Innovations in Nursing Education: Improving the Clinical Judgment of Nursing Students

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Abstract

Nursing education currently has the problem of less than optimal clinical judgment skills of nursing students and graduates. This essay presents two innovative teaching strategies that target clinical judgment skills. An explanation of each strategy is provided. Current evidence is presented to support such strategies.

Keywords: Nursing; Optimal clinical judgment skills; Innovative teaching strategies

Abbreviations: NCLEX-RN: National Council Licensure Examination for Registered Nurses; CBLAs: Concept-Based Learning Activities; VCS: Virtual Clinical Simulation.

Introduction

When nursing students graduate, they will be faced with many decisions. Bucknall [1] estimates that acute care nurses face a decision or judgment task every ten minutes while critical care nurses are challenged every 30 seconds. Nineteen million nurses work worldwide. Therefore, the potential for causing unnecessary harm to patients due to poor quality judgment and decision-making is clear. Leape [2] finds that 1 in 1000 patient encounters can result in some type of fatality. This makes each encounter as dangerous as engaging in bungee jumping or mountain climbing. Adverse events, errors, and iatrogenic harms in the realm of healthcare occur as the result of complex factors within a system. Nurses are key members of these systems. When these harms occur, they have major consequences. For example, medical errors have been identified as the third leading cause of death in the United States. The judgment and decision-making of healthcare professionals, including nurses, plays a key role in the etiology driving this statistic [3].

It is assumed that teaching nursing students to become decision makers will make an improvement in the quality of judgment and decision-making. Therefore, many schools of nursing have added skills training to already pack curricula. However, it must be realized that critical thinking is the pre-requisite for making 'good' judgments and clinical decisions [3]. Thompson and Stapley [4] completed a systematic review of educational interventions that sought to enhance clinical decision making and judgment in nurses. They found that these interventions only had limited evidence to support the effectiveness of such strategies. When 24 controlled comparisons were examined, only seven interventions were related to positive effects. Campbell et al. offer a possible explanation. They explain that more training does not always translate into improved performance. This occurs due to the causal relationships of clinical decision making and critical thinking being complex.

New graduate nurses are found to be lacking in the competency of clinical decision-making. Missen et al. [5] completed a systematic review of registered nurses' perceptions of new nursing graduates' competence in critical thinking and clinical decision-making. They found that several studies only

found a small percentage of subjects who were satisfied with nursing graduates' proficiency in these areas [6-9]. When nursing administrators were surveyed about graduates' ability, 35% stated they were satisfied with the ability of new graduates to ask for help, 28% thought new graduates were able to recognize unsafe practices, and 19% found that new graduates they encountered could recognize changes in a patient's status and properly interpret assessment data. Kantar [9] also showed a general concern in the patient care of graduates; 95% of preceptors found graduates encountered difficulties in interpreting the changes in patient's health. Many studies find that nurse preceptors are often dissatisfied with graduates' ability to engage in clinical decision making. Hickey's [7] study is an example of such findings with 13% of participants stating that new graduates were competent at setting priorities and another 20% declaring that graduates could engage in clinical decision making most of the time. Such repeated small percentages of positive evaluation of nursing graduates' competence in clinical decision-making are an issue of great concern that cannot be ignored.

Not only do working professional nurses identify that clinical judgment skills are lacking in nurse graduates, but new graduates themselves voice having difficulty in this area themselves. They have reported feeling unprepared and unable to meet the challenges of the nursing workplace [10,11]. Fero, et al. [12] showed how new graduates were often able to execute decisions but often were unable to provide a rationale for their decision making. Winfield, Melo, and Myrick [13] report that graduates were less confident in their critical thinking and ability to make decisions based on their clinical knowledge.

Problem Statement

New graduate nurses' performance of clinical decision making has proved suboptimal despite academic preparation. Clinical decision-making skills have been observed to be lacking regardless of the degree obtained, baccalaureate or associate, as well as of the type of program completed (accelerated, bridge, or traditional). One health care system's clinical decision-making ratings of nursing graduates reported that only 20 to 24% of nursing graduates were able to engage in the acceptable demonstration of recognizing a clinical problem and its urgency and then go on to properly manage it. It must be noted that the large sample of 5,000 newly graduated nurses utilized in this study all had passed the National Council Licensure Examination for Registered Nurses (NCLEX-RN). The outcomes of such a study clearly demonstrate that there exists a major gap between the acquisitions of adequate information to pass the NCLEX-RN when compared to what is imperative for new graduates to practice clinical decision-making safely with competence [14].

