Teaching Critical Thinking with Problem-Based Learning

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Abstract

Critical thinking (CT) capabilities are crucial for the contemporary nurse and vital for the delivery of safe patient care. As health care and technology continue to evolve, so must the teaching methods used by educators to develop the CT abilities of nursing students. Teaching methods must be interactive, student-focused, and address the various learning needs of diverse student populations. The review of the literature found that the active teaching strategies of problem-based learning (PBL) and case studies are effective in promoting CT development in nursing students. The evidence-based teaching project proposes the use of PBL case studies as the primary teaching method to improve the CT abilities of entry-level Bachelor of Science in Nursing (BSN) students enrolled in the psychiatric/mental health nursing course. Lippit's Phases of Change Theory will guide the action, implementation and evaluation phases of this project. Student CT development is evaluated by exam scores from the Health Education System Incorporated (HESI) Psychiatric/Mental Health Specialty Exam and surveys completed by participants following each case study. HESI exam results with the PBL case study approach are compared to HESI exam results from previous semesters that utilized a lecture-based learning (LBL) approach and participant surveys are analyzed throughout the course.

Keywords: critical thinking, problem-based learning, nursing students

Teaching Critical Thinking with Problem-Based Learning

CT in the clinical decision-making process is an essential competency for all nurses. Nursing educators strive to develop students' CT abilities through supported teaching modalities that will meet the needs of students as they transition into professional practice (Lauver, West, Campbell, Herrold, & Wood, 2009; Yildirim, Ozkahraman, & Karabudak, 2011; Yuan, Williams, & Fan, 2008). Nursing education has traditionally relied on LBL for delivering content but two evidence-based teaching methods being used to promote the nursing students CT development are case studies and PBL (Popil, 2011; Rowles, 2012b; Yildirim et al., 2011). The purpose of this capstone project is to examine the use of case studies and PBL strategies to improve the development of CT skills in the nursing students of an undergraduate, psychiatric/mental health nursing course.

Background

Description of Setting

The College of Nursing (CON) utilized in the project belongs to a four-year, public university located in Massachusetts. The University has a total enrollment of 8,916 students of which approximately 650 were enrolled in the CON. The University is accredited by the New England Association of Schools and Colleges (NEASC) and the CON is accredited by the Commission on Collegiate Nursing Education (CCNE). The CON features undergraduate and graduate degree program options in campus-based, hybrid, and online formats. Bachelor of Science (BS) options available are the post-secondary, campus-based program, online RN-BS program, and the second degree accelerated BS program. Graduate degree options available are the Master of Science (MS), Doctor of Nursing Practice (DNP), and Doctor of Philosophy

(Ph.D.) which prepare candidates to be advanced practice nurses, nurse educators, and nurse scientists.

Student Demographics. The University reports a 49% female and 51% male student population with 30.2% being students of color. Students in the CON represent several generations and come from diverse cultural, ethnic, and socioeconomic backgrounds. The Diversity in Nursing Scholars Program helps to generate this diverse population by recruiting students from disadvantaged backgrounds and assisting them to achieve academic success in the baccalaureate nursing program. The first time pass rate for the National Council Licensure Examination for Registered Nurses (NCLEX-RN) by graduates of the CON has been between 84 - 89% for 2012 – 2015 with the pass rate of 87% in 2015 (Massachusetts Department of Health and Human Services, 2016).

Faculty Demographics. The majority of university faculty possess graduate degrees in their specialty with 95% of faculty holding terminal degrees. Forty-one percent of the full-time CON faculty has an MS in nursing, and 59% has a DNP or Ph.D. Additionally, adjunct faculty who teach clinical courses in the CON may possess a BS in nursing but must demonstrate sufficient progress towards obtaining a graduate degree. Ninety-seven percent of the full-time CON faculty are female while 3% are male.

Problem Identification

The American Nurses Association (ANA, 2010) asserts that CT is a matter of professional competence and is an important aspect of the nursing process, problem-solving and decision-making (ANA, 2010). Assuring the CT abilities of nurses is vital to protecting patients because the majority of patient safety events occur as a result of poor communication and inefficiency amongst health care providers (Fero, Witsberger, Wesmiller, Zullo, & Hoffman,

2009). Fero et al. (2009) examined the CT learning needs of new and experienced nurses and found that 97.2% of nurses were able to successfully implement nursing interventions; but only 62.6% were able to provide a rationale to support decisions while 57.1% met expectations in problem recognition areas. Fero et al. (2009) also found that newly graduated nurses were less likely to meet CT expectations than nurses with ten or more years of experience. With this in mind, the question becomes how do nursing educators improve CT in nursing students before graduation?

According to Dutra (2013), nursing education has been founded on the lecture-style teaching of textbook content; but this limits student involvement and fails to stimulate deeper learning. Using active teaching methods such as case studies and problem-based learning engages students and have been proven to foster CT (Atherton, 2015; Dutra, 2013; O'Connor, 2015; Rowles, 2012b; Young, Rose, & Willson, 2013). Despite these findings, the significant time commitment required by students and instructors, limited familiarity with these modalities, and the reluctance to embrace new learning-teaching strategies are factors that can prevent these methods from being used more frequently (Dutra, 2013; O'Connor, 2015; Rowles, 2012b). If the correct level of active teaching strategies and quality nursing content cannot be achieved, nursing programs are likely to see the first-time NCLEX-RN pass rates for their students to decrease over time. The percentage of students successful completing the NCLEX-RN is a measurement of quality for nursing education programs and one of the factors in maintaining national accreditation and state-based program approval (CCNE, 2015).

At the University, CON administration have noted that the average test scores for the standardized exam completed by students at the end of the psychiatric/mental health course have fallen below acceptable performance levels in two of the last three semesters. This finding has

prompted a re-examination of the primary teaching method for this course with the goal of improving test scores in the upcoming semesters through course revision. Like most of the didactic nursing courses at this university, the primary teaching method is lecture, and this has driven a need to incorporate more active teaching methods to improve CT in students. The active teaching strategy the project offers to address the problem is PBL case studies.

Specific Data

Young et al. (2013) discusses that the HESI Specialty and HESI Exit (E2) exams by Elsevier were created to measure students' ability to apply CT to nursing content and research findings support that they are highly predictive of NCLEX-RN success. Comparing summary report data from the Psychiatric/Mental Health HESI Specialty Exam over the last three semesters confirms that students have room for improvement in CT. In the Spring 2015 semester, the mean HESI score was 775, which is considered "below acceptable performance" and the program percentile rank was 28.87% overall (Appendix A). In the Fall 2015 semester, the mean HESI score was 855, which is considered within the "acceptable performance" range and the percentile rank was 56.05% (Appendix A). Finally, in the Spring 2016 semester, the mean HESI score was 830, which is considered "below acceptable performance" and the percentile rank was 49.59% (Appendix A). Out of the last three semesters, students were only able to achieve acceptable performance levels on the exam in one semester; this supports that a problem currently exists in CT. One approach to correcting the problem is to change the teaching method from the didactic lecture format to include a more active learning format such as PBL with case studies. PBL modules can be created to focus on the nursing process and address specific content areas that students have previously performed poorly on the exam as compared to the national average.

Mission and Strategic Plan

The mission, vision, and educational philosophies of the governing university and the CON are supportive of active learning strategies and the development of CT within students. The University's strategic plan focuses on engaging learning that is student-centered and committed to student success with the promotion of CT and integrative learning such as PBL. Within the CON philosophy statement, the CON experiential learning is emphasized as a means to enhance CT abilities; CT is necessary for the professional nursing student to appraise information, synthesize knowledge, and prioritize patient care.

Global Trends

Developing the CT of nursing students is not only a challenge at this CON or even in the United States but remains a global issue. Azizi-Fini, Hajibagheri, and Adib-Hajbaghery (2015) compared the CT abilities of Iranian freshman and senior nursing students and found that both groups of students scored low in CT and did not significantly improve during their education. Azizi-Fini et al. (2015) suggested that the lack of CT is due to the overuse of lecture-based teaching and overlooking the CT aspects of the nursing process. Agbedia and Ogbe (2014) supports that CT deficiencies in nursing students is an international problem with reports from countries including Australia, Canada, China and Nigeria demonstrated low scores in the CT aspects of truth seeking and open-mindedness. Nursing education programs in these countries have also traditionally emphasized procedure-based training and less focus was placed on care planning and scientific inquiry which believed to be a cause of this issue (Agbedia & Ogbe, 2014).

PSCOT Question

Using a PSCOT format, the question for this is: In undergraduate students in a psychiatric/mental health nursing course (P), how does case study and PBL (S) compare to traditional didactic lecture (C) affect CT skills (O) by the completion of the course?

Review of Literature

Search Protocol

A search was conducted of the following databases: Academic Search Premier, Cumulative Index to Nursing and Allied Health Literature (CINAHL), Cochrane Central Register of Controlled Trials (CENTRAL), Cochrane Database of Systematic Reviews, Educational Research Complete, Educational Resources Information Center (ERIC), MEDLINE, and PsycINFO for literature published from 2006 – 2016. The search strategy used the keyword nursing education AND keywords for the teaching strategy (case-based learning OR case-based teaching OR case study learning OR case study teaching OR problem-based learning OR problem-based teaching) AND keywords for the outcome (analytical decision making OR analytical reasoning OR analytical thinking OR clinical decision making OR clinical reasoning OR clinical thinking OR critical decision making OR critical reasoning OR critical thinking OR dialectical decision making OR dialectical reasoning OR dialectical thinking).

