ABSTRACT

Background: The link between clinical education and development of clinical reasoning is not well supported by one theoretical perspective. Learning to reason during clinical education may be best achieved in a supportive sociocultural context of nursing practice that maximizes reasoning opportunities and facilitates discourse and meaningful feedback. Prelicensure clinical education seldom incorporates these critical components and thus may fail to directly promote clinical reasoning skill. Method: Theoretical frameworks supporting the development of clinical reasoning during clinical education were evaluated. Analysis of strengths and gaps in each framework’s support of clinical reasoning development was conducted. Comma-
surability of philosophical underpinnings was confirmed, and complex relationships among key concepts were elucidated. Results: Six key concepts and three tenets comprise an explanatory predictive theory—the integrated clinical education theory (ICET). Conclusion: ICET provides critical theoretical support for inquiry and action to promote clinical education that improves development of clinical reasoning skill. [J Nurs Educ. 2018;57(1):7-13.]

Nurses in today’s acute care health care environments must possess sound clinical reasoning skill to recognize salient cues indicative of early patient decline and take action to prevent costly complications, sentinel events, and death (Berkow, Visktis, Stewart, & Conway, 2008; Purling & King, 2012). Clinical reasoning is best learned over time and through experiences with multiple patient situations in the clinical learning environment (Benner, Surphen, Leonard, & Day, 2010; Tanner, 2010). Multiple theoretical perspectives (Ericsson, 2008; Lave & Wenger, 1991; Simon & Chase, 1973) and mounting evidence support that learning to reason through patient situations during clinical education may be best achieved when clinical education:

- Occurs in a supportive sociocultural context of nursing practice (Lave & Wenger, 1991; McNeils et al., 2014; Mulready-Shick, Flanagan, Banister, Mylott, & Curtin, 2013; Tanner, 2010).
- Includes multiple opportunities to practice reasoning through patient situations within that context (Benner et al., 2010; Ericsson, 2004; Lasater & Nielsen, 2009a; Tanner, 2006).
- Is characterized by discourse and meaningful feedback about students’ reasoning within those patient situations (Benner et al., 2010; McNeils et al., 2014; Tanner, 2010).

However, evidence shows that current prelicensure clinical education seldom incorporates this combination of critical components and thus fails to consistently promote the learning and practice of clinical reasoning (Benner et al., 2010; Ironside & McNeils, 2010; Ironside, McNeils, & Ebright, 2014; Jacobson & Grindel, 2006; McNeils et al, 2014). Part of this failure may be due to the lack of a theoretical framework linking clinical education practices to development of the key competency of clinical reasoning. Therefore, the purpose of this project was to elucidate the relationships among existing theoretical frameworks supporting clinical education and to provide a comprehensive theoretical framework that supports the development of clinical reasoning during clinical education.

METHOD

Theoretical frameworks previously used as support for prelicensure clinical education and the development of clinical reasoning
were evaluated. Situated learning theory (SLT) (Lave & Wenger, 1991), expert practice (EP) (Simon & Chase, 1973; Dreyfus & Dreyfus, 1986), deliberate practice (DP) (Ericsson, 2004, 2008), and the Tanner clinical judgment model (TCJM; Tanner, 2006) were identified as commensurate constructivist theoretical frameworks that each offer relevant yet incomplete support for a clinical education curriculum that promotes the development of clinical reasoning skill. Amalgamation of these frameworks defined six concepts, elucidated complex relationships among the concepts, and identified three tenets, creating a new integrated clinical education theory (ICET). This explanatory, predictive theoretical framework fills a gap in understanding and supporting the development of clinical reasoning during clinical education.

BACKGROUND

What Is Clinical Reasoning, and Why Is It Important?

