Use of Critical Thinking to Achieve Positive Health Outcomes

Margaret Lunney, RN, PhD

Chapter Objectives

By completion of this chapter, readers will be able to:

1. Describe the importance of quality-based nursing care;
2. Explain the relation of intelligence and critical thinking to quality-based care;
3. Describe the need for case studies to facilitate development of critical thinking for quality-based care.

The most important indicator of the quality of health care, including nursing care, is the health outcomes of consumers (Committee on Quality of Health Care in America, Institute of Medicine [IOM], 2001, 2004). The identification of consumer health outcomes is a priority so that the effectiveness of provider interventions can be described, explained, and predicted. Three assumptions related to the focus on health outcomes are: (1) the effectiveness of interventions varies among health care professionals, (2) knowledge development of the effectiveness of interventions is the responsibility of health care providers, and (3) when effectiveness is compromised, people may be "better off" without providers.

Health care providers can only provide quality-based care when they have sufficient intelligence and critical thinking competencies to use existing knowledge to provide health care services. Knowledge is necessary but not sufficient to provide the appropriate health care

services; ability to think about and effectively use knowledge is also essential. The purposes of this chapter are to (a) review the importance of quality-based nursing care, as demonstrated in the processes and outcomes of care; (b) explain the relation of intelligence and thinking to the achievement of quality-based care; and (c) describe the need for case studies to develop critical thinking competencies.

Importance of Quality-Based Care

The quality of health care services has become a major focus of health care providers, professional organizations, accrediting agencies, and other stakeholders such as governmental agencies, foundations, and insurance companies (e.g., Al-Assaf and Sheikh, 2004; Committee on Reviewing Evidence to Identify Highly Effective Clinical Services, IOM, 2008; Donabedian, 2002; Mechanic, 2008; Montalvo and Dunton, 2007). On its web page, the Robert Wood Johnson Foundation (2008) summarized the issue of quality care in the United States with the following statement: "Americans receive only about half of the recommended care they should receive. Adopting quality improvement strategies, reducing racial and ethnic disparities in care, and changing how care is delivered at the local level can improve the care all Americans receive."

A major reason for the current emphasis on quality is that research findings have shown that quality varies widely among localities, health care agencies, and providers (Committee on Quality of Health Care in America, IOM, 2001, 2004). When the quality of care varies widely, many consumers are not receiving quality-based services. For example, the results of a recent U.S. study of the quality of care provided in 73 hospital systems that represented 1,510 hospitals showed substantial variability in system quality for pneumonia, surgical infection prevention, acute myocardial infarction, and congestive heart failure (Hines and Joshi, 2008). Medication errors is an example of the problems that exist with quality. In the U.S., "medication errors harm at least 1.5 million people every year" (Institute of Medicine, 2008). The current emphasis on quality-based services is intended to establish accountability for the quality of health care services provided to the public and to make significant improvements in quality.

Nurses have a significant role in providing quality care (Aiken, 2005). According to Henderson's definition of nursing (1964), nurses help consumers as needed with the health behaviors that they would ordinarily do for themselves, e.g., eating, breathing, moving, obtaining nutrition, and taking medications. Nurses help people with their responses to health problems and life processes (NANDA International (I), 2009). Nurses are legally and professionally responsible for any interventions that they use to support consumer health, even when

those interventions have been prescribed by physicians (Aiken, 2005). Because nurses make up the largest number of health care workers, any efforts of nurses to improve quality-based care will probably have broad positive effects on health care in general.

Evidence-Based Practice

It is widely accepted that the quality of care is best achieved by using the best available research evidence for health care decisions (Committee on Reviewing Evidence to Identify Highly Effective Clinical Services, IOM, 2008; Melnyk and Fineout-Overholt, 2005). In many types of health care, variance in quality exists because there is insufficient evidence to establish consensus on the best way to approach the problem, risk state, or need for health promotion. In other types of health care, sufficient research evidence is available, but providers do not use the available evidence.

Nurse leaders collaborate with leaders from other disciplines to promote evidenced-based practice for improved quality of care. Strategies for nurses to learn how to critique research studies for possible use are taught in bachelor's and master's degree programs and in health care agencies (American Association of Colleges of Nursing, 2006; Ireland, 2008; Leasure, Stirlen, and Thompson, 2008). Methods to develop evidence-based practice projects and protocols are included in master's degree programs and implemented in clinical agencies.