The databases were combined for the search using nursing education AND a teaching strategy AND a keyword for outcome and produced the following results: case-based learning (17 returns), case-based teaching (11 returns), case study learning (37 returns), case study teaching (43 returns), problem-based learning (348 returns), and problem-based teaching (51 returns). The search yielded a total of 507 articles, and after manual review, ten articles were selected as the evidence base for this project. Inclusion criteria for evidence were (a) articles published in English, (b) studies composed of undergraduate, registered nurse (RN) students, (c)

studies conducted in academic settings, (d) studies that examined case studies, case-based, or problem-based teaching strategies, and (e) studies that examined CT or a related outcome as the primary outcome. The exclusion criteria were (a) articles not published in English, (b) studies that included graduate nursing students, non-RN nursing students, or students after obtaining RN licensure, (c) studies not completed in academic settings, (d) studies that did not use case studies, case-based, or problem-based teaching strategies, and (e) studies that did not examine CT or a related outcome as the primary outcome.

Evidence Matrix

See Appendix B

Literature Themes

Nursing educators agree that CT is an essential component of nursing education and a necessary competency for modern nursing practice (Choi, Lindquist, & Song, 2014; Jones, 2008; Kaddoura, 2011; Kaddorura & Williams, 2012; Kong, Qin, Zhou, Mou, & Gao, 2014; Lyons, 2008; Tiwari, Lai, So, & Yuen, 2006; Yu, Zhang, Xu, Wu, & Wang, 2013; Yuan et al., 2008). An all-encompassing definition for CT does not exist; but CT skills include: communication (Jones, 2008; Kaddorura & Williams, 2012; Kong et al., 2014; Yoo & Park, 2015; Yu et al., 2013), decision-making (Kaddoura, 2011; Kaddorura & Williams, 2012; Kong et al., 2014; Lyons, 2008; Tiwari et al., 2006; Yu et al., 2013; Yuan et al., 2008), and problem-solving (Choi et al., 2014; Jones, 2008; Kaddoura, 2011; Kaddorura & Williams, 2012; Kong et al., 2014; Tiwari et al., 2006; Yoo & Park, 2015; Yu et al., 2013; Yuan et al., 2008). Educators have been unable to form a consensus on the best method for teaching nursing students CT skills; however, many scholars believe that student-centered, active learning strategies are better than passive, teacher-focused strategies (Choi et al., 2014; Kaddoura, 2011; Kaddorura & Williams, 2012;

Kong et al., 2014; Lyons, 2008; Yoo, & Park, 2015; Yu et al., 2013; Yuan et al., 2008). Case studies and PBL are the two active teaching strategies utilized in the project for CT skill development in undergraduate nursing students. Case studies are real-life scenarios adapted for in-depth analysis of course content while PBL is presenting clinical situations for students to work towards the resolution of a problem while developing specific skills, knowledge, and abilities (Rowles, 2012b).

Appraisal of Evidence

The studies included in the literature review consisted of two systemic reviews (level I), three randomized controlled trials (level II), four quasi-experimental studies (level III), and a single descriptive study (level VI). The studies were conducted in multiple countries and included nursing content from a variety of specialties, which supports the ability to generalize the findings and use these methods when teaching course content to different student populations. Summarized below are the similarities and differences in the literature and research methods. Gaps in the literature are addressed along with how the literature influenced the execution of the teaching strategy project.

Similarities in Literature and Research Methods. Of the 507 articles returned for the literature search, 399 (78.7%) identified using a problem-based teaching method whereas 108 (21.3%) identified using case studies or a case-based teaching method. The search results indicate that the abundance of research currently exists for teaching CT skills to nursing students with problem-based teaching methods versus case study or case-based teaching methods. However, the case study or CBL studies included in the body of evidence reported that course instructors served primarily as a facilitator and encouraged self-directed student learning with teamwork and problem-solving skills, which is also seen with a PBL approach (Kaddoura, 2011;

Kaddorura & Williams, 2012; Yoo & Park, 2015). Additionally, the PBL studies in the body of evidence identified using case studies as the primary teaching activity in the modules (Choi et al., 2014; Jones, 2008; Kong et al., 2014; Lyons, 2008; Tiwari et al., 2006; Yu et al., 2013; Yuan et al. 2008). The degree of similarity between PBL and CBL methods and the overlap of research encouraging their use allows for the literature sources to be reviewed collectively and used as supporting evidence for PBL case studies as the teaching strategy in the project.

With the exception of Kaddorura and Williams (2012), the review studies compared case-based learning (CBL) or PBL against a traditional, didactic lecture teaching strategy. In the majority of studies, CBL or PBL was implemented in a single course over the period of a semester while other courses in the nursing programs continued to be taught in the lecture-based learning (LBL) format (Choi et al., 2014; Jones, 2008; Kaddorura & Williams, 2012; Kong et al., 2014; Lyons, 2008; Yoo & Park, 2015; Yu et al., 2013; Yuan et al. 2008). Kaddoura (2011) compared CT in students in from a CBL program to students in an LBL program. Tiwari et al. (2006) taught PBL content over in a course that extended over a period of two semesters. All of the studies in the review used the Statistical Package for Social Science (SPSS) software to conduct the statistical analysis of study findings and a second evaluator reviewed the findings.

Differences in Literature and Research Methods. Researchers used a variety of quantitative instruments to measure CT; studies may have used one instrument (Jones, 2008; Kaddoura, 2011; Kaddorura & Williams, 2012; Lyons, 2008; Tiwari et al., 2006; Yu et al., 2013) or multiple instruments (Choi et al., 2014; Kong et al., 2014; Yoo & Park, 2015; Yuan et al. 2008). The Assessment Technology Institute (ATI) Critical Thinking Test and the HESI Critical Thinking Exam are standardized instruments specifically designed to measure the CT abilities of nursing students and were used in Kaddorura and Williams (2012), Kong et al. (2014), and

Lyons (2008). Other external test instruments to measure the CT abilities of adult students and professionals include Insight Assessment's California Critical Thinking Skills Test (CCTST), California Critical Thinking Deposition Inventory (CCTDI), and Critical Thinking Deposition Inventory – Chinese Version (CTDI-CV); and the Watson-Glaser Critical Thinking Appraisal (WGCTA) (Kaddoura, 2011; Kong et al., 2014; Tiwari et al., 2006; Yu et al., 2013; Yuan et al. 2008). In addition to quantitative data, some studies included qualitative data from participants in the form of structured interviews or written journal prompts in order to provide a deeper understanding of the intervention's effects (Jones, 2008; Tiwari et al., 2006; Yuan et al., 2008).

Gaps in Research. A significant limitation of the current research was the small sample sizes ranging from 54 (Lyons, 2008) to 143 (Yoo & Park, 2015) participants in the single research studies. The statistical significance of research findings could be further validated if the studies were to be repeated with the same conditions but using larger sample sizes. Additionally, the use of various instruments for measuring CT in each of the studies may limit the ability to replicate the findings while the validity of each instrument for measuring CT in this population varied. All of the included studies recommended that additional research be conducted to examine the use of CBL or PBL in teaching CT to nursing students. Kong et al. (2014) and Yuan et al. (2008) are systematic reviews examining PBL on CT development in nursing students and found conflicting results. In the meta-analysis of Kong et al. (2014), the pooled effect size of the studies showed that PBL improved the CT of students while Yuan et al. (2008) asserted that the available evidence was insufficient to conclusively prove that PBL supported CT development. Both studies suggested that additional high-quality, randomized controlled trials (RCT) with a large number of study participants are needed (Kong et al., 2014; Yuan et al., 2008).

Literature Influence on Project Development

The instrument chosen for the project to quantitatively measure the CT abilities of students is Elsevier's HESI Psychiatric/Mental Health Specialty Exam. This instrument was chosen because it is the existing tool used by the CON in each of the nursing specialty content courses and could be compared to exam results from previous semesters that utilized a LBL teaching strategy. Kaddorura and Williams (2012) used the HESI CT exam to measure CT skill development in their study because the test is used nationwide, experienced nurse educators and clinicians have evaluated the validity of items, and has a reliability coefficient ranging from 0.86 to 0.99. According to Zweighaft (2013), HESI Specialty Exam test items are formulated with CT questions and schools of nursing that utilized these exams for course final exams had higher mean scores on the HESI Exit Exam (E^2) which has been proven to be highly predictive of first-time NCLEX-RN licensure success.

In addition to the quantitative data from the HESI exam scores, a qualitative element to the evidence-based teaching project includes feedback from students and the course instructor through anonymous surveys following the completion of each PBL module. Surveys will determine the perceived effectiveness of the PBL method and how it compares to LBL methods used in other courses. The inclusion of qualitative data from students and course instructors was present in the literature and was obtained through surveys, reflective journaling, and focus groups (Jones, 2008; Kong et al., 2014; Tiwari et al., 2006; Yuan et al. 2008). Yuan et al. (2008) found that even though students may perceive a particular teaching style is associated with improved communication, CT, decision-making, and problem-solving skills, without the quantitative data measured by a valid and reliable instrument this would be difficult to prove.

Summary

Quantitative assessment data from seven studies provided supportive evidence that CBL or PBL was associated with significant improvement in the development of CT-related skills in undergraduate nursing students compared to a lecture-based teaching method (Jones, 2008; Kaddoura, 2011; Kaddorura & Williams, 2012; Kong et al., 2014; Tiwari et al., 2006; Yoo & Park, 2015; Yu et al., 2013). Three of the ten studies failed to provide evidence supporting CBL or PBL as stronger methods for developing CT skills in nursing students than a lecture-based teaching method (Choi et al., 2014; Lyons, 2008; Yuan et al., 2008). Limitations were related to sample size and lack of use of a consistent measurement for measuring CT in this population. However, the strength of the research and statistical analysis support the benefits of case studies and PBL for teaching CT in undergraduate nursing students. Future research in this area should include additional RCT with larger groups of participants and explore the use of this intervention in other nursing specialty content areas.