Clinical reasoning is a discipline-specific reasoning process that, in nursing, encompasses the cognitive processes through which nurses combine patient data, knowledge, experience, professional values, and reflection-in-action to make nursing decisions (Benner, 1984; Simmons, 2010; Tanner, 2006). These nursing decisions, or clinical judgments, contribute to the trajectory and outcome of patient situations. In the acute care setting, poor clinical reasoning is often characterized by failure to recognize salient data or inability to interpret findings due to a foundational knowledge deficit or minimal experience; poor clinical reasoning is often difficult to discern in practice until it results in an adverse event. Failure to rescue, or failure to notice and appropriately act on early patient decline, results in avoidable morbidity and mortality (Mok, Wang, & Liaw, 2015). Conversely, the effectiveness of rapid response teams demonstrates that early identification of physiologic decline and the decision to take action contributes to reduction in morbidity and mortality in acute care settings (Salvatierra, Bindler, Corbett, Roll, & Daratha, 2014). Sound clinical reasoning enables clinicians to recognize salient data, discern trends, weigh findings against previous experiences and evidence, and determine the most appropriate action to prevent harm and promote positive patient outcomes.

How Is Clinical Reasoning Learned?

Documented differences in the clinical reasoning of novice and expert nurses demonstrate that this skill develops over time with experience reasoning through multiple patient situations (Benner, 1984). Novice thinking is characterized by analytic, rule-based processes best suited to well-structured tasks (Cader, Campbell, & Watson, 2005) that can be broken down into appreciable steps, such as measuring blood pressure or administering medications. Ill-structured tasks (Cader et al., 2005), including interpreting ambiguous patient situations such as elevated respiratory rate and accompanying patient agitation, are challenging to novice nurses. A lack of experience contributes to inability to discern subtle changes that do not fit the expected frame of reference and thus inhibit the ability to take appropriate action (Benner, 1984; Benner, Tanner, & Chesla, 2009; Norman, 2005). Further, engagement in a continuum of reflection about reasoning processes and outcomes of actions leads to the ability to reflect-in-action, or consider similar past experiences or patient responses, in the midst of challenging situations to arrive at a sound decision (Tanner, 2006). Experienced nurses have a depth of knowledge and experience that results in a cognitive repertoire of familiar situations from which to deductively and inductively solve complex client problems (Benner, 1984; Norman, 2005). The experienced nurse is capable of shifting patterns of thinking across the continuum from analytic to intuitive based on the complexity of the task and past experience with similar situations, whereas the novice becomes stuck when the situation does not fit within the frame of reference created by their limited knowledge and experience.

Shortcomings of Current Clinical Education

Optimal clinical education provides nursing students with opportunities for active engagement with the health care team in the complex cognitive and psychomotor work of nursing (Tanner, 2010). Engaging with multiple similar situations in the context of care may promote the ability to discern subtle qualitative distinctions and reason in transition toward optimal patient outcomes (Benner et al., 2009; Benner et al., 2010; Tanner, 2006). Traditional total-care clinical education pedagogy often fails to provide these opportunities because learning typically focuses on the care of one patient, rather than comparison across multiple patients. Opportunities to engage in clinical reasoning depend on the demands of the particular patient care situation and thus may be limited. Further, most current clinical education is implemented in a traditional group model, with one instructor supervising the learning of six to 10 students assigned to one patient, or preceptor models in which students may manage care for multiple patients. Multiple experiences and repetitive practice are limited primarily by the capacity of an instructor to provide adequate supervision (Irons and McNeils, 2010; Jacobson & Grindel, 2006), instructor teaching skill, quality of the instructor–student relationship, or a preceptor workload conducive to teaching (Courtney-Pratt, Fitzgerald, Ford, Johnson, & Wills, 2013; Luhanga, Billay, Grundy, Myrick, & Yonge, 2010; McClure & Black, 2013). Regardless of the model, clinical learning is often measured by task completion, rather than demonstration of knowledge and skill through reasoning toward sound clinical judgments (Benner et al., 2010; McNeils et al., 2014; Nishioka, Coe, Hanita, & Moscato, 2014).

