Walden Dissertations and Doctoral Studies

2019

Effects of High-Fidelity Simulation on the Critical Thinking Skills of Baccalaureate Nursing Students

Janine Roth Blakeslee
Walden University

Walden University

College of Education

This is to certify that the doctoral study by

Janine Blakeslee

has been found to be complete and satisfactory in all respects,
and that any and all revisions required by
the review committee have been made.

Review Committee
Dr. Sheilia Goodwin, Committee Chairperson, Education Faculty
Dr. Barbara Lopez Avila, Committee Member, Education Faculty
Dr. Markus Berndt, University Reviewer, Education Faculty

Chief Academic Officer
Eric Riedel, Ph.D.

Walden University
2019

Effects of High-Fidelity Simulation on the Critical Thinking Skills

of Baccalaureate Nursing Students

by

Janine R. Blakeslee

MSN, Michigan State University, 2009

RN, Grand Rapids Community College, 2001

BS, Ferris State University, 1986

Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Education

Walden University

February 2019

Abstract

This project study addressed the decline in successful passing rates for the National Licensure Exam for Registered Nurses (NCLEX-RN) in a nursing program at a private university in the Midwestern United States. There is support from the literature for a connection between critical thinking skills of nursing students and successful passing of the NCLEX-RN. The purpose of this quantitative study was to examine whether significant differences existed in mean critical thinking skill scores across time within groups (pretest to posttest) and between groups (simulation versus written case studies), as measured by the Health Science Reasoning Test. Cognitive learning theory as interpreted by Ausubel along with the Paul Elder critical thinking model comprised the frameworks for this study. In a quantitative causal-comparative pretest/posttest design, baccalaureate junior nursing students ($N = 69$) were investigated. A repeated measures mixed analysis of variance indicated there was no statistically significant difference in participants' mean critical thinking scores across time within groups (pretest to posttest) or between a simulation group ($n = 36$) and a written case studies comparison group ($n = 33$). The use of high-fidelity simulation as a teaching strategy versus written case studies to increase critical thinking skills of nursing students was not supported. The resulting project deliverable is a skills-development workshop for nursing faculty that would focus on multiple methods (as opposed to one method) of evidence-based teaching strategies that have been shown to increase critical thinking of nursing students. This study promotes positive social change by examining factors that can strengthen critical thinking in nurses. Factors associated with critical thinking can be addressed in training for nurses to enhance patient safety and outcomes.

Effects of High-Fidelity Simulation on the Critical Thinking Skills

of Baccalaureate Nursing Students

by

Janine R. Blakeslee

MSN, Michigan State University, 2009

RN, Grand Rapids Community College, 2001

BS, Ferris State University, 1986

Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Education

Walden University

February 2019

Acknowledgments

I first want to thank my parents who always encouraged education in their children. I grew up in a community where continued education after high school was not always the chosen path, but my parents had a larger vision. As I later became a Registered Nurse, got my Master's in Nursing Education, and now my Doctorate in Education, they have stood proudly at each step along my path.

Next, I want to thank my associate department chair, friend, and prayer partner, Debbie, who has supported me along this journey with continued words of encouragement. She was always a listening ear and my biggest cheerleader. I admire her wisdom and integrity, but I most appreciate her always being a role model of keeping the focus on God instead of ourselves.

Lastly, I thank my husband, Ken, who throughout our marriage has fully supported my decision each and every time I would say "I think I am going back to school again." This doctorate degree has been my most challenging endeavor, yet he continued to offer patience and understanding every single day. Ken places a high priority on seeing a commitment through to the end and was my consistent encourager to do the same during this process. His ability to find humor in any situation coupled with his abundant love for me makes every day worth it. I thank and love him from the bottom of my heart.

Table of Contents

List of Tables

List of Figures

Section 1: The Problem

The Local Problem

In this doctoral study, I examined a gap in practice at a private university in the Midwestern United States, which offers a four-year Bachelor of Science in Nursing (BSN) program. One of the variables in this study was critical thinking which has been identified as one of the standards for nursing school accreditation (National League for Nursing, 2016) and a long-standing outcome of nursing education and nursing practice (Burbach, Barnason, & Thompson, 2015). Despite these expectations, Del Bueno (2005) found that 70% of new and experienced nurses did not meet requirements in critical thinking.

The interim department chair at the local setting stated that the timing of this study was pivotal because a downward trend had been noticed in recent years with declines in first-time pass rates on the National Licensure Exam for Registered Nurses (NCLEX-RN) for new nursing students. Several researchers have demonstrated a relationship between critical thinking and NCLEX-RN pass rates (Frye, Alfred, & Campbell, 1999; Hoffman, 2006; Kaddoura, VanDyke, & Yang, 2017, Morris, 1999; Romeo, 2013; Wacks, 2005). Students who scored high on critical thinking as measured by the California Critical Thinking Skills Test (CCTST) also passed the NCLEX-RN (Giddens & Gloeckner, 2005). In response to these findings, faculty and administrator discussions at the local setting identified that increasing critical thinking of nursing students is a priority for this nursing program.

High-fidelity simulation is one method currently used by nursing programs to increase critical thinking in nursing students (Blevins, 2014; Goodstone et al., 2013). Evidence from research studies has demonstrated a link between simulation and critical thinking (Lee & Oh, 2015; Lewis, Strachan, & Smith, 2012). The local setting uses simulation in the junior and senior years for each student. The identified gap in practice is that despite simulation being used throughout the curriculum and the importance of assessment in education (Lee & Oh, 2015; Lewis et al., 2012), the associate dean of nursing stated there had been no evaluation of the impact of simulation on critical thinking in nursing students in the local setting. This research study was the first one at the local setting to examine high-fidelity simulation and its relationship to the critical thinking skills of its nursing students.

Rationale

Critical thinking was chosen as a variable to study because of its great significance to nursing and a national study in which researchers found 70% of new and experienced nurses did not meet requirements in critical thinking (Del Bueno, 2005; Weatherspoon et al., 2015). In addition, several studies have demonstrated a relationship between critical thinking and NCLEX-RN pass rates (Frye et al., 1999; Hoffman, 2006; Kaddoura et al., 2017; Morris, 1999; Romeo, 2013; Wacks, 2005). Students who scored high on critical thinking as measured by the CCTST also passed the NCLEX-RN (Giddens & Gloeckner, 2005). This fact is important because at the local setting, there have been declines in first-time pass rates on the NCLEX-RN as depicted in Table 1.

Fewer licensed nurses means fewer practicing nurses in a time of critical nursing shortage (Jung, Lee, Kang, & Kim, 2017; Snavely, 2016).

Table 1

NCLEX-RN First-time Pass Rates Percentages (2012-2015)

Year	National Average	State Average	Campus A	Campus B	Campus C
2012	90	91	96	72	86
2013	83	87	90	73	**
2014	81	83	96	**	75
2015	83	83	93	80	87

Note. ** Denotes no graduating class.

In addition, a large percentage of students were scoring below the benchmark on a standardized exit exam which was first administered in 2013 (Table 2). This standardized exit exam is given to all seniors and is nationally recognized as a predictor of NCLEX-RN success (Lauer & Yoho, 2013; Zweighaft, 2013). This standardized exit exam also contains composite scores for critical thinking which are noted to be below the recommended standard. In response to these findings, faculty and administrator discussions at the local setting identified that increasing critical thinking of nursing students is a priority for this nursing program.

Table 2

Mean Scores from Standardized Exit Exam Given to Senior Nursing Students (2013-2015)

Year	Benchmark	National Average	Campus A	Campus B	Campus C	Percentage Below Benchmark
2013	850	846	844	789	**	61%
2014	850	853	793	**	805	73%
2015	850	845	821	767	744	76%

Note. ** Denotes no graduating class

It is recognized that simulation is not the only variable or teaching strategy available to potentially increase critical thinking skills of nursing students. Researchers have shown that problem-based learning (Gholami et al., 2016; Kong, Qin, Zhou, Mou, & Gao, 2014; Orique & McCarthy, 2015), concept mapping (Burrell, 2014; Lin, Han, Pan, & Chen, 2015; Orique & McCarthy, 2015; Yue, Zhang, Zhang, & Jin, 2017), and reflective journaling (Naber, Hall, & Schadler, 2014; Naber & Wyatt, 2014; Padden-Denmead, Scaffidi, Kerley, & Farside, 2016; Zori, 2016) all have shown a positive impact to increase critical thinking skills.

Simulation is one variable, however, that has consistently been a part of the curriculum since the program's inception in 2006. Because of this consistency, simulation was a variable that was feasible for me to study and gain valuable information. The purpose of this causal-comparative study was to determine if there was a difference in mean critical thinking scores between a group who received the teaching strategy of high-fidelity simulation versus a comparison group who received the teaching strategy of written case studies, as measured by the Health Science Reasoning Test (HSRT). The HSRT was adapted from the generic CCTST to measure critical thinking skills for

educational research projects in health science settings. The results of this study have the capacity to initiate positive changes in the nursing program and improve student outcomes at the local level.

Definition of Terms

BSN nursing curriculum: The curriculum in a BSN program has nine expected student outcomes as set forth by the American Association of Colleges of Nursing (AACN). They include (a) a liberal education including the sciences and arts; (b) knowledge and skills in leadership, quality improvement, and patient safety; (c) scholarship for evidence-based practice; (d) information management and application of patient care technology; (e) basic knowledge of health care policy, finance, and regulatory environments; (f) interprofessional communication and collaboration for improving patient health outcomes; (g) health promotion, disease, and injury prevention at the individual and population level; (h) demonstrate professionalism in attitudes, values, and behaviors; and (i) practice with patients, families, groups, communities, and populations across the lifespan (AACN, 2008).

BSN program: There are currently three tracks for prelicensure entry into the profession of nursing which include (a) Associate Degree in Nursing which typically takes two years, (b) Diploma in Nursing, and (c) BSN which is a four-year degree (Fisher, 2014). Associate Degree programs are primarily offered in community colleges. BSN programs are offered primarily in a university setting and are considered an entry point into graduate education. The BSN program provides focus on leadership,

translating research for nursing practice, along with a wide variety of patient populations (Robert Wood Johnson Foundation, 2010).

Critical thinking: The ability to reason, deduce, and induce, based on current research and practice findings (Carvalho et al., 2017). Facione (2015) posited six core critical thinking skills of interpretation, analysis, evaluation, inference, explanation, and self-regulation.

High-fidelity simulation: High-fidelity is simulation that incorporates a full-body manikin that can be programmed to provide realistic physiological responses to student actions (Przybyl, Androwich, & Evans, 2015). Some studies have also referred to high-fidelity simulation as human patient simulation (Shelestak, Meyers, Jarzembak, & Bradley, 2015). High-fidelity simulation, as described by Lee and Oh (2015), currently offers the highest level of realism with regard to decision making and patient interaction.

Low-fidelity simulation: Provides anatomical representation such as a cardiopulmonary resuscitation (CPR) torso, an intravenous arm, or a static mannequin (Przybyl et al., 2015; Tosterud, Hedelin, & Hall-Lord, 2013).

Medium-fidelity simulation: Medium fidelity is full scale and can be used to support both task training and clinical scenarios. These mannequins have palpable pulses, blood pressure, breath, bowel sounds, and fetal heart tones. The mannequins lack chest movement and functional eyes. The functionality is more limited as they are not programmed to respond to interventions to the extent of high-fidelity mannequins (Griffiths, 2018).

National Licensure Exam for Registered Nurses: A proctored computerized test given to graduate nurses in all 50 states to measure their entry level knowledge and skills. The graduate nurse must pass the exam in order to bear the title of "Registered Nurse" and practice as a licensed nurse (Romeo, 2013).

Nurse: A contemporary definition of a nurse is one who is poised to help bridge the gap between coverage and access, to coordinate increasing complex care for a wide range of patients, to fulfill their potential as health care providers to the full extent of their education and training, and to enable the full economic value of their contributions across different practice settings (Aroke, 2014).

Nurse educator: Persons in academia who serve as instructors, researchers, and have experience in a clinical specialty area. Nurse educators also need pedagogical experience in curriculum development, teaching strategies, and evaluation methods (Booth, Emerson, Hackney, & Souter, 2016). Patterson and Krouse (2015) identified core competencies for nurse educators which included (a) articulate and promote a vision for nursing education, (b) function as a steward for the organization and nursing education, (c) embrace professional values in the context of higher education, and (d) develop and nurture relationships.

Nursing student: A student who is currently receiving educational training to be a nurse (Aroke, 2014).

Patient: The recipient of nursing care of services. In some patients are referred to as clients, consumers, or customers of nursing services. Patients can be individuals, families, groups, communities, or populations. Patients may function in independent,

interdependent, or dependent roles, and may receive nursing interventions related to disease prevention, health promotion, health maintenance, illness, and end-of-life care (AACN, 2008).

Simulation: A person, device, or set of conditions which attempts to present education and evaluation problems authentically (Przybyl et al., 2015). In nursing, simulation can be defined as an event or situation made to resemble clinical practices as closely as possible (Jensen, 2013). Fidelity in simulation is defined as the degree to which the simulator replicates reality. The various modalities of simulation include high-fidelity, medium-fidelity, low-fidelity, and virtual simulation.

Standardized exit exam: A standardized computerized test can be given to nursing students at the end of their academic education and prior to sitting for the NCLEX-RN. Research has indicated that some exit exams are a valid predictor of NCLEX-RN success. Some nursing curriculums establish a benchmark for that exam and it that score is not achieved the student must complete remediation and take a second version of the exit exam (Lauer & Yoho, 2013; Young, Rose, & Willson, 2013).

Virtual simulation: Virtual or screen-based computer simulation uses web programs or computer-assisted instructional programs where learners interact with a computerized environment, and clinical decisions are made with resulting actions (Blevins, 2014).

Written case studies: A teaching strategy delivered in a paper and pencil format with a written scenario and then questions to follow. The questions promote higher-level

thinking by challenging the learner to apply, analyze, and evaluate a variety of information about a patient scenario (Bowman, 2017).

Significance of the Study

Nursing programs have a responsibility to bridge the gap between education and practice (Cazzell & Anderson, 2016). Nurse educators are expected to produce innovative strategies that facilitate critical thinking skills for their students (Adib-Hajbaghery & Sharifi, 2017; Jones, 2017). The Nursing Executive Center (2008) identified a gap in knowledge between academic preparation and practice, with critical thinking being identified as a top priority. Del Bueno (2005) found that 70% of new and experienced nurses did not meet expectations in critical thinking.

The skill ability for a nursing student to critically think remains a continued topic of conversation among faculty and with students. Although there is the assumption that simulation will build the critical thinking skills of nursing students, the associate dean of nursing at the local setting stated there was no current evidence-based research to support this assumption in the local setting. This study was the first one at the local setting to examine high-fidelity simulation and its relationship to critical thinking skills of nursing students. This study held great significance to fill the current gap in practice that despite simulation being used throughout the curriculum, and the importance of assessment in education, especially in regard to accreditation, there had been no evaluation of the impact of simulation on critical thinking in nursing students in the local setting.