Action Plan

Description of the Change

The current teaching format for the undergraduate psychiatric/mental health nursing course at the CON is a face-to-face didactic lecture that meets once weekly for three hours over a fifteen-week semester. Students in the course are provided with PowerPoint presentation slides that correlate with the lecture content and can ask the instructor questions, but students' primarily listen while the instructor delivers the lecture content. The course features three summative examinations created by the instructor and the Psychiatric/Mental Health HESI Specialty Exam completed at the end of the semester. Each of the exams created by the instructor includes content from eight to ten chapters of the accompanying textbook that is reviewed over three lecture sessions.

The plan for change would be to replace the didactic lectures with six PBL case studies that would each be carried out over two class meetings. Choi et al. (2014), Yoo and Park (2015), and Yu et al. (2013) identified that individual cases were presented over multiple class sessions while Jones (2008) reported that each class session utilized a new case. Carrying out case studies over multiple class sessions allows students a greater length of time to study cases, discuss findings, and provides the instructor with the opportunity to change elements and add developing problems to the case. In this teaching plan, students would be placed into small groups of five to six participants to deliberate the case and plan the patient's care while the instructor would circulate to assist individual groups and facilitate discussions between the entire class to review similarities and differences between each of the groups work. The majority of studies reviewed featured between four to seven students in the case study/PBL intervention groups and found that to be an ideal number (Choi et al., 2014; Lyons, 2008; Kaddorura & Williams, 2012; Yoo & Park, 2015). However, three of the studies utilized larger groups of ten to fourteen students, which was due to a larger class size or easier facilitation for the instructor (Jones, 2008; Tiwari et al., 2006; Yu et al., 2013). Lastly, to maintain consistency in the evaluation of students understanding of course content, students would still be required to complete three instructor-created exams and the Psychiatric/Mental Health HESI Specialty Exam at the end of the semester. Each of the instructor-created exams would include subject matter from two case studies to maintain exams with a similar amount of content to the current format.

Evidence to Support the Need for the Change

CT is required in nursing education because the changing clinical environment necessitates that nurses possess extensive knowledge of disease states and technology while using evidence-based practices and high-level reasoning (Kaddorura & Williams, 2012; Kong et

al., 2014; Lyons, 2008; Rowles, 2012b; Yildirim & Ozkahraman, 2011; Yuan et al., 2008). Maintaining patient safety and positive outcomes have been directly linked to nurses' ability to implement CT, sound decision-making and effective communication (Fero et al., 2009; Jones, 2008). With the need for including CT competencies in nursing education being established, research supports that CT is best taught through active teaching strategies that engage learners as compared to passive teaching strategies such as didactic lecture (Dutra, 2013; Forsgren, Christensen, & Hedemalm, 2014; O'Connor, 2015; Popil, 2011).

Memorizing facts provided by lecture only encourages surface learning because students do not engage in the process of critical inquiry to obtain a deeper understanding of theory and its application (Dutra, 2013; Forsgren et al., 2014; Popil, 2011). LBL places students in a passive role to receive knowledge of facts while the instructor is active in disseminating their knowledge of facts in the specialty area (Gibbs, Trotta, & Overbeck, 2014; Dutra, 2013; O'Connor, 2015; Rowles, 2012b). While the didactic lecture format of teaching nursing may be comfortable for both students and instructors because it is the tradition and what they are most familiar with, it does not support active, cooperative learning (Dutra, 2013; Yildirim et al., 2011). Rowles (2012b) notes that if a nursing program has adopted a framework emphasizing CT, then traditional lecture would rarely be used as a teaching strategy.

The literature reviewed for this project largely supports a shift from didactic lectures in nursing education to active teaching methods that include case studies and PBL (Jones, 2008; Kaddoura, 2011; Kaddorura & Williams, 2012; Kong et al., 2014; Tiwari et al., 2006; Yoo & Park, 2015; Yu et al., 2013). Additionally, because the mission and strategic plan of the university encourages the use of PBL and the CON philosophy statement emphasizes its

commitment to developing CT within students, this supports a change in practice of teaching the psychiatric/mental health nursing course from a didactic format to a case study/PBL format.

Characteristics of Environment

Supporting elements. Elements present at the institutional level supporting this change are the university's strategic plan to offer courses featuring PBL and to become a research-centered university that utilizes and generates emerging pedagogic practices. In the CON, the addition of newer faculty who have expressed interest in using active teaching strategies is also reassuring for this project. Additionally, the department chair for community nursing in the CON has encouraged faculty for implementing active teaching methods in didactic courses. Faculty from all departments are invited to participate in the instructional development workshops and short courses provided by the University's Computing and Information Technology Services (CITS) department to learn about innovative teaching and learning practices through technology.

Inhibiting elements. Elements present that potentially inhibit the implementation of this project are that none of the other courses in the CON currently utilize a case study/PBL framework although some courses may include individual case studies within didactic content. According to Rowles (2012b), PBL is typically used for an entire curriculum instead of only in individual nursing specialties. Shifting to PBL in this one course may present a challenge if it requires changes to the entire program curriculum because of the need for support and approval of multiple faculty members, administration, and finally the accrediting agency for the CON.

Financially speaking, faculty are not provided with additional compensation for the development of case studies to be used in the course. Creating the case studies and learning modules for PBL requires a significant investment of faculty time and may have limited support

if they are not compensated for these efforts (Rowles, 2012b; Solomon & Coman, 2014). The last consideration is that courses with a large number of enrolled students typically require additional faculty to facilitate small group learning effectively (Rowles, 2012b). The benefit of the current method for teaching this course is that it only requires one faculty member to conduct the lectures.

Change Theory

The change model/theory guiding the teaching project *is Lippitt's Phases of Change Theory*, which was developed in 1958 (Kritsonis, 2004; Mitchell, 2013). The method expands on *Lewin's Three-Step Change Theory*, developed in 1951 and includes the following seven phases:

1. Diagnosing the problem.
2. Assessing motivation and capacity for change.
3. Assessing change agent's motivation and available resources.
4. Selecting progressive change objectives.
5. Choosing appropriate role of the change agent.
6. Maintain change.
7. Terminate the helping relationship (as cited in Mitchell, 2013, p. 33).

Lippitt's change theory has been particularly useful in nursing because the seven steps can be linked to the nursing process of assessment, planning, implementation, and evaluation (Mitchell, 2013). Mitchell (2013) noted that while Lippitt's theory is comprehensive and requires a deep understanding of change theory, it also creates a more detailed plan on the role of the change agent and how to generate change.

Phases I through III of Lippitt's theory are completed by the change agent and are included in the stakeholder presentation to facilitate buy-in from faculty and CON

administration. Phase IV is done during and after the stakeholder presentation as feedback from stakeholders will determine the change objectives including additional resources and personnel available to assist with the project. Phase V is outlined by the change agent during strategy development but as the project progresses the role will grow, and Phase VI requires the change agent be an active and adaptable leader to maintain the change. Phase VII marks the conclusion of the project and is the process of the change agent withdrawing from an active leadership role and allows participating faculty to take over management responsibilities. Specific details of how each phase of Lippitt's theory applies to the project are discussed in the application of change theory section and the implementation strategy.

Application of Change Theory and Timeline

Phase I. Diagnosing the problem. The problem is changing the format of a psychiatric/mental health nursing course that is taught in didactic lecture format to a case study/PBL format. The goal of implementing a case study/PBL format is to improve deficiencies in CT amongst undergraduate nursing students that have resulted in decreased HESI scores on the Psychiatric/Mental Health HESI Specialty Exam in the selected CON.

Phase II. Assessing motivation and capacity for change. The CON faculty and governing university are motivated to change because consistent underperformance on this exam by students reflects poorly on the program, places students at risk for failure of the course, and increases the chance that students will have decreased performance on the NCLEX exam.

Phase III. Assessing change agent's motivation and resources. The change agent for this project would be the graduate student, and the motivation to change is to raise students the Psychiatric/Mental Health Speciality Exam HESI performance scores through increased CT

abilities. The resources required to implement change will be training in PBL teaching methods and the additional time required to develop case studies and PBL modules.

Phase IV. Choose progressive change objectives. This project requires the change agent, course instructor, and any faculty volunteers undergo formalized training in PBL and thus would need to be scheduled to attend the appropriate workshop in October 2016 before implementing this plan. The project also requires time to create the case studies and review that the essential content for the course is addressed to facilitate students meeting the established learning objectives. To ensure that the necessary preparations are made to implement this project, this would be proposed to CON faculty and administrators in September 2016 before being implemented in this course for the Spring 2017 semester. A resource to develop realistic case studies would be to recruit the assistance of the clinical instructors for this course to help provide scenarios based on their clinical experiences. Additionally, faculty from other nursing specialties with experience using PBL strategies could be included in the project to facilitate module development and lesson planning.

Phase V. Choosing appropriate role of the change agent. The role of the change agent in this project would be the project leader, to work with the course instructor and faculty volunteers in developing the case studies and ensuring theory is addressed in modules. The change agent would be collected project data, evaluating the data, and presenting the findings to stakeholders.

Phase VI. Maintain the change. Maintaining the change during the Spring 2017 implementation period requires constant communication between the change agent, course instructor, and CON administration to ensure that there are adequate resources to continue the project and that constructive feedback is provided for areas of strength and areas needing

improvement. The change agent will also seek feedback from students regarding the effectiveness of this teaching method and ways to improve the teaching plan for future use via survey.

