thinking.

*Being motivated.* The fourth attribute identified by the nurses was the need for individuals to feel motivated to engage in thinking critically. When motivation is lacking, the critical-thinking process will be stifled. What contributes to motivation is highly individual and is outside the scope of this thesis. However, I have detailed an example of data in the following paragraph that illustrates the nurses' perception of the role of motivation in critical thinking.

I think too it comes down to motivation as to why you’re here. Are you here because you have a love of nursing, you have a love for people, you have a love for being an integral part of seeing someone go through a difficult time in their life?

The nurses primarily focused on the negative influence to the critical-thinking process when motivation is lacking. Within the theme of motivation, I identified several subthemes that affected motivation to think critically. I cannot say for certain if the data represent lack of motivation or actual lack of ability to engage in critical thinking. I propose that the distinction between lack of motivation or lack of ability would be dependent on the individual in individual circumstances. Regardless, I have included the data under motivation with this caution about how the data may be interpreted. These subthemes of motivation include: stress and fatigue, the stage of life and career of an individual, complacency, and the work environment.
To begin with, the nurses described stress and fatigue as potential barriers to critical thinking. I have cited examples from the data that describe this subtheme:

Stress or fatigue, that kind of thing will play a huge role in how well you critically think. If you come into work and you are exhausted or the baby kept you up all night, you’re not going to be on top of your game as much as you normally are.

Some people, and it comes down to their make-up. They tend to think more black and white, and so they go through their day. They do what they have to do. They don’t really think as much around what’s going on around them, and you have those types of people. And that’s just fine…and you have other people who do have the ability to absorb the whole environment of what’s going on around them, and they’re the ones who are more developed in their critical thinking.

The nurses also identified that a lack of critical-thinking ability or motivation can span the extremes of both mature nurses with long careers and young nurses with short careers.

A lot of people stopped counting how many years they’ve been there I think and are counting how many more years until retirement.

There are newer nurses who aren’t quite so willing to open up in the same way. Even if they’ve been out for a few years there is a different kind of mindset out there…their commitment is slightly different. It’s more to themselves rather than to patient care.

As a third subtheme in the role of motivation, the nurses described complacency towards learning or growth as negatively influencing the critical-thinking process. The following data excerpts illustrate this concept:
I’m comfortable here. I don’t really need to go further on.

There are some who are happy where they are and they are not going to be moved...no amount of sticking a fork into them is going to make a difference.

Some people are seeking knowledge and they want to learn more and it’s continual with their education and knowledge. Some people, they just come in here and work.

The above examples of lack of interest in ongoing education and professional development characterize a negative influence on critical thinking. The previously identified positive critical-thinking qualities being open-minded and being inquisitive are opposite to the negative quality of complacency, providing additional rationale for what is needed for effective critical thinking.

Last, the nurses identified the work environment as a subtheme contributing to motivation to think critically.

The work environment...which could be another barrier...because in general a negative atmosphere and people aren’t happy, I guess that does impact your motivation.

Work environment may be connected to the important role of collaboration detailed in the next section of this chapter. I also expect that work environment may include other components related to work-life satisfaction that were not revealed in the data. To recount for clarity, the subthemes identified by the nurses that affect motivation to engage in critical thinking were stress and fatigue, the stage of life and career of an individual, complacency, and the work environment. These factors may influence commitment to
think critically, resulting in nurses engaging or not engaging in the process of critical thinking.

*Being calm.* The fifth attribute consistently cited by the nurses is the importance of being calm in order to enable critical thinking in oneself and others. Below, I have provided multiple rich descriptions from the data that illustrate the value that calmness has on critical thinking.

We have to calm down and always keep our emotion under control too. That is usually happening in a situation of crisis like that. Again, you know some people don’t cope. So this is another adaptation that we have to learn or probably will learn-critically thinking. It is very important and smooths the situation...if you are calm, quiet, and you know it’s hard to do that, but if you do that you’re really affecting so much in your critical thinking.

For critical thinking you need to have patience when you’re developing your skills to give yourself time and not get frustrated with it, and when you’re teaching other people, the skill to have the patience to let them build it slowly. I think that’s tough for nurses because nurses are doers. So the ability to sit and watch as somebody works their way through this is what becomes difficult because it’s much easier once you have that experience and that knowledge to do it because you can see that picture so much clearer, so much faster, that the waiting for that next person can become very difficult when you know and it seems too simple, so logical to you, so that patience I think for critical thinking is very important.
Having that preceptor who can have that patience to let the person work through it. And you have to judge it. Obviously if an alarm’s ringing and your patient’s blood pressure is in their boots, you’re not going to take as much time to think it through...you’re going to tend to react and then discuss it after. Maybe they’re not doing it as fast as you would, but letting them do it and letting them start to become more comfortable with tasks and skills, and then after they become more comfortable with tasks and skills asking them why did we need to do that? And what are we going to do next?

The critical-thinking theories cited in Chapter Two detailed various personal attributes that influence critical thinking. Consistent with the literature, the nurses identified attributes that they believed to be valuable in critical thinking. While the individual critical-thinking qualities are not exactly consistent across theories or from the perspectives of the nurses in this study, the qualities resound with similarity.

Collaboration

The role of nurse-to-nurse collaboration and collaboration with the critical-care interdisciplinary team in critical thinking was pervasive throughout the data. I identified several subthemes regarding the contribution of effective teamwork to critical thinking. These subthemes are: the diverse praxis of professionals enhances perspective and therefore enhances critical thinking, team members can stimulate critical thinking in each other, it is important to support less expert members of the team to learn to think critically, and more expert members of the team need to support appropriate action being taken to maintain quality patient care.
To begin with, the nurses identified that interdisciplinary team members make unique contributions to critical thinking. I am using the term praxis to acknowledge the practice expertise that the varied interdisciplinary professionals bring to the team. While health professionals for the most part share the common theories of human physiology and pathophysiology, members of each discipline utilize these theories differently to inform their practice. It is an individual’s experience-based praxis that contributes to critical thinking. I have identified the following examples from the data of interdisciplinary praxis contributing to critical thinking:

A mutual respect and trust for each other and being willing to listen and to support each other in the thinking and the going through and recognizing that, well, the disciplines and their focus on the patient is different. Asking your coworkers or even doctors or respiratory like we should work as a team as a whole, that’s why we have the interdisciplinary group, so we all kind of get a little bit from everybody and it helps to build your knowledge better and you’re able to take better care of your patient and everybody around. When we support each other in critical thinking and we acknowledge each other, that’s how we are going to pick up on those small subtleties of patients to prevent them from doing the downward spiral.

The second subtheme within collaboration identified by the nurses is that team members can and need to stimulate critical thinking in each other. The following examples depict this concept:
What forces you to look at the big picture is encompassing other team members into your thinking...it will force you to open up your mind a little bit more, broaden your thinking again.

It's easy enough to lose that ability to step back at any point in time and say what's going on here right now, and you may need to hear from somebody else. A good critical thinker will integrate that.

It's like steel sharpening steel on me. That's what we need from our coworkers.

The ability to bounce ideas off each other and to learn from their experiences, and it helps. That's part of critical thinking too.

The third subtheme within collaboration is the importance of less expert members of the team being supported to think critically. Additionally within this subtheme, the nurses identified that a team environment that is nonthreatening, collegial, and supportive was conducive to critical thinking. I have provided the following data excerpts as indications of this subtheme:

You are learning from your colleagues. You're seeing what's going on with a patient they have, and when you help them through their thinking or try to work through critical thinking, you learn yourself then, because you expose yourself to more situations even though you are not directly caring.

We can draw on each other's strengths because as patients become more complex...have to redevelop or re-fine-tune your critical-thinking skills to that patient set...but the knowledge base would need to be developed.
That you can feel comfortable when you approach someone... I feel comfortable to ask a person to help me right at that moment that I need help, and she can help me without criticizing.

When the environment is not tense, it's an environment of willingness... comradery.

It's symmetry within your coworkers. It really enhances the ability to critically think.