The evidence obtained from this study will directly benefit future nursing students in the local setting. One significant benefit for nursing students to have high critical

thinking scores is in preparation for successful passing of the NCLEX-RN (Trofino, 2013). There is evidence that critical thinking skills are a significant predictor of first-time NCLEX-RN pass rates (Kaddoura et al., 2017; Romeo, 2013). A nurse who has strong critical thinking skills has the potential to impact social change by directly improving patient safety and enhancing patient outcomes (Carvalho et al., 2017; Kaddoura, 2013; Paul, 2014; VonCollin-Appling & Giuliano, 2017). Based on the evidence from this study, faculty development could be implemented to maximize known teaching strategies which increase critical thinking skills in nursing students.

Research Question and Hypotheses

The purpose of this causal-comparative study was to determine if there was a difference in mean critical thinking scores between a group who received the teaching strategy of high-fidelity simulation versus a comparison group who received the teaching strategy of written case studies, as measured by the HSRT.

Research Question: For nursing students in a traditional 4-year Bachelor of Science in Nursing program, is there a statistically significant difference in participants' mean critical thinking scores across time within groups (pretest to posttest) and between groups (simulation versus written case studies) as measured by the HSRT?

Null hypothesis: There is no statistically significant difference in participants' mean critical thinking scores across time within groups (pretest to posttest) and between groups (simulation versus written case studies), as measured by the HSRT.

Alternative hypothesis: There is a statistically significant difference in participants' mean critical thinking scores across time within groups (pretest to posttest) and between groups (simulation versus written case studies), as measured by the HSRT.

Review of the Literature

This review of literature examined the broader problem with regard to the teaching strategy of simulation and its association to critical thinking of the nursing student. The theoretical framework which serves as the foundation of this study is first reviewed. Various components of the identified problem are then compared, contrasted, and synthesized to provide a clear picture of the current research. Searches were conducted in nursing and education databases. The following databases were searched at the Walden University Library and included Education Source, Education Research Complete, ERIC, Teacher Reference Center, CINAHL Plus with Full Text, Proquest Nursing and Allied Health Source. Each database was searched for scholarly, peer-reviewed articles. The majority of studies cited in this project study are current within the past five years. There are a limited number of seminal articles which were cited as appropriate. Key words for the database searches included critical thinking, simulation, high-fidelity simulation, nurse, nursing student, college, university, critical thinking theory, critical thinking framework, and cognitive learning theory.

Theoretical Foundation

An educational theory, as described by Merriam, Caffarella, and Baumgartner (2007) is a set of inter-related concepts that provide an explanatory framework and a guide for future directions. The roots of this study are based on cognitive learning theory

which focuses on the development of critical thinking, thought processes, and how individuals learn (McLeod, 2015). As I explored the different theorists who have pioneered this facet of learning, it was the work of Ausubel who best aligned with my research question. Though influenced by Piaget, it was Ausubel who distinguished between meaningful learning and rote learning (Ausubel, 1962). While rote learning is memorization, meaningful learning takes place when it can be related to concepts that already exist in a person's cognitive structure (Ausubel, 1962; Lawton, Saunders, & Muhs, 1980). To develop critical thinking skills in nursing students, rote memorization would be insufficient. As applied to my research study, higher-order meaningful learning (critical thinking) can be developed by using classroom theory and then applying the concepts through a teaching strategy such as high-fidelity simulation where nursing students can act and react to a variety of real-life patient scenarios.

Building on cognitive learning theory framework was the work of Richard Paul and Linda Elder who developed the Paul-Elder Critical Thinking Model (Figure 1). This framework posits three components:

- Elements of reasoning (thought);
- Intellectual standards that should be applied to the elements of reasoning (thought);
- Intellectual traits, skills, or dispositions developed by elements of reasoning (Paul & Elder, 2014).

**Critical Thinkers Routinely
Apply Intellectual Standards
To The Elements Of Reasoning In
Order To Develop Intellectual Traits**

THE STANDARDS

Clarity	Precision
Accuracy	Significance
Relevance	Completeness
Logicalness	Fairness
Breadth	Depth

Must be applied to

THE ELEMENTS

Purposes	Inferences
Questions	Concepts
Points of view	Implications
Information	Assumptions

As we learn to develop

INTELLECTUAL TRAITS

Intellectual Humility	Intellectual Perseverance
Intellectual Autonomy	Confidence in Reason
Intellectual Integrity	Intellectual Empathy
Intellectual Courage	Fairmindedness

Figure 1. Paul-Elder critical thinking model. Adapted from "The Miniature Guide to Critical Thinking Concepts and Tools," by R. Paul and L. Elder, 2014, *The Foundation for Critical Thinking*, p. 19. Copyright 2014 by the Foundation for Critical Thinking Press. Reprinted with permission.

The purpose of my causal-comparative study was to determine if there was a difference in mean critical thinking scores between a group who received the teaching strategy of high-fidelity simulation versus a comparison group who received the teaching strategy of written case studies. As one examines the Paul-Elder Critical Thinking Model, the eight elements of reasoning become paramount in developing critical thinking skills and traits. To develop good reasoning, students must identify a purpose or reason to achieve an objective. Next, students must identify questions that need to be answered or a problem that needs to be solved. They must be made aware of the data, facts, observations, and information available to them to solve the problem effectively.

Students should then make appropriate interpretations and inferences to draw conclusions and give meaning to data. They should identify theories, principles, and rules. They should be able to identify and articulate implications and consequences. Finally, students should be able to clearly state their points of view (Naber et al., 2014; Naber & Wyatt, 2014; Paul & Elder, 2014). High-fidelity simulation will be used as the catalyst to take these elements of reasoning (thought) and develop the intellectual dispositions or skills which in my research study will be measured using the HSRT.

Review of the Broader Problem

    Critical thinking. Although this term was briefly defined in a previous section, it warrants greater examination because of its significance to the research study. Critical thinking is not a new concept, but it is one with different meanings to different people and applications. The concept of critical thinking has roots dating back to Socrates who educated students on the principles of thinking through questioning and how answers lead to deeper thought that could be applied to new situations. Martin Luther King, Jr. spoke of using critical thinking in the education of American's youth and the importance of incorporating critical thinking into school curriculums (VonCollin-Appling & Giuliano, 2017).

    Goodstone et al. (2013) defined critical thinking as an interactive reflective reasoning process of making a judgment about what to believe or do. Further it develops over time, requiring the learner to integrate both theoretical knowledge and clinical experience. Facione (2015) posited six core critical thinking skills of interpretation, analysis, evaluation, inference, explanation, and self-regulation (Figure 2). The middle

core is helpful in depicting how those six different skills all intertwine to promote

purposeful reflective judgment.

Figure 2. Core critical thinking skills. Adapted from "Critical Thinking: What it is and Why it Counts," by P.A. Facione, 2015, *Insight Assessment*, p. 5. Copyright 2015 by Measured Reasons, LLC. Reprinted with permission.

Carvalho et al. (2017) echoed on the explanation of Facione (2015) and also

added that critical thinking is a reflective reasoning process to guide a nurse in generating

approaches for dealing with client care. Shin, Park, and Kim (2015) offered that along

with some of the cognitive attributes that have been discussed, there must be a frame of

mind or a quest for thinking. In other words, a person must have an inner desire to delve

deeper into their thinking. A unique approach by Victor-Chmil (2013) was that critical

thinking is not based on the situation at hand, but rather on the knowledge about the

subject that the nurse possesses. This follows up on the conjecture by Goodstone et al.

(2013) that critical thinking develops over time.

Kaddoura (2013) conducted an explorative qualitative descriptive study to specifically examine new graduates' perceived definition of critical thinking. Themes that emerged included multiperspective thinking, a decision-making process, and ability to analyze a situation. The most encompassing analysis by Robert and Petersen (2013) identified 10 defining attributes of critical thinking (a) recognizing a unique situation that needs further evaluation, (b) defining a set of criteria for analyzing ideas, (c) using reasoned judgment, (d) recognizing personal assumptions and biases, (e) being open-minded and flexible, (f) viewing the situation from all angles, (g) selecting the best solution based on knowledge and experience, (h) taking a risk to implement a decision, (i) having confidence in implementing a solution, and (j) being willing to alter opinions when new facts are presented (p. 87). Facione (2015) summarized that if you teach people to think critically and make good decisions, you equip them to not only improve their own futures, but to also become contributing members of society. This term with many meanings also serves as a foundation for positive social change.

Relevance of critical thinking to nursing profession. In this section the relevance of critical thinking is examined as related to the profession of nursing. In particular why it is important for a nurse or nursing student to have critical thinking skills is explored. It was not until the late 1990s' when critical thinking first became a focus of professional nursing practice (Cazzell & Anderson, 2016). Perhaps its importance was always present, but it was then given a title and recognition.

One significant benefit for nursing students to have high critical thinking scores is in preparation for successful passing of the NCLEX-RN. Several studies have

demonstrated a relationship between critical thinking and NCLEX-RN pass rates (Frye et al., 1999; Hoffman, 2006; Kaddoura et al., 2017; Morris, 1999; Romeo, 2013; Wacks, 2005).   In a quantitative retrospective study, Romeo (2013) examined the predictive ability of critical thinking (as measured by the Educational Resources Incorporated RN Assessment Test), grade point average, and SAT scores on first-time NCLEX-RN pass rates. The assessment test composite score and the critical thinking composite score had the largest Pearson's correlation ($r = .941$, $p < .001$). In a recent retrospective study, Kaddoura et al. (2017) examined standardized critical thinking entry and exit scores of nursing students and found a statistically significant relationship between critical thinking scores and passing the NCLEX-RN. Performance on the national licensure examination is a primary indicator of program success and can threaten a program's accreditation if certain benchmarks are not met (Trofino, 2013). Many states require that nursing programs achieve a minimum rate of 80% or more for first-time testers, and if this is not achieved, the program can be placed on probation (Serembus, 2016).

A cascading effect when students are not successful on their NCLEX-RN exam is that it contributes to an ever-rising nursing shortage. It is projected there will be a shortage of approximately one million nurses nationally by the year 2022 (Bureau of Labor Statistics, 2013). In addition, the estimated elderly population requires more chronic care health services, which requires additional nursing care hours to ensure quality care (Snavely, 2016). The ongoing nursing shortage and increased acuity of patients requires that nurses master both psychomotor and critical thinking skills (Theisen & Sandau, 2013).

Looking at a broader picture, the identified problem is not just limited to undergraduate nursing students at the local setting but carries through as they begin practicing in the clinical arena. A common theme in the literature review of the critical thinking nurse revolved around patient safety. Healthcare is fast-paced and requires new graduate nursing students to be able to identify various health problems and issues as they arise (Burbach et al., 2015; Jensen, 2013). Global changes in healthcare require an increased competency of nurses in order to respond effectively to clinical situations (Shin et al., 2015). The skill to think critically can lead to competent judgments about patient care issues (Adib-Hajbaghery & Sharifi, 2017; Kim 2018). A nurse's critical thinking skills can make a pivotal difference in patient safety as nurses identify problems or potential problems and make judgments about the plan of care (Pitt, Powis, Levett-Jones, & Hunter, 2014; Robert & Petersen, 2013). In a fast-paced health care system, patient safety is paramount and must be a top priority. Robert and Petersen (2013) maintained that the critical thinking health care worker leads to safe patient care. Critical thinking is important for the delivery of safe, effective care to patients (Hunter, Pitt, Croce, & Roche, 2014; Jones, 2017). The nurse who has strong critical thinking skills has the potential improve patient safety and enhance patient outcomes (Carvalho et al., 2017; Kaddoura, 2013; VonCollin-Appling & Giuliano, 2017). Critical thinking is a key factor in problem solving and decision making and it is an essential part of patient-centered care, patient safety, and wellness promotion (Romeo, 2013).

Responsibility of nursing programs and nurse educators to promote critical thinking. Although a nurse builds his or her critical thinking skills throughout their

profession, a review of the literature concurs that its origin is during the educative process. The previous sections discussed critical thinking and its relevance to the profession of nursing. This section examines the responsibility of nurse educators and nursing programs to foster critical thinking skills in their students.

Critical thinking has been identified as a vital student outcome during education (Hunter et al., 2014; Shin et al., 2015). Problems in the past, as pointed out by Pitt et al. (2014) were that some nursing curriculums had a stronger focus on knowledge rather than application, which led to a lack of critical thinking skills in nursing students. According to Forneris et al. (2015), the goal of contemporary nursing education is to teach students to think like a nurse with a focus on teaching strategies which extend beyond memorization, but rather foster critical thinking skills. Nurses who use critical thinking in their practice display traits of confidence, creativity, curiosity, and integrity (Kim, 2018). Both simple and complex healthcare situations can benefit from strong critical thinking skills of nurses (VonCollin-Apling & Giuliano, 2017). Benner, Sutphen, Leonard and Day (2010) maintained that nursing education needs to shift to multiple ways of thinking that includes critical thinking. The skill of a nurse to think critically is a common theme throughout nursing programs (Shinnick & Woo, 2013). Nursing programs should include critical thinking as a program objective (Theisen & Sandau, 2013; Tutticci, Coyer, Lewis, & Ryan, 2017).

Nurse educators are expected to produce learning environments that facilitate critical thinking (Adib-Hajbaghery & Sharifi, 2017; Przybyl et al., 2015). Similarly, Romeo (2013) stated that critical thinking is an essential component of nursing education

and should teach nurses to make decisions based on facts rather than assumptions. It is the responsibility of nurse educators, stated VonCollin-Appling and Giuliano (2017), to promote attributes of independent, analytical and reflective thinking in nursing students as a driving force behind the profession. Jensen (2013) supported an even stronger position that nurse educators have an obligation to ensure that students graduating from nursing programs have critical thinking skills.

These viewpoints are well-grounded by respected nursing and healthcare organizations. The AACN includes critical thinking as one of the major curricular threads woven into the nine essential outcomes (AACN, 2008; Romeo, 2013). In 2010, the Robert Wood Johnson Foundation at the Institute of Medicine published a lengthy initiative on the future of nursing. This initiative is widely respected and has been the springboard for many changes in nursing curriculums. One of the key themes regarding nursing education recommended "technology such as that used in high-fidelity simulation that fosters problem-solving and critical thinking skills in nurses will be essential for nursing education to produce sufficient numbers of competent, well-trained nurses (Robert Wood Johnson Foundation, 2010). Standard V of the accreditation standards set forth by the National League for Nursing (2016) stated that nursing curriculums should provide learning opportunities that enhance the student's ability to demonstrate leadership, clinical reasoning, reflection, and responsive care to diverse populations. Simulation was offered as an example of how these learning opportunities could be accomplished. The National Advisory Council of Nurse Education and Practice (NACNEP) (2010) discussed challenges facing nursing education along with solutions

for transforming the healthcare environment in its Eighth Annual Report. One of the recommendations was to expand the use of technologies, such as simulation, to prepare faculty to teach effectively and prepare student nurses for practice in the complex healthcare system of today.