Phase VII. Terminate the helping relationship. As the teaching practice change is accepted and becomes the established format for this course, the change agent can gradually withdraw from their role. Working with the involved stakeholders, the change agent would purpose during the final stakeholder presentation in September 2017 that the PBL model be adapted for other courses in the undergraduate nursing program.

Implementation Strategy

Continuing with Lippitt's Change Theory as the guiding framework for this project, implementation of the teaching strategy will follow the seven phases to deliver a lasting change in teaching practice. Appendix C is a table establishing the timeline, outcomes, and roles of the individuals/teams in the implementation of the project.

Plan and Timeline

September 2016. Phase one of change is diagnosing the problem, which was determined to be underdeveloped CT skills in undergraduate nursing students in the content area of psychiatric/mental health nursing. The change agent for the project will present a stakeholder presentation to faculty and CON administrators during the first CON department faculty and curriculum change committee meetings of the 2016 – 2017 school year. The goal of the stakeholder presentation is to receive approval to proceed with the project from CON administrators and faculty. The presentation will explain the extent of the problem with the evidence of below acceptable performance scores on the Psychiatric/Mental Health HESI Specialty Exam for two of the past three semesters and the negative impact that poor

performance on standardized exams can have on the program. The primary objective of the project is to increase the Psychiatric/Mental Health HESI Specialty Exam scores of students to above the acceptable performance designation (score of 850 or higher). The goal of using PBL case studies as the educational strategy is to improve the CT abilities of undergraduate nursing students in a psychiatric/mental health course. Buy-in from faculty and administration will be earned by highlighting the research supporting the use of PBL formatting for developing CT skills over the existing LBL format.

Phases two and three are assessing the motivation, capacity, and resources for change and will be done during the stakeholder presentation by eliciting feedback from faculty and administrators on the availability of resources (e.g. funding, training opportunities, faculty volunteers). During the presentation, the change agent would seek volunteers for case study development and reviewers of the finalized modules. Ideally, clinical instructors for the course would volunteer to work with the course instructor as the content expert in case study development, and other CON faculty volunteers would be reviewers who examine the modules and deliver objective critique.

October 2016. In phase four, the progressive change objectives are chosen, and this begins by providing the change agent, content expert, and faculty volunteers with training in PBL teaching strategies. One of the free faculty workshops offered by the University's CITS department teaches educators about team-based learning, case studies, and PBL used as active teaching strategies in the flipped classroom. After participating in the workshop, the change agent, content expert, and case study development volunteers would meet to review the outline for course content and assign roles in drafting case studies. In phase five of change, the role of the change agent is defined. At this stage, the change agent is the project leader providing a

supporting role to the content expert and volunteers while ensuring that PBL modules meet learning objectives.

November 2016. Phase five continues as the change agent continues in the project leader role by meeting again with the content expert and case study development volunteers to revise the drafts of the case study modules. The change agent and content expert will then meet with the volunteer reviewer faculty to discuss the modules and elicit feedback which will be used to make the final revisions before being presented to the CON administration and other faculty.

December 2016. The change agent will present the finalized PBL modules and proposed curriculum change for the undergraduate psychiatric/mental health nursing course to faculty and administrators during the December CON department faculty and curriculum change committee meetings. Feedback will be solicited from the audience and questions or concerns will be addressed to achieve the goal of final approval for the project launch in the Spring 2017 semester. Students in the Fall 2016 cohort will also complete the Psychiatric/Mental Health HESI Specialty Exam at this time.

Spring 2017 Semester. The period begins the implementation of the educational strategy at the facilitator and student level and maintaining this change. Final approvals for the six PBL models include pediatric, adult, and geriatric patients of both genders and represent a variety of ethnicities. The diagnoses chosen for the modules are attention-deficit/hyperactivity disorder (ADHD), major depressive disorder (MDD), opioid abuse/dependence, post-traumatic stress disorder (PTSD), schizoaffective disorder, and vascular dementia. The sample lesson plan (Appendix D) and case study prompt (Appendix E) for schizoaffective disorder have been provided along with the module instructions (Appendix F) for implementing this strategy.

The change agent will oversee that the students and course instructor complete the evaluation surveys after each module. Surveys will determine the perceived effectiveness of PBL modules in student CT development and provide needed feedback for course improvement. Phase six of the change is maintaining the change, this requires the change agent remain in constant communication with the involved faculty members and students to ensure adequate provision of resources and support for the project. At the end of the course, the Spring 2017 cohort of students will complete the Psychiatric/Mental Health HESI Specialty Exam.

September 2017. The seventh and last phase of change is terminating the helping relationship. The change agent will present the project findings to faculty and CON administrators during the first CON department faculty and curriculum change committee meetings of the 2016 – 2017 school year. The change agent will use data tables to compare the student and instructor survey results following each module in the Spring 2017 semester. Data tables will compare the Psychiatric/Mental Health HESI Specialty Exam results from the Spring 2017 to results from previous semesters. The change agent will discuss the strengths and areas for improvement in the project while noting that results from one semester are not sufficient to prove that the superiority of a particular teaching method. The change agent will propose that the selected course continue to utilize this format and other courses in the CON adopt a PBL format. The change agent can withdraw from the role of project leader for this course because change will be established and volunteer to serve in a similar role for the implementation of PBL in other courses if the curriculum change is approved.

Stakeholder Roles

Stakeholders in the project are the change agent, CON administration, the course instructor, faculty volunteers, and students. The graduate student serves as the change agent and

begins as the project leader but as the project progresses the role expands to include module review, survey data collection, evaluation of participant feedback, and presenting project findings to stakeholders. CON administrators review the initial project proposal, monitor the progress of the project during the implementation phase, and conclude by evaluating the results to determine if the strategy can be implemented in other courses. The course instructor is the content expert, and before project implementation they will develop the PBL modules collaboratively with faculty volunteers. During implementation, the course instructor serves as the module facilitator and provides their feedback of the strategy's effectiveness. Faculty volunteers will participate in either a case study developer or module reviewer role. Lastly, students will be participating in the learning strategy and providing feedback via survey responses. Appendix C further describes the implementation strategy with stakeholder roles and outcomes and Appendix G addresses the stakeholder roles and outcomes for the evaluation method.

Summary

Lippitt's Change Theory has been used in numerous nursing change projects because of its comprehensive nature and detail on how the change agent works to generate change (Mitchell, 2013). The successful implementation of this project guided by Lippitt's theory will establish PBL modules as the primary method of teaching the selected course and could lead to the redesign of the entire CON curriculum to a PBL format. Such a major revision to the program would likely require approval from the accreditation agency for the CON, in this case the CCNE, and necessitates additional financial and faculty resources. However, implementing a teaching format that directly aligns with the University's strategic plan and has the potential to improve CT development in nursing students may be assessed as worth the investment.

Evaluation Method

Following implementation is the evaluation phase, during which data is collected using the appropriate evaluation tools, and the results are analyzed to determine if they achieve the identified performance criteria outcome and support the use of the selected education strategy or the comparison strategy (Boswell & Cannon, 2016). Sauter, Gillespie, and Knepp (2012) discuss that the purpose of nursing educational program evaluation is to demonstrate accountability and identify areas for quality improvement. Both summative and formative instruments can evaluate the effectiveness of teaching strategies; this method will include post-module surveys from the students and course instructor along with test results from the Psychiatric/Mental Health HESI Specialty Exam.

Timeline, Outcomes, and Roles

Elaborating on the implementation strategy plan previously discussed, a detailed plan for the evaluation method is addressed in Appendix G. The plan begins with the Fall 2016 cohort of students in psychiatric/mental health nursing course completing the Psychiatric/Mental Health HESI Specialty Exam in December 2016. During the Spring 2017 semester, the role of students will be as participants and evaluators of the learning activities. The role of the course instructor will be facilitator and evaluator of the learning activities along with sharing the responsibility of learning quality assurance with the change agent.

The role of the change agent begins with project leadership and overseeing that the course instructor and students complete the post-module surveys. At the completion of each module, the change agent will prompt the students and course instructor to complete the electronic evaluation surveys created by the change agent. The change agent will then review the survey findings and provide the course instructor with immediate feedback from students.

This feedback can identify student learning needs and guide both course content revisions and adjustments to lesson delivery to improve student CT skill development. The change agent will use the Summer 2017 period to organize and analyze the data collected during the Spring 2017 semester and prepare the presentation for CON administration and faculty stakeholders. In September 2017, the change agent will present the findings at the department faculty and curriculum change committee meetings and will advocate for the adoption of the learning strategy to other courses within the undergraduate BSN curriculum.

The role of CON administration throughout the project is supportive; project updates will be provided as requested and if post-module evaluations identify matters that require immediate attention (i.e. inadequate resources, significant concerns that learning objectives are not met). At the stakeholder presentations in September 2017, the role of CON administration is to critique the findings, deliberate the risks and benefits of using this teaching method, and determine if it is implemented on a larger scale.

Evaluation Methods

Post-Module Surveys. When surveys are administered following a lesson or periodically throughout a course, they are a classroom assessment technique (CAT) because their immediate feedback provides an evaluation of learning and leads to curriculum development (Cannon, 2016). CAT are formative assessments that improve teaching techniques, ensure student comprehension of the content and gauge the effectiveness of teaching styles (Cannon, 2016; Dillard & Siktberg, 2012; Rowles, 2012a). Following each PBL module, the course instructor and students will complete an electronic evaluation survey that was created by the project change agent (see Appendix H).