Impact of Electronic Health Records on Quality-Based Care

Electronic health records (EHR) are being implemented everywhere in the world (Committee on Quality of Health Care in America, IOM, 2004; Olsson, Lymberts, and Whitehouse, 2004) and will eventually be mandated for all health care events. The advantage is that when health care events are electronically recorded the individual health records can be aggregated with other health records to measure the outcomes of care provided in specific localities and by specific agencies and providers. Health care data can be compared from one place to another to determine the quality of care provided (Committee on Quality of Health Care in America, IOM, 2004).

For decades, nurse leaders have been expecting and preparing for the EHR. For example, NANDA-I was started in 1973 at the first meeting to classify nursing phenomena for computerized documentation (Gordon, 1982). This meeting was initiated by Drs. Kristine Gebbie and MaryAnne Levine to identify the phenomena that should represent the focus of nursing care. Since that time, many nurse leaders have been involved in health technology and informatics. For example, nursing specialty groups have a strong presence within the

international and national informatics associations (see Appendix A, Webliography). These are the professional leaders who are planning for and working toward worldwide implementation of EHRs. Judith Warren, a past president of NANDA-I, is one of 18 members of the most important U.S. government group for planning an EHR system, the National Committee on Vital and Health Statistics.

Need for Standardized Nursing Languages (SNLs)

Standardized nursing languages are organized systems of labels, definitions, and descriptions of the three nursing care elements of diagnosis (assessment is subsumed within diagnosis), outcomes, and interventions—key aspects of the nursing process (Wilkinson, 2007). These three elements are considered essential for establishing a nursing minimum data set (NMDS) (Delaney and Moorhead, 1995). Some SNLs are combinations of all three elements, e.g., the Omaha System (Martin and Norris, 1996). NANDA-I, NOC, and NIC, the SNLs used in this book, are three separate systems that are used together to represent diagnosis of human responses (NANDA-I), the results or outcomes of nursing care (NOC), and nursing interventions (NIC) (Bulechek, Butcher, and Dochterman, 2008; Moorhead, Johnson, Maas, and Swanson, 2008; NANDA-I, 2009). These three systems are used for this book because they are the most comprehensive of all nursing language systems and have strong research support.

SNLs are needed to achieve quality-based nursing care for three reasons: (1) they represent three nursing care elements considered essential for the NMDS, (2) they represent evidence-based nursing, and (3) they serve as the file names for documentation in computerized systems. The elements of an NMDS were described by nurse leaders as the minimum data that should be available and communicated to determine the quality of nursing care.

SNLs such as NANDA-I, NOC, and NIC represent evidence-based nursing. Each of these languages was developed using nursing research. The individual labels and descriptions of the NANDA-I classification are based on research studies (NANDA-I, 2009). The NOC and NIC labels and descriptions were developed and organized by research teams, partially funded with millions of dollars from the National Institute of Nursing Research. To develop these systems, the research teams organized previous nursing knowledge, both research and practical, that had evolved over decades.

SNLs provide the file names with which to record consumer data in EHRs. Organized systems of file names are needed to organize and retrieve data from electronic systems. The three systems of NANDA-I, NOC, and NIC were developed with the EHR in mind; each label, for example, is coded for the EHR. Consistent use of these labels enables health care agencies to describe the services they provide and deter-

mine the quality of care. A medical-surgical unit, for example, can describe the number of patients in a day, week, month, or year for which the diagnosis of *disturbed body image** was made and treated. Inferences about the quality of care are made by comparing interventions to evidence-based standards and measuring the outcomes of nursing interventions.

Because SNLs are so useful to evidence-based clinical practice and implementation of EHRs, nurses need to learn how to use critical thinking for selecting diagnoses, outcomes, and interventions. The following section explains intelligence and critical thinking for application in clinical practice.

Intelligence and Critical Thinking to Achieve Quality Care

For nurses to help people achieve positive health outcomes, they need intelligence to think about, interpret, and act on clinical situations. Sternberg's theory of intelligence (1988, 1997) provides a framework for understanding this concept. From this perspective, intelligence is described as the ability to function well in the external world of work, home, play, and so forth, not by performance on an intelligence test. Critical thinking is a dimension of nursing intelligence that is necessary for using the nursing care elements of diagnosis and selecting appropriate outcomes and interventions. Nurse clinicians and students have the potential to continuously improve the quality of nursing care if they know about thinking processes and critical thinking.