When one examines how clinical decision making and judgment occurs, it is clear how problems may arise when novices attempt to engage in these activities. Human reasoning is made up of two parallel forms of processing information. System one is fast and an intuitive form of reasoning. This system is related to behaviors which are highly practiced and over-learned. On the other hand, system two is a slower and a more deliberative approach to reasoning. The development of clinical judgment occurs along a developmental continuum. The novice relies on rules without considering the context of clinical situations. However, experts possess a depth in their knowledge that enables them to grasp a clinical situation comprehensively. This is due to their ability to notice patterns and organize their knowledge based on concepts [15-18]. Brehaut, et al. [19] points out that for the novice each decision involves a deliberate consideration of signs and symptoms whereas experts may appear to make the same decision effortlessly. Benner [15] explicates that expertise is the function of repeated exposure to similar tasks. Repeated exposure to similar tasks presents as a challenge due to various barriers in nursing clinical experiences. Nurse educators are challenged with providing learning strategies that facilitate students' clinical judgment along that developmental continuum [20].

Two innovative nursing education teaching strategies have the potential to overcome barriers in nursing clinical experiences by ensuring repeated exposure to similar tasks and therefore facilitating clinical judgment. These teaching strategies include concept-based learning activities and virtual clinical education.

Tanner's Clinical Judgment Model as a Foundation

The use of concept-based learning activities and virtual clinical education is based on Tanner's clinical judgment model. The model is based off a synthesis of robust nursing research of clinical judgment. It accounts for the foremost conclusions that arose from such literature. It is applicable to rapidly changing clinical situations which require reasoning in transitions and continuous evaluation and interventions as it unfolds. The model describes the clinical judgment of experienced nurses, but Tanner [21] states that it also serves as guidance to nurse faculty to facilitate students in the breakdown of diagnoses, the identification of areas for needed improvement, and to consider learning experiences that focus on such areas. The process of clinical judgment is proposed to have four aspects: noticing, interpreting, responding, and reflecting. The aforementioned learning activities allow students to practice this process.

Noticing is a function of what the nurse expects of a clinical situation. The nurse's expectations of a situation are based

on their familiarity with a patient and his or her patterns of responses, their clinical experience of similar patients, and their textbook knowledge. An example of noticing can be seen in the example of a nurse who is caring for a client postoperatively who over time begins to recognize the client's typical pain levels and responses to analgesic administrations. Likewise, nurses who are experienced in the care of postoperative clients will know the typical response of this population to surgeries as well as its physiological and pathophysiological mechanisms. Collectively, such understanding will shape what the nurse expects of each patient and their pain levels so that there exists the possibility of one noticing if one's expectations are met or not. Tanner [18] points out that other factors may influence the ability of a nurse to notice a change in a clinical situation. These factors include their personal values as they relate to the patient situation, the culture of a nursing unit and the patterns of care provided on such a unit, and the general work environment.

After a nurse notices and initially grasps the clinical situation at hand, it will trigger one or several reasoning patterns. The reasoning pattern that ensues will determine how the nurse will interpret the meaning of the data from which he or she will determine an appropriate course of action. Two examples illustrate this aspect of the process of clinical judgment. A nurse will either be able to or unable to make immediate sense of what he or she has noticed in a clinical situation. If unable to first comprehend a clinical situation, a hypothetico-deductive reasoning pattern may be triggered where interpretive or diagnostic hypotheses are created. To rule out hypotheses, nursing assessment will be performed until the nurse finds and interpretation which is supported by most of the data collected. On the other hand, a nurse may be able to immediately recognize a pattern, interpret the pattern, and respond with tacit intuition. The nurse then will confirm their pattern recognition by evaluating how the client responds to the intervention. Therefore, Tanner's [21] model of clinical reasoning finds that the nursing actions of assessment and intervention both support the process of clinical reasoning as well as both are the result of clinical reasoning having taken place.