Surveys were designed using the SurveyMonkey software platform (http://www.surveymonkey.com) because it is free of cost and creates comparative reports that can be further analyzed for statistical significance and then presented to stakeholders (SurveyMonkey, 2016). Faculty of the University have frequently used SurveyMonkey when completing CAT but if survey findings are to be used in published research faculty must develop surveys with the Qualtrics software platform after receiving prior approval and training. The change agent designed survey questions using the sample formatting from SurveyMonkey and with question development recommendations provided by the University of Wisconsin-Madison Office of Quality Improvement (2010) to minimize bias while upholding reliability and validity. The primary purpose of the surveys is to determine if the students and course instructor believe that PBL modules improve the students CT skills and content mastery as well as determine their outlook on the teaching strategy. If results suggest that students or instructors do not believe that PBL improved CT skills or content mastery or if results reveal an overwhelmingly negative opinion of the strategy, this may limit the conversion of LBL courses to a PBL format in the future.

Psychiatric/Mental Health HESI Specialty Exam. The Psychiatric/Mental Health HESI Specialty Exam is a concentration-specific assessment tool developed as part of the RN Specialty Exam Series by Elsevier (Elsevier, 2016). At this CON, the HESI RN Specialty Exam Series was already purchased, and the cost of administration is included as a student tuition fee. HESI exams have been used in this setting for years as a formalized, external testing method for summative evaluation of students after the completion of a course. A benefit of using external testing systems is that students will answer NCLEX-style test questions that were created by a

party with no affiliation to the CON and have been tested repeatedly by educators and students nationwide (Sauter et al., 2012).

Scores from the Psychiatric/Mental Health HESI Specialty Exam are an outcome evaluation criteria for the project because of its established history of use at the CON and because the problem identified by CON administration was that the scores on this exam were below the acceptable performance level in two of the last three semesters. Additionally, this exam is appropriate for measuring student CT skill development because HESI exams were designed to assess the ability of students to apply CT to specific content areas while evaluating their readiness for the NCLEX-RN exam (Elsevier, 2016; Young et al., 2013; Zweighaft, 2013). Before the Spring 2017 semester, the change agent will compile the test scores for the previous cohorts and will begin organizing the data into tables for comparison. During Summer 2017, the change agent will compile test score data from the Spring 2017 semester cohort and incorporate it into the presentation for stakeholders.

Conclusion

CT and the application to the nursing process are of utmost importance for nurses to be successful in professional practice. Research from across the world has found that fostering CT within students remains a challenge for nurse educators using traditional means. PBL case studies are an active teaching strategy that has the potential to improve the CT abilities of nursing students, which can then be evaluated by HESI exam scores before graduation. Using Lippitt's Change Theory as a guiding framework, the selected CON can implement a change in the current teaching practices beginning with the undergraduate, psychiatric/mental health nursing course. If this endeavor results in improved CT skills in students, as evidence by

increased HESI exam scores, this would support a permanent change in teaching strategy for this course and consideration of changes to the entire CON curriculum.

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Appendix A

HESI RN Specialty Exam Scores: Spring 2015 – Spring 2016

Psychiatric/Mental Health HESI Specialty Exam Scores: Spring 2015 – Spring 2016			
	Spring 2015 Semester	Fall 2015 Semester	Spring 2016 Semester
Average HESI Score	775	855	830
Percentile Ranking	28.87%	56.05%	49.59%

HESI Specialty Exam Scoring Interval	
Performance Level	HESI Score
Below Acceptable Performance	≤ 849
Acceptable Performance	850 - 899
Recommended Performance	≥ 900

Appendix B

Literature Review Matrix

Source	Level of Evidence & Design	Hypothesis, Question, Purpose	Variables	Theoretical Framework	Sample, Setting, Inclusion/Exclusion Criteria	Data Collection Methods, Instruments, and Procedures	Results/Findings
Choi, E., Lindquist, R., & Song, Y. (2014). Effects of problem-based learning vs. traditional lecture on Korean nursing students' critical thinking, problem-solving, and self-directed learning. *Nurse Education Today.*	**Level:** III, **Design:** Quasi-experimental, pretest-posttest	**Hypothesis & Question:** Not clearly stated. **Purpose:** Examine CT, problem-solving and self-directed learning of nursing students receiving PBL versus traditional lecture teaching strategies.	**DV:** Outcomes (CT, problem-solving, self-directed learning). **IV:** Teaching strategy (PBL or traditional lecture).	None noted	**Sample/Setting:** 90 First-year nursing students from two junior colleges in South Korea. **IC:** First-year nursing students at the participating colleges, written consent from study participants. **EC:** Students declining to participate, students submitting incomplete form data.	Participants completed three validated questionnaires (Critical Thinking Ability Scale for College Students, Problem-Solving Scale for College Students, and the Self-Directed Learning Scale for College Students) before and after receiving the teaching strategy for 16 weeks. SPSS software was used to analyze the data with analysis of covariance (ANCOVA) to control for group differences at baseline.	**Findings:** CT scores increased 2.20 points for PBLstudents and 0.82 for lecture students. Problem-solving scores increased to 4.13 for PBL students and decreased in the lecture students by 1.3. However, neither of these results were statistically significant.
Jones, M. (2008). Developing clinically savvy nursing students: an evaluation of problem-based learning in an associate degree program. *Nursing Education Perspectives*.	**Level:** III **Design:** Quasi-experimental, pretest-posttest	**Hypothesis:** Not clearly stated. **Question(s):** Does the use of PBL as a teaching strategy in the clinical area in an associate degree education program result in the development of higher levels of CT? Does it result in the development of improved communication skills in nursing?	**DV:** Outcomes (CT, communication). **IV:** Teaching strategy (PBL or pre- and post-conference lectures).	None noted	**Sample/Setting:** 60 Second-year nursing students enrolled in the maternal-newborn nursing course at a community college in New York. **IC:** Second-year nursing students at the participating college, consent from study participants. **EC:** Students declining to participate.	Participants were evaluated for CT and communication skills based on two written care plans, communication observations, and reflective journal entries graded by the faculty member using Bloom's taxonomy at the beginning and end of the course. SPSS software was used to analyze the data for descriptive and inferential statistical analysis.	**Findings:** Both groups showed improvement, but the PBL students demonstrated a highly significant increase in CT and communication compared to the control group ($p < 0.000$). 93.33% of the PBL students reported the program was useful and 96.66% reported enjoying the program.

Kaddoura, M. A. (2011). Critical thinking skills of nursing students in lecture-based teaching and case-based learning. *International Journal for the Scholarship of Teaching & Learning*.	**Level:** VI **Design:** Comparative descriptive survey	**Hypothesis:** There will be no significant difference in the CT scores in nursing students educated using the CBL program and those student educated using the traditional lecture-based program.	**DV:** CT. **IV:** Teaching strategy (CBL or didactic lectures).	None noted	**Sample/Setting:** 103 Third-year nursing students enrolled in two nursing diploma programs in the United Arab Emirates (UAE). **IC:** Third-year nursing students at the participating nursing programs, consent from study participants. **EC:** Students declining to participate.	Participants completed the CCTST at the end of their third year. Before taking the CCTST, students from both programs received the same instructional content, examinations, and course instructor oversight but had different instructional methods. The data was analyzed using the SPSS software and an independent samples t-test was computed to compare the didactic versus CBL performance on the CCTST.	**Findings:** The mean CCTST total score for participants in the CBL program was higher than those in the lecture-based program and the CBL students performed better in all subscales of the test than the lecture-based program participants.
Kaddorura, M., & Williams, C. (2012). Comparison of generic accelerated nursing students. *Educational Research Quarterly*.	**Level:** III **Design:** Quasi-experimental, pretest-posttest	**Hypothesis:** There is a difference in the adjusted differences in mean scores of CT skills of generic accelerated baccalaureate nursing students educated by a case study pedagogical method from the pretest to posttest as measured by the HESI CT test.	**DV:** CT. **IV:** Case study teaching strategy.	None noted	**Sample/Setting:** 75 Second-year accelerated nursing students enrolled in a nursing fundamentals course at a college in the Northeast United States. **IC:** Second-year accelerated nursing students at the participating college, consent from study participants. **EC:** Students declining to participate.	Participants completed the HESI CT test before beginning and after completing the course. The principal researcher and research assistant used the SPSS software to analyze the data and a paired t-test was completed to determine if there was a significant different in student pretest and post-test CT mean scores.	**Findings:** The mean differences between the pre and posttest overall was 60.67 and was increased on all subscales. The analysis completed found this to be significant. These findings suggested that the results were likely due a systemic cause and with other co-variables eliminated, this cause would be the case studies teaching method.
Kong, L-N., Qin, B., Zhou, Y., Mou, S., & Gao, H-M. (2014). The effectiveness of problem-based learning on development of nursing students' critical thinking: A systematic review and meta-	**Level:** I **Design:** Systematic review with meta-analysis	**Hypothesis:** PBL will have a positive effect on nursing students' CT.	**DV:** CT **IV:** N/A	None noted	**Sample/Setting:** Study samples varied from 46 – 311 participants and were conducted internationally. The total number of participants was 985. **IC:** Articles describing RCT, included nursing students, used PBL as intervention and lecture as control, examined CT as an	Two reviewers assessed article eligibility and extracted data. Two other reviewers conducted the quality assessment with the Cochrane Collaboration's Risk of Bias Tool. Critical thinking scores were analyzed with a standardized mean different or weighted mean difference. Heterogeneity was assessed using the Cochran's Q statistic	**Findings:** The review and meta-analysis found evidence to support PBL use can improve nursing students CT but additional studies with high quality, larger sample size, randomization and use of a standardized measurement instrument for critical thinking are recommended.