And that's when you call on your coworker who either has more experience or has a clearer head or you know hasn't been part of the situation and is just coming in so their head is clear and they are not befuddled.

The nurses consistently identified that a supportive, nonthreatening environment is required to foster critical thinking. In the above data excerpts, the nurses specify the importance of willingness to help one another regardless of how experienced or inexperienced someone is. The comradery the nurses describe is important to stimulate trust to engage in critical thinking regardless of years of experience and what an individual “should know” at that point in their career.

The fourth and final subtheme within collaboration that the nurses emphasized is the importance of the more expert members of the team supporting appropriate action to be taken to maintain safe patient care. I have identified examples of this subtheme below:

Sometimes you might need the help of your coworkers or the other people around you, you know in order to carry out whatever is happening there and then and also take the appropriate action.
I go to the appropriate source to make sure I get the accurate information and do it right.

You should be fast to get help if there is a problem rather than dealing alone; it's better that you have all the people and be very quick in getting help so that everybody can put their ideas together.

For example, last night we got a patient. We knew that he was crashing so we were all ready for what we were going to have to face in a few minutes. We got everything ready. Everything was just ready for the patient to crash. We had time for that thinking and we were thinking amongst all of us and we did everything and the code went really well. Really organized.

The nurses have identified the importance of seeking help from more expert colleagues in a timely way to ensure that patients are safe. The nurses identify patient safety when they recognize the need that "appropriate action is taken" and to "do it right," "be fast to get help" and "we were thinking amongst all of us."

The importance of a collegial, interactive team is more evident when teams do not work effectively together. I have cited the following examples to emphasize this point.

Depending on the dynamics of the groups that are involved, or the people who are there in the unit at any given time, it can blunt...my ability to think big, to think focused at the same time, to think specifically about my patient...you're not as buoyant.

If you are working with a bunch of people who are stressful you are bound to be stressed as well.
Finally, the nurses also identified that some nurses rely too much on other team members and have not developed adequate knowledge and skills of their own, making them less effective team members.

They rely so much on others, like if there is a situation, rather than them dealing with it, you know, they let somebody else deal with it and they like to stay at the back.

This data excerpt acknowledges the importance of development of individual knowledge and skills through educative experiences. Individuals require support to learn; however learning does not take place when individuals “let somebody else deal with it and...stay at the back.” Strong individuals are required for strong teams.

I believe that the data I have presented in this section directly reinforce the importance of this study. Objectifying the elements of critical thinking makes critical thinking more tangible and thus makes it possible to encourage and support critical thinking. The above data acknowledge that nurses are functioning at various stages, and this implies that patient outcomes may be compromised unless individuals work together as a team. It is valuable to have critical-care nurses explore their perceptions about critical thinking including how critical thinking is related to expert nursing judgment.

Additional Data Not Included in the Model

I developed the Critical-thinking Model for Expert Nursing Judgment (see Figure 1) from the affirmative perspective of what critical thinking is. However, I also learned the nurses’ perspective on what critical-thinking is not. I want to acknowledge these data, for they help to clarify the nurses’ definition of critical thinking; however they did not fit within the affirmative context of the model.
Critical thinking is not task focused and not skill based. The nurses identified that critical thinking is not task focused and not skill based. First, while the nurses acknowledged that patient care requires that tasks be accomplished, they also identified that a focus on tasks that excluded a more holistic approach to patient care demonstrated a deficiency in critical thinking.

Critical thinking is definitely not task oriented.

I have seen people so focused on the task that they just ignore the patient as a whole.

Additionally, the nurses identified the importance of having good skills. However, the ability to think critically predominated good nursing practice:

I think you can have excellent nursing skills, but I don’t think that you can be a good nurse without being able to think critically.

Very task-oriented people can get quite fixed on and might have developed some fairly good specific skill sets around some complex activities that we do, but you can still find they get quite muddled up in their thinking.

In the following data excerpt, the nurse provides an example of a clinical situation where the accomplishment of specific tasks was prioritized over completing the holistic assessment of the patient. Please note in this example that “bi-pap” is a noninvasive method to assist a patient with ventilation. This treatment modality is common in critical-care units.

Just as an example, on a night shift we admitted a patient for bi-pap.

Automatically for me I would start thinking that the respiratory [system] is not working, well I’m going to assess that … but the nurse admitting the patient was
so focused [on] the computer work. [She had] to [finish] the nursing care plan, the database ... so I nicely said, have you listened to his chest... [she said] oh yeah, I’ll get to it when I find out all the drugs they plan to give the patient. [But] the patient is there. The patient is in. Let’s go and look at the patient.

I determine from the above example that the nurse was indicating that critical thinking was lacking when the tasks of completing the patient database (history) and care plan were prioritized over the patient assessment. As I analyzed the data for nurses’ perceptions about what critical thinking is, the theme of critical thinking not being task focused or skill based was obvious. This perspective supports Paul’s differentiation between procedural knowledge and principled knowledge (1984) with critical thinking contributing to principled knowledge. This perspective is also supported by Benner’s (2001) differentiation of “knowing how” compared to “knowing that.”

Critical thinking is not consistently sustainable. Finally, the nurses identified that critical thinking may not be consistently sustainable for any individual.

I would hesitate to think that all great critical thinkers are great critical thinkers all the time.

If we define [critical thinking] as being on the ball constantly, can we do it all the time?

I agree that it is reasonable and realistic to acknowledge that critical-thinking performance will vary in an individual, especially given the complexity and depth of the expectation. There will always be circumstances that contribute to an individual engaging less than optimally in the critical-thinking process. However, it is an individual’s consistent commitment to educative experiences that builds the expert practitioner. I use
the term consistent rather than continual to acknowledge situational variations in an individual’s ability to think critically. An educative experience requires engaging in critical thinking and building knowledge. Potentially with greater knowledge and enhanced ease of thinking, the effort required for critical thinking may be reduced, raising the likelihood of engaging in critical thought.

*The universality of critical thinking.* Nurses identified that critical thinking was required in all areas of nursing and not restricted only to critical-care areas.

I think even in the other areas, critical thinking is very important because especially, you know, when there are no doctors around.

The nurses identified that caring for critically ill patients consistently requires a holistic approach and suggested that nurses who choose to work in the area of critical care are more likely to enjoy the challenge of critical thinking and therefore be more skilled in critical thinking. An example to support this idea is:

I think in critical care that you’ll find more people who...don’t just want to focus on tasks. They want to know the whys and wherefores and be able to figure it out themselves and maybe predetermine that something is going to happen. Be prepared for it.

The fact that the nurses themselves identified universality related to critical thinking in nursing suggests a transferability of the critical-thinking model to nurses practicing in any area of nursing.

*Expert Practice*

From the focus groups and interview, I identified some specific information regarding expert nursing practice. One participant shared her perspective that critical-
thinking ability is a criterion within the scope of an expert critical-care nurse. In addition, this nurse provided insight into how an expert nurse may facilitate development of critical-thinking ability in others.

An expert, in whatever area they are in, whether it’s critical care or on a ward...they look at all the little pieces, even the most obscure pieces, to be able to go, what is causing it? They really seek that whole picture. When you are in that expert phase you can, or start getting towards it, you can help facilitate somebody else moving up there, and you can gauge when is the perfect learning opportunity and when is not...you can ask them those questions, those inquisitive questions, those open-ended questions, and let them develop their thinking as opposed to here’s what’s going on, here’s what you need to do, go do it, which we tend to do as we’re building up our own comfort because we are validating in ourselves what you need to do.

Throughout the analysis of the focus groups and interview transcripts, I interpreted the narrative data described in this chapter to develop and refine the model in Figure 1. After completing the transcript data analyses, I realized that I could not sufficiently answer my second research objective, which was, “How is critical thinking related to nurses’ expert clinical judgment?” In order to answer this objective, I developed a postparticipation questionnaire to obtain data from the participants about Benner’s (2001) five stages of nursing practice.