History and contemporary use of simulation in nursing education. Simulation in its most basic form is defined as a person, device, or set of conditions which attempts to bridge theoretical knowledge and practical skills in a controlled environment (Lestander, Lehto, & Engstrom, 2016). In nursing education, it can be described as an event or situation made to resemble taking care of patients at the bedside (Jensen, 2013). The origin of simulation is traced back to the military, aviation (flight crew training), and nuclear power, with military using it the longest dating back to the 18th century (Przybyl et al., 2015). Nursing first began using simulation in the 1950s to teach basic procedures such as insertion of intravenous catheters, mouth-to-mouth resuscitation, and insertion of urinary catheters (Robinson & Dearmon, 2013). According to White (2017), 87% of prelicensure nursing programs across the United States are currently using simulation in their curriculum. Simulation based education is recognized as a key factor in nursing education to create that transfer of learning from nursing student to the practicing bedside nurse (Bussard, 2017; Cant & Cooper, 2017).

As with any type of teaching modality, simulation has evolved over the years now using very sophisticated technology. There are currently various types of simulation used in nursing education including standardized patients, screen based (virtual), low-fidelity, medium-fidelity, and high-fidelity (Griffiths, 2018). Standardized patients are trained

individuals who pose as patients. They interact with the student and respond to various interventions (Lee & Oh, 2015). Challenges with standardized patients include scheduling, payment for services, and inability to do any invasive procedures for training purposes (Ko & Kim, 2014). Screen based computer simulation uses web programs or computer-assisted instructional programs where learners interact with a computerized environment, and clinical decisions are made with resulting actions (Blevins, 2014). Low-fidelity simulation, as described by Przybyl et al. (2015) provides anatomical representation such as a cardiopulmonary resuscitation (CPR) torso, an intravenous arm, or gender specific parts to insert urinary catheters. Even an evolving thought-provoking case study could be a form of low-fidelity simulation (Tosterud et al., 2013).   Although low-fidelity simulation plays an important role in nursing education, the key factor it lacks is the ability to respond to interventions of the nursing student.

The last type of simulation used in nursing education, and the one relevant to this research study, is high-fidelity simulation. This type of sophisticated simulation involves computerized mannequins with a wide variety of lung sounds, heart tones, pulses, cardiac rhythms, and vocal responses (Przybyl et al., 2015). These mannequins can be programmed to provide realistic physiological responses to student actions (Bussard, 2017). A popular manufacturer of simulators by Laerdal Medical offers SimMan3G, SimMom (who can birth a baby), SimJunior, and SimBaby. According to the simulation lab coordinator at the local setting, SimMan3G currently has an approximate purchase price of $90,000.00. These mannequins now have the ability to talk, cry, blink, bleed, sweat, urinate, seize, and die (Laerdal Medical, 2018). They include all the anatomically

correct orifices to practice insertion of any type of tube or catheter. Vital signs such as blood pressure, heart rate, respirations, temperature, and oxygen saturation can all be altered and reflected on a bedside monitor. The instructor manipulates all of these activities in a control room while the nursing student(s) take part in a prearranged scenario. Based on interventions by the nursing student(s), the mannequin can provide instant feedback with both negative and positive responses (Lee & Oh, 2015; Mahoney, Hancock, Iorianni-Cimbak, & Curley, 2013). High-fidelity simulation, as described by Lee and Oh (2015), currently offers the highest level of realism with regard to decision making and patient interaction.

Simulation has traditionally been used as an adjuvant teaching strategy along with didactic and actual clinical hours in a hospital or clinical environment under the supervision of a nursing instructor. A longitudinal, randomized, controlled study conducted by the National Council of State Boards of Nursing examined replacing clinical hours with simulation in prelicensure nursing education. The study took place from Fall 2011 through May 2013 and included three groups (a) a control group who had traditional clinical experiences and no more than 10% of clinical hours spent in simulation, (b) students who had 25% of traditional clinical hours replaced by simulation,and (c) students who had 50% of traditional clinical hours replaced by simulation. Students were examined on both clinical competency and nursing knowledge in both simulation and clinical environments. Results indicated no differences between the three groups in overall clinical competency, nursing knowledge assessments and NCLEX-RN pass rates. The implications from this study provide evidence that up to half

of traditional clinical hours could be replaced with high-fidelity simulation with positive

outcomes (Hayden, Smiley, Alexander, Kardong-Edgren, & Jeffries, 2014). In a time of

limited clinical sites and faculty shortages (Jung et al., 2017; Snavely, 2016), the use of

high-fidelity simulation in nursing curriculums may take on an even larger role in the

future to meet those demands.

      Benefits of simulation to nursing students. This section reflects on why

simulation has been successful with nursing students and the benefits it offers as a

teaching strategy. Although this research study focuses on simulation and critical

thinking skills, there are various other positive outcomes of simulation. High-fidelity

simulation has proven itself to be a valuable teaching-learning strategy with nursing

students and has become the standard for use in nursing labs to provide students with an

opportunity to apply theory and knowledge in a variety of settings (Kirkman, 2013;

Mahoney et al., 2013; Robinson & Dearmon, 2013; Zhang, 2017). Simulation

experiences augment clinical learning and complement direct care opportunities which

are essential for the professional nurse. Simulation experiences also provide that safe,

effective, learning environment where student nurses can apply the cognitive and

performance skills needed for practice (Adib-Hajbaghery & Sharifi, 2017; Herrington &

Schneidereith, 2017; Jung et al., 2017). According to Kim (2018), the benefits of high-

fidelity mannequins which can imitate a patient's physiologic as well a human response

to diseases, make it more suitable for higher-level thinking and problem solving. Cant

and Cooper (2017) argued that with the use of a fully programmable computerized body

manikin, simulation not only enhances critical thinking skills, but also engages the students' emotions.

Lee and Oh (2015) conducted a meta-analysis to evaluate the effects of high-fidelity simulation on cognitive, affective, and psychomotor outcomes of learning. A review of 26 studies which met inclusion criteria, provided evidence that high-fidelity simulation positively impacts cognitive skills and clinical skill acquisition. Similarly, in a quantitative study, Przybyl et al. (2015) found evidence that the use of high-fidelity simulation enhanced knowledge skills, and attitudes of nurses.

In 2009, the Carnegie Foundation for the Advancement of Teaching released a national study conducted by renowned nursing education expert, Patricia Benner. Strengths and weaknesses of nursing education were examined and spoke strongly to bridging a gap between the theory and clinical components of nursing education (Benner et al., 2010; Mahoney et al., 2013). High-fidelity simulation provides that link to put all the pieces together and give a very robust learning experience for the nursing student. Simulation can assist the student to make a successful transition from education to practice (Everett-Thomas, Valdes, Fitzpatrick, & Birnbach, 2015). As stated by Kaddoura, VanDyke, Smallwood, and Gonzalez (2016), high-fidelity simulation exposes students to all types of scenarios and circumstances which they are not routinely exposed to in the clinical setting. Mahoney et al. (2013) followed up on the recommendations by Benner et al. (2010), which were discussed above, and conducted a mixed-methods study focusing on bridging the gap between theory and simulation along with a focus on decision-making and communication. The authors reported that learning objectives were

met 80% of the time. In their analysis of the qualitative data, Benner et al. (2010) found

that there was a positive experience with simulation by nursing students with the

recommendation by participants that high-fidelity simulation scenarios become a

requirement prior to the start of clinical rotations.

Another major benefit of high-fidelity simulation is from a safety perspective.

Simulation provides an opportunity to improve the effectiveness and safety of a patient in

the clinical setting and also provides an environment where mistakes are acceptable and

used as a learning tool (Blevins, 2014; Jung et al., 2017). Robinson and Dearmon (2013)

suggested that safe nursing judgment and practice will more likely occur when students

are exposed to realistic clinical scenarios and opportunities for repeated practice.

Simulation assists in making that transition from education to practice by providing that

safe environment where novice nurses can improve their skills without harming patients

(Everett-Thomas et al., 2015; Kim, 2018; Tosterud et al., 2013). Lewis et al. (2012)

reviewed literature on the use of simulation in the development of nontechnical skills in

nursing. Simulation was found to be positively associated with improved interpersonal

communication skills at patient handover, along with an increase in teamwork in the

management of crisis situation. The overall concluding findings were that high-fidelity

simulation provided learners with an environment where participants could make and

correct mistakes without compromising patient safety.

High-fidelity simulation and critical thinking skills. This last section of the

literature review directly involves the two variables in this study, high-fidelity simulation

and critical thinking. Critical thinking along with clinical judgment and problem solving

can all be improved during simulation (Leigh, Miller & Ardoin, 2017). A meta-analysis, literature review, qualitative study, and several quantitative studies were reviewed and analyzed for the current evidence-based research on these variables.

Overview studies. A meta-analysis of 26 studies (from 2006-2014) with experimental designs was evaluated on the effects of high-fidelity simulation on cognitive, affective and psychomotor outcomes of learning (Lee & Oh, 2015). The authors of the meta-analysis pointed out that although high-fidelity simulation is an education strategy used in nursing education, much of the research involves small studies, anecdotal reports, and expert opinions. Unfortunately, there are a limited number of high-quality randomized control trials. Of particular interest in the meta-analysis was the cognitive findings which measured knowledge acquisition, problem-solving competency, *critical thinking*, clinical judgment, and communication skills. In a subgroup analysis, use of high-fidelity simulation for nursing students led to a statistically increase in scores in problem solving, *critical thinking* and clinical judgment. This analysis gave credence that the development of cognitive skills, such as critical thinking, through the use of high-fidelity simulation is meaningful.

Similarly, a literature review by Lewis et al. (2012) examined if high-fidelity simulation was the most effective method for the development of nontechnical skills in nursing. The time-frame of the reviewed literature was 2000-2011. Sixteen studies were reviewed which included three randomized controlled trials, seven pretest/posttest experiments or quasiexperiments, and six studies that used single interventions and simple post-test designs. Studies were reviewed for using simulation for the development

of interpersonal communication, team working, clinical leadership, *critical thinking*, and clinical decision-making. Relevant findings of the literature review were that high-fidelity simulation enabled the development of transformational leadership skills and also demonstrated the ability to improve critical thinking and clinical reasoning in complex care situations.

A more recent systematic literature review by Adib-Hajbaghery and Sharifi (2017) examined 16 studies regarding the effect of simulation training on the development of nursing students' critical thinking. This literature review was meaningful to my study because it focused on experimental and quasiexperimental designs with a majority of them using the pretest and posttest design. In addition, four of the studies used my measurement tool, the HSRT. The characteristics which were examined included objective, type of design, sample, instrument, type of simulation, number of sessions, duration of sessions, and results. Out of the 16 studies, eight reported that simulation positively affected the critical thinking skills of nursing students. Conversely eight of the studies reported ineffectiveness of simulation methods on critical thinking.

Qualitative studies. There is limited qualitative research on high-fidelity simulation and critical thinking. In both the meta-analysis and literature review discussed above, there were no qualitative studies reviewed. It is unknown if that is because there were no qualitative studies available or if the authors chose to only include quantitative studies. The most recent qualitative study in this literature review was by Kaddoura et al. (2016) which examined the perceived benefits and challenges of repeated exposure to high-fidelity simulation. A convenience sample ($N = 107$) of senior-level nursing

students went through various simulation scenarios and were then given a paper test. Themes that emerged included critical thinking, confidence, competence, theory-practice integration, and knowledge deficit identification. Specifically looking at critical thinking, participants cited that simulation go them thinking on their feet, interpret data, make inferences, prioritize needs, and think about alternative options for care (p. 300). In reflecting back on the definitions of critical thinking by Facione (2015) which were interpretation, analysis, evaluation, inference, explanation, and self-regulation, the themes from this study coincide with those attributes.

Quantitative studies. The current research revealed several quantitative studies with various samples, interventions, and results. Several of the studies confirmed that more research is needed to explore the relationship between the development of critical thinking and high-fidelity simulation (Maneval et al., 2012; Park, 2013; Shinnick & Woo, 2013). In a nonexperimental retrospective comparative quantitative study, Hall (2014) examined the impact of high-fidelity simulation in enhancing critical thinking in senior maternity nursing students. A convenience sample ($N = 279$) received either instruction through high-fidelity simulation in additional to hospital-based instruction or students who received hospital-based instruction alone. Results demonstrated those students receiving both interventions had high critical thinking scores as measured by the Assessment Technologies Institute (ATI) content mastery series (maternal newborn module).

Shin et al. (2015) took a unique approach and looked at the effects of simulation on critical thinking at multiple sites as opposed to just one site. This pretest/posttest

multisite study involved three universities with a convenience sample ($N = 237$) of senior

nursing students who were all exposed to the same simulation courseware, evaluation

tools, and equipment. Participants at one of the schools completed one simulation

session, another school completed two simulation sessions, and the third school

completed three simulation sessions. The instrument used to measure critical thinking

was Yoon's Critical Thinking Disposition tool, which as described by Shin, most

resembles the CCTDI as compared with other instruments. Critical thinking scores varied

according to the number of exposures. With a single exposure there were no statistically

significant gains in critical thinking, however the participants who had three exposures to

simulation did have statistically significant gains in critical thinking. An interesting

finding pertinent to the study is that the junior year for a nursing student has shown to be

more likely to have increases in critical thinking, specifically in analysis along with

inductive and deductive reasoning skills.

Shinnick and Woo (2013) also examined the effects of simulation on critical

thinking in prelicensure nursing students. A convenience sample ($N = 154$) of four

cohorts recruited from three schools of nursing all at the same point in their nursing

curriculum participated in three simulation scenarios involving acute heart failure. Note

that there was not any type of comparative or control group in this study. Critical thinking

was measured using the HSRT for both pre and post test scores. Results indicated a

mean improvement in knowledge scores, but there was no statistically significant change

in critical thinking scores.

Maneval et al. (2012) conducted a study to determine if the addition of high-fidelity simulation to new nurse orientation would enhance critical thinking skills of new graduate nurses. A convenience sample ($N = 26$) had the intervention of high-fidelity simulation and a control group did not have that intervention. As with many other studies, a pretest/posttest design was used and measured by the HSRT. Although both groups showed an increase in critical thinking skills, the results were not found to be statistically significant. Goodstone et al. (2013) used a quasiexperimental study to examine associate degree nursing students in their first semester of health assessment. This study compared critical thinking skills in students who were exposed to high-fidelity simulation versus low-fidelity simulation. Both groups showed an increase in critical thinking skills, but there was no statistically significant difference found between the two groups. One difference to this study which differs from the study outlined in this doctoral study are associate-degree nursing students versus BSN nursing students. Another difference is that the interventions took place during their first semester while in my study they took place in their junior year. The junior year for a nursing student has shown to be more likely to have increases in critical thinking, specifically in areas of analysis along with inductive and deducting reasoning skills (Shin et al., 2015).