Lastly, reflection is theorized to occur in the process of clinical reasoning. Reflection-in-action and reflection-on-action together are a large component of Tanner's [21] model of clinical reasoning. Reflection-in-action occurs when a nurse is able to effectively recognize how a patient is responding to the nursing intervention and their ability to adjust the intervention based on such an assessment. Reflection-on-action occurs after the clinical situation occurs and clinical learning occurs from the nurse's experience. It contributes to the continuous development of clinical knowledge and the nurse's ability to engage in clinical judgment in future

situations. Any clinical situation of uncertainty encountered may require judgments. The "noticing" and "interpreting" phases of clinical judgment are the antecedents of the outcomes of "responding" and "reflecting" on the patient's responses to nursing interventions. One must be able to grasp the clinical situation at hand as well as develop an adequate understanding of that situation to be able to decide on course of action that is appropriate. After these initial 3 phases, reflection can take place, both during the clinical situation and afterwards. Only then, can the clinician properly attend to the patient's responses to nursing action by "reflecting-in-action". Afterwards, "reflection-on-action" may then occur by evaluating the appropriateness of all the preceding steps that were taken [18].

Application to Learning Strategies

Tanner's Model of Clinical Judgment is the basis for the learning strategies of concept-based learning activities and virtual clinical simulation. These strategies can be utilized to enhance the clinical judgment of nursing students by enabling them to go thru the four aspects of clinical judgment as proposed by Tanner. Both strategies allow students to engage in noticing by having students first complete a study assignment that is aligned with their theoretical textbook reading. This allows students to create expectations and gain an initial grasp of possible clinical situations they will encounter. Afterwards, a clinical situation is presented and the students must use reasoning patterns to respond to the clinical presentations of virtual or live patients. During the clinical, the nursing student is able to test their interpretation of theoretical knowledge by implementing interventions and reflecting in action on the patient's response to their actions. Based on such reflection, they can continue, discontinue, or change their interventions. Afterwards, debriefing is had that provides the student with feedback, fulfilling the reflection on action phase of clinical judgment.

What are Concept-Based Learning Activities and Virtual Clinical Simulations?

Meeting the Challenges of the Traditional Total Patient Care Clinical Education Approach

The traditional total patient care clinical education approach: The traditional model of clinical education is becoming inadequate due to its total patient care approach. The total patient care approach to clinical education begins when a student is assigned a patient and is given time to prepare caring for the patient, often the day before the actual clinical. For the entirety of the clinical day, the students are expected to provide total care to the patient. Due to the unpredictability of patients available, such an approach leaves meeting clinical learning objectives to chance. Also,

the high acuity of many patients forces students to track so many aspects of patient care that they become task-oriented. Faculty is then forced to focus their discussions of such high-acuity patients on safety issues. Nurse preceptors are also stretched thin as they care for sicker patients and are expected to precept new staff and nursing students. Due to many preceptors being overloaded, many are unable to provide the full measure of clinical education and assist students as they develop clinical decision-making skills. As a result, students are unable to grasp a deeper understanding of patient care situations and fail to develop proper clinical judgment [22].

Concept-Based Learning Activities

Concept-based learning activities are defined as a "guided approach" to studying a nursing care concept. They provide a way for learners to study explicit and central concepts of nursing. A study guide is used to direct data collection, patient assessment, and an investigation of how such findings relate to a concept of study [23,22]. A detailed explanation of how CBLAs are implemented will follow. CBLAs begin with clinical learning objectives being established at the beginning of a clinical day. Such objectives are met by students completing a study guide of the concept, clinical group rounding on assigned patients, and faculty evaluation and feedback. The study guide defines the concept, provides learning outcomes, describes learning activities, and clarifies evaluation strategies. Preliminary readings are also assigned for students to complete before the scheduled clinical. This gives the students the basic knowledge of the concept or the background information as described by Tanner [18]. Upon arrival to the clinical unit, a patient is chosen by the instructor based on how they exemplify the concept of study that clinical day. The study guide uses the four aspects of Tanner's Clinical Judgment Model to assist the student in identifying how the concept presents in their assigned patient (See Figure 1.) Noticing occurs as students began studying their patients by collecting data through listening to report, reading patient charts, and exploring electronic health records. This allows students to bridge their findings with their previous theoretical knowledge from their pre-clinical readings.