analysis. *International Journal of Nursing Studies*.					outcome, reported the sample size, the mean difference and associated 95% CI of CT scores in intervention and control group. **EC:** Non-RCT, including non-nursing students, not using PBL, not evaluating CT, provided incomplete reporting data.	and I^2 statistic. Publication bias was assessed using a funnel plot and Egger's test of asymmetry. Measurement tools included: ATI CT test, Bloom's taxonomy of cognitive learning, CCTDI, CCTST, and WGCTA.	
Lyons, E. (2008). Examining the effects of problem-based learning and NCLEX-RN scores on the critical thinking skills of associate degree nursing students in a southeastern community college. *International Journal of Nursing Education Scholarship*.	**Level:** II **Design:** Randomized, pretest-posttest experimental	**Hypothesis & Question:** Not clearly stated. **Purpose:** Determine the effects of two teaching methods (PBL and lecture) on CT skills of fourth-semester students enrolled in an NCLEX-RN review course.	**DV:** CT, NCLEX-RN exam pass rates. **IV:** Teaching strategy (PBL or lectures).	None noted	**Sample/Setting:** 54 Fourth-semester nursing students enrolled in 17-week NCLEX-RN review course at a community college in the Southeast United States. **IC:** Fourth-semester nursing students at the participating college, consent from study participants. **EC:** Students declining to participate.	Participants in each group completed the ATI CT test before and following the course. Participants were either in a lecture-based or PBL course that received the same instructional content and NCLEX-RN review practice tests. Results were analyzed with ANCOVA, logistic regression and chi-square on the pre and post-treatment data. Forward logistic regression was used to determine if the teaching method and ATI scores were predictors of success on the NCLEX-RN exam. SSPS software was used to conduct the statistical analysis.	**Findings:** The ATI CT score rose from 65.5 to 68.9 in the lecture group and 64.4 to 67.9 in the PBL group, but these were found to be statistically insignificant changes. The lecture group had an 85% NCLEX-RN pass rate and the PBL group had a 93% pass rate, but the chi-square analysis found this to be not statistically insignificant. This means there was no difference between PBL and lecture in CT skill development or NCLEX-RN pass rates in the groups.

Tiwari, A., Lai, P., So, M., & Yuen, K. (2006). A comparison of the effects of problem-based learning and lecturing on the development of students' critical thinking. *Medical Education*.	**Level:** II **Design:** pretest-posttest RCT with qualitative interviews	**Hypothesis:** Not clearly stated. **Question:** Is there any difference in CT development between PBL and lecturing?	**DV:** CT. **IV:** Teaching strategy (PBL or lectures).	None noted	**Sample/Setting:** 79 Year-one undergraduate nursing students enrolled a university in Hong Kong. **IC:** Year-one nursing students at the participating college, consent from study participants. **EC:** Students declining to participate.	Participants completed the CCTDI on the first day of the course, at the end of the second semester, one year following the course, and two years following the course completion. Based on CCTDI pretest scores three categories of students were formed (positive inclination, ambivalence, and negative disposition) and 20% of students from each category were interviewed following each CCTDI examination. Results were analyzed with SAS software. Multivariate regression, 1-sample and 2-sample t-tests were used to compare CCTDI scores between groups.	**Findings:** The overall CCTDI and subscale scores were not significantly different at baseline for the groups. Compared with lecture students, PBL students showed greater improvement in overall CCTDI from the first to second time points (P = 0.0048) and first to third time points (P = 0.0090). Compared with lecture students, PBL students showed greater improvement in one or more CCTDI subscales in at each time point. These findings suggest that PBL is superior to lecture in the CT development of nursing students.
Yoo, M-S., & Park, H-R. (2015). Effects of case-based learning on communication skills, problem-solving ability, and learning motivation in nursing students. *Nursing & Health Sciences*.	**Level:** III **Design:** Quasi-experimental, pretest-posttest	**Hypothesis:** Students in the intervention group, who were receiving CBL, were expected to show improved communication skills, problem-solving ability, and learning motivation when compared to the control group receiving traditional LBL.	**DV:** Outcomes (communication, problem-solving, learning motivation). **IV:** Teaching strategy (CBL or LBL).	None noted	**Sample/Setting:** 143 undergraduate nursing students enrolled a health communication course of a nursing college in Suwon, Korea. **IC:** Students scheduled for the course at the participating college, consent from study participants. **EC:** Students declining to participate, students submitting incomplete form data.	Participants completed three validated questionnaires (Communication Assessment Tool, Problem-Solving Inventory, Instructional Material Motivation Scale) before beginning and after finishing the 28-hour course. SPSS software was used to analyze the data with descriptive statistics and a t-test being completed to compare differences in communication skills, problem-solving ability and learning motivation scores between the two groups.	**Findings:** No significant differences were found between the groups in communication, problem-solving and learning motivation during pretesting. Significant improvements were noted in the CBL group in all three categories at posttest whereas slight increases in communication and problem-solving were noted in the LBL group, and a decrease was noted in learning motivation.

Yu, D., Zhang, Y., Xu, Y., Wu, J., & Wang, C. (2013). Improvement in critical thinking dispositions of undergraduate nursing students through problem-based learning: a crossover-experimental study. *The Journal of Nursing Education.*	**Level:** II **Design:** pretest-posttest, randomized crossover experiment	**Hypothesis & Question:** Not clearly stated. **Purpose:** Examine the effect of PBL on the development of CT dispositions in nursing students using a crossover-experimental study to nursing students in China	**DV:** CT **IV:** Teaching strategy (PBL or LBL).	None noted	**Sample/Setting:** 76 Second-year undergraduate nursing students enrolled in the Medical-Surgical Nursing II of Shanghai Jiao tong University in China. **IC:** Students scheduled for the course at the participating college, consent from study participants. **EC:** Students declining to participate.	Participants completed the CTDI-CV before beginning and after the first and second learning processes. SPSS software was used to analyze the data with a paired t test used for comparing pretests and posttests. Analysis of variance (ANOVA) was used to control for the effects of the difference in pretest scores of the experimental and control groups posttest mean scores.	**Findings:** In group A, CT dispositions significantly improved after PBL (P = 0.032) with open-mindedness and inquisitiveness improving the most. In group B, CT dispositions did not improve after LBL but CT overall score and truth-seeking score improved significantly following PBL. These findings suggest that PLB improved CT dispositions in nursing students compared to LBL.
Yuan, H., Williams, B. A., & Fan, L. (2008). A systematic review of selected evidence on developing nursing students' critical thinking through problem-based learning. *Nurse Education Today*.	**Level:** I **Design:** Systematic review	**Hypothesis:** Not clearly stated. **Question(s):** What is the effect of PBL on nursing students' CT? Does the available evidence provide information for developing nursing students' CT through PBL?	**DV:** CT **IV:** N/A	None noted	**Sample/Setting:** Study samples varied from 24 – 257 participants and were conducted internationally. The total number of participants was 693. **IC:** Subjects in nursing educational programs, studies using PBL, literature in English or Chinese language. **EC:** Studies not using PBL.	Two independent reviewers assessed study eligibility, level of evidence and methodological quality. The quality of controlled trials was evaluated with the Jadad scale. The interrater coefficient of agreement was reported as 0.66 for the scale. CT measurement tools in the studies included: students' perceptions of the change in CT, CCTDI, and WGCTA.	**Findings:** The review could not provide sufficient high-quality evidence to report the effect of PBL on the CT of nursing students although students receiving PBL perceived that they developed stronger communication, CT, and problem-solving skills. Additional RCT studies with larger sample size and use of a standardized measurement instrument for CT are recommended.

Appendix C

Timeline, Outcomes, and Roles for Implementation Strategy

Lippitt's Change Phase	Date	Outcome	Accountable Role
Phases I, II and III	September 2016	• Present the stakeholder presentation at department faculty and curriculum change committee meetings. • Seek project volunteers for case study development and other faculty members to review finalized modules.	Change Agent (Graduate Student)
Phase IV and V	October 2016	• Change agent, content expert, and volunteers attend one-day workshop offered by the University's CITS department on flipped classrooms and team-based learning. • Change agent and content expert meet with case study developers to outline course content and draft case studies.	Change Agent Content Expert (Course Instructor) Faculty Volunteers
Phase V	November 2016	• Change agent and content expert meet with case study developers to make draft revisions. • Change agent and content expert meet with reviewers to discuss modules and make revisions based on reviewer feedback.	
Phase V	December 2016	• Present finalized PBL modules at department faculty and curriculum change committee meetings for approval. • Students in the current course cohort (LBL format) will complete the Psychiatric/Mental Health HESI Specialty Exam.	Change Agent Students and Course Instructor
Phase VI	Spring 2017 Semester	• Students will complete the PBL modules and following each module the students and instructor will complete an evaluation survey. • Students will complete the instructor-created examinations at the end of each unit and the Psychiatric/Mental Health HESI Specialty Exam at the end of the semester.	
Phase VII	September 2017	• The change agent will present project findings at the department faculty and curriculum change commitment meetings. Student and instructor survey results over the course of the semester will be reviewed along with the scores from the Psychiatric/Mental Health HESI Specialty Exam as compared to results from previous semesters. • The change agent will discuss the strengths and areas for improvement in the project and propose that other courses adopt a PBL format. The change agent will volunteer to serve as the project leader for the projects if approved. • CON administrative stakeholders will discuss the project findings and determine if other courses will use a PBL format.	Change Agent

Appendix D

Sample Lesson Plan: Schizoaffective Disorder (Day 1)

<table>
<tr><th>Objectives</th><th>Content</th><th>Methods</th><th>Allotted Time</th><th>Resources</th><th>Evaluation</th></tr>
<tr><td>Upon completion of the case study, students will be able to:</td><td>Introduction

The case study is distributed, and groups of four or five students are formed by the instructor with the roles of leader, reader, and scribe assigned. Students review the PBL instructions and student expectations. Groups will read the case study and begin Part I.</td><td rowspan="3">Problem-based case study with small group work followed by a facilitated class discussion.</td><td>10 minutes</td><td rowspan="3">Required:

Assigned course textbook, Psychiatric Nursing: Contemporary Practice (Boyd, 2015).