Although there has been a variety of research conducted on this topic, it remains clear that more research is warranted. Both qualitative and quantitative research are severely lacking. The National League for Nursing (2012) identified in its 2012-2015 Research Priorities in Nursing Education a need for studies linking simulated learning experiences with program outcome and graduate competencies. It is the hope that the

results of this study can one day be a contributing source of evidence- based research on the teaching strategy of simulation which is integrated in many nursing curriculums.

Implications

The evidence in my study indicated there was not a statistically significant difference in participants' mean critical thinking scores across time within groups (pretest to posttest) and between groups (simulation versus written case studies). Based on the findings of my study and the current literature, my project will be a skills development workshop for faculty that would incorporate multiple methods of teaching strategies that have been shown to enhance critical thinking of nursing students. The foundation of the workshop would be structured on evidence-based research and best practice so that faculty could build their skills in delivering these teaching strategies to maximize the benefits to nursing students.

Summary

A gap in practice was identified at a private university in the mid-western United States, which offers a four-year BSN program. Despite simulation being used throughout the curriculum, and the importance of assessment in education, especially in regard to accreditation, there had been no evaluation of the impact of simulation on critical thinking in nursing students in the local setting. One of the variables in this study was critical thinking which has been identified as an area that needs growth and improvement based on declining NCLEX-RN scores of nursing students at the local level. That declining trend is important because several studies have demonstrated a relationship between critical thinking and NCLEX-RN pass rates (Frye et al., 1999; Hoffman, 2006;

Kaddoura et al., 2017; Morris, 1999; Romeo, 2013; Wacks, 2005). This trend is also seen on a national scale reflecting that 70% of new and experienced nurses did not meet requirements in critical thinking (Del Bueno, 2005; Weatherspoon et al., 2015).

The other variable in this study was high-fidelity simulation which is one method currently used by nursing programs to increase critical thinking in nursing students (Blevins, 2014; Goodstone et al., 2013). Although there is the assumption that simulation will build the critical thinking skills of nursing students, the associate dean of nursing at the local setting stated there was no current evidence-based research to support this assumption in the local setting. This study was first one at the local setting to examine high-fidelity simulation and its relationship to critical thinking skills of nursing students. This study holds great significance because a nurse who has strong critical thinking skills has the potential to impact social change by directly improving patient safety and enhancing patient outcomes (Carvalho et al., 2017; Kaddoura, 2013; VonCollin-Appling & Giuliano, 2017). The theoretical framework for this study included cognitive learning theory as interpreted by Ausbel along with the Paul Elder critical thinking model.

A causal-comparative methodology with a pretest/posttest design used baccalaureate junior nursing students ($N = 69$) as participants. A repeated measures mixed ANOVA was used to determine there was no statistically significant difference in the participants' mean critical thinking scores across time within groups (pretest to posttest) and between groups (simulation versus written case studies).

Section 2 provides the methodological approach used for this study. This section details the research design, setting and sample, instrumentation, data collection, and

results analysis. Section 3 will detail the project which is a skills-development workshop for nursing faculty that would incorporate multiple methods of evidence-based teaching strategies that have been shown to enhance critical thinking of nursing students. Section 4 contains project strengths and limitations, recommendations for alternative approaches, reflections, and directions for future research.

Section 2: The Methodology

Research Design and Approach

The identified gap in practice was a lack of evaluation on the impact of high-fidelity simulation on critical thinking in nursing students in the local setting. To close this gap and address the problem, a causal-comparative methodology with a pretest/posttest design was chosen as the research method. There was consideration given early in this study's infancy to a qualitative approach, but once the problem and research question were identified, a quantitative study was needed to achieve clear alignment.

Once it was narrowed down that I would be doing a quantitative study, I explored various types of experimental designs such as time series, true experimental designs, and causal-comparative designs (Creswell, 2012; Lodico, Spaulding, & Voegtle, 2010). I considered a time series design which as described by Creswell (2012) consists of studying one group over time with multiple pretest and posttest measures or observations by the researcher. My research question was very specific about examining mean critical thinking scores across time within groups (one pretest and one posttest) and between two groups (simulation versus written case studies). To keep my design properly aligned with my research question, a time series design was not feasible for my doctoral study.

Although a true experimental design would have the most rigor since groups could be equated using random assignment (Creswell, 2012; Lodico et al., 2010), when a study takes place in an educational setting using already established groups (classrooms of students), participants cannot be randomly assigned to different groups or interventions. Finally, I considered a causal-comparative design which as described by

Lodico involves comparing groups to see whether some independent variable has caused a change in a dependent variable. In my study, the independent variable of being exposed to the teaching strategy of simulation or the teaching strategy of written case studies was compared to see if there was a difference in mean critical thinking scores (dependent variable). After careful review of various options, the causal-comparative design was found to be the most appropriate type of study to align with my research question.

Setting and Sample

The local setting for this doctoral study was a private university in the Midwestern United States, which offers a four-year BSN program. This degree is available at four separate campuses, with a total nursing student enrollment of approximately 600 students. Since I did not conduct the study at the campus where I currently teach, there were three separate sites (campuses) from one institution used in the study. Each school year consists of two 15-week semesters (fall and winter). High-fidelity simulation is integrated into nursing courses beginning in the junior year. For nursing students to graduate, they must successfully complete 120 credit hours. The nursing students' ages range from 18 to mid-50s. The ethnic distribution at the time of my study in 2017 was White (86%), Black or African American (4%), Asian (2%), and, Hispanic (6%). Gender distribution was 16% males and 84% females.

Each of the nursing campuses is equipped with state-of-the-art simulation laboratories (labs) housed on site for use by nursing students. In addition to Laerdal SimMan 3G, which was used in this doctoral study, the labs also offer other high-fidelity

simulators such as Laerdal SimMom, SimJunior, and SimBaby. The labs are set up to simulate a patient's hospital room with appropriate beds, tray tables, medication carts, and oxygen delivery systems. Each lab also has a control room behind one-way glass to encourage student independence during the scenarios, while still allowing for instructor observation. The instructors assigned to the course facilitated the simulation sessions independently. I communicated with the simulation lab coordinators at several points prior to the actual study and provided a detailed description of the simulation scenarios and their execution.

The population was all junior level nursing students currently enrolled in Medical-Surgical I lectures, clinical, and simulation courses ($N = 106$). The rationale for selecting junior students as participants was because students in their first two years do not have high-fidelity simulation in their curriculum, so for the juniors, this would be their first exposure to high-fidelity simulation.

A priori power analysis using G*Power 3 software was used to determine the appropriate sample size or the number of participants needed for this study. According to Creswell (2012), there are three factors which affect the sample size (a) power, (b) significance level, and (c) effect size. Using a repeated measures ANOVA (within and between interaction) with a power of 0.80, significance level of 0.05, and an effect size of 0.25, it was determined that the minimum total sample size of 34 participants was needed for this study (Cohen, 1992; Faul, Erdfelder, Lang, & Buchner, 2007; Forneris et al., 2015; Ko & Kim, 2014).

In this project study, I used convenience sampling of three existing junior nursing student classes. The size of the convenience sample was 106 potential participants with a breakdown of 29, 38, and 39 junior students from the three campuses. While random selection of the sample would have allowed a stronger ability to generalize the results, this type of selection was not feasible in the local setting. As pointed out by Lodico et al. (2010), depending on the overall purpose of the study and how the results will be utilized and disseminated, lack of generalizability with convenience sampling might not be an issue. Since I examined a very specific problem at the local setting, convenience sampling was viewed as an appropriate method. The inclusion criteria were that the student must be 18 years of age or older, must have completed the first two years of nursing school, and was a junior currently enrolled in Medical-Surgical I lecture, clinical, and simulation. One exclusion criterion was that the student must not be repeating the course because of failure where they would have been previously exposed to high-fidelity simulation. Another exclusion criterion was that students must not have transferred from the campus where I teach, to reduce any appearance of coercion or bias.

Simulation at the local setting consisted of six to eight nursing students who were preassigned to a lab by an advisor at each site. There were 15 separate labs between the three sites. Before the study, I worked with associate department chairs and simulation lab coordinators to determine which labs would be for the simulation group and which labs would be for the written case studies group. No individual labs were broken up to conduct this study. My goal during this initial process was to break down the 15 labs equally to have 106 students participating, divided equally into two groups of 53

students. Students were placed in either the simulation group or the written case studies group. The lab activities were mandatory as part of the nursing curriculum; however, participation in the study was optional and did not affect the students' grades or class standing. Only participants in the study, simulation group and written case studies group, completed the pretest and posttest. The possible sample size was 106 and 69 (65%) agreed to participate in the study, with 36 participants in the simulation group and 33 participants in the written case studies group. A post hoc analysis using an actual sample size of 69, significance level of 0.05, and a small effect size of 0.25, calculated the actual power of my study as 0.98 (Cohen, 1992; Faul et al., 2007; Forneris et al., 2015; Ko & Kim, 2014).

Instrumentation and Materials

The instrument used to measure critical thinking skills was the HSRT. This instrument was first published in 2006 and was developed by Peter and Noreen Facione. HSRT is a standardized instrument published through Insight Assessment in San Jose, California. This instrument is based on the landmark 1990 Delphi Report, a concept analysis study in the 1980s, that was used to develop a consensus definition of critical thinking (Facione, 1990). The HSRT was adapted from the generic CCTST and is currently the preferred instrument to measure critical thinking skills for educational research projects in health science settings (HSRT User Manual and Resource Guide, 2017).

An important consideration in choosing the HSRT was that this instrument specifically measures critical thinking skills. In the early stages of my doctoral study, I

intended to use the Critical Thinking Dispositions Inventory (CCTDI), but after careful

review, it was determined that the CCTDI instrument measured critical thinking

dispositions and not critical thinking skills. Based on an analysis of various critical

thinking tools available, I felt confident that the HSRT best aligned with my identified

problem and research question.

The HSRT is calibrated for undergraduate and graduate students in health

sciences educational programs and has been used extensively in nursing research (Cazzell

& Anderson, 2016; Forneris et al., 2015; Gooodstone et al., 2013; Hooper, 2014; Hunter

et al., 2014; Pitt et al., 2014; Shinnick & Woo, 2013; Sullivan-Mann, Perron, & Fellner,

2009). Although the test items are set in clinical and professional practice contexts, the

participant does not require specific health science knowledge to complete it. The HSRT

is a test of critical thinking and not of health science or health care knowledge (HSRT

User Manual and Resource Guide, 2017). Permission to use the HSRT instrument is

attached as Appendix D.

The HSRT is a 33-question multiple choice format test which can typically be

completed by participants in a 50-minute setting. The exact mechanism used for scoring

is kept confidential by Insight Assessment as the proprietor of the HSRT instrument

(HSRT User Manual and Resource Guide, 2017). An example of a sample question is

shown in Figure 3.

Sample Thinking Skills Question #5.

"I've heard many reasons why our nation should reduce its reliance on petroleum vehicle fuels. One is that relying on imported oil makes our economy dependent on the political whims of foreign rulers. Another is that other energy sources, like the possibility of hydrogen-based fuels, are less harmful to the environment. And a third is that petroleum is not a renewable resource so when we've used it all up, it will be gone! But I don't think we're likely to use it all up for at least another fifty years. And by then we'll have invented new and better fuels and more fuel-efficient vehicles too. So that argument doesn't worry me. And I don't really believe the stuff about how foreign leaders can force our nation to change its policies simply by decreasing their oil production. Oil companies like Exxon have made record profits precisely in those times when the supply of foreign oil was reduced. I don't see the big oil companies being very interested in policy change when the money is rolling in. And for another, our nation has demonstrated that it is willing to wage war rather than to permit foreign leaders to push us around. So this whole thing about how we have to reduce our reliance on petroleum based gasoline, diesel, and jet fuel is bogus." The speaker's reasoning is best evaluated as

A = strong. It shows the arguments for reducing petroleum vehicle fuels are weak.
B = strong. The speaker is very clear about what he believes and why he believes it.
C = weak. The speaker probably owns stock in Exxon or some other oil company.
D = weak. The speaker ignored the environmental argument entirely.

Figure 3. Sample HSRT question. Adapted from "Sample Thinking Skills Questions," by Insight Assessment, a division of the California Academic Press, 2018. Retrieved from https://www.insightassessment.com/Resources/Teaching-Training-and-Learning-Tools/node_1487. Reprinted with permission.

The HSRT provides an overall critical thinking score along with individual scores

on five separate subscales of analysis, deduction, evaluation, induction, and inference.

These subscales were established as a result of the landmark 1990 Delphi Report, a

concept analysis study in the 1980s, that was used to develop a consensus definition of

critical thinking (Facione, 1990). The AACN (2008) has also identified similar subscales for critical thinking as outlined in the "Essentials of Baccalaureate Education for Professional Nursing Practice."

Analysis: Analytical reasoning skills enable people to identify assumptions, reasons, and claims, and to examine how they interact.

Deduction: Strong deductive reasoning skills are important in contexts where rules, operating conditions, core beliefs, values, policies, principles, procedures, and terminology determine the outcome.

Evaluation: Evaluative reasoning skills help to assess the credibility of sources of information and the claims they make. These skills help to determine the strength of weakness of arguments.

Induction: Inductive reasoning skills are used when one draws inferences about what is probably true based on analogies, case studies, prior experience, statistical analyses, simulation, hypotheticals, and patterns.

Inference: Skills of inferences enable people to draw conclusions from reasons and evidence. Inferences skills are used to offer thoughtful suggestions and hypotheses (HSRT User Manual and Resource Guide, 2017, pp 14-15).

Reliability and validity are two criteria used to judge the quality of all quantitative measures (Lodico et al., 2010), which in this study was the HSRT. Reliability procedures for the HSRT produced internal consistency estimates with the Kuder-Richardson [KR-20] ranging from 0.77 to 0.84 with an overall internal consistency of 0.81 (Cazzell & Anderson, 2016; Forneris et al., 2015; Maneval et al., 2012; Pitt et al., 2014). Content and

construct validity were established by correlating test items to the Delphi Report, which was a foundational concept analysis study in the 1980s to develop a consensus definition of critical thinking. Validity was also established with the support of health sciences faculty committees and human resources professionals as well as national and international graduate research (Facione, 1990; Forneris et al., 2015; HSRT User Manual and Resource Guide, 2017; Hunter et al., 2014).

The HSRT was administered in a paper and pencil format with me as the proctor being present at all times. The testing environment was a designated quiet classroom or lab setting with all electronic devices turned off during the testing session. Participants were each provided with a clean assessment booklet, a CapScore response form (a proprietary electronic marking/scoring form for question responses), and a USA #2 pencil. A 9-digit ID number was assigned to each participant, and that number was placed on both the assessment booklet and CapScore response form by the participant. The 9-digit number consisted of a leading zero (0), the participant's birth month, birth date, and last four digits of their social security number. Thus, a participant, who was born on December 15 and had a social security number of XXX-XX-1234, would have an ID number of 012151234. This method assured that the same ID number was used and scored for the same participant in both the pretest and posttest. This method also assured confidentiality for the participants.