Students then continue the noticing phase by performing a concept-focused assessment of their patient with the assistance of the faculty or patient's assigned nurse. After data collection and physical assessment of the patient was complete, the interpretation phase begins where the student determines the concept-based problem in the patient by creating related nursing diagnoses. Then students make decisions regarding the appropriate responses to such conceptual problems and identified appropriate outcomes which would indicate such responses were effective. Lastly,

students would reflect what they learned through debriefing with faculty. During the entire clinical day, nurses remained responsible for the total patient care of their clients [22].
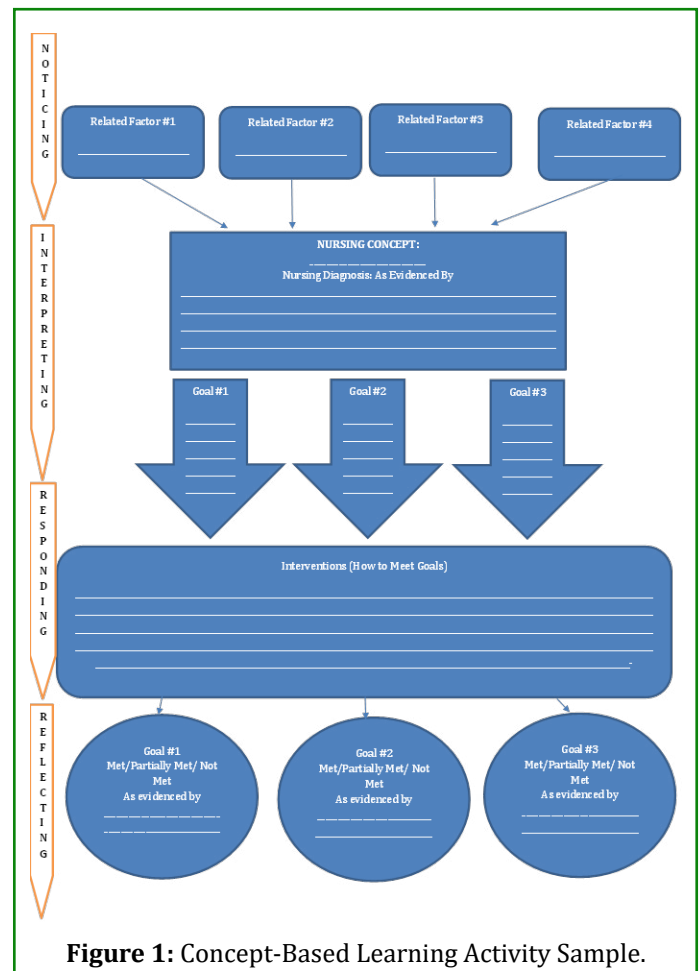
Figure 1: Concept-Based Learning Activity Sample.

The second part of the day consists of clinical rounding. Clinical rounding occurs when students round on each other's patients together to explore how the concept is exemplified in each of their patients. This allows students to see how the concept manifested in their colleague's patients and to compare the manifestations of their own assigned patient. Nielsen [22] describes an example of a group of assigned patients: "a student group exploring oxygen-carbon dioxide exchange could individually explore nursing care of a 1-year-old child with asthma, a 3-year-old child with cystic fibrosis, a 5-year-old child with congestive heart failure, and a 10year-old child with pneumonia" (p. 352). During rounds, each student's patient would be visited, as deemed appropriate. The patient and family would be introduced by the student to their colleagues along with their findings. Any abnormal patient assessment findings would be pointed out to their colleagues. The faculty member would point out which findings were both expected and unexpected about the patient situation and encourage deep learning by asking

pertinent questions. This exposure to a group of differing patients provides an enriched experience of the nursing concept, so that such background knowledge could be carried forward in future patient care [22].