The Postparticipation Questionnaire

The nurses identified the components of critical thinking in the focus groups and the interview. Using the critical-thinking components identified by the nurses, I created a
questionnaire that the nurses completed 2-3 months after their initial participation in a focus group or interview (see Appendix D). For the questionnaire, I asked the nurses to consider and rate how each of the critical-thinking components applied to a nurse at each of Benner’s (2001) stages of nursing practice: novice, advanced-beginner, competent, proficient, and expert. The nurses rated the degree to which a nurse at each of Benner’s practice stages would typically demonstrate each individual critical-thinking component using the scale 0 (not applicable), 1 (weak), 2 (moderate), and 3 (strong). During the analysis phase of my research as I developed the final critical-thinking model, I refined my interpretation of the critical-thinking components, accounting for the fact that the critical-thinking components of the model are not exactly as represented on the postparticipation questionnaire.

The postparticipation questionnaire was completed by each of the 11 participants. I used an Excel spreadsheet to organize the data from the questionnaire. From the data, there were only six missing or invalid responses. Three responses had no data, and three responses had two ratings selected. To manage the missing and invalid data for the selected responses, I entered the average rating across all participants. I enlisted the assistance of a biostatistician at my place of work, and I used the quantitative software program SPSS (MapInfo, 2004) for all statistical analyses of the data.

The postparticipation questionnaire gave me direct data about how the nurses viewed critical thinking at each of Benner’s (2001) practice stages. More specifically, the data enabled me to objectively interpret the nurses’ perspectives about critical thinking at the expert stage compared to critical thinking at Benner’s other practice stages. From the questionnaire data, I calculated: (a) how each participant rated each critical-thinking
component at each practice stage from novice through expert, (b) the overall critical-thinking rating at each stage from novice through expert, (c) the chi-square of the critical-thinking ratings, (d) how each participant scored overall critical-thinking at each stage from novice through expert, (e) the overall mean critical-thinking scores, and (f) Spearman's Rank Correlation comparison of the mean critical-thinking scores of the five stages of nursing practice.

For the first phase of the data analysis, I determined how the nurses rated the strength of each critical-thinking component across Benner's (2001) stages from novice to expert. From the questionnaires, I entered the individual nurses' ratings of each critical-thinking component for each of Benner's stages into an Excel spreadsheet (Microsoft, 2000). Remember that the critical-thinking components identified on the questionnaire emerged from the grounded theory analysis of the focus group and interview sessions. The nurses defined the components as relevant to critical thinking. Again using the Excel spreadsheet, I calculated the average of the nurses' ratings of each of the critical-thinking components at each of the practice stages (Table 1). On the questionnaire, the nurses used the rating scale 0 (not applicable), 1 (weak), 2 (moderate), and 3 (strong). Therefore a critical-thinking component rated at 3 indicated that it was strong at that practice stage. I have graphed the average component ratings in order to visually depict the critical-thinking trend across the novice to expert continuum (see Figure 2). Due to space limitations for the graph, I have assigned numbers to the critical-thinking components that correspond to the critical-thinking components described in Table 1.
Table 1

*Average Critical-Thinking Component Ratings*

<table>
<thead>
<tr>
<th>Critical-thinking (CT) component</th>
<th>Novice</th>
<th>Advanced-beginner</th>
<th>Competent</th>
<th>Proficient</th>
<th>Expert</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 CT is a complex, systematic process</td>
<td>1.4</td>
<td>2.0</td>
<td>2.4</td>
<td>2.6</td>
<td>2.6</td>
</tr>
<tr>
<td>2 CT is needed for quality patient care</td>
<td>1.5</td>
<td>2.1</td>
<td>2.6</td>
<td>2.8</td>
<td>2.9</td>
</tr>
<tr>
<td>3 Uses colleagues and resources</td>
<td>2.0</td>
<td>2.3</td>
<td>2.5</td>
<td>2.5</td>
<td>2.6</td>
</tr>
<tr>
<td>4 Is an approachable team member</td>
<td>2.0</td>
<td>2.4</td>
<td>2.6</td>
<td>2.6</td>
<td>2.6</td>
</tr>
<tr>
<td>5 Thinks expansively</td>
<td>1.3</td>
<td>1.7</td>
<td>2.5</td>
<td>2.7</td>
<td>3.0</td>
</tr>
<tr>
<td>6 Prioritizes</td>
<td>1.4</td>
<td>1.8</td>
<td>2.6</td>
<td>3.0</td>
<td>3.0</td>
</tr>
<tr>
<td>7 Knows what to expect</td>
<td>1.0</td>
<td>1.9</td>
<td>2.5</td>
<td>2.8</td>
<td>3.0</td>
</tr>
<tr>
<td>8 Makes decisions</td>
<td>1.4</td>
<td>1.7</td>
<td>2.5</td>
<td>2.8</td>
<td>3.0</td>
</tr>
<tr>
<td>9 Takes correct action</td>
<td>1.4</td>
<td>1.8</td>
<td>2.5</td>
<td>2.9</td>
<td>3.0</td>
</tr>
<tr>
<td>10 Has knowledge</td>
<td>1.5</td>
<td>1.9</td>
<td>2.5</td>
<td>2.9</td>
<td>3.0</td>
</tr>
<tr>
<td>11 Has experience</td>
<td>0.8</td>
<td>1.6</td>
<td>2.5</td>
<td>2.9</td>
<td>3.0</td>
</tr>
<tr>
<td>12 Reflects</td>
<td>1.3</td>
<td>1.7</td>
<td>2.5</td>
<td>2.7</td>
<td>3.0</td>
</tr>
<tr>
<td>13 Is motivated</td>
<td>2.0</td>
<td>2.2</td>
<td>2.3</td>
<td>2.6</td>
<td>2.8</td>
</tr>
<tr>
<td>14 Has humility</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
<td>2.5</td>
<td>2.9</td>
</tr>
<tr>
<td>15 Is a continuous learner</td>
<td>2.2</td>
<td>2.2</td>
<td>2.4</td>
<td>2.6</td>
<td>2.9</td>
</tr>
<tr>
<td>16 Is open-minded</td>
<td>2.0</td>
<td>2.2</td>
<td>2.3</td>
<td>2.6</td>
<td>2.7</td>
</tr>
<tr>
<td>17 Is inquisitive</td>
<td>2.1</td>
<td>2.1</td>
<td>2.4</td>
<td>2.6</td>
<td>2.9</td>
</tr>
<tr>
<td>18 Has patience</td>
<td>1.5</td>
<td>1.8</td>
<td>1.9</td>
<td>2.5</td>
<td>2.7</td>
</tr>
<tr>
<td>19 Is able to concentrate</td>
<td>1.5</td>
<td>1.9</td>
<td>2.6</td>
<td>2.9</td>
<td>2.9</td>
</tr>
<tr>
<td>20 Has a vision of the whole patient</td>
<td>1.0</td>
<td>1.5</td>
<td>2.5</td>
<td>2.9</td>
<td>3.0</td>
</tr>
<tr>
<td>21 Is realistic</td>
<td>1.3</td>
<td>1.5</td>
<td>2.5</td>
<td>2.8</td>
<td>3.0</td>
</tr>
<tr>
<td>22 Has intuition</td>
<td>1.1</td>
<td>1.4</td>
<td>2.4</td>
<td>2.6</td>
<td>3.0</td>
</tr>
</tbody>
</table>
Figure 2. Trend of average critical-thinking component ratings.
For the second analysis phase of the questionnaire data, I investigated if there was a difference across Benner's (2001) practice stages in how the nurses perceived critical thinking. The null hypothesis for the questionnaire was "there is no difference in critical-thinking abilities of nurses at Benner's different stages of nursing practice." For each practice stage, novice through expert, I totaled the frequency that each critical-thinking component was individually rated as not applicable, weak, moderate, or strong (Table 2). At each stage of nursing practice, a total frequency of 242 applies (the product of 22 critical-thinking components and 11 questionnaires). Looking at the data, the nurses rated the individual critical-thinking components as strongly relevant at the novice stage only 33 times of a possible 242, representing 14%. Conversely, the nurses rated the individual critical-thinking components as strongly relevant at the expert stage 223 times of a possible 242, representing 92%. A strong rating of the critical-thinking components consistently increases across Benner's continuum from novice to expert, with an exception at the novice and the advanced-beginner stages (see Figure 3). These two stages were similarly rated when considering strong only. However, this similar rating is explained when looking at the other ratings within the two stages. The weak critical-thinking rating at the novice stage of 130 is higher than the weak critical-thinking rating at the advanced-beginner stage of only 56. Additionally, the novice's moderate rating of 69 is lower than the advanced-beginner's moderate rating of 154. This trend identifies a stronger critical-thinking relevance in the advanced-beginner nurse when compared to the novice nurse. This descriptive analysis informs me that the nurses identified differences in the critical-thinking abilities of nurses across Benner's novice-to-expert practice continuum.
Table 2