Participants were instructed to select the best answer for each question and to record their answers by darkening only one bubble for each item on the CapScore response form. Participants were given 50 minutes to complete the HSRT which is the

recommended testing time by the developer, Insight Assessment (HSRT User Manual and Resource Guide, 2017). I did not answer specific questions from participants that could assist or sway them on answers to the assessment items, but was available to answer other generalized questions, such as how long they had to test and date of the posttest. At the end of the 50 minutes, all materials were collected. CapScore response forms were sent to Insight Assessment for scanning, scoring, and preparation of descriptive statistical information. Upon completion of the interventions used in this research study, a posttest was given to all participants following a similar format. Raw data are available from Insight Assessment and can be obtained upon request.

Data Collection and Analysis

The research question for my doctoral study was whether there was a statistically significant difference in participants' mean critical thinking scores across time within groups (pretest to posttest) and between groups (simulation versus written case studies), as measured by the HSRT?

To address the research question, critical thinking scores were first obtained in a pretest given to both the simulation group and the written case studies group. The study was conducted over a three week period where 36 participants were in the simulation group and 33 participants were in the written case studies group. Finally, a post-test was given to both the simulation group and the written case studies group to measure critical thinking scores. In a normal 15-week semester at the local setting, junior nursing students have a simulation experience once per week for 14 weeks.

The chosen number of weeks (sessions) in the study were based on two considerations. Adib-Hajbaghery and Sharifi (2017) examined the effect of simulation training on the development of nursing students' critical thinking in nursing education. One of the variables examined was the number and duration of simulation sessions. The numbers ranged from one session (Ahn & Kim, 2015; Shinnick & Woo, 2013), three sessions (Shin et al., 2015; Shin & Kim, 2014), five sessions (Brown & Chronister, 2009; Ravert, 2008), or 14 sessions (Goodstone et al., 2013). It should be noted that some of the studies did not identify the number of sessions. Second, I consulted with the vice-president for institutional research and assessment at the local setting to discuss my research question, my review of the literature, and the current curriculum for nursing students. It was recommended by the representative at the local setting that three sessions were thought to provide sufficient data to answer the research question and also not disadvantage any of the nursing students who participated in the study.

The dependent variable in this study was a difference in the critical thinking mean scores between pretest and posttest and was measured on interval (scale) data. The independent variable was being exposed to high-fidelity simulation or being exposed to written case studies and was measured on nominal (categorical) data.

The HSRT provided demographic information on the participants along with overall pretest and posttest critical thinking scores. I used the Statistical Package for the Social Sciences (SPSS) Student Version 24 for Windows to further analyze the data in this study. Both descriptive and inferential statistics were calculated. The inferential

statistics analysis was completed using a repeated measures mixed ANOVA to test the following hypotheses:

Null hypothesis: There is no statistically significant difference in participants' mean critical thinking scores across time within groups (pretest to posttest) and between groups (simulation versus written case studies), as measured by the HSRT.

Alternative hypothesis: There is a statistically significant difference in participants' mean critical thinking scores across time within groups (pretest to posttest) and between groups (simulation versus written case studies), as measured by the HSRT.

The specific data collection steps are outlined as follows:

Recruitment and Administration of Pretest

The necessary IRB approval from Walden University (Walden IRB approval number 08-30-17-0424962) and the local setting were first secured. A list of junior nursing students' names was then obtained from the associate department chair for each of the three campuses. Dates, times, and locations of the pretest and posttest were also established at that time. The recruitment process consisted of a cover letter (Appendix B) and consent form (Appendix C). I initially met with the potential participants at either an orientation session before the semester began or at the end of a scheduled course to hand out the cover letter which explained the study. The consent form was fully explained, and each student was allowed time to review the document before making their decision to participate or not in the study. Students were not asked to raise their hand to indicate interest in participating in the study. This step was completed during Week 1 of the fall

semester on three separate days (Tuesday, Wednesday, and Thursday) at the three separate sites.

In the next step which took place during Week 2 of the fall semester, I met on three separate days (Tuesday, Wednesday, and Thursday) at the three separate sites at a designated date, time, and location with all students who were interested in participating in the study. I answered any questions the students had regarding participation in the study. Participants were reminded that this study was voluntary and they could withdraw at any time. All eligible participants who agreed to participate in the study were asked to sign the informed consent document. All informed consent documents were stored in a sealed envelope and always in my possession from the time they were collected until they could be stored in a locked cabinet in my home-office.

Immediately after the informed consents were signed, participants who agreed to be in the study were administered the pretest. Participants were each provided with a clean assessment booklet, a CapScore response form (a proprietary electronic marking/scoring form for question responses), and a USA #2 pencil. A 9-digit ID number was assigned to each participant, and that number was placed on both the assessment booklet and CapScore response form by the participant. All participants completed the paper and pencil Pretest via the HSRT instrument in my presence. Participants were given 50 minutes to complete the HSRT. I did not answer specific questions from participants that could assist or sway them on answers to the assessment items but was available to answer other generalized questions, such as how long they had to test and date of the posttest. At the end of the 50 minutes, all materials were collected.

All pretests were stored in a sealed envelope and always in my possession from the time data were collected until it was sent to Insight Assessment.

Administrative Procedures for Simulation Group

Three different high-fidelity standardized simulation scenarios were administered to the designated simulation lab groups for three consecutive weeks. The scenarios included (a) lower leg fracture with basic assessment, (b) bowel obstruction with spiritual care needs, and (c) bowel obstruction with fluid and electrolyte imbalance (Laerdal Medical, 2017). Although there were three different scenarios used in these simulations, the essential components were similar. Each scenario was designed with a 5-10 minute briefing, 15-20 minute actual scenario, and 15-20 minute debriefing. No more than eight students participated in a scenario at one time, each with specifically assigned roles. The interactive, high-fidelity simulator used for this study was Laerdal SimMan 3G©. See Table 3 for a detailed outline of the bowel obstruction with fluid and electrolyte imbalance scenario.

Table 3

High-fidelity Simulation Scenario: Bowel Obstruction with Fluid and Electrolyte Imbalance

Scenario Background	Learning Objectives and Scenario Specific Objectives	Nursing Diagnoses and Recommended Roles	Sample Debriefing Questions
Complex Case: Preoperative Bowel Obstruction – Fluid and Electrolyte Imbalance Patient: Stan Checketts Setting: Emergency Department Brief Summary: This case presents a preoperative patient who presents to the emergency room with severe dehydration. The symptoms of dehydration are related to poor intake of fluid by mouth as well as nausea and vomiting from a small bowel obstruction. The students will be expected to demonstrate basic assessments to detect signs and symptoms of severe dehydration with impending hypovolemic shock, notify the provider immediately, and provide the appropriate treatment.	Learning Objectives: (1) Performs appropriate patient assessment (2) Evaluates patient assessment data (3) Identifies primary patient care problem (4) Prioritizes patient care (5) Implements patient care with quality, safety, and evidence-based standards (6) Collaborates with team members (7) Communicates effectively with patient, family, and health care team (8) Provides patient education Scenario Objectives: (1) Identifies signs and symptoms of bowel obstruction and severe dehydration (2) Analyzes lab values to determine fluid and electrolyte imbalance (3) Implements treatments for bowel obstruction and electrolyte imbalance	Nursing Diagnoses: (1) Fluid volume deficit (2) Acute pain Recommended Roles: (1) Primary nurse (2) Secondary nurse (3) Lab technician; (4) Medical provider (5) Family member (6) Outgoing nurse (7-8) Observer(s)	(1) What are the etiologies of bowel obstruction? (2) What abnormalities were identified in the patient's labs? (3) How did you determine if fluid replacement was adequate? (4) What were the potential complications of fluid boluses? (5) How did you monitor patient outcomes? (6) Describe the patient education you provided? (7) What could you do to improve the quality of care for this patient? (8) How did you ensure safe administration of medication? (9) Discuss the knowledge of evidence that guided your thinking in this scenario? (10) How will you apply what you learned to your clinical practice?

Note. Adapted from "Laerdal Learning Applications, Learning Technologies, Simulation in Nursing Education," *by Laerdal Medical*, 2017.

Administrative Procedures for Written Case Studies Group

During the three weeks when the designated labs were receiving simulation, the comparison group was receiving the intervention of written case studies. The case studies were taken from Winningham's Critical Thinking Cases in Nursing (Harding & Snyder, 2016). The case study for Week 1 was on end of life nursing care. The case study for Week 2 was related to pressure ulcers. The case study for Week 3 involved a postoperative patient who required pain control and wound management. I provided the appropriate number of written case studies to each campus with instructions on administration. Written case studies are routinely used in the local setting as an adjuvant teaching strategy but are not considered comparable in difficulty and learning objectives to simulation. The case studies were delivered in a paper and pencil format with a written scenario and then questions to follow. The questions promote higher-level thinking by challenging the learner to apply, analyze, and evaluate a variety of information about a patient scenario. The downside of traditional written case studies, as described by Bowman (2017) is that because they are static, they do not allow the instructor to assess the student's continued thought process for decision making.

Administration of Posttest

I returned to the three sites during Week 6 (Tuesday and Thursday) and Week 7 (Wednesday and Thursday) of the fall semester to administer the posttests. All participants who participated in the study met in a designated quiet classroom. Participants were each provided with a clean assessment booklet, a CapScore response form, and a USA #2 pencil. The same established 9-digit ID number was used again by

each participant, and that number was placed on both the assessment booklet and CapScore response form by the participants. All participants took the paper and pencil posttest via the HSRT in my presence. Participants were given 50 minutes to complete the HSRT. I did not answer specific questions from participants that could assist or sway them on answers to the assessment items but was available to answer other generalized questions, such as how long they had to test and date of the posttest. At the end of the 50 minutes, all testing materials were collected. All posttests were stored in a sealed envelope and always in my possession from the time data were collected and sent to Insight Assessment.

All completed HSRT pretests and posttests were numerically coded by me as being a pretest simulation group (101), pretest written case studies group (201), posttest simulation group (102), and posttest written case studies group (202), and were sent to Insight Assessment for scanning, scoring and preliminary results reporting. The exact mechanism used for scoring is kept confidential by Insight Assessment as the proprietor of the HSRT instrument. Approximately ten days later, results were returned to me via email correspondence in the form of PDF files, charts, graphs, and spreadsheets. For each individual test-taker, the analysis by Insight Assessment included an overall score of critical thinking skills, the percentile ranking of the overall score when compared to a group of similar test takers (undergraduate nursing students), and a set of scale scores on induction, deduction, analysis, inference, and evaluation.

Assumptions, Limitations, Scope, and Delimitations

It was assumed that the students had completed the same required courses with the same content and in the same sequence in prior semesters of clinical, lab, and didactic environments. All students advanced to their junior year with a minimum score of 80% needed in each nursing course for progression, noting that no rounding of scores was allowed in the nursing program. Another assumption was that students who took the HSRT pretest and posttest did so seriously and put forth their best effort to answer all questions with a high degree of thought and professionalism. A final assumption was that students were not marked differently from others taking the HSRT and that all students received fair and equal treatment in the scoring process.

One limitation was that the sample was taken from a single educational institution carrying its own specific demographics that may or may not be representative of the total population of nursing students. Thus, the results of the study will be difficult to generalize to a larger population. Another limitation was convenience sampling versus random selection of participants. Again, this creates a barrier to generalize the results to a larger population. Other limitations are the length of the study (3 weeks) and perhaps differences in how the interventions were administered by faculty at three different campuses. Although detailed instructions were provided for administration, different teaching styles and different demographics of the participants could have led to different outcomes. In addition, this study was void of a control group where no intervention was given to participants. Since evidence has shown that these teaching strategies make a positive difference to students, I could not ethically have a group of students who

received no interventions. It did, however, create another limitation that was considered when analyzing results.

Although a quantitative study was chosen to align with the research question, a qualitative study would have been useful to explore attitudes and feelings of students with regard to simulation and its relationship to critical thinking skills. Another limitation is that I explored critical thinking skills over a very specific period of time in the students' junior year. A longitudinal study starting from entry into the program until the student takes their NCLEX-RN exam would provide a richer examination of critical thinking skills and how they evolve as the student progresses forward.

The scope of this study involved a limited number of variables: high-fidelity simulation, critical thinking skills, and written case studies. Further, the scope of this study was confined to baccalaureate nursing students at a private university and examined critical thinking over a very specific period of time. It was beyond the scope to measure other teaching modalities which might lead to an increase in critical thinking skills. Nonacademic or academic variables that influenced the students during the study were not determined.

Protection of Participants' Rights

Before collecting any data, I obtained approval to conduct the study from Walden University's Institutional Review Board (Walden IRB approval number 08-30-17-0424962) as well as from the Institutional Review Board at the local setting where the research was conducted. As described by Lodico et al. (2010), research ethics focuses on establishing safeguards to protect the rights of participants in a research study and

includes informed consent, protection from harm, and ensuring confidentiality. Informed

consent (Appendix C) was obtained from all participants before the study and included

the purpose, procedures, voluntary nature of the study, risks, and benefits of being in the

study, compensation, confidentiality, and contact information.

Protection from harm was provided to the participants by advising them that

everyone would respect their decision of whether or not they participated in the study and

that no-one at the University would treat them differently if they decided not to be in the

study. Participants were also informed that their grade would not be affected based on

whether they participated or declined participation in the study. Finally, if a participant

decided to join the study, they could change their mind and withdraw at any time during

the study. Although high-fidelity simulation is a course that students must complete and

pass as part of the nursing curriculum, students were given the option to decline

participation in the study, but still take the required simulation course. All of the

participants were adults who were 18 years of age or older.

To ensure confidentiality, once informed consent was obtained, the actual forms

have been maintained in a locked cabinet within my home office. The participants were

told that any information they provided would be kept confidential. Participants were

given an identification number to place on their pretest and posttest and were told that I

would not use their information for any purposes outside of this research project.

Data Analysis Results

In this section, I discuss the data analysis process, interpretation of the findings

related to the research question, and summarize the statistical analysis. The research

question which served as the foundation of this study was: For nursing students in a traditional 4-year Bachelor of Science in Nursing program, is there a statistically significant difference in participants' mean critical thinking scores across time within groups (pretest to posttest) and between groups (simulation versus written case studies), as measured by the HSRT?

Null hypothesis: There is no statistically significant difference in participants' mean critical thinking scores across time within groups (pretest to posttest) and between groups (simulation versus written case studies), as measured by the HSRT.

Alternative hypothesis: There is a statistically significant difference in participants' mean critical thinking scores across time within groups (pretest to posttest) and between groups (simulation versus written case studies), as measured by the HSRT.