Literature review

There are three current and one monumental nursing study of concept-based learning activities (CBLAs). Heims and Boyd [23] completed the first monumental study of CBLAs which collected both qualitative and quantitative data from student nurses, nurse faculty, and staff nurses regarding their perception of CBLAs. Students, staff nurses, and faculty indicated several advantages of CBLAs including "flexibility, focus of learning, efficacy in the use of clinical time, and recognition of the students as a capable learner" [23]. There were positive staff nurse perceptions of this learning strategy as indicated by statistically significant results of staff nurses who utilized CBLAs when compared to those who did not. Lee-Hsieh, et al. [24] completed a three-year longitudinal study on the development of competence in a nursing concept-based curriculum. The curriculum organized learning around concepts and related patient health problems using case studies. Data was collected with a self-reported questionnaire of 121 students that assessed competence after finishing each semester. Over three years self-reported scores of competence increased in full-time students.

Another smaller study with a sample size of 28 was conducted by Lasater and Nielsen [20]. Lasater and Nielsen investigated the relationship between clinical judgment scores as measured by the Lasater Clinical Judgment Rubric and attendance or non-attendance of concept-based learning activities. In addition to such quantitative measures, they also considered the qualitative reports of the students. About half of the subjects were not exposed to CBLAs whereas the other half had 2 to 4 CBLA experiences. The CBLA group was found to have statistically significantly higher scores in each of the four stages of clinical judgment and in their total clinical judgment scores. The qualitative results explain that students found CBLAs to be "helpful". Students also expressed appreciation for the cooperative learning aspect of this strategy. They found the study guide helped to focus their learning of a concept. Preparation activities reportedly facilitated students in the noticing phase and recognition of the patient's status so as to increase the depth of their study. Students explained they were better able to see the connection between theory and practice. They also expressed the time spent with the educator questioning them, discussing their thinking, and rounding enhanced their clinical judgment progress [20].

The most recent study of CBLAs was completed by Neilsen [25]. She completed a multiple-case study research study to provide a rich description of CBLAs in clinical inpatient education settings. Nielsen [25] observes four clinical groups using CBLAs during clinical. She found that CBLAs facilitated deep learning, the connection of theory to practice, and clinical judgment. Overall, these studies indicate that CBLAs are related to improvements in clinical judgment skills, self-reported competence, and the fostering of bridging theory to practice in nursing students. Staff nurses and faculty also have found the value of this learning activity in its flexibility, the focusing of learning, and the efficient use of time [23,20]. Therefore, all parties involved with nursing clinical education report positive views of this learning activity and its outcomes [25].

Virtual Clinical Simulation

Virtual clinical simulation (VCS) involves students using avatars to navigate within a virtual environment. VCS is also known as three-dimensional virtual worlds, serious gaming, or massively multiplayer virtual worlds. There are multiple platforms and virtual worlds that exist. Some three-dimensional environments include PowerPoint presentations with an interactive audio conference. Higher-level virtual environments are programmed in a similar way as high-fidelity human-patient simulator. It utilizes algorithms to provide physical responses to the nurse avatar's interventions such as a change in heart rhythm or vital signs. Students can calculate and administer medications, check laboratory tests, review diagnostic imaging reports, and document in an electronic health record. VCS can also include live dialogue so that students can ask and respond to questions posed of patients and their colleagues. This facilitates problem-solving, critical thinking, teamwork, and therapeutic communication. VCS provides an environment where nurses and student nurses can be educated in a safe, interactive, and dynamic environment [26].

Virtual clinical simulations begin with pre-work to prepare students for the care of their virtual patient. Such pre-work consists of a reading from their aligned textbook and multiple-choice and open-ended questions for their completion. Afterwards, they enter the software and are provided with report on their virtual patient. A workbook guides them through the various parts of patient care including assessment of the patient by allowing them to view the patient's chart and assess their patient virtually. They also are able to perform certain interventions such as medication administration and wound care. Certain safety issues are built into the virtual scenarios such as the potential for medication errors. The student must practice satisfactory clinical judgment to complete to scenario. At the end of the scenario, a screen notifies them of what learning objectives they met and did not meet. Remediation is provided. Students

are required to receive a passing grade on the virtual clinical simulation to pass the assignment. Otherwise, they often are redirected to restart the virtual simulation scenario. Group debriefing is then had live or online by the instructor to allow students to reflect on the care of their virtual patients. Group debriefing on the virtual scenario allows students to reflect on their own and their colleagues' responses to various cues in the scenario and evaluate their effectiveness. Debriefing proves critical to facilitating the improved clinical decision making of the students.

