Enhancing Critical Thinking through Simulation Problem based Learning in Nursing Education

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Abstract

Objectives: Nursing practice and education discourse it should identify a replacement a need to stimulate and simulate critical thinking. The aim of this study was to think about the pedagogical effectiveness for promoting critical thinking of nursing students. **Methods/Statistical Analysis**: We review the literature regarding the simulation training, problem-based learning, clinical practice experience to enhancing the critical thinking in nursing education and discuss the future direction of nursing education to promoting critical thinking. **Findings:** When compared with other types of instruction and teaching strategies, simulation is associated with positive outcomes. Given continuing beliefs in the centrality of critical thinking behavior to nursing practice, learning experiences must be structured in ways that elicit and make it explicit. Clinical learning experience during undergraduate programs and uses of Problem Based Learning claim to facilitate development of skills such as critical thinking. Changing contexts of education and practice in nursing require exploration of the potential of simulation to provide alternative and complementary learning to clinical placement. **Applications/Improvements:** Faculty Staff development was engaged in nursing education focused on integrating and assessing elements of PBL, critical thinking and simulation through a model of Simulation PBL may address limitations of clinical placement and develop and refine clinical judgment acumen.

Keywords: Critical Thinking, Nursing Education, Nursing Practice, Problem-based Learning, Simulation

1. Introduction

In general, participants¹ and educators like simulation and, intuitively, believe it leads to improved learning and performance^{2,3}. Also, multiple studies conclude that simulation improves satisfaction and confidence^{4–6} and, overall, participants enjoy simulation and request additional simulation experiences⁷. Authentic learning experiences, in particular clinical placement experience, are espoused to provide a learning environment which fosters the development of critical thinking skills^{8,9}. In this paper we discuss critical thinking as a learning outcome and the need for simulated learning experiences to be underpinned by sound pedagogy in order to ensure they facilitate development of critical thinking abilities considered essential for nursing. We assert that, given one primary aspect of curriculum design is clarity of the concept of critical thinking and its determinants is necessary. We present a model that integrates simulated learning experiences into Problem-Based Learning (PBL) curricula. We reflect on the implementation of that model to argue that staff members need to have sound curriculum, instruction and assessment skills in order to maximize simulations as adjuncts to clinical placement. While clinical placement is valued by students, clinicians, academics, professional bodies and communities, few studies have attempted to determine how time spent during clinical placement has been used by students. Ranges of unengaged times varies and there is a reluctance to acknowledge and determine this. In other professions, 20 to 60% of students' clinical time was identified as not being used for either learning or clinical care¹⁰. In nurse education, there are indications that students use

about the indicators of competence, further exploration

'downtime' during clinical placements for developing care plans, undertaking self-directed learning and case presentations. Clinical placement is not required for these activities. There is increasing concern at the perceived scarcity or variation in competence of graduates which has resulted in the emergence of demands for preferred essential clinical skills to be taught and assessed systematically¹¹. It is time for nurses to question assumptions that contact with actual patients optimizes learning; the extent to which hours of clinical placement involve care activities and beliefs that clinical placement affords a learning experience that is individualized for patients or students.

In addition to questions about the efficacy of approaches to clinical education it is conceded that given the increasing dynamism of health settings¹², the likelihood that student nurses will develop confidence and competence in those environments is limited¹³. The nature of contemporary health service delivery would seem inconsistent with the traditional apprenticeship model upon which clinical placement is based. Coupled with the need to challenge the efficacy of clinical placements, is the need to respond to the impact of increasing numbers of students entering health professional programs.

2. Critical Thinking and Learning to Nurse

Critical thinking is considered a vital component of professional competence. Central to many approaches to teaching and learning in contemporary nurse education are beliefs that nurses, as critical thinkers, are flexible, creative, independent and collaborative and that the intellectual capabilities demanded in critical thinking can be learnt. Although considerable emphasis has been placed on abilities to problem solve and make effective clinical judgment in the Australian Nursing and Midwifery Council (ANMC) National Competency Standards¹⁴ there is no clear definition of, or requirement for, critical thinking. The view of critical thinking as identical to problem solving and clinical decision making has resulted in the continuing assumption that nurses not only should, but do, think critically in order to make effective clinical judgments and achieve nursing goals for effective care. However, increasing emphasis on measurable outcomes in nurse education require agreement on how broad concepts such as critical thinking is operationalized in nursing practice and developed throughout education programs.