A total of $N = 69$ participants completed the research study which consisted of a pretest, three weeks of being in either the simulation group or the written case studies group, and a posttest. There were 36 participants in the simulation group and 33 participants in the written case studies group. Demographic variables for the participants are depicted in Table 4.

Table 4

Descriptive Statistics for the Participants' Demographic Variables

Demographics	Overall (N = 69)	Simulation (n = 36)	Case Studies (n = 33)	X^2
Gender				
Female	58 (84%)	30 (83%)	28 (85%)	.793
Male	11 (16%)	6 (17%)	5 (15%)	.763
Age				
18-24	22 (32%)	16 (44%)	7 (21%)	.061
25-34	28 (41%)	12 (33%)	16 (49%)	.450
35-44	16 (23%)	7 (20%)	8 (24%)	.796
45-54	3 (4%)	1 (3%)	2 (6%)	.564
Highest Degree Completed				
High School	44 (64%)	27 (75%)	17 (52%)	.132
Associate	17 (25%)	7 (19%)	10 (30%)	.467
Bachelor	7 (10%)	2 (6%)	5 (15%)	.257
Master	1 (1%)	---------	1 (3%)	---------
Self-Identification by Participants				
Anglo American, Caucasian	59 (86%)	32 (88%)	28 (85%)	.606
African American	3 (4%)	1 (3%)	1 (3%)	1.000
Hispanic, Latino, Mexican American	4 (6%)	2 (6%)	2 (6%)	1.000
Asian American, Pacific Islander	1 (2%)	-----------	1 (3%)	---------
Native American	---------	-----------	-----------	---------
Mixed/Other	1 (2%)	1 (3%)	1 (3%)	1.000

A chi-squared test for nominal (categorical) data was conducted to examine if there were any group differences on the demographic variables and it was determined there were no statistically significant differences between the two groups with regard to the demographic variables. Although no statistical difference was found, there were some evident discrepancies between the groups with regard to age and highest degree

completed that must be addressed. The written case studies group overall was older than the simulation group with 21% of the participants being under 24 and 79% being 25 years old or greater. In comparison the simulation group had 44% of participants under the age of 24 and 56% who were 25 years old or greater.

Another evident discrepancy is that the written case studies group overall had a higher educational background than the simulation group. There were 75% of participants in the simulation group whose highest degree completed was high school, with the remaining participants having an associate degree (19%), and bachelor's degree (6%). In comparison, the written case studies group had 52% with a high school degree, with the remaining participants having an associate degree (30%), bachelor's degree (15%) and master's degree (3%).

The reason for these differences is unknown. All nursing students are randomly enrolled in course by an advisor as opposed to self-scheduling. There were two labs for the written case studies group participants which took place toward evening hours from 5:00 p.m. to 7:00 p.m. which could have contributed to students being placed there because of work schedules or family commitments. However, there were also another two labs for simulation group participants for that same time-frame. It is unknown how the demographic variables of the written case studies group being older and with a higher educational background than the simulation group would have changed the outcome of the study.

After first entering the individual participant scores from Insight Assessment along with all individual demographic data into an Excel spreadsheet, I then transferred

that information to Version 24 of the SPSS software for my analysis. Because the

demographic variables in my study revealed pre-existing differences of the case study

group being older and with a higher educational background then the simulation group, I

first wanted to determine if there was a statistical difference in pretest scores between the

simulation and case study groups. Creswell (2012) stated that an independent samples t

test can be used to compare the means between two unrelated groups (simulation and

case study) with the same continuous dependent variable (critical thinking scores). Table

5 depicts the descriptive statistics for overall pretest scores along with highest and lowest

scores for the HSRT and for the participants.

Table 5

Descriptive Statistics for Overall Pretest Scores

Group	n	M	SD	HSRT Range [a]	Participant Range
Simulation	36	20.39	3.04	0-33	16-28
Case Study	33	20.18	3.80	0-33	12-27

[a] Adapted from "Health Sciences Reasoning Test User Manual and Resource Guide",
2017, pp. 51, 55, by Insight Assessment, a division of the California Academic Press.
The point ranges are further classified as Low (0-14), Moderate (15-20), Strong (21-
25), and Superior (26-33). Low is defined as a result consistent with possible
insufficient test taker effort, cognitive fatigue, or possible reading or language
comprehension issues. Moderate is defined as a result indicating potential for skills-
related challenges when engaged in reflective problem-solving and decision making
associated with learning or employee development. Strong is defined as a result
consistent with the potential for academic success and career development. Superior is
defined as critical thinking skills that is superior to the vast majority of test takers.

I then conducted an independent samples t test for equality of means of the

overall pretest scores which is depicted in Table 6. My analysis indicated no statistical

difference between the mean pretest scores for the simulation group (M = 20.39, SD

=3.04) and the mean pretest scores for the case study group (M= 20.18, SD = 3.80), *t*(67)

= .251, *p* = 0.802.

Table 6

Independent Samples t test for Equality of Means of Overall Pretest Scores

Overall Pretest Scores	*t*	*df*	Sig. (2-tailed)	Mean Difference	Standard Error Difference
	.251	67	.802	.207	.824

I then directed my analysis back to my research question which was to determine

if there was a statistically significant difference in participants' mean critical thinking

scores across time within groups (pretest to posttest) and between groups (simulation

versus written case studies), as measured by the HSRT. Table 7 represents the means and

standard deviations of critical thinking test scores by time and group. Table 7 also

provides the HSRT range of scores along with the actual participants' range of scores.

There was a noteworthy score of six in the case study posttest group, which is classified.

as a low score and could be attributed to possible insufficient test taker effort or cognitive

fatigue (Health Sciences Reasoning Test User Manual and Resource Guide, 2017). At

baseline, the overall mean critical thinking score for the simulation group (20.39) was

slightly higher than the mean critical thinking score for the written case studies group

(20.18). The simulation group increased by 0.64 from pretest to posttest while the written

case studies group increased by 0.21 from pretest to posttest.

Table 7

Means and Standard Deviations of Mean Test Scores by Time and Group

Group	Time	n	M	SD	HSRT Range [a]	Participant Range
Simulation	Pretest	36	20.39	3.04	0-33	16-28
	Posttest	33	21.03	3.57	0-33	13-29
Case Study	Pretest	36	20.18	3.80	0-33	12-27
	Posttest	33	20.39	4.92	0-33	6-31

[a] Adapted from "Health Sciences Reasoning Test User Manual and Resource Guide", 2017, pp. 51, 55, by Insight Assessment, a division of the California Academic Press. The point ranges are further classified as Low (0-14), Moderate (15-20), Strong (21-25), and Superior (26-33). Low is defined as a result consistent with possible insufficient test taker effort, cognitive fatigue, or possible reading or language comprehension issues. Moderate is defined as a result indicating potential for skills-related challenges when engaged in reflective problem-solving and decision making associated with learning or employee development. Strong is defined as a result consistent with the potential for academic success and career development. Superior is defined as critical thinking skills that is superior to the vast majority of test takers.

A repeated measures mixed ANOVA (Table 8) was used to analyze if there was a statistically significant difference in participants' mean critical thinking scores across time within groups (pretest to posttest) and between groups (simulation versus written case studies). Results revealed the differences in the participants' mean critical thinking scores across time within groups (pretest to posttest) were not statistically significant, $F(1, 67) = .900$, $p = .346$ ($\eta^2 = .013$). Results also revealed the differences between groups (simulation versus written case studies) were not statistically significant $F(1, 67) = .264$, $p = .609$ ($\eta^2 = .004$).

Table 8

ANOVA on Critical Thinking Mean Test Scores by Time and Group

Source	df	F	Sig.	η^2
Within Groups				
Time	1	.900	.346	.013
Time * Intervention	1	.226	.636	.003
Error (Time)	67			
Between Groups				
Group	1	.264	.609	.004
Error (Group)	67			

Further, the null hypothesis was not rejected as the evidence indicated there was no statistically significant difference in participants' mean critical thinking scores across time within groups (pretest to posttest) and between groups (simulation versus written case studies), as measured by the HSRT. Evidence in this study does not support using high-fidelity simulation as a teaching strategy versus written case studies to increase critical thinking skills of nursing students. A reflection on the possible reasons for these findings is warranted. One reason could be the pre-existing differences between the two groups with regard to demographic variables. The written case studies group was older and had a higher educational background than the simulation group which could have potentially skewed the end results. Because I was not able to obtain demographic information for those students who chose not to participate, I am unable to ascertain how those differences might have been affected if all the students joined the study.

Other considerations are the length of the study (3 weeks) or perhaps differences in how the interventions were administered to the simulation and written case studies groups were administered by faculty at three different campuses (fidelity of the intervention). Although detailed instructions were provided for administration, different teaching styles and different demographics of the participants could have led to different outcomes.

A final consideration is that my chosen design did not include a control group which received no intervention at all. Designating a group that did not receive any type of intervention was not used in this study because of ethical obligations to not disadvantage any students. Schwartz, Chesney, Irvine, and Keefe (1997) discussed this control group dilemma in behavioral science where researchers often feel compelled to instead compare two interventions that have similar perceived value. From a statistical perspective, this type of comparison makes it difficult to garner statistically significant results (Schwartz et al., 1997) which was the outcome of my study analysis.

In reviewing the literature, evidence from the results of past studies indicates that the foundations of critical thinking development are not based on one specific teaching method (Carter, Creedy, & Sidebotham, 2015; Lin et al., 2015; Swart, 2017). Simulation was one teaching strategy that had been a part of the curriculum at the local setting since the program's inception in 2006. Because of this consistency, simulation was a variable that was feasible for me to study and gain valuable information. Although the findings in my study were not statistically significant, they did align with the available literature and

the local setting now for the first time has quantitative evidence on the effects of high-fidelity simulation on the critical thinking skills of nursing students.

The next step based on my findings was not to abandon the development of critical thinking in nursing students, but rather to examine the literature again and develop an action plan. It was found that the current trend in nursing education is the integration of multiple types of critical thinking strategies (Burrell, 2014; Carvalho et al., 2017; Nelson, 2017). Development of critical thinking does not necessarily involve a single teaching strategy such as simulation or is there the concept that one strategy is far more effective than another (Carter & Welch, 2016; Farashahi & Tajeddin, 2018; Gibbs, Trotta, & Overbeck, 2014). Combining multiple teaching strategies to develop critical thinking has the ability to reach out to students with varied learning styles, millennial nursing students, and culturally diverse nursing students (Andreou, Papastavrou, & Merkouris, 2014; Ferszi, Dugas, McGrane, & Calderelli, 2017; Sommers, 2018).

Thus, based on results of the available literature, my project will be a skills development workshop for faculty that would incorporate multiple methods of teaching strategies that have been shown to enhance critical thinking of nursing students. These strategies would include simulation, case studies, concept mapping, reflective journaling, and problem-based learning. The foundation of the workshop would be structured on evidence-based research and best practice so that faculty could build their skills in delivering these teaching strategies to maximize the benefits to nursing students. Section 3 will detail the project to include the purpose, rationale, literature review, and

description. Section 4 contains project strengths and limitations, recommendations for

alternative approaches, reflections, and directions for future research.

Section 3: The Project

Introduction

The purpose of this causal-comparative study was to determine if there was a difference in mean critical thinking scores between a group who received the teaching strategy of high-fidelity simulation versus a comparison group who received the teaching strategy of written case studies, as measured by the HSRT. A repeated measures mixed ANOVA was used to determine there was not a statistically significant difference in participants' mean critical thinking scores across time within groups (pretest to posttest) and between groups (simulation versus written case studies). These findings are consistent with the available literature in that studies on critical thinking teaching strategies have identified mixed results from similar interventions (Behar-Horenstein & Niu, 2011; Carter, Creedy, & Sidebotham, 2015). A literature review revealed that the current trend in nursing education is the integration of multiple types of critical thinking strategies into the curriculum (Burrell, 2014; Carvalho et al., 2017; Nelson, 2017).

Based on the literature, I have chosen the genre of professional development and training for my project. The format of the project will be a three-day workshop for all faculty (full-time and adjunct) on best practice(s) for delivering multiple evidence-based teaching strategies to enhance critical thinking skills of nursing students. The specific critical thinking teaching strategies of focus include simulation, case studies, concept mapping, reflective journaling, and problem-based learning. A detailed outline of the workshop is outlined in Appendix A, which includes the purpose, goals, learning outcomes, target audience, and all training materials. The remainder of this section

focuses on the rationale for the chosen project, literature review, description of the project, plan for evaluation, and finally project implications for both the local setting and for social change.

Rationale

Prior to conducting my study and analyzing the results, I contemplated some possible directions that my project could follow. One possible direction was professional development and training specifically related strictly to simulation. There is a considerable drive for simulation in nursing education because clinical sites are limited along with qualified clinical instructors. Simulation has been an avenue to deliver quality clinical experiences often in place of students being in acute care hospitals (Basak, Unver, Moss, Watts, & Gaiosom 2016; Hayden et al., 2014; Shin et al., 2015). However, as the results of my study unfolded, and I further reviewed the literature on multiple teaching strategies to enhance critical thinking skills of nursing students, a shift in the direction of my project was necessary.

The appropriate path based on the available literature is a professional development and training workshop for faculty but expanded to include multiple teaching strategies which promote critical thinking skills of nursing students. The decision to include multiple teaching strategies instead of a single strategy such as simulation was based on several factors. First, the foundations of critical thinking development are not based on one specific teaching method that is consistently better all the time (Carter et al., 2016; Lin et al., 2015; Swart, 2017). Behar-Horenstein and Niu (2011) reviewed 42 studies on critical thinking teaching strategies identifying mixed results from similar

interventions. In another systematic review of literature, Carter et al. (2016) reviewed 12 different teaching interventions to develop critical thinking and found that results varied, with little consistency across studies using similar types of teaching interventions.

Another rationale for using multiple teaching strategies is to reach out to varied learners. In a systematic review, Andreou et al. (2014) identified that critical thinking differed significantly related to learning styles of students. Thus, even using a well-proven strategy such as simulation, might not be effective for all learners, however, utilizing several active learning strategies could lead to more positive outcomes. Similarly, Sommers (2018) examined critical thinking development from the lens of diverse cultures and found that multiple teaching strategies are necessary to meet their global learning needs. Montenery et al. (2013) focused on the millennial generation and their need to have multiple modalities for learning to meet their technical and active participation learning styles.

The final rationale for using multiple teaching strategies was based on the current trend in research. Nelson (2017) suggested using a variety of teaching strategies to promote critical thinking such as case studies, simulation, concept mapping, questioning, exam review, and the flipped classroom. Echoing on Nelson were recommendations from Carvalho et al. (2017) to employ various student-centered learning strategies such as problem-based learning, simulation, reflective essays, and concept mapping. Evidence continues to suggest that traditional lectures with corresponding multiple-choice tests are not nearly as effective to engage students and promote critical thinking as active, student-centered, and problem-focused teaching strategies (Azizi-Fini, Hajibagheri, & Adib-

Hajbaghery, 2015; Nelson, 2017; Ward, Knowlton, & Laney, 2018). Farashahi and Tajeddin (2018) examined the effectiveness of lectures, case studies, and simulations. Results indicated simulation and case studies were perceived as being similar, but both more effective than the traditional lecture.