Sternberg's Theory of Intelligence: The Triarchic Mind

Sternberg's Theory of the Triarchic Mind (1988) focuses on intelligence as it pertains to "everyday" matters in the lives of people. Sternberg identified five major problems associated with previous theories of intelligence. First, there was too much emphasis on the use of intelligence in unusual and bizarre situations rather than in ordinary problem solving. Second, positions pertaining to intelligence were politicized (e.g., the argument about which was more important, genetics or environment) before there was sufficient evidence about how people think. Third, technology was driving the science of intelligence—people were being tested for intelligence without knowing what intelligence was all about. Fourth, the belief that a single test score, the intelligence quotient (IQ), revealed people's intelligence was given too much credence in the

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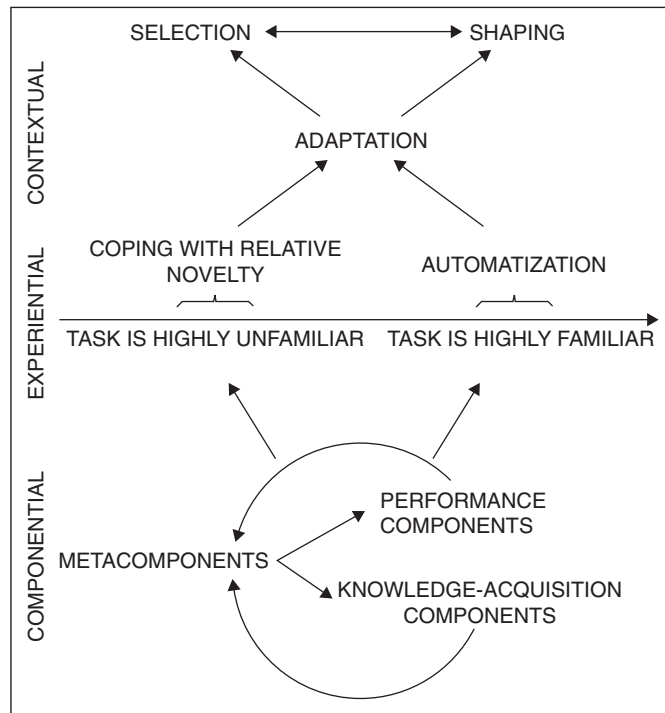*Italics will be used throughout the book for the official NANDA-I, NOC, and NIC labels.

Figure 1.1. Relationships among the various aspects of the triarchic theory of human intelligence. Source: From *The triarchic mind: A new theory of human intelligence* (p. 68) by R.J. Sternberg, 1988, New York: Penguin Books. Reprinted with permission.

face of evidence that intelligence was much more complex than an IQ score could indicate. Fifth, the idea that intelligence is a "fixed entity" was promulgated and believed while research and experience demonstrated that intelligence can be improved through guided instruction and practice. Sternberg's theory counteracts previous views and provides a more optimistic view of intelligence.

According to Sternberg's theory, intelligence in everyday life is mental self-management consisting of "the purposive adaptation to, selection of, and shaping of . . . environments relevant to one's life and abilities" (p. 65). The process of mental self management makes it possible to continuously develop intelligence for functioning well within our daily environments, for example, nursing care. Intelligence develops as an interaction or relation among three components: the internal world of the individual, the external world of the individual, and the person's experience of the resultant interchange between internal and external worlds (Figure 1.1). It is through these interrelationships that people can improve their own intellectual functioning, including critical thinking.

The Internal World of the Individual

The internal world of the individual is comprised of three components: metacomponents, knowledge-acquisition components, and performance components. The metacomponents activate the other two components, which in turn provide feedback to the metacomponents. Metacomponents are the executive processes used to plan, monitor, and evaluate problem solving. The knowledge-acquisition components are processes used to learn how to solve problems. Performance components are the lower order (intellectual) processes used to implement the commands of the metacomponents. The performance components refer to performance of the person's mind (e.g., making a decision after more complex thinking processes have led you to that decision), not visible performance of the whole person.