Pre- and postclinical conferences and written clinical evaluations persist as the primary forms of discourse and feedback within clinical education despite decades of calls for interactive verbal discourse, or situated coaching, to engage students’ higher order thinking skills, and timely (at or shortly after the experience) specific feedback (Benner et al., 2010; McNeils et al., 2014). One-to-one instructor–student interactions, or clinical coaching interactions, are primarily characterized by a focus on task completion and confirmation of knowledge and understanding, rather than analysis of embedded meaning in situations that facilitate the development of clinical reasoning and judgment (McNeils et al., 2014). Two decades of research on students’ perceptions of learning in the clinical learning environment identified that students reporting more positive perceptions of overall sociocultural atmosphere, inclusion as members of the health care team, supervisory relationships, peer learning, and peer relationships, and collaborative clinical education
structures expressed more positive perceptions of their overall learning (Jessee, 2016a). Therefore, theoretically based modification of these factors may offer potential for designing clinical education that purposefully promotes clinical reasoning in prelicensure nursing students (Jessee, 2016a).

OVERVIEW OF SUPPORTING THEORIES

The complexity of clinical education and the development of clinical reasoning are not well supported by a single theoretical perspective. SLT, EP, DP, and the TCJM are each incomplete to support clinical education that purposefully promotes development of clinical reasoning. However, the constructivist philosophical underpinnings of each theory support that knowledge is continually constructed and when incorporated into future practice may result in improvement over time. The tenets of each theory, and how each partially supports the development of clinical reasoning during clinical education, are described.

Situated Learning Theory

SLT posits that (a) learning is influenced by, dependent on, and a result of experiences situated in the sociocultural context of a practice, (b) context is inherent in experience, (c) it is the evolving interaction between the participant and the context that shapes thinking and enables meaning making in the experience, and (d) there is equal emphasis on the participant and the context in shaping cognition (Lave & Wenger, 1991). SLT embraces the social learning aspects of traditional apprenticeship learning. However, it advances the concept from hierarchical learning under the master, disconnected from the holistic nature of the practice, to active participation alongside the expert from the viewpoint of legitimate peripheral participation—meaningful engagement in individual components of the work of a practice characterized by repetitive practice, interactions with community of practice members, and gradual building of participation and responsibility toward full membership in the community of practice (Lave & Wenger, 1991). Discourse, or purposeful engagement in the verbal and nonverbal language of the practice within the context, is integral in these interactions (Lave & Wenger, 1991). Thus, legitimate peripheral participation supports integration of students in the cognitive and psychomotor tasks of nursing within the sociocultural context of practice and facilitates discourse within supportive relationships with experienced nurses and skilled instructors.

Expert Practice

Early EP dictated that innate ability limited skill acquisition; practice resulted in initial large, then smaller gains in ability to the point of innate limitation (Galton, 1869). Contemporary EP notes quantity of practice over time, not innate ability, as the catalyst of performance mastery (Fitts & Posner, 1967; Simon & Chase, 1973). Experience over time leads to increased numbers and complexities of cognitive patterns that foster progression from rule-based analytic thinking to intuitive thinking and performance (Dreyfus & Dreyfus, 1986). Benner’s (1984) from novice to expert theory further specifies the steps to expert practice are based on time and reflection on experiences while fully engaged in practice. Multiple experiences build knowledge and expectations for patient situations, leading to an improved ability to recognize unexpected deviations. Hence, contemporary EP supports appreciable improvement in students’ clinical reasoning through accumulation of experiences over time and reflection on those experiences.

Deliberate Practice

Most individuals engaging in practice will experience performance improvement until they plateau at an acceptable but less than expert level (Ericsson, 2004, 2008). To advance toward expertise, the learner must (a) practice on improvement of a specific aspect of performance for a well-defined task, (b) receive immediate, detailed feedback on performance to guide improvement, and (c) have multiple, purposeful opportunities for repeated practice of the same or similar tasks (Ericsson, 2004). It is deliberate progression from an acceptable plateau to acquisition of a repertoire of cognitive skills that promotes advancement toward expert performance (Ericsson, 2004). Thus, DP supports purposefully designed practice with multiple similar patient situations, coupled with meaningful feedback, to promote positive modification of future practice.