*Chi-Square of Critical-Thinking Component Ratings*

<table>
<thead>
<tr>
<th>Level</th>
<th>Not applicable</th>
<th>Weak</th>
<th>Moderate</th>
<th>Strong</th>
</tr>
</thead>
<tbody>
<tr>
<td>Novice</td>
<td>Frequency 10</td>
<td>130</td>
<td>69</td>
<td>33</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>4.0</td>
<td>53.7</td>
<td>28.5</td>
</tr>
<tr>
<td>Advanced-beginner</td>
<td>Frequency 0</td>
<td>56</td>
<td>154</td>
<td>32</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>0</td>
<td>23.1</td>
<td>63.6</td>
</tr>
<tr>
<td>Competent</td>
<td>Frequency 0</td>
<td>12</td>
<td>118</td>
<td>112</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>0</td>
<td>4.9</td>
<td>48.7</td>
</tr>
<tr>
<td>Proficient</td>
<td>Frequency 1</td>
<td>5</td>
<td>49</td>
<td>187</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>0.4</td>
<td>2</td>
<td>20</td>
</tr>
<tr>
<td>Expert</td>
<td>Frequency 3</td>
<td>0</td>
<td>16</td>
<td>223</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>1.2</td>
<td>0</td>
<td>6.6</td>
</tr>
<tr>
<td>Total frequency</td>
<td></td>
<td>14</td>
<td>203</td>
<td>406</td>
</tr>
</tbody>
</table>

*Note.* Degrees of freedom: 12. Chi-square = 728.1.

* *p* < 0.001.
Figure 3. Trend of individual critical-thinking component ratings.
Next, I investigated if these differences that the nurses identified were statistically significant. I conducted quantitative analysis to support the descriptive analysis provided by the data. I entered the data from Table 2, the critical-thinking component frequency, into the chi-square analysis formula in SPSS (MapInfo, 2004).

The purpose of a chi-square analysis is to provide a rough estimate of confidence that any differences observed when comparing two or more groups are true differences within the sample group and not random differences (Connor-Linton, 2003). Chi-square is a nonparametric statistical test. A nonparametric test is appropriately utilized when data do not have a normal distribution (Rumsey, 2007). Chi-square is not considered a strong measure of statistical significance; however this quality also makes it an appropriate test for analysis of qualitative data (Connor-Linton).

The chi-square value is calculated by SPSS (MapInfo, 2004) by finding the sum of the cross-multiplication of the data in each cell of the table (Connor-Linton, 2003). The chi-square value was calculated at $\chi^2(12) = 728.1, p < 0.001$. The degrees of freedom for this table were 12. The degrees of freedom of a table are calculated by multiplying the number of rows in the table minus one by the number of columns in the table minus one (4x3). With greater degrees of freedom of a table (more variables in the table), there is more flexibility to show statistical significance (Connor-Linton). The $p$ value represents the measure of statistical significance. A $p$ value is the probability ($p$) that the result could have been produced by chance and was not related to a difference between the variables (Creswell, 2002). When the $p$ value is less than or equal to 0.05, the relationship between the variables is statistically significant and not coincidental. The chi-square analysis of the nurses’ critical-thinking ratings across Benner’s (2001) stages was statistically
significant at a $p$ value less than 0.001. This result indicates that the nurses identified a measurable difference in critical-thinking components across Benner’s stages of nursing development. I acknowledge weaknesses in the data including the small sample size of 11 participants and also that no demographic criteria were controlled with the exception that all participants were female. However, even with the small sample size, statistical significance was determined. Through both the descriptive analysis and chi-square analysis, it appears that critical thinking, as defined by the nurses, differs in nurses at different stages of development on Benner’s continuum. Most important, the nurses identified that the critical-thinking components were increasingly more relevant across the continuum of nursing practice from novice to expert. However, I wanted to compare the overall critical-thinking scores at each of the practice stages and specifically determine how the nurses viewed critical thinking at the expert stage of nursing practice compared to the other practice stages. I required further analyses of the data to explore these relationships.

I returned to the data from the postparticipation questionnaire to calculate and compare mean scores at each of Benner’s stages. However, comparison of mean scores requires larger values to effectively represent differences. I therefore reassigned larger values to the original 4-point Likert scale. The new scale became 25 (not applicable), 50 (weak), 75 (moderate), and 100 (strong). From the critical-thinking component ratings for each participant I calculated a mean critical-thinking score for each participant, and then I calculated a mean overall critical-thinking score for each of Benner’s (2001) stages of nursing practice (see Figure 4). The mean critical-thinking score at the novice stage was 63.3%, at the advanced-beginner stage it was 72.4 %, at the competent stage it was 84%,
Figure 4. Comparison of mean critical-thinking scores.
at the proficient stage it was 92.4%, and at the expert stage it was 97.6%. There is a very clear progression in the critical-thinking scores across Benner’s continuum.

There was a 34% difference between the overall mean score at novice (63%) compared to the overall mean score at expert (98%). Also of note was that the confidence interval was twice as wide at the novice stage (12.8) and tighter at the expert stage (6.4).

A confidence level represents the range of values that would most likely emerge with repeated sampling and is therefore most representative of a population (Rumsey, 2007). The confidence interval represents the sample statistic plus or minus a margin of error (Rumsey). The narrower confidence interval at the expert stage indicates that there would be higher consistency in rating critical-thinking abilities as strong at the expert stage of nursing development. In fact, the mean critical-thinking score at the expert stage was very high at 97.6%, indicating that the majority of scores were at or near the maximum score of 100%. The expert stage was the maximum level that the nurses were able to select; therefore, the upper confidence level at the expert stage extended beyond the 100%, causing a phenomenon known as a “ceiling effect.”

When I compared individual mean critical-thinking scores, 9 of 11 nurses identified that critical thinking had increasing significance across the stages of Benner’s (2001) continuum, peaking at the expert stage of nursing practice. Two of the 11 nurses identified that critical-thinking peaked at the proficient stage of nursing practice and decreased at the expert stage. The 2 nurses who indicated a lower mean critical-thinking score at the expert stage of nursing practice commented anonymously on their questionnaires:
Perhaps because older nurses with experience and years of working are not willing to put as much energy into their work-have found other things outside of work to motivate them?

Some of the expert nurses come across very aggressive and intimidate others because they think they know everything and resist change. This may possibly be due to comfort level in familiar surroundings or burnout.

Additionally, 2 other nurses offered comments on their questionnaires regarding the potential decline in critical thinking of the expert nurse:

If there was a component of burnout these answers may differ in one expert nurse to another one with no burnout.

Expert practitioner does not address the issue of burnout. For example, does a burned out nurse still act as an “expert practitioner”—does this impact ability to act in most optimal manner?

Alternatively, another nurse identified the following perspective on the expert nurse:

The expert nurse is able to operate at all levels—able to communicate with novice nurses and the entire multidisciplinary team at their level. Expert nurses are flexible and able to adapt to situations. Expert nurses share knowledge.