Metacomponents are used to think about the nurses' role in relation to the clinical situation. Nurses need to think about whether a consumer has a problem that should be treated, the severity of the problem, the priority of the problem, the prognosis of the problem, the interventions that are needed, how the problem should be communicated to others for a plan of care, the accuracy of the problem's identification, and the effectiveness of the interventions in responding to the problem.

Knowledge-acquisition components are used to select related knowledge. Examples of knowledge acquisition are use of books on nursing diagnoses, nursing-sensitive patient outcomes, and nursing interventions; checking an agency policy manual; seeking a family member to obtain more information; and collaborating with another nurse to understand the meaning of data.

In the performance components, when data are available for making an accurate diagnosis, the diagnosis is selected in partnership with the consumer, if possible. When a diagnosis is considered to be highly accurate, an outcome is selected, a baseline score is assigned, and interventions are chosen. These three components are continuously interactive in the internal world of the nurse diagnostician. Each aspect of the internal world of a nurse provides feedback to the other two aspects and has the potential to improve intelligence for the practical world of nursing.

The External World of the Individual

The external world of an individual consists of all of the individual's environments. The individual uses intelligence to exist in these environments. Intelligence serves three functions in the person's external world: (1) adapting to existing environments, (2) selecting new environments, and (3) shaping existing environments into new environments. For example, a woman who is being battered by a male partner can use her intelligence to adapt to the situation, leave the situation, or change the situation to fit her needs. The environments in which people live and work are the contexts within which

intelligence exists. When intelligence is developing, the person considers the contexts of the external world and develops a fit within these contexts. People in various contexts use a wide variety of strategies to function in the external world. People who function well in relevant environments seem to capitalize on their strengths and compensate for limitations by using other resources and seeking consultations.

Nurses must use their intelligence to function well in a variety of environments or contexts. Sometimes there are serious time constraints for health assessments and thinking about diagnostic and intervention possibilities. Other times, the clinical situation is extremely complex with multiple interacting variables related to pathophysiology, emotional states, family processes, and so forth. With the complexity and diversity of environments that form the context of nursing, nurses can capitalize on their strengths to help them function well in a variety of environments (e.g., ability to conduct interviews and physical examinations, ability to collaborate effectively with families). They can also compensate for weaknesses by collaborating with other nurses on making diagnoses and validating diagnostic impressions with health care consumers.

The Experience of the Individual

The three components of the individual—metacomponents, knowledge-acquisition components, and performance components—are applied at various levels of experience (i.e., from new experiences to routine experiences) in the external world. There are differences in the use of metacomponents, knowledge-acquisition components, and performance components when a task in the external world is novel as opposed to routine. After a task is performed a number of times, it becomes routine or automatic. For example, brushing teeth is novel to an infant but becomes routinized as the mother helps the child to practice this skill. The ability to cope with novelty, including checking whether aspects of the situation are familiar enough to rely on previous knowledge and techniques, is considered an aspect of intelligence.

In nursing situations, for example, the first time that a specific diagnosis is used, it may require more emphasis on knowledge-acquisition components than metacomponents. The performance components of a nurse who is familiar with the human experience being diagnosed are more competent or efficient than those of a nurse who is unfamiliar with the experience. The three mental processes of intelligence are improved with repeated exposures to particular nursing diagnoses in a variety of contexts. This aspect of Sternberg's theory was supported by nursing research conducted on the development of competence (Benner, 1984). Benner showed that years of nursing experience was a critical factor in development from the novice stage to more advanced stages of competence.

Critical thinking involves specific types of thinking that occur in the internal world of the individual (i.e., in the three components). Knowledge of critical thinking, as it applies in nursing practice, and reflection on thinking processes (metacognition) enable nurses to improve these aspects of the internal world.

Critical Thinking

A definition of critical thinking in nursing that was produced by a study of expert nurse opinions serves as a basis for understanding the subject (Scheffer and Rubenfeld, 2000; Rubenfeld and Schaffer, 2006). Critical thinking in nursing is 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, seeking information, logical reasoning, predicting, and transforming knowledge (Scheffer and Rubenfeld, 2000, p. 357).

This definition was developed through five rounds of a Delphi study with 51 nurse experts in critical thinking. The definition includes the characteristics of critical thinking from previous theoretical and research-based activities considered important for nursing.