The Tanner Clinical Judgment Model

The TCJM is a dynamic, research-based description of the components of clinical judgment in experienced nurses (i.e., Noticing, Interpreting, Responding, and Reflecting) and a practical framework for teaching and evaluating clinical reasoning and judgment in nursing students (Tanner, 2006). What nurses notice about a patient situation (Noticing) is influenced by the context of that situation—most notably, the knowledge, experience, and expectations the nurse brings to the situation, as well as their initial grasp, or understanding, of the situation (Tanner, 2006). What is noticed activates patterns of reasoning that facilitate the nurse’s understanding of the situation and consideration of plausible alternative actions (Interpreting). These two components of the TCJM are critical precursors to the decision for action (Responding), and reflection in and on action for improvement in the reasoning processes, and the patient response to that action (Reflecting). Discourse between the instructor and student, and the provision of meaningful feedback by the instructor, is critical to student engagement in deep reflection on clinical reasoning processes and future application to practice. Hence, the TCJM supports attention to teaching and evaluating individual components of students’ reasoning during actual or simulated clinical situations as key to improving individual components of the reasoning process and promotion of sound clinical reasoning and judgment.

INTEGRATED CLINICAL EDUCATION THEORY FOR ADVANCING CLINICAL REASONING IN CLINICAL EDUCATION

The synthesis of SLT, EP, DP, and the TCJM identified three tenets that encompass six key interconnected concepts essential to promoting the development of clinical reasoning during clinical education.

- Centrality of context: Clinical learning occurs in a supportive sociocultural context of clinical practice in which students are engaged as members of the health care team.
Multiple practice opportunities: Clinical learning experiences over time that are purposefully designed to provide multiple practice opportunities with essential cognitive, affective, and psychomotor skill sets that support understanding.

Discourse with meaningful feedback: Discourse, including one-to-one clinical coaching and interaction with team members, coupled with feedback that is timely and specific about how to improve, guides purposeful attention to strengths and deficits, alternate perspectives, and engagement in the continuum of reflection (-on-action, -for-action, and -in-action) to improve future practice.

Elucidation of the complex relationships among the six defined concepts (Table) supports the essential nature of synthesis of SLT, EP, DP, and the TCJM for the design and implementation of clinical education that purposefully promotes the development of clinical reasoning (Figure).

### CONCEPTUAL RELATIONSHIPS

Clinical learning occurs in a sociocultural context of practice in which students are considered members of the health care team, engaged in the cognitive, affective, and psychomotor work of nursing. The development of clinical reasoning is influenced by the context of practice and occurs with accumulation of experiences over time, characterized by reasoning through clinical situations (Benner, 1984; Benner et al., 2009; Benner et al., 2010; Carrier, Levasseur, Bedard, & Desrosiers, 2010; Durning et al., 2012; Esposito & Freda, 2015; McBee et al., 2015; Mullen, 2014). However, the pace of development is governed by the haphazard nature of experiences that are left to chance. The deep, discipline-specific knowledge gained from application of foundational knowledge, interpretation of patient responses, and comparison of subtle distinctions among multiple practice opportunities is key to purposeful improvement of clinical reasoning (Lasater & Nielsen, 2009a, 2009b; Nielsen, 2009; Tanner, 2006). As experience with similar clinical situations builds, the ability to recognize deviations from expected outcomes of those situations and the ability to shift from analytic to intuitive reasoning processes characteristic of expert nurses improves (Cader et al., 2005).

Metacognition and engaged discussion across the continuum of reflection to evaluate, confirm, modify, or improve decisions and actions within clinical situations is integral to purposeful development of clinical reasoning skill (Tanner, 2006). Inherent variability in students’ ability to engage in deep reflection justifies the need for skilled teaching, questioning, and feedback provided within a clinical coaching relationship. Discourse and meaningful feedback are defined separately as concepts but are inextricably interdependent, equally essential components of discourse and meaningful feedback.