On the questionnaire, adjacent to the specific critical-thinking components that were identified, one nurse specifically indicated that “expert” nurses could potentially be less humble, motivated, inquisitive, open minded, patient, and less interested in continuous learning than nurses with fewer years of experience. This description resounds of nurse “burnout.” Based on the data from the nurses, the topic of burnout in
experienced nurses warrants further investigation, especially in light of the current and future nursing shortage. The engaging in the process of critical thinking and possessing the qualities of an effective critical thinker do not coincide with my perception of a “burned out” nurse. The nurses have validated that an individual who is burned out may lack the core critical-thinking qualities and that may result in less than ideal or absent critical thinking. Certainly expert nurses can become “burned out”; however, I challenge that in this less than ideal state the nurse is not functioning as an expert. This topic of burnout in expert nurses is fascinating and requires further exploration. When considering the model of critical thinking that I have developed, it may be possible that critical thinking for the purpose of building educative experiences plateaus at the expert stage for some practitioners, leading to stagnation. Exploration of how critical thinking and the advancement of educative experiences occur at the expert stage of practice could be a topic for future study.

Returning to the mean critical-thinking scores, I wanted to investigate how critical-thinking mean scores were related at each of Benner’s (2001) nursing practice stages. I selected Spearman’s Rank Correlation Coefficient as the statistical test to quantify the critical-thinking mean score relationships. This is a nonparametric test that is used to measure the correlation of ordinal variables. Ordinal variables are described as categorical data that have ordered numerical values (Rumsey, 2007). Each practice stage is a category of data, and the mean critical-thinking scores are the ordered numerical values. Spearman’s tests whether two ordinal variables are dependent, related to each other, or independent, not related to each other. The Spearman’s correlation values will range from -1 to +1. The higher the correlation value is away from 0 in either a positive
or negative direction, the stronger the relationship of the two variables in similarly a positive or negative way (Rumsey). A correlation value of 0 means that the two variables are independent or not related. A correlation value approaching +1 means that the two variables have a strong positive relationship and are similar. A correlation value approaching −1 means that the two variables have a strong negative relationship and are dissimilar. Again, using the SPSS statistical program (MapInfo, 2004), I compared the mean score at each stage (Table 3) to analyze the relationship among Benner’s five stages of nursing practice.

There is a strong positive correlation between the advanced-beginner and novice stages of practice at 0.87 that is statistically significant at the $p < 0.01$ level. Additionally, there are positive correlations between the competent and novice stages at 0.72, the competent and advanced-beginner stages at 0.74, and the proficient and competent stages at 0.74 that are each statistically significant at the $p < 0.05$ level. There is a weak positive relationship between the proficient and novice stages of practice at 0.39 and the proficient and advanced beginner stages of practice at 0.46, neither of which was statistically significant. Last, and of particular interest, there is a negative relationship between the expert stage and the first three stages of practice and no relationship between the expert and proficient stages. These findings validate that the nurses expressed that the expert stage of practice is dissimilar to the early stages of practice. This negative relationship is strongest between the expert and advanced-beginner stages of practice at −0.76, which is statistically significant at the $p < 0.05$ level. I cannot explain why the expert and novice stages did not demonstrate the greatest negative correlation.
Table 3

*Spearman's Rank Correlation of Mean Critical-Thinking Scores*

<table>
<thead>
<tr>
<th>Paired-sample mean comparisons</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Novice</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Advanced-beginner</td>
<td>0.87**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Competent</td>
<td>0.72*</td>
<td>0.74*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Proficient</td>
<td>0.39</td>
<td>0.46</td>
<td>0.74*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Expert</td>
<td>-0.55</td>
<td>-0.76*</td>
<td>-0.23</td>
<td>-0.01</td>
<td></td>
</tr>
</tbody>
</table>

*Note. N = 11. 0 = weak correlation. 1 = strong correlation.

*p < 0.05. **p < 0.01.*
I conclude from the Spearman’s Rank correlation analysis that critical thinking at the expert stage is very different than critical thinking at the novice, advanced-beginner, and competent stages of nursing practice. I concluded previously that the critical-thinking components, as defined by the nurses, were most likely to be present in expert nurses. Coupling these two conclusions, I can state with confidence that expert nurses have superior critical-thinking abilities to nurses at other stages of nursing practice, according to the nurses who participated in this study. These results satisfy my second research objective to explore how critical thinking is related to nurses’ expert clinical judgment. Nurses at the expert stage of nursing practice demonstrate expert nursing judgment, and key to this nursing judgment are the critical-thinking components identified by the nurses. I have documented the “Critical-thinking Model for Expert Nursing Judgment” (Figure 1) as the grounded theory outcome of this study.
CHAPTER FIVE: SUMMARY, DISCUSSION, AND IMPLICATIONS

The influx of nurses to the ICU environment is continuous. In many ICUs, the nurses who are being hired are in the novice or advanced beginner stages of nursing practice according to Benner’s (2001) model. Nurses require expert judgment in order to optimize the potential for positive patient outcomes. New critical-care nurses and nurses who have worked in critical care for many years, do not by years of experience alone demonstrate expert judgment. Through the course of this master’s program, I have been interested in critical thinking, expertise, and Benner’s model of nursing development. The purpose of this study was to explore critical-care nurses’ perceptions about critical thinking. The first objective of this study was to answer the question, “How do critical-care nurses define critical thinking?” The second objective of this study was to explore the question, “How is critical thinking related to nurses’ expert clinical judgment?” The educational goal in appreciating critical thinking and its relationship to nurses’ expert clinical judgment is to contribute to successful integration of nonexpert nurses in the critical-care setting and to ideally facilitate their progression to expert nurses.

Both critical thinking and expert judgment are complex concepts that have been studied for decades, yet in a practical sense these concepts remain mysterious. I summarized nursing and educational literature in Chapter Two that helps to put perspective to critical thinking and expert judgment. Critical thinking is defined as a cognitive skill contributing to judgment (P. Facione, 1990b). Nursing judgment is described as the outcome of critical thinking (Kataoka-Yahiro & Saylor, 1994). Building experts with expert judgment is a significant educational goal. It is necessary to “ensure that novices develop into experts rather than into experienced nonexperts” (Bereiter &
Scardamalia, 1993, p. 18). Development of expertise in clinical judgment requires critical thinking, content knowledge, and practice experience (N. Facione et al., 1994). Experts are built through knowledge acquired through study and practice (Bereiter & Scardamalia).

Critical thinking, knowledge, and experience are recognized as essential in the development of expert practice. Through my experience as both an educator and a manager in critical care, I have observed that not all knowledgeable and experienced nurses become experts. Experts do not evolve with the passage of time alone. Benner acknowledges that not all nurses will become experts (Benner, 2001). Based upon this study, I believe that engagement in critical thinking contributes to educative experiences and together these concepts are the key to expert practice.

Using a qualitative grounded-theory research design, I collected data through focus groups, an interview, and postparticipation questionnaires from 11 critical-care nurses. All nurses were employed in a 16-bed adult ICU in a 365-bed urban community hospital in the Greater Toronto area. This study is important because I have articulated a model that represents both critical thinking and expert nursing judgment that is relevant to practicing critical-care nurses because it is grounded in their perspectives.

Discussion

Critical thinking is not a skill that can be taught, learned, and replicated. Critical thinking is a complex process that needs to be fully appreciated in order for its development to be supported. Documenting the perspectives of practicing nurses has provided relevant insight into this complex process. Similar to the educational and
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nursing literature presented in Chapter Two, the nurses identified both the characteristics of the process of critical thinking and qualities required for critical thinking.

I have documented the process of critical thinking in Figure 1 as the grounded theory outcome of this thesis. I presented an overview of the model in Chapter Four. In review, the model depicts the critical-thinking process that, when practiced, contributes to the development of an educative experience. Educative experiences transform knowledge that then contributes to enhanced critical thinking and high-quality judgment.

Engagement in the critical-thinking process therefore is self-sustaining. The more an individual engages in critical thinking, the more their knowledge builds to sustain further critical thinking. Intuition arises from knowledge gained through educative experiences. Nursing judgment is the outcome of critical thinking in nurses. Intuition, as a form of knowledge, contributes to the reflection and judgment of expert nurses. This critical-thinking model could be broadly applicable within other clinical domains, with clinical judgment becoming the outcome of critical thinking.