It is assumed that nurses, like other adults, vary widely in thinking abilities; numerous studies have shown that adults demonstrate a wide variance in thinking abilities of all types (Gambrill, 2005; Sternberg, 1988, 1997; Willingham, 2007a, 2007b). Lunney (1992) substantiated that nurses vary widely in the divergent thinking abilities of fluency, flexibility, and elaboration. Fluency is the ability to think of many units of information. Flexibility is the ability to mentally change from one category of information to another. Elaboration is the ability to identify many implications from a unit of information. Some nurses scored very high, while others scored very low on fluency, flexibility, and elaboration. These thinking abilities, however, can be improved through instruction and practice (Gambrill, 2005; Sternberg, 1997; Willingham, 2007a). One of the purposes of selecting diagnoses, outcomes, and interventions for the case studies in this book is to further develop thinking skills for application to future clinical cases.

The seven cognitive skills of critical thinking—analyzing, applying standards, discriminating, seeking information, logical reasoning, predicting, and transforming knowledge—are applied during the nursing process (Scheffer and Rubenfeld, 2000; Table 1.1). The 10 habits of mind developed by critical thinkers in nursing are evident in each of the cognitive skills. Intuition as a habit of mind seems to be associated with increased experience and may be related to fewer of the cognitive skills than other habits of mind. The seven cognitive skills

Table 1.1. Critical thinking in nursing: definitions of terms.*

Dimensions of Critical Thinking	Definitions
Cognitive skills	
Analyzing	Separating or breaking a whole into parts to discover the nature, function, and relationships
Applying standards	Judging according to established personal, professional, or social rules or criteria
Discriminating	Recognizing differences and similarities among things or situations and distinguishing carefully as to category or rank
Information seeking	Searching for evidence, facts, or knowledge by identifying relevant sources and gathering objective, subjective, historical, and current data from those sources
Logical reasoning	Drawing inferences or conclusions that are supported in or justified by evidence
Predicting	Envisioning a plan and its consequences
Transforming knowledge	Changing or converting the condition, nature, form, or function of concepts among contexts
Habits of the mind	
Confidence	Assurance of one's reasoning abilities
Contextual perspective	Consideration of the whole situation, including relationships, background, and environment, relevant to some happening
Creativity	Intellectual inventiveness used to generate, discover, or restructure ideas; imagining alternatives
Flexibility	Capacity to adapt, accommodate, modify, or change thoughts, ideas, and behaviors
Inquisitiveness	An eagerness to know by seeking knowledge and understanding through observation and thoughtful questioning in order to explore possibilities and alternatives
Intellectual integrity	Seeking the truth through sincere, honest processes, even if the results are contrary to one's assumptions and beliefs
Intuition	Insightful sense of knowing without conscious use of reason
Open-mindedness	A viewpoint characterized by being receptive to divergent views and sensitive to one's biases
Perseverance	Pursuit of a course with determination to overcome obstacles
Reflection	Contemplation upon a subject, especially one's assumptions and thinking, for purposes of deeper understanding and self-evaluation

and the 10 habits of mind are mental processes of the internal world of nurses.

Use of Cognitive Skills and Habits of Mind

The use of cognitive skills and habits of mind are discussed here in relation to deciding on a diagnosis because that is the foundation for selecting outcomes and interventions. The two aspects of critical thinking, cognitive skills and habits of mind, are interrelated (Scheffer and Rubenfeld, 2000); cognitive skills are the context in which the habits of mind are useful. Nurses can develop both aspects as they learn to diagnose and intervene for diagnoses to achieve positive health outcomes. To illustrate these relationships, the 10 habits of mind are explained in relation to each of the cognitive skills. The cognitive skills are presented in alphabetical order because most likely the order in which they are used differs for various aspects of the nursing process.

Cognitive Skill of Analyzing

When a person presents with cues (signs and symptoms) that indicate a nurse should assess that person's health status, the nurse (internal world, metacomponent) analyzes the presenting data and determines what additional data are needed and which diagnoses are probable. During the assessment process, the nurse synthesizes information and analyzes how well the cues fit with particular diagnoses.