Assigned program textbook, NANDA International Nursing Diagnoses: Definition and Classification 2015 – 2017 (Herdman & Kamitsuru, 2014).

Chalkboard or dry-erase whiteboard for writing notes or bullet points from the class discussion.

Computer with internet access (one per group) for students to search additional sources to complete assignments.</td><td rowspan="3">Student and instructor evaluation survey administered after completion of PBL module on day two.

A multiple-choice, instructor created examination at the end of the unit (two case studies).

Psychiatric/Mental Health HESI Specialty Exam at the end of the semester.</td></tr>
<tr><td>Identify communication techniques that escalate and de-escalate anxious or agitated behavior.</td><td>Part I. Therapeutic Communication and Behavioral De-escalation

Groups will identify examples of non-therapeutic communication between the patient and the emergency department (ED) staff. They will identify therapeutic communication alternatives and present their findings as a class discussion.</td><td>30 minutes (15 minutes for group work, 15 minutes for class discussion)</td></tr>
<tr><td>Define seclusion and restraint and provide two examples of each.

Describe three alternative options to seclusion or restraint.

Apply the nursing process in the management of agitation, aggression, or violence in patients.</td><td>Part II. Anger, Aggression, and Safety Management

Groups will begin Part II by reading that the patient was restrained due to aggressive/assaultive behavior towards the ED staff and attempted elopement from the ED. Groups will define the concepts of seclusion and restraint including their indications and monitoring parameters. Each group will write a narrative nursing note detailing the event that led to the patient’s restraint, type of restraint, medications administered, assessment findings, and criteria for discontinuation. Groups will then debate as a class the need and choice of seclusion/restraint for this patient and present their nursing notes.</td><td>65 minutes (30 minutes for group work, 35 minutes for class discussion)</td></tr>
</table>

Objectives	Content	Methods	Allotted Time	Resources	Evaluation
	BREAK		10 minutes		
Formulate a nursing care plan for the patient in acute psychosis that addresses their immediate medical and psychiatric needs.	**Part III. Biological Assessment & Care Planning** Groups will begin Part III by reading the patient is sedated and has been released from restraints. Students will consider what diagnostic tests and treatments are likely to be ordered for this patient in the ED for medical clearance before psychiatric evaluation. Each group will create a nursing care plan with two relevant diagnoses for this acute period. Groups will then discuss their findings as a class and present their individual care plans.	Problem-based case study with small group work followed by a facilitated class discussion.	50 minutes (30 minutes for group work, 20 minutes for class discussion)	**Required:** Assigned course textbook, *Psychiatric Nursing: Contemporary Practice* (Boyd, 2015). Assigned program textbook, *NANDA International Nursing Diagnoses: Definition and Classification 2015 – 2017* (Herdman & Kamitsuru, 2014). Chalkboard or dry-erase whiteboard for writing notes or bullet points from the class discussion. Computer with internet access (one per group) for students to search additional sources to complete assignments.	Student and instructor evaluation survey administered after completion of PBL module on day two. A multiple-choice, instructor created examination at the end of the unit (two case studies). Psychiatric/Mental Health HESI Specialty Exam at the end of the semester.
	Conclusion Students will be asked to summarize major themes as a class and the instructor will allow students to ask questions as a follow-up to the lesson. The instructor will encourage students to assist each other to answer questions but provide guidance or clarification when needed.		15 minutes		

Sample Lesson Plan: Schizoaffective Disorder (Day 2)

<table>
<tr><th>Objectives</th><th>Content</th><th>Methods</th><th>Allotted Time</th><th>Resources</th><th>Evaluation</th></tr>
<tr><td>Upon completion of the case study, students will be able to:</td><td>Introduction

The case study is distributed, and groups of four or five students are formed by the instructor with the roles of leader, reader, and scribe assigned. Students review the PBL instructions and student expectations. Groups will read the case study and begin Part I.</td><td rowspan="4">Problem-based case study with small group work followed by a facilitated class discussion.</td><td>10 minutes</td><td rowspan="4">Required:

Assigned course textbook, Psychiatric Nursing: Contemporary Practice (Boyd, 2015).

Assigned program textbook, Davis's Drug Guide for Nurses (Vallerand & Sanoski, 2016).

Chalkboard or dry-erase whiteboard for writing notes or bullet points from the class discussion.

Computer with internet access (one per group) for students to search additional sources to complete assignments.

Optional:

Colored pencils, crayons or markers for creating a handout.</td><td rowspan="4">Student and instructor evaluation survey administered after completion of PBL module on day two.

A multiple-choice, instructor created examination at the end of the unit (two case studies).

Psychiatric/Mental Health HESI Specialty Exam at the end of the semester.</td></tr>
<tr><td>Describe the key symptoms of the following disorders while comparing their similarities and differences:

bipolar-I disorder, delusional disorder, psychotic disorder, schizoaffective disorder, and schizophrenia.</td><td>Part I. Differential Diagnosis (Schizophrenia, Bipolar Disorder, Psychotic Disorders)

Groups will be assigned to research one of the differential diagnoses (bipolar I disorder, delusional disorder, psychotic disorder, schizoaffective disorder, schizophrenia) and explain its features in a way that is appropriate for patients/family members. Groups present their assigned diagnosis to the class and diagnoses are compared.</td><td>40 minutes (15 minutes for group work, 25 minutes for class discussion)</td></tr>
<tr><td>Differentiate the difference between voluntary and involuntary treatment.

Identify the different mental health treatment settings and programs along the continuum of care from least restrictive to most restrictive.</td><td>Part II. Community Healthcare Services

Groups will begin Part II by reading that the patient will be involuntarily hospitalized by the psychiatrist. Groups will review the criteria for involuntary admission and discuss alternative level of care treatment options. Groups will then debate as a class the different treatment options available in the community and their appropriateness for this patient as well as if the patient met the criteria for involuntary inpatient hospitalization.</td><td>30 minutes (15 minutes for group work, 15 minutes for class discussion)</td></tr>
<tr><td></td><td>BREAK</td><td></td><td>10 minutes</td><td></td><td></td></tr>
</table>

Objectives	Content	Methods	Allotted Time	Resources	Evaluation
Identify ethical frameworks used in psychiatric nursing practice. Discuss the legal protection of patient's rights when receiving mental health service including competency and informed consent.	**Part III. Ethical Considerations and Patient Rights** Groups will begin Part III by reading that the patient's family has asked the treatment team to administer antipsychotic medications to the patient without her consent because they believe it is in the patient's best interest. Each group will deliberate the ethical and legal concerns of this request and determine if they would honor the request. Groups will then defend their decision and determine how to communicate this to the patient's family as a class.	Problem-based case study with small group work followed by a facilitated class discussion.	30 minutes (15 minutes for group work, 15 minutes for class discussion)	**Required:** Assigned course textbook, *Psychiatric Nursing: Contemporary Practice* (Boyd, 2015). Assigned program textbook, *Davis's Drug Guide for Nurses* (Vallerand & Sanoski, 2016). Chalkboard or dry-erase whiteboard for writing notes or bullet points from the class discussion. Computer with internet access (one per group) for students to search additional sources to complete assignments. **Optional:** Colored pencils, crayons or markers for creating a handout.	Student and instructor evaluation survey administered after completion of PBL module on day two. A multiple-choice, instructor created examination at the end of the unit (two case studies). Psychiatric/Mental Health HESI Specialty Exam at the end of the semester.
Explain the major categories of psychotropic medications (antipsychotics and mood stabilizers) used in treating bipolar, psychotic, and schizophrenia disorders.	**Part IV. Psychopharmacology (Antipsychotics and Mood Stabilizers)** Groups will begin Part IV by reading that the patient has been non-adherent with medications because of side effects she has experienced when taking antipsychotic and mood stabilizer medications in the past. Each group will be assigned to research a specific antipsychotic or mood stabilizer drug and create a handout that includes information about the medication name, therapeutic class, indications, common side effects, and nursing considerations. Groups will present their assigned medication to the class.		40 minutes (20 minutes for group work, 25 minutes for class discussion)		
	Conclusion Students will be asked to summarize major themes as a class, and the instructor will allow students to ask questions as a follow-up to the lesson. The instructor will encourage students to assist each other to answer questions but provide guidance or clarification when needed.		15 minutes		

Appendix E

Case Study Prompt

Psychiatric/Mental Health Nursing

Case Study: Schizoaffective Disorder (Day 1)

Background: Janie is a 27-year-old Caucasian female in the emergency department (ED) after being found by police wandering on the highway and reporting that she was walking to Washington D.C. to meet with the President of the United States. Upon arrival, the patient appears disheveled, dehydrated, and has numerous small abrasions on her skin due to environmental exposure. The patient appears agitated and has requesting to leave the ED multiple times. For this exercise, you will be assuming the role of the ED nurse directly caring for the patient.