Nursing judgment is founded on knowledge and educative experiences. The components of critical thinking that the nurses identified as relevant were: prioritizing, knowing what to expect, making decisions, taking appropriate action, and consulting team members. I interpret these tangible actions to be the components of nursing judgment. Specifying the components of judgment is useful. Recall that clinical judgment is a required standard of the College of Nurses of Ontario competency statement (College of Nurses of Ontario Professional Standards, 2002). The clarification of nursing judgment is beneficial professionally for nurses to have an understanding of their accountability. Specifying nursing judgment is also beneficial for nursing leaders who are
null
attempting to teach and mentor nursing judgment in nonexpert nurses and to facilitate expert nurses to articulate their practice. I will discuss these implications further in the next section of this chapter.

Knowledge is a complex process of acquisition and transformation that results from formal education and practice experience. Knowledge is consistently linked to experience in the data. Knowledge and experience together constitute nursing practice. Experiences provide the context for nursing judgment, which is the outcome of critical thinking. What links knowledge to experience? The nurses in the study identified that reflection bridges knowledge and experience. While in-depth exploration of reflection was not within the scope of this study, I will discuss my interpretation of reflection as it relates to critical thinking and expert judgment.

As cited in Chapter Two, van Manen (1995) identified that retrospective reflection, or reflection on past experiences, differs significantly from anticipatory reflection, or reflection on future experiences. I used these concepts to define reflection as the bridge between knowledge and judgment (see Figure 1). I describe \textit{reflection for judgment} as the reflection required to assess, interpret, and operationalize both formal and tacit knowledge acquired from the past. I describe \textit{reflection on judgment} as required after an experience in order to evaluate the judgment and to interpret and assimilate new knowledge from that experience. Following both effective and ineffective judgments, engagement in \textit{reflection on judgment} using the core critical-thinking qualities, contributes to an educative experience and knowledge transformation that will contribute to future judgments. Bereiter and Scardamalia (1993) use the terms “fluid knowledge” and “crystallized knowledge” to describe two possible shapes of knowledge. I
conceptualize that an individual uses crystallized knowledge when engaging in reflection for judgment. Subsequently, when an individual engages in reflection on judgment, they are engaging in the process of evaluating the outcomes of their judgment. Through critical reflection, crystallized knowledge may become fluid knowledge before once again being transformed to crystallized knowledge. This describes an educative experience.

The definitions of the process of critical thinking differ yet all are similar; there is no overall consensus. Recall from Chapter Two that Brookfield’s (1987) stages of critical thinking are: acknowledging a trigger event, appraising the event, exploring the event, developing alternative perspectives, and integrating new perspectives. In addition, Paul (2004) identifies the process of critical thinking to include: “the ability to clarify questions; gather relevant data; reason to logical or valid conclusions; identify key assumptions; trace significant implications, or enter without distortion into alternative points of view” (p. 3). While different terms may be used to define the process of critical thinking, it is the principled qualities of critical thinkers, which enable critical reflection on past judgments and for future judgments that is the critical-thinking process.

The core critical-thinking qualities determined by the nurses in this study include being humble, open-minded, inquisitive, motivated, and calm. Having a critical spirit is necessary to engage in critical thinking. The qualities of emotional intelligence are aligned with the qualities required to think critically. Elder identifies that the human mind can have conflicting tendencies to be either egocentric or nonnegocentric. Egocentric thinking is focused on self-interest and is often marked by “rigid, inflexible habits of thought” (Elder, 1996, p. 4). Nonnegocentric thinking is more fair-minded and rational.
Elder describes nonegocentric thinking as empathetic, kind, generous, considerate, and thoughtful. Experts are able to engage in nonegocentric critical thinking. Supporting this notion, Bereiter and Scardamalia (1993) identified that self-regulatory knowledge, the temperaments or habits of an individual towards learning, is vital for expert practice.

The nurses identified that the altruistic qualities required for critical thinking are not consistently present in the character of all nurses in all situations. In support of the nurses' perspectives, Paul's (1990) description of weak sense (or egocentric critical thinking) and strong sense (or nonegocentric critical thinking) acknowledge the reality of varying individual qualities and varying individual capacities to think critically. This individual inconsistency is understandable and important to acknowledge. However, I interpret that it is consistent engagement in strong sense critical thinking that builds the knowledge that results in expert judgment.

The nurses emphasized the influence of the team in either contributing to or deterring from critical thinking. The nurses identified factors such as personal and environmental stress, fatigue, and lack of motivation as interfering with effective critical thinking. The nurses also identified the importance of collaboration for critical thinking. Nurse-to-nurse and interdisciplinary collaboration is essential to contribute diverse knowledge and perspective to the reflective process and the judgment that arises out of critical thinking. Drawing on members of the interdisciplinary team to add new perspectives to critical thinking must be encouraged to support quality patient care and to facilitate educative experiences and progression of practitioners from nonexperts to experts. It is essential for individuals within the team to have the core critical-thinking qualities and for the team environment to support the core critical-thinking qualities to
foster critical thinking. The nurses identified that negative team dynamics diminished critical thinking and positive team dynamics encouraged critical thinking. I cited literature in Chapter Two from Paul (1984) and Kataoka-Yahiro and Saylor (1994) that supports the nurses’ perspectives on team dynamics. Team members must overtly support and contribute to critical thinking to make available educative experiences that foster the progression of practitioners from nonexperts to experts.

As a result of this study, I believe that when individuals engage in the critical-thinking process detailed in the model, they may become expert practitioners. The difference in the expert’s critical-thinking process compared to the nonexpert’s critical-thinking process is based on the quality of nonegocentric reflection and therefore the quality of the educative experience. It is this critically reflective process, stemming from an individual’s core critical-thinking qualities and ability to collaborate with team members in an environment that nurtures this critical spirit, that builds expert knowledge. Nurses who have shaped years of educative experiences have acquired formal knowledge but, more important, have acquired the informal knowledge from their experiences that contributes to expert judgment and expert practice. As previously identified, years of experience alone do not make an expert. Effective critical thinking shapes educative experiences. Educative experiences contribute to the development of expert knowledge that results in expert judgments. Nurses may become expert practitioners by consistently engaging in the critical-thinking process I have documented in the Critical-thinking Model for Expert Nursing Judgment (see Figure 1). While not all individuals will become expert practitioners, I believe that a lifelong commitment to critical thinking and therefore consistent engagement in educative experiences precedes individuals becoming
expert practitioners. The educational goal in appreciating critical thinking and its relationship to nurses' expert clinical judgment is to contribute to successful integration of nonexpert nurses in the critical-care setting and to ideally facilitate their progression to expert nurses.

Implications

To maintain consistent high-quality patient care and outcomes, critical-care nursing leaders have a responsibility to identify and implement educational strategies to bridge the gap between nonexpert and expert practice. Recall that the educational goal in appreciating critical thinking and its relationship to nurses' expert clinical judgment is to contribute to successful integration of nonexpert nurses in the critical-care setting and to ideally facilitate their progression to expert nurses.

Although grounded in the perspectives of critical-care nurses, the Critical-thinking Model for Expert Nursing Judgment (see Figure 1) has broad educational applicability. The model may be beneficial to undergraduate, continuing education, and workplace programs in all disciplines for emphasizing critical thinking as a process that contributes to educative experiences that are required to foster expert judgment. The elements of the critical-thinking model have led me to recognize seven broad educational strategies: (a) developing individual core critical-thinking qualities, (b) fostering a collaborative team environment that nurtures critical thinking, (c) recognizing and creating opportunities for reflective dialogue, (d) incorporating the tangible actions of nursing judgment in teaching, (e) encouraging and supporting individual opportunities for formal learning, (f) raising the capacity of the preceptors to foster critical thinking, and (g) identifying opportunities for ongoing mentoring of less expert nurses.
To begin with, the nurses' identification of tangible individual core critical-thinking qualities that are relevant in their practice was valuable. These critical-thinking qualities, because practicing nurses have identified them, may be considered relevant to their peers. The critical spirit of individuals and the team is the foundation of critical thinking. In order to facilitate development of nurses' judgment from nonexpert to expert, engagement in the critical-thinking process and educative experiences are required. Individuals require the core critical-thinking qualities to effectively engage in nonegocentric critical thinking. Both within nursing and in other professions, practitioners and formal leaders need to identify and implement relevant strategies to assist individuals to develop and sustain the qualities required for critical reflection and critical thinking.