Literature review

The current literature on virtual simulation as it relates to clinical reasoning and decision-making focuses on two aspects of learning. Virtual simulation has been used as a model of clinical reasoning for nursing students [27]. However, researchers have also found it to be used as a way to assess the clinical reasoning of nursing students [28-30].

Virtual simulation as a model for clinical reasoning

Forsberg et al. [27] investigated how pediatric nurses engage in clinical reasoning about complex virtual patient scenarios. The study also aimed to assess possible issues involved in clinical reasoning exams in post-graduate students in diploma specialist pediatric nursing education. The goal of the study is to develop a model of grading and scoring virtual patient-based examinations for a specialist diploma in pediatric nursing education. A think-aloud method was used to collect data from 30 Swedish pediatric registered nurses. Subsequently, content analysis was completed. The results found that experienced nurses attempt to consolidate their hypotheses "by seeing a pattern and judging the value of signs, symptoms, physical examinations, laboratory tests and radiology" [27]. They displayed high specific competence. However, the previous experiences of these nurses in similar cases contributed to their decision making. The nurses indicated that it was an enjoyable and innovative assessment of clinical reasoning and clinical decision-making. A weakness of this study was that the virtual patient exam did not control for learners who utilized too few or too many inquiries such as questions, labs, and physical exam procedures of the patient. Such behavior could indicate that the learner is guessing or unconfident in patient management. However, it is concluded that virtual patients are a potential model that could be used for assessing clinical reasoning and clinical decision-making.

Virtual Simulation as an Assessment Tool of Clinical Reasoning

Several qualitative studies demonstrated how virtual clinical scenarios could be used to assess clinical reasoning skills. Botezatu, et al. [28] conducted a randomized control trial to compare the assessment results of virtual clinical simulation evaluations and regular course exams in the topics of hematology and cardiology. Both VCS evaluation and traditional exam scores were higher when students were taught using VCS compared to those in the traditional teaching arm. Likewise, all students in both groups scored higher on the virtual clinical simulation exams than the paper traditional exams. The authors conclude that VCS can be used to support learning and assessment in the same course and that VCS assessment results are consistently superior to those obtained from traditional course assessment. Forsberg, et al. [29] completed a qualitative pilot study that investigated the opinions of 77 nursing students on the feasibility of using VCS for clinical reasoning assessment in nursing education. Questionnaires revealed that student found VCS cases to be realistic, engaging, and that they found such a tool highly acceptable as an assessment method.

Forsberg, et al. [30] completed a descriptive, qualitative study which explored the use of VCS as a tool to assess the progress of nursing student clinical reasoning development. Progress was measured by way of students' self-evaluations. The initial assessment revealed student feelings of uncertainty and exposed their gaps in knowledge. The mid-course assessment students demonstrated improved clinical reasoning and students expressed feeling more certain of how to solve VCS cases. The final assessment revealed self-efficacy amongst the students. This study demonstrated that VCS could be used as an assessment strategy that resulted in students' gain of identifying the concept of clinical reasoning, becoming aware of what to focus in on during clinical practice, and visualized expected clinical competence.

Conclusion

Nursing education must adapt in response to our changing environment. Adaptive challenges provide educators with the opportunity to revisit and revise the "value, purpose, and process" by building off of the foundation of the past but also examining new practices so our discipline may thrive [31]. Murray points out those opportunities for change arise when they are "visible, but not seen" (p. 320.) This means that nursing education will benefit from addressing adaptive challenges when problems arise that are "widely recognized, affect other organizations, the industry's economics are impacted, and tacking the problem could create big opportunities for the profession" [31]. The issue of lacking clinical decision-making skills of nursing students and graduates warrants our attention. Concept-based learning activities have the potential to reinvent how clinical are run and facilitate greater depth to the understanding and clinical judgment of students. Virtual clinical simulations take the facilitation of clinical judgment to the next level by also having the potential to better assess students for this essential skill.

The use of virtual clinical education and concept-based learning activities are innovative in their departure from what has always been practiced in clinical education-they are a departure from what is 'safe'. Nevertheless, thinking differently in regards to how we educate is the only real way we can create a bridge from the current state of nursing education to our preferred future [31].

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