Description of the expert and intuitive nurse could be viewed as consistent with a nurse who thinks critically¹⁵ observed "the vast majority of research on clinical judgment, and on educational approaches to improve it has focused on that which is deliberative, conscious and analytic"¹⁶. It could be that clinical judgment is not judgment at all unless it has these characteristics. In nursing, we have used "clinical decision making", "nursing process", "clinical problem solving", and, more recently, "critical thinking" as interchangeable terms all referring to roughly the same phenomenon. Despite the body of work undertaken with a focus on defining and describing aspects of critical thinking in nursing, much of the nursing literature from the 1990s has been criticized for failing to determine if critical thinking is in fact essential to nursing practice, and if it is, to clearly identify the determinants of thinking critically reviewed over 200 articles and cautioned that models of clinical judgment centered on systematic problem-solving approaches fail to accommodate complexities of the processes and contexts that influence nursing judgments.

Contemporary education requires nurses question and justify practice and emphasis abilities to both think about and perform nursing implementations to best manage care situations. The challenge is to develop an integrated approach to learning which results in thoughtful, highly skilled and efficient action. This requires the ability to examine clinical situations, deconstruct them from a number of perspectives and reconstruct them around core concepts essential to practice¹⁷ observes that knowledge related to intelligence and thinking has continued to develop since the 1900s. In18 nursing, Facione, Facione, and Sanchez¹⁹ related critical thinking skills to nursing competence and developed the California Critical Thinking Disposition Inventory. This tool describes attributes of a critical thinker and the authors claim these are the same skills of a nurse with ideal clinical judgment. The constructs of: inquisitiveness, analyticity, truth seeking, open mindedness, systematicity, critical thinking, self confidence and maturity are seen to underpin clinical judgment¹⁹.

It concurs that determinants of critical thinking as an outcome of nursing education have focused on quantitative measures that view critical thinking as a product rather than a process which is evolutionary and context dependent²⁰. While it is required to allow that critical thinking is the type needed for problem-solving and complex decision-making, it is also essential to recognize that critical thinking is not an independent skill but one that develops through the application of discipline-specific knowledge²¹. Replayed experiences or training with thinking as it relates to particular knowledge improves the ability to make decisions and problem solve. Lunney has synthesized a range of literature to conclude that 'thinking about thinking', or meta-cognition, is a significant process to improve thinking abilities and that the learner should unite 'thinking about thinking' with knowledge related to the thinking undertaking. In other words, it is important that student nurses engage in learning events which develop their knowledge about thinking as well as more traditional nursing knowledge.

In²² have developed an exclusive nursing framework, derived from a Delphi-created agreement of experts, which contained 10 'habits of the mind' and 7 skills for critical thinking.' The habits demonstrate affective predispositions for thinking and skills refer to the cognitive components in thinking. In nursing habits included: confidence, contextual perspective, creativity, flexibility, curiosity, intellectual integrity, insight, open-mindedness, perseverance and reflection.

The strategies identified in the literature for teaching critical thinking are consistent with constructivist approaches to teaching and learning such as PBL. PBL educational approaches claim to foster the construction of meaning and deep learning. Well structured instructional and curriculum designs like PBL it is argued provide mechanisms to develop and assess a range of behaviors including the construction of meaning and deep learning and critical thinking behaviors²³. Skills of critical thinking in nursing supported by the PBL process include those described by in: analyzing, employing standards, discriminating, information seeking, and logical reasoning, predicting and transforming knowledge. However, from PBL and other constructivist approaches there is potential to produce graduates who are so concerned about considering multiple perspectives, generating alternative solutions and working in groups, that they fail to develop the confidence and competence that is required to make sound, timely and reality based decisions²⁴. The outcome of critical thinking processes must be informed clinical judgment.

In models of PBL commonly used, a scenario is developed to stimulate learning. This is often text based with associated simulated experiences in clinical laboratory experiences which focus on performance of clinical tasks and procedures. Students are then provided clinical placement experiences which may not relate directly to the content, concepts and processes explored in on-campus settings. As Lunney observed "the opportunities for repeated practice, however, to learn the deep structures of the associated content knowledge are limited in clinical settings". The challenge for nurse education is to continue to meet the goal of promoting graduates' ability to make sound clinical decisions for a range of clinical contexts. But there is pressure on those placements and a questioning of the extent to which the actual and espoused learning that occurs in clinical placement settings align. In the remainder of this paper, we share findings from an evaluation of the implementation of simulated learning experiences which has resulted in us proposing a model of S-PBL. We propose integration of simulation and PBL maximizes opportunity for students to both think critically and apply this in ways that optimize clinical judgement and clinical decision making in a safe environment. We also identify aspects of staff development essential to successful implementation of S-PBL.