Kim, Kim, Lim, Kim, and Baek (2018) emphasized the need for nurse educating programs to develop multiple comprehensive teaching strategies to help nursing students improve their critical thinking skills. A benefit noted by Kim et al. is that the nurse with high critical thinking skills is more likely to base decisions on evidence-based practice because of their ability to reason, question, and inquire. Pierce and Reuille (2018) encouraged the use of multiple active learning strategies created by instructors to engage undergraduate nursing students. Multiple teaching strategies can be implemented in classrooms, labs, or clinical settings.

The rationale for choosing a workshop format was also based on evidence-based research. Nursing instructors require structured training to use and foster critical thinking in their teaching practices (Gul et al., 2014; Raymond, Profetto-McGrath, Myrick, & Strean, 2018). The ability to practice these skills with other nursing faculty in a safe environment such as a workshop is paramount to its success. In a cross-sectional survey design study, Oprescu, McAllister, Duncan, and Jones (2017) examined professional development needs of educators and found the top desired areas were designing assessment challenges, designing learning activities, simulation, and critical thinking ideas. Oprescu et al. (2017) further stated that especially with regard to simulation

learning activities, a workshop-style format is helpful to allow both discussion and application for the nurse educators as learners.

Although simulation was the primary variable in my, there other evidence-based options to increase critical thinking skills of nursing students. The workshop would provide knowledge and application to faculty for delivery of multiple teaching strategies based upon robust evidence-based research.

Review of the Literature

This review of literature focuses on multiple teaching strategies which promote critical thinking skills of nursing students and the best practice for their facilitation. The findings will be applied to my chosen project genre of professional development and training. Various components were compared, contrasted, and synthesized to provide a clear picture of the current research. Searches were conducted in both nursing and education databases. Key words for the database searches included teaching strategies, simulation, high-fidelity simulation, case studies, concept mapping, reflection, problem-based learning, faculty development, nurse, nursing student, nursing education, critical thinking, college, university, facilitation, prebriefing, debriefing, and reflective journaling. The following databases were searched at the Walden University Library and included Education Source, Education Research Complete, ERIC, Teacher Reference Center, CINAHL Plus with Full Text, Proquest Nursing and Allied Health Source. Each database was searched for scholarly, peer-reviewed articles.   The specific critical thinking teaching strategies discussed in this literature review include simulation, case studies, concept mapping, reflective journaling, and problem-based learning.

Simulation

Although simulation was covered extensively in the earlier literature review, this review focuses on prebriefing and debriefing which are important aspects of simulation to increase critical thinking skills. An extensive literature review by Page-Cutrara (2014) specifically examined prebriefing and its role in nursing simulation. Thirteen studies were reviewed as to different elements that might occur during a prebriefing. They included the traditional methods of facilitator providing scenario specific information to the students along with some alternative methods such as an oral shift hand-off report and also the use of a white board to map out a plan of action. A predominant theme was that prebriefing gives the opportunity for undergraduate nursing students to engage more fully and develop more complex skills such as higher-level critical thinking.

Debriefing which may also be known as reflective thinking was first introduced by John Dewey back in 1910 with active engagement as a defining characteristic (Dufrene & Young, 2014). Debriefing is often referred to as the cornerstone of simulation and where the real learning takes place (Reierson, Haukedal, Hedeman, & Bjork, 2017; Waznonis, 2014). Fey and Jenkins (2015) described debriefing as a guided reflective discussion that can close the gaps between experiencing an event and understanding it at a higher level.

Mariani, Cantrell, and Meakim (2014) examined nurse educators' perceptions about the benefits and barriers to structured debriefing after simulation. An important overall theme identified was that students who go through structured debriefing have an increased ability to display critical thinking along with incorporating new learning into

their current knowledge base. Participants in the study identified other advantages of structured debriefing as an active learner-centered teaching strategy, allows for reflection, provides the learners with quality feedback, and makes good connections between theory and practice. The major disadvantage noted was that debriefing requires time to attain proficiency and time to conduct it properly and that time is often not available for nurse educators.

There are also various instruments available which can be used for educational purposes. Rojas et al. (2017) described the methods one school of nursing used to educate their faculty on simulation debriefing using the Debriefing Assessment for Simulation in Healthcare (DASH) tool. Thirty faculty were instructed and then evaluated on how they structured debriefing and how they applied the learning concepts. The DASH tool is an instrument to measure success and identify gaps that needed to be reinforced. It was created by the Center for Medical Simulation at Harvard Medical School and is composed of six elements each rated on a 7-point Likert scale. The six elements are establishing an engaging learning environment, maintaining an engaging learning environment, structuring the debrief in an organized way, provoking engaging discussion, identifying and exploring gaps, and helping trainees achieve or sustain good future performance.

Debriefing can be conducted through a variety of modalities and tailored to the simulation, level of learner, and simulation objectives (Mariani et al., 2014). A more traditional approach is verbal debriefing led by the simulation facilitator. If the facilitator is competent and well-trained in debriefing, this method can be very effective (Bussard,

2017; Ha, 2014). The facilitator uses the simulation objectives as a guide and follows a predetermined series of open-ended question to all participants with follow-up discussion as the debriefing unfolds (Bussard, 2016).

Guided reflection is another method where through structured discussion and feedback, the participants thoughtfully review the simulation and their role identifying both positive aspects and areas for growth (Fey & Jenkins, 2015; Ha, 2014). Reflective debriefing allows all participants regardless of their role to assume an active role during the debriefing process (AlSabei & Lasater, 2016) and the participants' own reflections become a valuable learning opportunity for the entire simulation team (Abelsson & Bisholt, 2017). In a multisite quasiexperimental study, Forneris et al. (2015) found HSRT mean scores statistically significant for participants who had the intervention of reflective debriefing as opposed to customary debriefing.

Videotaping the simulation and then playing it back during the debriefing process can be another useful type of debriefing method (Bussard, 2017). The use of video playback described by Reierson et al. (2017) can provide an accurate perspective of the simulation for both observers and nurses. A qualitative study by Bussard (2016) examined whether self-reflection on video-recorded high-fidelity simulations assisted nursing students in the development of clinical judgment. Four positive themes arose which were confidence, communication, decision making, and change in clinical practice. Evidence from a quantitative study by Grant, Dawkins, Molhook, Keltner, and Vance (2014) revealed that video-assisted oral debriefing has positive effects in assisting nursing students to reflect on their simulation performance. Another study by Ha (2014)

found that video-assisted debriefing provides an affirmative self-reflection with regard to what went right during a simulation, what went wrong, what had to be done, and what might be done moving forward.

One of the roles during simulation can be that of an observer. Though normally the observer role is a passive activity, having the observers lead the debriefing session fosters all participants to be more engaged, motivated, and attentive. A debriefing experience handout could be provided for the observers to guide the debriefing session and keep the participants on task. The debriefing session could end with the facilitator summarizing the main themes discussed (Leigh, Miller, & Ardoin, 2017).

Reflective journaling is another method that could be used during the debriefing process. Bussard (2017) described how the simulation could be videotaped and students could access it later to complete a reflective journal. Students would be given questions or cues to guide their thought process and faculty would provide feedback on the journals. Reed (2015) held similar beliefs to Bussard and also suggested that reflective journaling could focus on the learning objectives and sequence of events during the simulation.

Case Studies

Case studies can be delivered as a teaching strategy in many forms such as written, unfolding, virtually, videotaped vignettes, or as a combination of case studies and simulation. My research study involved traditional written case studies that were taken from Winningham's Critical Thinking Cases in Nursing (Harding & Snyder, 2016). They were delivered in a paper and pencil format with a written scenario and then questions to

follow. The questions promote higher-level thinking by challenging the learner to apply, analyze, and evaluate a variety of information about a patient scenario. The downside of traditional written case studies, as described by Bowman (2017) is that because they are static, they do not allow the instructor to assess the student's continued thought process for decision making.

Another type of case study is the unfolding version where information is purposefully incomplete to encourage the student to use critical thinking skills and application of prior knowledge to prioritize and make decisions (Carter & Welch, 2016). Though research is limited on unfolding case studies, a recent qualitative study by Bowman (2017) used an unfolding case study to foster critical thinking skills of students. The case study was rolled out in four parts throughout the day. Initial information was related to laboratory data, physical assessment, orders, and medications. Students were required to look up data they were unsure of and responded to faculty-imposed questions to encourage critical thinking. The next part involved a change in the patient status where students were required to explain the changes and relay their thought process to a provider. The next part involved new orders from a provider where students had to talk about the orders and how they might explain them to a patient. The final part was when the patient's condition stabilized, and the students could focus on psychosocial issues. The overall results of this study included the development of critical thinking skills, increased confidence, and handling a critical situation in a safe environment.

Virtual interactive case studies are another alternative shown to have positive outcomes. Burke (2017) conducted a study using an I-Human Patients Case Player which

is marketed as a cloud-based virtual patient simulator and case authoring system. As a virtual case study, the student has active engagement and can "talk" with virtual patients, develop solutions, and receive feedback. Each case study takes approximately 1 hour to complete. In the study by Burke, findings revealed a significant improvement in three areas of clinical decision making and critical thinking.

Hooper (2014) conducted research using case studies and videotaped vignettes to examine critical thinking skills of nurses. Six videotaped vignettes on different topics were selected with a case study to follow each vignette. A quantitative one-group pretest/posttest design ($N = 18$) using the HSRT found a statistically significant increase in overall mean critical thinking scores. This study had many similarities to mine with regard to the pretest/posttest design and the HSRT as the measurement tool.

Combining teaching strategies such as simulation and case has the potential to offer a robust learning experience for the student (Gibbs et al., 2014). A mixed methods research study by Mills et al. (2014) involved a combination of both strategies where the participants worked through unfolding case studies within a simulation setting. This method offered the opportunity, stated Mills, for students to critically analyze problems and make decisions in a changing environment.

A more recent retrospective study by Sarasnick, Pyo, and Draper (2017) examined the two teaching strategies of simulation and computerized case studies together in an advanced medical-surgical nursing course. Standardized test scores were statistically significantly improved for the group of participants who received

computerized case studies along with increasing the application time of high-fidelity

simulation on a biweekly basis.

Concept Mapping

Another teaching strategy which has been shown to have a positive association

with critical thinking is concept mapping. Concept maps can be used in a variety of ways

such as a visual representation of health issues (Lin et al., 2015; Orique & McCarthy,

2015), connecting new information to existing knowledge (Yue, Zhang, Zhang, & Jin,

2017), and actively engaging students in the interpretation of data and synthesis of ideas

(Kaddoura, Vandyke, Cheng, and Shea-Foisy, 2016; Mammen, 2016). Concept mapping

is versatile and can be used in the classroom, labs, or clinical settings (Burrell, 2014). A

sample concept map for nursing students is shown as Figure 4.
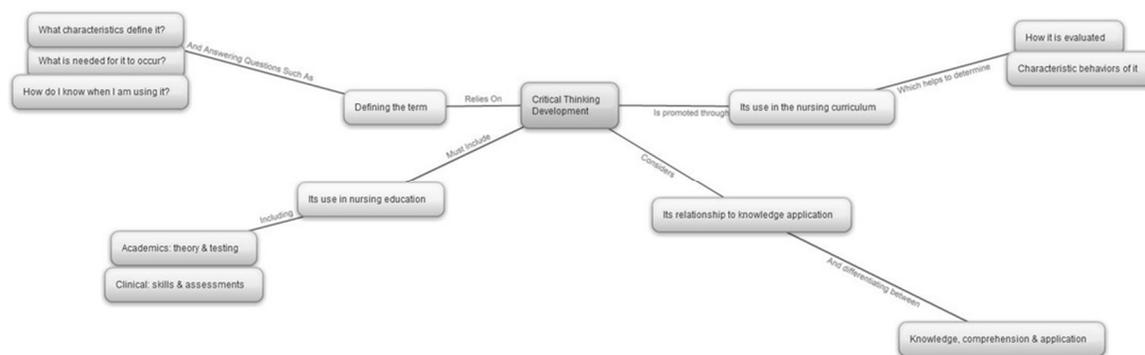
Figure 4. Critical thinking concept map. Adapted from "Using Concept Mapping to Foster Critical Thinking," by P. Schmehl, 2018. Retrieved from https://www.nursingconceptmapping.com/

Although traditional concept maps are constructed with a paper and pencil

format, computer-assisted concept mapping (CACM) is gaining greater attention. The

advantages of CACM over paper maps is greater ability to modify content, size, shape,

and examine multiple concepts. Examples of free software for CACM include Virtual

Understanding Environment, Xmind, MindMaple, and Prezi (Mammen, 2016).

A quasiexperimental pretest-posttest study by Orique and McCarthy (2015)

examined critical thinking and the use of concept mapping during the preparation of care

plans. Evidence found a statistically significant increase in critical thinking scores

measured by the Holistic Critical Thinking Scoring Rubric. In comparison, in a

qualitative study Lin et al. (2015) analyzed a teaching-learning strategy of concept

mapping, question and answers, and real-life case studies found that these methods

alternately influenced and enhanced each other in the development of critical thinking.

Thus, both a single teaching strategy and combined strategies can promote critical

thinking for nursing students (Burrell, 2014; Carvalho et al., 2017; Nelson, 2017).

A large systematic review and meta-analysis by Yue et al. (2017) examined the

effectiveness of concept mapping versus traditional methods (such as lectures) on the

development of critical thinking in nursing education. The review provided evidence

supporting the use of concept mapping in nursing education. The subgroup analyses

"suggested that concept map user had significantly higher critical affective dispositions

of open-mindedness, truth-seeking, analyticity, systematicity, self-confident,

inquisitiveness, and maturity compared with traditional methods" (p. 93).