### TABLE

Conceptual Definitions

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<tr>
<th>Concept</th>
<th>Definition</th>
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<tr>
<td>Context of practice</td>
<td>The interaction of factors contributing to the meaning of a clinical learning experience, including physical environment and participants, knowledge, assumptions, and expectations each participant brings, and the interactions among all of these factors (Lave &amp; Wenger, 1991).</td>
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<tr>
<td>Experience over time</td>
<td>Accumulation of knowledge through experience with clinical situations and reasoning about those situations encountered through engagement in practice over time.</td>
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<td>Continuum of reflection (-on, -for-action)</td>
<td>Purposeful metacognition and engaged discussion during and after action to evaluate, confirm, modify, and improve decisions and actions for clinical situations. Reflection-on-action: Thinking back on thought processes, decisions, actions, and outcomes to deconstruct how an outcome occurred (Schön, 1987, p. 26). Reflection-in-action: Thinking during action, upon recognition of the need for modification, and when modification can still be made to improve action and outcomes (Schön, 1987, p. 26). Reflection-for-action: Thinking back on unexpected or sub-optimal outcomes to identify deficits and improve knowledge, skill, or attitudes to promote improvement of future outcomes.</td>
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<tr>
<td>Multiple practice opportunities</td>
<td>Engagement with multiple purposefully designed experiences in similar contexts to promote reasoning toward understanding of subtle distinctions among similar clinical situations.</td>
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<tr>
<td>Discourse</td>
<td>Purposeful engagement in the language of the practice, both verbal and nonverbal within the context of practice (Lave &amp; Wenger, 1991). Clinical coaching: One-to-one verbal questioning, teaching, and feedback behaviors used by a clinical instructor with a student in the context of patient care situations to promote student identification of salient aspects of nursing practice and engagement in the continuum of reflection (Jesse, 2016b). Interactions with team members: Verbal discussion of clinical situations, including background knowledge and past experiences influencing expectations and decisions, moral and ethical perspectives, evidence guiding practice, and reasoning processes used to determine most appropriate actions.</td>
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<tr>
<td>Meaningful feedback</td>
<td>Verbal feedback given during or just after the clinical situation that is specific about how to improve (Jesse, 2016b).</td>
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in this framework. Student engagement in the discourse of clinical coaching with an instructor or expert nurse using the TCJM as a framework to guide and evaluate students’ reasoning through multiple similar patient situations will facilitate students’ recognition of strengths and weaknesses in their own reasoning processes (Ericsson, 2008; McNelis et al., 2014; Tanner, 2010).

Clinical coaching may occur at any point during clinical practice when there is opportunity for student learning or for self or instructor evaluation of performance. Students often have limited skill in turning feedback into actionable improvement. Therefore, to show appreciable learning gains and practice improvement from multiple practice opportunities, meaningful feedback must address specific knowledge, skills, and attitudes needing improvement (Ericsson, 2004). Clinical coaching is the medium for analysis of meaning in clinical situations, engagement in the continuum of reflection, and promotion of learning and practice improvement.

The discourse of interaction with team members promotes discussion of multiple perspectives, varied background knowledge, and past experiences that influence expectations and decisions, moral and ethical perspectives, evidence guiding practice, and reasoning processes used to determine the most appropriate actions (Jessee, 2016a). Whether impromptu discussions with multiple disciplines within the health care team during clinical practice or during scheduled clinical conferences with peer students, interaction with team members exposes students to alternative reasoning processes and provides rich opportunity for reflection and further discourse around similarities and differences among nurses with multiple levels of experience and team members with foci other than nursing. Meaningful feedback during, or just after, these group processes guides student consideration of how the perspectives and knowledge gained from those interactions promote deeper understanding of the concepts discussed. Although the feedback described in this framework is verbal, in the moments close to the learning opportunity, it should be followed by a written summary of feedback from a clinical day or week, depending on the structure of the clinical curriculum. Given that targeted feedback facilitates reflection, accountability, and practice improvement over time (French, Colbert, Pien, Dannefer, & Taylor, 2015), without this feedback, students may miss the embedded meaning in interactions with team members, engagement in the continuum of reflection will lack depth, and improvement in clinical reasoning may be lost.