Habits of Mind
A contextual perspective is needed to analyze cues in the context of the whole situation (e.g., if a woman is smiling, it may not mean that she is happy; rather, she may have been taught to smile to cover up bad feelings). The nurse needs confidence to trust the data analysis and seek further consensus through mutual collaboration with health care consumers and other providers. Creativity, flexibility, inquisitiveness, intuition, and open-mindedness are needed to consider a variety of possible meanings of data. Intellectual integrity is also required for analysis along with a commitment to spend professional time and energy on the analysis process. Perseverance and reflection are essential when the analysis is more difficult and time consuming than expected.

Cognitive Skill of Applying Standards

The nurse (internal world, metacomponent) applies standards related to the diagnostic process by: (a) using the principles of good communication during the health history, (b) working collaboratively with the consumer throughout the diagnostic process, (c) conducting physical examinations using valid and reliable techniques, and (d) using research and theory when making diagnoses. The nurse draws

these standards from memory or identifies standards during information seeking.

Habits of Mind
Confidence is required when selecting the best standard for use in the diagnostic process. A contextual perspective is needed to discern the relevance of standards to the whole situation, e.g., the culture of the individual. Creativity, flexibility, inquisitiveness, intuition, and open-mindedness are needed when the usual standards may not apply. Intellectual integrity is essential when the applied standards are not well accepted by others. Perseverance and reflection are needed to identify standards for application in unusual or difficult situations.

Cognitive Skill of Discriminating
The nurse (internal world, metacomponent) notices or discriminates those cues or data in a clinical situation that are important to consider. These cues are discerned in relation to the possible meanings of cues (diagnoses) and the relevance of cues, e.g., low, moderate, high. This process narrows the selection of cues for consideration during analysis and other mental processes (internal world, performance component intellectual).

Habits of Mind
Because cues and diagnoses are only meaningful in the context of the whole situation, a contextual perspective is essential. Confidence in self is needed to isolate important cues. Creativity, flexibility, inquisitiveness, intuition, and open-mindedness are required to notice unusual or unexpected cues. Intellectual integrity is needed to follow up on cues, despite the time, energy, and effort involved. Perseverance and reflection are needed to discriminate cues that fit with other cues for making decisions about the diagnosis.

Cognitive Skill of Information Seeking
The nurse (internal world, knowledge-acquisition component) seeks information to assist with and support the interpretation of cues as they relate to diagnoses. Information sources may be the health care consumer, the family, the health care record, the literature on a particular health problem, the literature on human response concepts, and the literature related to developmental or cultural aspects of the consumer.

Habits of Mind
The mental habit of reflection is needed to guide the nurse's search for new information. Intellectual integrity is needed to seek the most appropriate source of information, even when the task is difficult or unrewarding. It is important that nurses use creativity, flexibility, and inquisitiveness as they consider sources of information that are unusual

for the situation. Perseverance is needed when the required knowledge is elusive, difficult to find, or difficult to interpret.

Cognitive Skill of Logical Reasoning

The nurse (internal world, metacomponent) uses logical reasoning to consider the meaning and relevance of cues in relation to diagnoses and to converge to the most accurate diagnoses. Logical reasoning is a process of evaluating, comparing, and judging existing data against expected data. In previous decades, logical reasoning, inductive and deductive, was considered to be the primary method of interpreting data (e.g., Bandman and Bandman, 1995). Additional thinking strategies such as intuition were acknowledged and accepted as seen in the definition of critical thinking (Scheffer and Rubenfeld, 2000). The cognitive skills of analysis, discrimination, and applying standards are intimately involved with logical reasoning in making diagnoses.

Habits of Mind

Confidence is needed to select the most appropriate diagnoses for a data set. A contextual perspective enables the nurse to interpret data in the context of the whole situation. Intellectual integrity is required to select the most accurate diagnosis when the decision is a difficult one. Intuition and open-mindedness are needed to recognize and accept that logical reasoning may not be the most appropriate way to make a diagnosis in a specific situation. Perseverance and reflection are needed when logical reasoning is more difficult than expected.

Cognitive Skill of Predicting

The nurse (internal world, metacomponents, and performance components) predicts possible diagnoses from clusters of cues, anticipates human responses for particular health states, and prioritizes diagnoses for interventions and outcomes. Thinking abilities, clinical experience in nursing, and knowledge are the basis for such predictions.