3. Simulation PBL

3.1 Introduction of Simulation PBL

Simulation is an educational process provided National Council of State Boards of Nursing (NCSBN) which can imitate the working environment and require learners to indicate procedural techniques, decision making; critical thinking and develop higher learning 25, 26. According to 27, simulation "provides educators with standardized ways to have students work as a team, collaborate with others, problem solve, make decisions and use critical thinking in a safe environment".

Have reviewed a range of literature to conclude that the use of clinically based learning in 'on campus' activity, promotes self-efficacy, increases confidence and motivation to learn, improves clinical performance and enhances critical thinking and gains in knowledge²⁸ and concur, reminding us that simulation appropriately incorporates elements of the real world to achieve specific goals related to learning^{29,30}. Nurse teachers engaging with simulations therefore need to use pedagogies which encourage reciprocal transfer of learning between on campus and clinical settings and foster the ability to think critically and engage in clinical reasoning.

A review of the literature provides explication of the elements of critical thinking in nursing and educational

strategies to develop these. Increased adoption of simulation as an active learning strategy has permeated both academic and practice settings³¹, found that as the number of hours of clinical simulation increased, critical thinking and knowledge scores increased³², and confirmed that longer simulation exposure correlated with improved learning outcomes^{33,34}.

The Simulation-PBL (S-PBL) Model was initially developed for all undergraduate students in one college in Republic of Korea in 2004 as an outcome of a project funded by Ministry of Education and Human Resources. Concomitant staff development within an existing cross cultural collaborative partnership resulted in substantial curriculum renewal appropriate to the culture and context of Republic of Korea³⁵.

Against mutually agreed criteria evaluation of the development and implementation an integrated S-PBL curriculum determined the nature and extent to which these were underpinned by commitment to: articulation of abilities within a profile of graduate and the use of competencies as the assessment rubric, use of contemporary nursing frameworks informing content development, concepts and practices applicable to a range environments reflected instimulus material and learning events, enhanced integration of knowledge, skills and attitudes/behaviors for critical thinking and clinical decision-making, and maximal use of simulation facilities high-fidelity human mannequins and actors simulating patient experiences.

Particular emphasis was placed on the extent to which students engaged in the assessment processes related to critical thinking.

3.2 S-PBL Instructional Design

Sub-concepts were identified and clustered into learning modules and applied to clinical situations as stimuli for learning in events ranging from 3 to 6 weeks. Weekly tutorials, lectures and clinical laboratory sessions made up of learning modules which culminate in integrated simulated assessment. Figure 1 showed the composite of two teaching and learning methods: Simulation and PBL. The vertical axis expressed to the PBL elements, indicating the increasing complexity of clinical situations challenging students to utilize previous learning and critical thinking skills. The horizontal axis means simulation focused learning experiences. Although not easy to present as formulae, simulation learning begins with basic or compartmentalized simulation and advances to blended/ integrated simulation characteristics the complexity of clinical situations. As learning progresses over structured learning events each week, the levels of knowledge integration with skills and professional attitudes improves³⁶. S-PBL sought to ensure that the limitations of some approaches to implementation of PBL were addressed: For example, that stimulus material was used in ways that was limited to acquisition of knowledge. According to the researchers it noted that curricula must include structured, integrated learning opportunities to acquire technical and process skills together with opportunities to fuse knowledge and experience³⁷. To develop an effective S-PBL program, well-designed quality scenarios must be created and integrated into the curricula³⁸. The quality design of stimulus material and aligned simulation learning experiences integrated thinking and doing during learning processes and informed action oriented decision-making by students. Tanner provides a Clinical Judgment Model which includes four aspects: Noticing (a perceptual grasp of the situation); Interpreting (sufficient understanding to respond); Responding (concluding on a pertinent course of action); and Reflecting (reviewing all the previous aspects against the actions and outcomes). Considering the previous literature, we adapted the model depicting PBL curriculum design used throughout the collaboration, to demonstrate the relationships among clinical judgment and PBL as a curriculum design as shown in Figure 2. PBL curriculum may position students in a simulated real world working and educate students the knowledge and skills needed to think in an interdisciplinary way. Students can learn experimental knowledge and problem solving skill, communication skill and interpersonal skill of using PBL. As a curriculum design PBL stimulate student attitude and values toward ethical professional behaviors. The use of problem based learning as teaching method enhanced clinical judgment Figure 2.



Figure 1. Simulation-PBL framework.



Figure 2. PBL as a curriculum design to enhance clinical judgment.