Situating multiple practice opportunities during experience over time in the context of practice provides rich opportunity for enhancing learning within those experiences. The addition of purposeful discourse that includes interactions with team members and clinical coaching provides the impetus for transformative influence on students’ thinking, practice, and confidence for practice, and promotes successful student engagement in the continuum of reflection. Meaningful feedback from the instructor during or shortly after both clinical coaching interactions and interactions with team members increases students’ ability to improve future practice. This cycle of student engagement in the cognitive, affective, and psychomotor work of nursing is not static or linear; it is designed to promote continuous, purposeful improvement of clinical reasoning throughout the clinical education curriculum, preparing students with a skill set to continue intentional improvement of their clinical reasoning after entry into practice.

**TESTING OF THE INTEGRATED CLINICAL EDUCATION THEORY**

Improvement in the persistent deficit in new graduate nurses’ clinical reasoning skill and promotion of expertise in clinical reasoning in experienced nurses and practitioners of other dis-
ciplines depends in part on implementation and testing of clinical education models purposefully designed to improve clinical reasoning. The ICET provides a comprehensive theoretical framework to support these efforts. Testing of individual tenets or the full theory through randomized control trials or quasi-experimental designs examining measurable student outcomes and instructor and student perception of outcomes is feasible. Although measurable gains in clinical reasoning skill in the clinical learning environment have not yet been established, classic and recent inquiry has indicated positive student outcomes from the use of pedagogy supported by concepts included in this theoretical framework. Experience over time, and reflection on that experience, produces appreciable transition from analytic to intuitive reasoning processes (Benner, 1984; Dreyfus & Dreyfus, 1986). Oermann et al. (2011) identified that deliberate practice of CPR knowledge and psychomotor skill contributed to improved skill maintenance over time. Clearly, CPR is a well-structured task and sound clinical reasoning is quasi-rational, bringing into question the feasibility of teaching and measuring clinical reasoning. However, the use of structured models, such as the TCJM, to engage students in essential components of clinical reasoning improves the feasibility of teaching students with analytic, rule-based thinking, how to improve their clinical reasoning skills. Inquiry into the effects of clinical coaching (McNelis et al., 2014) and the feedback occurring during clinical education (Clynes & Rafty, 2008) has produced foundational data to use in further study into the influence of clinical coaching on the development of sound clinical reasoning.

Incorporation of an integrated clinical education curriculum set within a supportive clinical learning environment and using pedagogy supported by this theoretical framework could be compared with multiple existing clinical education models and teaching methods to determine the efficacy of the full theory to promote the development of clinical reasoning during clinical education. Findings from both single-tent and full-theory testing studies would inform further development and testing of the theory. Of equal importance, the ICET may serve as the impetus for the development and testing of instruments to improve the ability to measure clinical reasoning skill.

**CONCLUSION**

Development of sound clinical reasoning is a common goal of clinical education in nursing and other practice professions. The ICET provides a strongly interconnected foundation for the design and implementation of clinical education that promotes the development of sound clinical reasoning. The three tenets—centrality of context, multiple practice opportunities, and discourse with meaningful feedback—provide a framework focused on the ideals of clinical learning, not necessarily on one type of clinical learning (e.g., acute care, community, primary care) or level of nursing student (i.e., prelicensure or advanced practice) and are therefore transferable across a variety of clinical education arenas. Indeed, these tenets are transferable to other practice professions characterized by participant interaction within a sociocultural context and the need for expert practice, including sound clinical reasoning (e.g., medicine, dentistry, physical and occupational therapy). Multiple practice opportunities in the sociocultural context of nursing practice, coupled with discourse and meaningful feedback, will promote meaningful student engagement in the cognitive, affective, and psychomotor work of nursing that is so critical to the development of sound clinical reasoning. Thus, the ICET is well situated to undergird the design and implementation of clinical education that advances the development of sound clinical reasoning skill in the nurses of the future.

**REFERENCES**


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activities on students’ clinical judgment development. *Journal of Nursing Education, 48*, 441-446.