Part I: The ED nursing assistant (NA) has told Janie that it is department policy to change into a hospital gown and secure her belongings in a locker. Janie's gaze is frequently shifting and does not appear to be listening to the NA. When the NA attempts to help remove Janie's shirt Janie pushes the NA away and says "I can't stay here I need to go now! I have a meeting with the president." Janie then attempts to run out of the room and the NA calls for ED security to escort Janie back into the room. Janie starts pacing in the room and yells "I need to go! All of the children are counting on me!" The ED staff gather by the room and tell Janie that she "needs to say in the room or we will have to tie you down."

- Identify examples of non-therapeutic communication (verbal and non-verbal) between the ED staff and the patient. Discuss in your groups what therapeutic alternative

communication strategies could have been used in this case.

Part II: When Janie is told that she cannot leave the ED she attempts to push past the staff at the door to elope. Subsequently, Janie is placed in 4-point leather limb restraints due to "aggressive/assaultive behavior towards staff and attempted elopement from the ED" and receives 5 MG Haldol (haloperidol), IM and 2 MG Ativan (lorazepam), IM.

- Define the concepts of seclusion and restraint including their indications and monitoring parameters. Each group will write a narrative nursing note detailing the event that led to the patient's restraint, type of restraint, medications administered, assessment findings, and criteria for discontinuation.

Part III: Within an hour Janie has been assessed as no longer at risk of harming others or eloping and is released from the restraints although she remains lethargic from the medications she received. You can now perform the necessary diagnostic testing and treatments for medical clearance before having Janie evaluated by the nurse case manager and psychiatrist.

- Discuss in your groups what diagnostic testing and treatments are likely to be necessary for this patient. Create a nursing care plan for the patient in the ED setting; include two nursing diagnoses that address acute concerns for the patient at this time.

Psychiatric/Mental Health Nursing

Case Study: Schizoaffective Disorder (Day 2)

Background: Janie is a 27-year-old female in the emergency department (ED) after being found by police wandering on the highway with disorganized, delusional thinking. Six hours ago she was physically restrained and administered psychotropic medications after attempting to elope from the ED. Janie's parents (with whom she lives) have arrived from their home and are speaking with the nurse case manager and psychiatrist. For this exercise, you will be assuming the role of the nurse case manager evaluating the patient.

Part I: Janie's parents report a history similar behavior in the past since Janie's first psychotic break at age 24. Based on the history of her present illness and the review of her psychiatric records the diagnosis of *schizoaffective disorder, bipolar type* is assigned. Janie's father is confused and frustrated because previous providers have diagnosed Janie with bipolar-I disorder, delusional disorder, psychotic disorder, and schizophrenia.

- Your group will be assigned one of the featured diagnoses; you will research the diagnosis and present your findings to the class. Present the diagnostic criteria, etiology, and basic epidemiology data in a way that a patient's family could understand.

Part II: The psychiatrist plans to admit Janie to the inpatient mental health unit for further treatment based on her presenting behavior in the ED, current evaluation, and collaborating information from her parents. Janie calmly continues to deny the need for psychiatric treatment and asserts that she should be discharged so that she can resume her journey. Based on this information the psychiatrist assigns her disposition as involuntarily admission to the inpatient

mental health unit.

- Review the criteria for involuntary admission and discuss the alternative level of care treatment options. The class will debate the appropriateness of the different treatment options available in the community for this patient and if she met the criteria for involuntary inpatient hospitalization.

Part III: Janie's mother asks you privately if the nursing staff can administer Janie's medications even if she refuses them. She reports that in the past she has hidden Janie's medications in her food "just for a few days until she remembers that she needs them." Janie's mother says "She will never take the meds on her own when she's this way. We are her family and we love her, she will understand once her head is clear".

- Deliberate the ethical and legal concerns of this request as a group and determine if you would honor the request. Groups will then defend their decision to the class and discuss how to communicate this to the patient's family.

Part IV: When talking with Janie she explains that she is medication non-adherent because of numerous side effects she has experienced when taking antipsychotic and mood stabilizer medications in the past. You explain to Janie that when she is admitted, she can meet with the psychiatrist and a pharmacist to discuss her treatment history and work together to come up with a treatment plan.

- Your group will be assigned to research a specific antipsychotic or mood stabilizer drug and create a handout that includes information about the medication name, therapeutic class, indications, common side effects, and nursing considerations. Groups will then present their handout to the class and copies will be made for future studying.

Appendix F

PBL Module Instructions with Student and Facilitator Expectations

Psychiatric/Mental Health Nursing

Problem-Based Learning (PBL) Modules – Expectations and Instructions

Expectations

- Students will come to class prepared to participate in the activity. Preparation means coming to class on time with assigned reading completed and necessary course materials.
- Facilitators will maintain a professional classroom environment with respectful communication and behavior. Students are expected to discuss ideas and engage in civil debate as a part of the learning process.

Instructions

- For each session, students will be assigned to a four or five member group by the facilitator and will be in the roles of group leader, reader, and scribe. Students will function in each of the roles and work with different peers throughout the course.
- The facilitator will distribute the case and groups begin after reading the background information. Before moving onto the next part of a module the class will have a discussion to review the work of each group and identify key concepts.
- In PBL the instructor is a facilitator, meaning that they help guide students in seeking answers to questions using available resources and meet learning objectives through group discussions. Facilitators can encourage deeper learning with clarifying, critical questions but should limit supplying students with direct answers to questions.
- Modules are clinical cases with problems that may have multiple correct solutions.

Appendix G

Timeline, Outcomes, and Roles for Evaluation Method

Date	Outcome	Accountable Role
December 2016	• Students in the current cohort (LBL format) will complete the Psychiatric/Mental Health HESI Specialty Exam.	Change Agent (Graduate Student) Students and Course Instructor
Spring 2017 Semester	• Students will complete the PBL modules and following each module the students and course instructor will complete the electronic evaluation survey on SurveyMonkey. • The change agent will review feedback from student and instructor surveys and will discuss findings with the course instructor and CON administration to address any immediate concerns and use in future course improvement. • Students will complete the instructor-created exams at the end of each unit and the Psychiatric/Mental Health HESI Specialty Exam at the end of the semester.	
Summer 2017	• The change agent will analyze the evaluation data from the Spring 2017 group and prepare the presentation for stakeholders in September 2017.	Change Agent
September 2017	• The change agent will present project findings at the department faculty and curriculum change commitment meetings. Student and course instructor survey results over the course of the semester will be reviewed along with the scores from the Psychiatric/Mental Health HESI Specialty Exam as compared to results from previous semesters. • The change agent will discuss the strengths and areas for improvement in the project and propose that other courses adopt a PBL format. The change agent will volunteer to serve as the project leader for those projects if approved. • CON administrative stakeholders will appraise the project findings and determine if other courses will convert to a PBL format.	Change Agent CON Administration

Appendix H

Post-Module Instructor and Student Evaluation Surveys

NUR 340: Problem-Based Learning Module Survey

Facilitator/Instructor Survey

* 1. *How well did your facilitation/instruction promote active, collaborative learning among students?*

- Extremely well
- Very well
- Somewhat well
- Not so well
- Not at all well

* 2. *How well did your facilitation/instruction encourage students to be autonomous, self-directed learners?*

- Extremely well
- Very well
- Somewhat well
- Not so well
- Not at all well

* 3. *How helpful did you find this module in developing the students' understanding of the material?*

- Extremely helpful
- Very helpful
- Somewhat helpful
- Not so helpful
- Not at all helpful

* 4. *How well prepared do you feel students are for further testing on the content of this module after participating in the activity?*

- Extremely well
- Very well
- Somewhat well
- No so well
- Not at all well

* 5. *How do you feel the communication skills of students have been impacted by participating in this module?*

- Significantly improved
- Somewhat improved
- No impact
- Somewhat worsened
- Significantly worsened

* 6. *How do you feel the critical thinking skills of students been impacted by participating in this module?*

- Significantly improved
- Somewhat improved
- No impact
- Somewhat worsened
- Significantly worsened

* 7. *Compared to lecture-based courses you have taught previously, how effective do you feel this problem-based learning (PBL) module was at meeting the learning needs of students?*

- Much more effective
- Somewhat more effective
- About as effective
- Somewhat less effective
- Much less effective

* 8. *Compared to lecture-based courses you have taught previously, how effective do you feel this problem-based learning (PBL) module was at improving the critical thinking skills of students?*

- Much more effective
- Somewhat more effective
- About as effective
- Somewhat less effective
- Much less effective

* 9. How interested would you be in teaching another course using the problem-based learning (PBL) format?

- Extremely interested
- Very interested
- Moderately interested
- Slightly interested
- Not at all interested

* 10. *What did you like about using this teaching method? What did you dislike about using this teaching method?*

11. *Do you have any other questions, comments, concerns, or suggestions?*

NUR 340: Problem-Based Learning Module Survey

Student Survey

* 1. *How well did your facilitator/instructor promote active, collaborative learning among students?*

- Extremely well
- Very well
- Somewhat well
- Not so well
- Not at all well

* 2. *How well did your facilitator/instructor encourage autonomous, self-directed learning among students?*

- Extremely well
- Very well
- Somewhat well
- Not so well
- Not at all well

* 3. *How helpful was this module in developing your understanding of the material?*

- Extremely helpful
- Very helpful
- Somewhat helpful
- Not so helpful
- Not at all helpful

* 4. *How well prepared do you feel for further testing on the content of this module after participating in the activity?*

- Extremely well
- Very well
- Somewhat well
- No so well
- Not at all well

* 5. *How have your communication skills been impacted by participating in this module?*

- Significantly improved
- Somewhat improved
- No impact
- Somewhat worsened
- Significantly worsened

* 6. *How have your critical thinking skills been impacted by participating in this module?*

- Significantly improved
- Somewhat improved
- No impact
- Somewhat worsened
- Significantly worsened