Habits of Mind

Confidence is needed to make predictions. A contextual perspective or consideration of the whole situation, not just the parts, improves the validity of predictions. When the most accurate predictions are different than the routine, the nurse needs to be open-minded enough to accept explanations that are unusual, inquisitive enough to explore alternative explanations, and flexible enough to change from one category of explanation to another. Creativity may be needed when explanations are unusual or novel. Intellectual integrity is needed to accept the predictions that are best indicated by the data. Intuition is needed to discern cues and predict that which may not be evident through logical reasoning. Perseverance and reflection are needed when predictions are more difficult to develop than usual.

Cognitive Skill of Transforming Knowledge

The nurse transforms knowledge by using the processes described above to apply the general knowledge of diagnostic concepts to clinical situations of varying contexts. Knowledge is transformed from one form to another when general knowledge of diagnostic concepts is used to help an individual, family, group, or community. For example, general knowledge of self-esteem must be transformed for use with people of various cultures. The meaning of self-esteem varies among cultures so the concept cannot be universally applied. The nurse transforms knowledge by integrating knowledge gained through clinical experiences (practical knowledge) with theoretical knowledge (research and theory). For example, the nurse with five years of clinical experiences working with post-operative patients with ineffective airway clearance applies theoretical knowledge of this concept differently than a nurse with one year of experience.

Habits of Mind

Without self-confidence, the nurse cannot transform knowledge to make a diagnosis, especially when the diagnosis is not one that is routine. An inquisitive nurse is more likely to recognize opportunities for transforming knowledge. Being able to incorporate the context of a clinical situation with highly relevant data enables nurses to be more accurate in diagnosis generation and transformation of knowledge. With flexibility, the nurse can mentally search multiple categories of knowledge as indicated. Creativity supports the transformation of knowledge through identification of unusual connections or relationships. Intuition is needed when the specific data for knowledge transformations cannot be identified. Perseverance and reflection are needed when knowledge transformations are more challenging than usual. Intellectual integrity may be needed to accept knowledge transformations despite conflicts with assumptions and beliefs and to be able to validate diagnoses with others.

Metacognition

Nurses' intelligence and critical thinking are improved through metacognition (Pesut and Herman, 1999). Metacognition involves thinking about thinking and is a tool for self-improvement. Development of this skill provides a basis for growth as a professional. The seven cognitive skills and 10 habits of mind provide the language, meanings, and framework for nurses to think about their own thinking. Each of the cognitive skills and habits of mind can be thought about and analyzed independently, discussed with other nurses or instructors, or written about in a journal for examination later.

An independent process of thinking about the diagnostic process was referred to as self-monitoring of diagnostic reasoning (Carnevali,

1984; Lunney, 1989). It can be likened to having a bird sitting on your shoulder and whispering in your ear: what are you thinking? how are you thinking? (Carnevali, 1984). Reflection, or reflective practice (Johns, 2006), includes self-monitoring of thinking processes. Self-monitoring can be described for self or others (e.g., an instructor) through a clinical journal (Degazon and Lunney, 1995). Teachers can require students to write clinical journals so they can reflect on the thinking processes that occurred during a clinical event. A course requirement to use metacognition in clinical journals can stimulate ongoing use of thinking about thinking.

Need for Case Studies to Develop Critical Thinking Skills for Quality-Based Care

Case studies are needed for nurses and nursing students to learn critical thinking for diagnosis, outcomes, and interventions because metacognition only achieves skill development when it is combined with repeated practice of the thinking processes with the specific skill, e.g., use of NANDA-I, NOC, and NIC (Lunney, 2008; Willingham, 2007a). Many studies have substantiated that critical thinking skills only advance when metacognition is combined with repeated experiences of applying the requisite skills (Willingham, 2007a, 2007b).

In the real world of nursing, there are not enough clinical experiences that can be offered to nurses and student nurses for them to become proficient in applying the cognitive skills and habits of mind to diagnose clinical cases and use NANDA-I, NOC, and NIC. Case studies offer low-risk opportunities to use critical thinking and metacognition to achieve evidence-based practice. The case studies and analyses in this book stimulate metacognition by providing challenges to the thinking processes of nurses and nursing students. Readers can diagnose the clinical cases and match their diagnoses and thinking processes with those of the case study authors.

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