The nurses' emphasis on team collaboration and the sharing of knowledge and practice experience across disciplines was identified as essential to the critical-thinking process. Individuals ideally possess the core critical-thinking qualities and ideally mentor these qualities amongst colleagues. The current nursing shortage and the gap between nonexpert and expert practice necessitates that team members collaborate in the critical-thinking process to have educative experiences that foster learning and growth. It is necessary to assist teams to build environments that foster collaborative critical thinking. The nonthreatening and supportive learning environment that is required for critical thinking is not always found in health care. Educational leadership theories that focus on, for example, developing communities of learning (Senge, 2000) and communities of virtue (Ryan & Bohlin, 2000) are highly applicable to the health-care environment. Commitment by practitioners and administrators at all levels is required to change the
culture in health care to one that is more conducive to continuous learning through practical experience. This culture of critical thinking and continuous learning is also the culture that is required to achieve quality patient care and patient safety outcomes.

The third broad educational strategy is to acknowledge current and create new opportunities for reflective dialogue. Nurses and interdisciplinary team members engage in reflective dialogue. Reflective dialogue is easily recognized in the formal settings of classroom teaching and interdisciplinary patient care rounds. Reflective dialogue can also be informal, random, and not consistently recognized as a highly effective tool for articulating critical thinking and contributing to an educative experience. For example, the dialogue that occurs when nurses report to one another at the time of break coverage or shift hand-over provides excellent opportunities for reflection and sharing educative experiences. Even the informal discussions that often occur when nurses are on break together are reflective in nature and need to be recognized as potentially contributing to the critical-thinking process, knowledge transformation, and the shaping of an educative experience.

Through this study, the nurses’ identified specific components of judgment that were relevant to them. These components include prioritizing, knowing what to expect, making decisions, taking appropriate action, and consulting with team members throughout. In the Critical-thinking Model for Expert Nursing Judgment (see Figure 1), I have articulated that nursing judgment is the outcome of critical thinking. I recommend that these action components of judgment may be broadly applicable to nurses in general and also to other professionals. As I discussed previously, it is valuable to articulate the components of judgment in order to teach them. The judgment actions could be utilized
to teach in structured settings at the undergraduate level, the orientation level, the in-service level, and at the graduate level. In addition, the judgment actions could be utilized informally in practice to guide reflective dialogue amongst colleagues. I have articulated throughout this document that the nursing shortage has resulted in newly graduated nurses entering the critical-care specialty. I want to clarify that new graduates will not demonstrate expert nursing judgment, in any area of nursing. A nurse can demonstrate judgment fitting of their practice experience only (Benner, 2001). However, the educational model I have developed is highly relevant to undergraduate nurses because engagement in critical thinking related to nursing and the building of educative experiences must begin on entry to the undergraduate nursing program. Today’s nursing students and new graduates need to possess the core critical-thinking qualities and lead the critical thinking through collaboration and reflection. In addition, new graduates will hopefully experience a changed health-care culture that is nurturing of critical thinking and supportive of continuous learning through educative experiences.

The fifth educational strategy I am highlighting is the importance of encouraging and supporting formal opportunities for education. The *Critical-thinking Model for Expert Nursing Judgment* (see Figure 1) requires life-long learning. There are endless opportunities to learn in the practice setting however formal education is also required to keep the critical-thinking spirit alive and well. Formal education may include specialized courses and conferences, baccalaureate degree studies, and graduate studies. Nursing leaders have a responsibility to acknowledge the challenges nurses face in continuing with formal education and help nurses to overcome those challenges. Recall that the educational goal in appreciating critical thinking and its relationship to nurses’ expert
clinical judgment is to contribute to successful integration of nonexpert nurses in the critical-care setting and to ideally facilitate their progression to expert nurses. To facilitate progression from nonexpert to expert, it is essential to have new knowledge to contribute to the critical-thinking process. Much new knowledge arises out of practice; however formal education definitively adds new knowledge and can transform individuals. Formal educational opportunities must be encouraged and supported.

Through this study and the *Critical-thinking Model for Expert Nursing Judgment* (see Figure 1), I have articulated that critical thinking and expert judgment are learned through educative experiences. The nurse preceptors have an important role in facilitating critical thinking. The preceptors are nurses who guide new nurses during orientation. To reiterate from Chapter One, the goal of critical-care nursing orientation is to develop and utilize critical-thinking abilities in order to make sound clinical judgments based on scientific knowledge (Smith-Blair & Neighbors, 2000). It is imperative for critical-care nurses and leaders to appreciate the value of critical thinking in building knowledge and making judgments. The preceptors are in an ideal role at the bedside to formulate educative experiences with learners by engaging in critically reflective dialogue and critically thinking through the action components of judgment that I identified in the model. Typically, nursing preceptors have not been well prepared for their vital roles. Preceptors require formal education to teach them how to promote learning through critical thinking.

Last, the progression of nonexpert nurses to expert nurses requires time beyond critical-care nursing orientation. The role of mentors, following the orientation and preceptorship period, is significant in guiding critical thinking, educative experiences,
and therefore continuous learning. It would be beneficial for administrators, in nursing and other professions, to acknowledge the value of mentoring in guiding critical thinking and therefore building expertise. To support quality patient care, it is necessary to dedicate appropriate time and resources for mentoring opportunities to be formalized. For example, nonexpert nurses may benefit greatly from working collaboratively with a more expert nurse in a complex or crisis patient situation. A guided educative experience is often challenging to put in place given the reality of the critical-care nursing shortage; usually there is no surplus of nurses to mentor. However, it is imperative that nursing leaders create these opportunities for guided educative experiences, as such opportunities will surely contribute to the progression of nonexpert nurses and potentially to enhanced patient outcomes.

The critical-thinking process consists of the following interconnected concepts: knowledge informs practice, judgments are made through practice, and these judgments require individual core critical-thinking qualities, team collaboration, and critical reflection. The interconnectedness of these concepts is represented in the Critical-thinking Model for Expert Nursing Judgment (see Figure 1). Not all individuals will become expert practitioners. However, individuals who consistently and effectively engage in the critical-thinking process detailed in the model may become expert practitioners. To maintain consistent high-quality patient care, critical-care nursing leaders have an accountability to identify and implement educational strategies to bridge the gap between nonexpert and expert practice. The educational goal in appreciating critical thinking and its relationship to nurses’ expert clinical judgment is to contribute to
successful integration of nonexpert nurses in the critical-care setting and to ideally facilitate their progression to expert nurses.

Additional research is required into the complex processes of knowledge transformation and critical reflection to broaden the understanding and usefulness of the Critical-thinking Model for Expert Nursing Judgment (see Figure 1). Additionally, I reported the nurses’ perspectives in Chapter Four on burnout. Specifically within nursing, the shortage of nurses previously detailed emphasizes the need to facilitate progression of nonexpert nurses. I suspect that burnout is a reality within all disciplines that requires study. In particular, further exploration of critical thinking and the continuation of educative experiences at the expert stage of practice could be a topic for future study. The questionnaire utilized in this study (see Appendix D) may provide a tool to guide such exploration.