When engaging in evaluation of instructional design for their respective PBL curricula, staff members from both partner organizations recognized the need to meet specific criteria: Material should be genuine and reflect "real world" practices; provide specificity and direction for students around time, place and role; include social, political and ethical components; and recognize the potential for multi-media to enhance faithfulness of simulation³⁹. Learning events are as follows³⁹:

- should complement and extend self-directed learning
- must provide opportunity for skill development and practice
- should fully utilize expertise of faculty
- should focus learning on key concepts
- provide a guide to breadth and depth of learning
- require assessment that focus on priority outcomes

Evaluation data has shown that simulation, when coupled with a PBL approach as depicted in Figure 1, provides students with the opportunity, time and a safe environment in which to acquire, practice and test their ability to make clinical judgments in a unique modality for experiential learning and evaluation. It also encourages provision of feedback to students in a manner consistent with Tanner's criteria for development of critical thinking. The simulated setting provides a risk-free environment where learners can integrate theory and practice and think critically without the fear of harming patients or having less than positive learning experiences during a clinical placement⁴⁰. When integrated appropriately into learning and holistic assessment of competence, simulation plays an important role in acquiring the critical and reflective thinking skills needed to provide competent, safe patient care. However, Gaba quite rightly indicated that simulation is an educational strategy, not

a technology. As an educational strategy, S-PBL requires that learning outcomes for which S-PBL has been implemented included an appropriate assessment. If critical thinking is one of the processes inherent in effective clinical judgment, there is a need to develop assessment strategies which capture the formation and development of this.

3.3 Assessment of Critical Thinking Process as a Subset of Clinical Competence

Learning is the construction of meaning in context and apprenticeship experiences such as the clinical placement have been highly valued because they provide immersion in context. Preparing health professionals for contemporary practice requires a transformation in pedagogical philosophy from apprenticeship to competency based learning and assessment and all that entails. The extent to which the goals of the clinical component of the curriculum are assessed in ways that are consistent with the knowledge, skills and attitudes underpinning competent performance requires constant appraisal. Self appraisal of the strengths and weaknesses of implementation of the Cheju Halla Health Science programs support caution that methods of assessment may "underemphasize some important domains of professional (medical) practice, including interpersonal skills, lifelong learning, professionalism, and integration of core knowledge into clinical practice"41. Nevertheless, the efforts of the Centre in curriculum renewal reflecting contemporary thinking were acknowledged in 2005 as reflecting best practice by the Ministry of Education and Human Resources in Republic of Korea.

Performance assessment developed essentially from asking the students what they would do in response to particular scenarios (traditional assessments such as oral examinations or multiple choice questions) to viewing what they actually do in particular scenarios. Practices include assessment of interpersonal skills, professional practice and application of theory to practice across a range of health care professions. Most on-campus assessment methods in health professional education still evaluate one dimension of competence⁴¹ such as knowledge or skills rather than integration of both and explicitly assessing the processes which underpin knowledge and skills.

4. Conclusion

The partnership addresses the progressing need for faculty development in all facets of implementation of S-PBL but

particularly those assessing a range of abilities. Unless nurse educators can agree on behaviors that reveal critical thinking and design assessment activities that evoke processes of establishing critical thinking and outcomes of its application to nursing practice, the evidence that nurses can and do think critically will continue to be questioned. In times of shrinking resources within higher education there is a tendency to rationalize assessment methods to product oriented, summative assessment such as essays, knowledge tests or observation of performance of clinical procedures. Those necessitated need to develop valid, reliable, efficient and effective instruments for evaluating critical thinking as processes integral to both practice and learning.

Contexts of practice for the health professions are dynamic, complex and dependent upon variables such as case blend and presentation, skill mix, availability and quality of clinical instructors and the learner's response to settings and clientele. There is limited formal appraisal of the use of simulation and virtual environments in health professional education. These options continue to be explored in relation to effectiveness for student learning, practicality, feasibility and cost effectiveness in one cross cultural collaborative partnership. The cross cultural partnership between the two institutions involved in the endeavours reported, enable robust discussion and debate about the importance of creating learning experiences which provide opportunities for defining, developing and determining processes such as critical thinking within curricula in the health professions. Nurses must be prepared to critically evaluate the concept of critical thinking lest they fall prey to tendencies to develop unreasoned and misinformed practice in relation to its purpose and nature in practice.

5. Acknowledgement

The authors thank the PROBLARC of University of Newcastle and Cheju Halla/Newcastle center for PBL of Cheju Halla University who were willing to provide data for PBL and S-PBL. Also, the authors have no conflicts of interest to disclose.

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