Expert nurses are essential to provide the quality patient outcomes that society values. It is nurses who drive the health-care system. The educational model that I have developed through this study provides a relevant theory for critical-care nurses’ critical thinking and expert nursing judgment. However, the educational model is sufficiently broad and inclusive to have potential applicability throughout the discipline of nursing and other professions.
References


null


null


Appendix A

Comparison of Stages of Nursing Practice and Levels of Critical Thinking

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<td>• Assumes that authorities have the</td>
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<td>measurable parameters, and</td>
<td>right answers for everything</td>
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<tr>
<td>context-free rules</td>
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<tr>
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<td>situation because of prior</td>
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<td>experience and the ability to be</td>
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<tr>
<td>comparative</td>
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</tr>
<tr>
<td><strong>Competent</strong></td>
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</tr>
<tr>
<td>• Begins to see actions in terms of</td>
<td>• Has the ability to detach, analyze,</td>
</tr>
<tr>
<td>long-range goals or plans</td>
<td>and examine alternatives systematically</td>
</tr>
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<td>rather than in aspects</td>
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<td>• Anticipates the necessity of</td>
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### Appendix B

#### Study Participant Demographics

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Appendix C

Brock University REB Clearance
Appendix D

Postparticipation Questionnaire

Thank you for your participation to date in my thesis research. In the first stage of my research, yourself and 10 of your critical care nursing colleagues provided your responses to define critical thinking. This next questionnaire is the final component of my data collection.

Patricia Benner is a respected and renowned nursing scholar who has published extensively. She purports a 5-stage model of nursing development along a continuum from the novice nurse to the expert nurse. The levels Benner identifies are not intended to be rigid. However consideration of the individual stages along the entire continuum can provide insight into nursing development through which educational supports and strategies can be recommended.

Each of the 5 stages of the novice to expert continuum is described in the questionnaire below. Following each stage, I have listed the components of critical thinking that you identified as a group. Please rate each component as to its relevance to critical thinking in each stage of Benner’s continuum. Each table is identical. There is space at the bottom of each page or on the back if you wish to write comments.

I recommend that you first read each of Benner’s stages to get a sense of the continuum, prior to rating the components. If you have any questions or concerns about the questionnaire, please let me know. I truly appreciate your time and efforts in my research and I hope that you gain a sense of the importance and value of your contribution to our nursing profession. Please also answer the following demographic questions, you can detach this page and submit separately from your questionnaire if you prefer. All research data are confidential at this time and not to be photocopied please. Thank you.

My Age:
20-30 years
31-40 years
41-50 years
51-60 years
60+ years

The number of years I have been a Nurse: _________

The number of years I have been a Nurse in Critical Care: _________

Educational achievements (indicate all that apply):
Nursing diploma
Undergraduate degree
Graduate degree (Masters)
Critical Care courses
CNCC(C) certification
Stage 1 Novice:

This stage applies to a nurse who is new to a clinical area, where he/she has no experience with the patient population and no experience in the situations in which he/she is expected to perform. This individual may have knowledge acquired in the classroom or through reading however has not yet had opportunity to acquire situational experience. For example, the nurse identifies that the arterial pressure is alarming low and is able to hypothesize why however unsure where to begin with the patient to figure this out.

<table>
<thead>
<tr>
<th>To what degree would a <strong>novice nurse</strong> comprehend the following descriptions or possess the following attributes?</th>
<th>Not Applicable</th>
<th>Weak</th>
<th>Moderate</th>
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<tr>
<td><strong>Descriptions of Critical Thinking</strong></td>
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</tr>
<tr>
<td>Critical thinking is a complex, systematic process</td>
<td>0</td>
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<td>2</td>
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</tr>
<tr>
<td>Critical thinking is needed for quality patient care</td>
<td>0</td>
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<td>2</td>
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</tr>
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<td>Using colleagues and resources contribute to critical thinking</td>
<td>0</td>
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<td>2</td>
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</tr>
<tr>
<td>Approachable team members contribute to critical thinking</td>
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<td><strong>Attributes of a Critical Thinker</strong></td>
<td></td>
<td></td>
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<td></td>
</tr>
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<td>Able to think expansively</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Able to prioritize</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Able to know what to expect</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Able to make decisions</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Able to take correct action</td>
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<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Having knowledge that is based in evidence</td>
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<td>2</td>
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</tr>
<tr>
<td>Having experience</td>
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<td>Able to reflect</td>
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<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Being motivated</td>
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<td>3</td>
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<tr>
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<td>3</td>
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<td>3</td>
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<td>Being realistic</td>
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<td>Having intuition</td>
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<td>1</td>
<td>2</td>
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</tbody>
</table>

Comments:
Stage 2 Advanced Beginner:

A nurse at this stage has coped with enough real situations to be able to identify aspects of a situation on their own, or with the help of a colleague. For example, this nurse may recognize the symptoms of pneumothorax after central line insertion, especially if faced with this complication for the second time.

<table>
<thead>
<tr>
<th>Descriptions of Critical Thinking</th>
<th>Not Applicable</th>
<th>Weak</th>
<th>Moderate</th>
<th>Strong</th>
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<td>2</td>
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<td>Approachable team members contribute to critical thinking</td>
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<tr>
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<tr>
<td>Able to know what to expect</td>
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<tr>
<td>Able to make decisions</td>
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Comments:
Stage 3 Competent:

The nurse at the competent stage has been working with patients in similar situations for approximately 2 to 3 years. This nurse is able to organize patient care, based on both acute and long-term patient needs, carefully determining which parts of a situation are important and which can be ignored. The competent nurse has a feeling of mastery and the ability to cope. For example, when faced with the hypotensive, bleeding patient, the nurse at the competent stage would be responding in a focused manner by notifying the MD, running IV fluids, sending group and screen, asking for pressors if required, starting the transfusion.

<table>
<thead>
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</table>

Comments:
Stage 4 Proficient:

The proficient nurse understands a situation as a whole, rather than as many individual parts. This nurse often understands a situation simply by presentation and the nurse has apparently not been required to “think through” the problem. The proficient nurse considers fewer options, yet accurately determines the problem. It is often very subtle nuances that contribute to the proficient nurse’s interpretation of the situation - these nuances could have a different meaning in different situations. Through experience, this nurse is able to determine the problem accurately. For example, when faced with the same hypotensive, bleeding patient as above, the nurse at the proficient stage would not only be responding to the priority of patient stability but would also be simultaneously considering the whole situation including patient comfort and family communication for example.

<table>
<thead>
<tr>
<th>Descriptions of Critical Thinking</th>
<th>Not Applicable</th>
<th>Weak</th>
<th>Moderate</th>
<th>Strong</th>
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Comments:
## Stage 5 Expert:

The expert nurse operates from a deep understanding of the total situation. This nurse does not rely on analytic rules. Through enormous experience, the expert nurse now seems to have an intuitive grasp of a situation and is able to zero in on the accurate region of the problem without wasteful consideration of a wide range of unfruitful diagnoses or solutions. For example, in the situation described above with the bleeding, hypotensive patient, the expert nurse is working to stabilize the patient, communicate with family to provide support and also explore the patient’s wishes for resuscitation. In addition, the expert nurse is recalling the patient’s remote history of gastric varicies and informing the MD that a GI consult and endoscopy are warranted.

<table>
<thead>
<tr>
<th>To what degree would an <strong>expert nurse</strong> comprehend the following descriptions or possess the following attributes?</th>
<th>Not Applicable</th>
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**Comments:**

Thank you again for your contributions!
Excerpt of Open Coding

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Appendix F

Excerpt of Axial Coding

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<th>Closing Summary Question</th>
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<td>knowledge</td>
<td>Knowledge: knowledge (F), knowledge from within (G), put it together and build your knowledge</td>
<td>knowledge is patient as a whole</td>
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<tr>
<td>based,</td>
<td>base</td>
<td>(F), knowledge base specific to an area i.e. surgical (G), knowledge with deficit blocks CT (E), integrate a lot experience of different areas (G)</td>
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<td>Continuous Learning: builds up process of ongoing CT does not happen day 1 - years of experience, keeping updated and constantly learning</td>
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<td>(G), start with the basics and when you find the area you like it branches continuing out (G), you need to slowly build up with experience and support (G, F agrees), learning every day (F), ongoing (G), ongoing learning process (F), in CC 20 years and every time you come in there's something new (G)</td>
<td></td>
</tr>
</tbody>
</table>