Reflective Journaling

Although research on reflective journaling and its effect on critical thinking is

limited, there is justification for its use. Naber et al. (2014) stated that reflective writing

focuses on an activity the learner has undergone, such as clinical experiences in the

hospital, collaborative group work, or research projects, and connects what was learned from the activity. Burrell (2014) described reflection as being a part of active learning which assists the learner to correlate theory and practice. A descriptive qualitative study by Zori (2016) examined how the teaching strategy of reflective journaling influenced critical thinking dispositions of nurses. Journal entries were analyzed with regard to inquisitiveness, systematicity, analyticity, truth-seeking, open-mindedness, critical thinking self-confidence, and critical thinking maturity. Two major themes evolved with the first theme being that critical thinking is a process which progresses over time. The second theme, and of great importance, was that using critical thinking dispositions might prevent negative patient outcomes in providing safer patient care. A visual example of a reflective journal is shown in Figure 5.
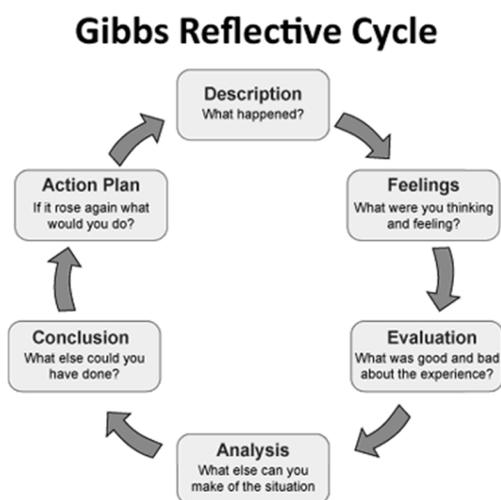
Figure 5. Reflective learning journal by R. Holmes, 2013. Retrieved from https://richardaholmes.wordpress.com/2013/02/05/assessment-task-6-fiction-project-reflective-learning-journal-criteria-4-1-4-2/

In a similar qualitative analysis, Naber et al. (2014) identified six narrative themes with regard to critical thinking and nursing students. The themes included transferring knowledge, centering care on the patient, recognizing consequential issues, collaboration, and self-examination. Naber (2014) further added that demonstrating critical thinking in the clinical setting leads to high-quality interventions and improved patient outcomes.

Naber and Wyatt (2014) conducted a quantitative experimental pretest-posttest study on the effect of reflective writing on critical thinking skills and dispositions. This study included an experimental group who completed six reflective writing assignments and a control group who did not complete the reflective writing assignments. Results indicated the experimental group had a statistically significant increase in the subscale of truth-seeking.

Reflective journaling can also be used during the debriefing process in simulation. Bussard (2017) described how the simulation could be videotaped and students could access it later to complete a reflective journal. Students would be given questions or cues to guide their thought process, and faculty would provide feedback on the journals. Reed (2015) held similar beliefs to Bussard and also suggested that reflective journaling could focus on the learning objectives and sequence of events during the simulation.

Problem-based Learning

The final teaching strategy for review is problem-based learning which had its origin at the McMaster School of Medicine in Canada dating back to 1965 and was first used as curriculum teaching strategy in 1988 (Kong et al., 2014; Wosinski et al., 2018). It is described as a process-focused teaching strategy as opposed to content-based (Choi,

Lindquist, & Song, 2014), building cognitive skills to solve complex problems (Gholami et al., 2016), and is a highly structured group-centered collaborative approach to learning (Carvalho et al., 2017). The self-directed aspect of problem-based learning is crucial in the development of critical thinking (Choi et al., 2014).

The problem-based learning teaching strategy as applied to nursing education involves students working in small groups to collaboratively create solutions. It generally follows a minimum of five steps to include (a) analysis of an actual or potential health problem, (b) review the data on the problem, (c) identify knowledge gaps, (d) research possible solutions, and (e) create an action plan (Orique & McCarthy, 2015).

In a systematic literature review, Jeppesen, Christiansen, and Frederiksen (2017) examined the connection between teaching strategies and student learning to determine which strategies provided the strongest learning experiences and outcomes. One of the findings was that problem-based learning as a strategy not only motivates students, but strongly develops their critical thinking and clinical reasoning skills. Another systematic review conducted by Carvalho et al. (2017) found that problem-based learning was the most widely used teaching strategy to promote critical thinking.

A quasiexperimental quantitative study by Gholami et al. (2016) compared problem-based learning and the traditional lecture method on critical thinking skills of nursing students. For the problem-based learning intervention group, the students were given a core concept map, learning goals, scenarios, and focused questions. The problem-based learning model in this study was applied in the following six stages and could be replicated as a teaching strategy into most nursing curriculums:

1. Group clarification. In this stage the students clarified the scenario and problem and discussed areas which were undefined.

2. Brainstorming. The students shared their thoughts, past knowledge, and potential solutions.

3. Self-directed learning. The students conducted their own research for additional information and then supplied summaries and critical thinking questions to the peers in their group.

4. Group discussion. All members and discussed and debated possible explanations to the problem. The group facilitator assisted to guide the discussion with focused questions.

5. Presenting a care plan. Each group prepared a care plan which outlined their resolution.

6. Evaluation and reflection. All members participated in a peer evaluation and self-evaluation and reflection of this process.

Results of the study showed a statistically significant increase in overall critical thinking scores and also in the subscales of evaluation and deduction as opposed to the traditional lecture method. Another study by explored Kong et al. (2014) explored the effectiveness of problem-based learning on nursing students' critical thinking. Results also indicated problem-based learning was able to improve critical thinking scores compared with traditional lectures. A conceptual view of problem-based learning is shown in Figure 6.
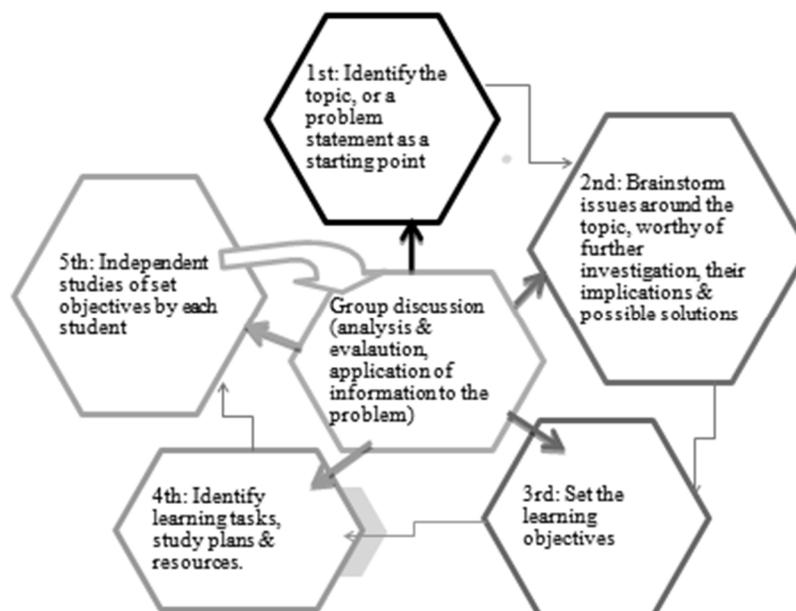
Figure 6. Problem based learning sequential steps. Adapted from "Motivations for the Use of Problem-Based Learning for Preparation of Undergraduate Nursing Students for Professional Competencies: A Literature Review," by K. Amakali, 2012, *International Journal of Nursing Sciences*, p. 55.

Problem-based learning can be effectively integrated into nursing curriculums in the classrooms, labs, and clinical settings. Wosinski et al. (2018) conducted a qualitative systematic review study on how to facilitate problem-based learning in undergraduate nursing students. Findings with regard to students were that the quality of the group interactions is paramount to the success of problem-based learning and the instructor aids to foster that interaction. Students also need to fully understand the process and intent of the problem-based learning model to garner its success. The other findings of this study were that because of its highly structured approach, it is a learning strategy which requires instructors to be adequately trained on facilitation and fostering the students through the process.

Project Description

After I have completed the doctoral program, disseminated the results of my study, and obtained approval from the nursing leadership team, I would be in a position to implement the project. The project is a 3-day workshop (Wednesday through Friday) to be offered in August 2019, entitled *Keep Calm and Teach On: An Evidence-Based Review of Teaching Strategies to Enhance Critical Thinking Skills of Nursing Students.* This month was chosen because nursing classes begin in September and the month of August is typically where faculty prepare and plan for the next academic year. Calendar invites would be sent to faculty in the months prior once I have been permitted to move forward.

The purpose of my chosen project is to provide faculty with the training and practical application to deliver multiple teaching strategies that enhance critical thinking skills of nursing students using research-driven and evidence-based practice techniques. The target audience for the workshop is all full-timed and adjunct faculty who teach at the local setting. It is estimated there would be approximately 25 faculty eligible to participate in the workshop.

The learning outcomes are that at the conclusion of this workshop, participants would be able to:

1.   Describe the rationale for multiple types of teaching strategies in nursing education to enhance critical thinking skills of nursing students;

2.   Discuss and apply current evidence-based practice of simulation as a teaching strategy to enhance critical thinking skills of nursing students;

3.   Discuss and apply current evidence-based practice of case studies as a teaching strategy to enhance critical thinking skills of nursing students;

4.   Discuss and apply current evidence-based practice of concept mapping as a teaching strategy to enhance critical thinking skills of nursing students;

5.   Discuss and apply current evidence-based practice of reflective journaling as a teaching strategy to enhance critical thinking skills of nursing students;

6.   Discuss and apply current evidence-based practice of problem-based learning as a teaching strategy to enhance critical thinking skills of nursing students.

One existing support for this project is that leadership of all levels at the local setting fully support the use of active learning teaching strategies throughout the curriculum. Specifically, with regard to simulation, many nursing programs, invest in high-priced mannequins without having adequate support for faculty to deliver high-quality learning and teaching (Topping et al., 2015). That is not the case at the local setting, as they strongly encourage professional development to meet the learning needs of nursing students. There is also support for existing faculty to serve as onsite presenters for professional development conferences and workshops as an alternative to faculty going to a destination which requires airfare, lodging, meals, and conference fees.

Another existing support is that decisions at the local setting are driven by current evidence-based research. The results and research from my doctoral study will disseminated to the key stakeholders when I request permission to offer the workshop to nursing faculty.   The main campus at the local setting serves as another existing support as a location to conduct the simulation workshop. There are adequate conference rooms

along with the simulation laboratory and software which can be used without any fees to the participants or the nursing department. The information technology resources are also available at the main campus and can assist with any technical components required for the workshop.

The biggest potential barrier to my project is the financial component. It is estimated there will be expenses for travel (mileage reimbursement), lodging, and meals for the participants. One solution to this barrier is to utilize the catering services at the local setting to serve a continental breakfast and lunch on the three workshop days. Dinner would be the responsibility of the participants which is a standard practice when events are held at the main campus.

My responsibility for this workshop would be as lead facilitator. I would coordinate all aspects including invites, agenda, lodging, meals, securing involvement from Information Technology personnel, and securing students to take part in practice simulations. I would seek assistance from the four simulation lab coordinators at each campus for the workshop days to serve as co-presenters and offer their well-respected expertise on simulation.

Project Evaluation Plan

As described by Caffarella and Daffron (2013), formative evaluations focus on what can be done to improve or change while a program is in progress, while summative evaluations assess the results or outcomes of a program. I will employ formative evaluations with a short posttest at the end of each workshop day to assess discussed content for that day. I will also use formative evaluations during the workshop with the

aid of the Debriefing Assessment for Simulation in Healthcare (DASH) tool[1]. The

DASH tool is an instrument to measure success and identify gaps that needed to be

reinforced. It was created by the Center for Medical Simulation at Harvard Medical

School and is composed of six elements each rated on a 7-point Likert scale. The six

elements are establishing an engaging learning environment, maintaining an engaging

learning environment, structuring the debrief in an organized way, provoking engaging

discussion, identifying and exploring gaps, and helping trainees achieve or sustain good

future performance (Rojas et al., 2017). After receiving training on prebriefing and

debriefing techniques, participants will have the opportunity to conduct a simulation with

other participants (observers) using the DASH tool to provide constructive feedback.

This form of evaluation is being utilized to close the gap between theory and application.

Conferences and workshops often provide a plethora of valuable information, but if the

knowledge is not timely applied, there remains a disconnect for the learner.

Summative evaluation will be used in the form of a survey emailed to the

participants within a few days following completion of the workshop. Survey Monkey is

the online survey software that will be used for this project. A post-workshop survey was

chosen to gather information about the workshop environment, presenters, and learning

outcomes. The timeframe of emailing it after the workshop instead of having participants

complete it onsite was to give participants time to process the information and reflect

prior to completing the survey.

---

[1] Permission granted for use of the DASH tool from: Center for Medical Simulation
(2018). Debriefing Assessment for Simulation in Healthcare (DASH). Retrieved from
https://harvardmedsim.org/debriefing-assessment-for-simulation-in-healthcare-dash/

The overall learning outcomes are that at the conclusion of this workshop, participants would be able to:

1.   Describe the rationale for multiple types of teaching strategies in nursing education to enhance critical thinking skills of nursing students;

2.   Discuss and apply current evidence-based practice of simulation as a teaching strategy to enhance critical thinking skills of nursing students;

3.   Discuss and apply current evidence-based practice of case studies as a teaching strategy to enhance critical thinking skills of nursing students;

4.   Discuss and apply current evidence-based practice of concept mapping as a teaching strategy to enhance critical thinking skills of nursing students;

5.   Discuss and apply current evidence-based practice of reflective journaling as a teaching strategy to enhance critical thinking skills of nursing students;

6.   Discuss and apply current evidence-based practice of problem-based learning as a teaching strategy to enhance critical thinking skills of nursing students.

The key stakeholders in this project include full-time and adjunct faculty who teach simulation. The target audience for the workshop is all full-time faculty who teach at the local setting. It is estimated there would be approximately 25 faculty eligible to participate in the workshop. Each of the four campuses has an associate department chair who will have a vital role in encouraging faculty to attend the workshop. Other valuable stakeholders in leadership positions are the department chair of nursing, associate dean of nursing, and the dean of the College of Health Professions. These stakeholders are who I

will approach for permission to conduct the workshop and will also approve and give direction regarding the workshop expenses and budget.

I am also a full-time faculty member and will also serve as lead facilitator for the workshop. Each of the four campuses has a simulation coordinator who would attend the workshop and assist me in the delivery. Nursing students are potential stakeholders in a two-fold manner. First, it is the long-range goal that this workshop will improve the delivery of teaching strategies to increase critical thinking skills of future nursing students. In the immediate, members of the Student Nurse Association will be asked to participate in the practice simulations during the workshop as students so that participants can apply their knowledge and gain valuable feedback for the future.

Project Implications

It is the long-range goal that this project will improve the delivery of multiple evidence-based teaching strategies to subsequently increase critical thinking skills of future nursing students. One significant benefit for nursing students to have high critical thinking scores is in preparation for successful passing of the NCLEX-RN (Trofino, 2013). There is evidence that critical thinking skills are a high predictor of first-time NCLEX-RN pass rates (Kaddoura et al., 2017; Romeo, 2013). In addition, a nurse who has strong critical thinking skills has the potential to impact social change in a larger context by directly improving patient safety and enhancing patient outcomes (Carvalho et al., 2017; Kaddoura, 2013; Paul, 2014; VonCollin-Appling & Giuliano, 2017).

Section 4: Reflections and Conclusions

This final section will provide the strengths and limitations of the project and will discuss recommendations for alternative approaches to the problem. Also addressed is an introspective analysis about myself as a scholar, practitioner, and project developer. A reflection on the importance of this work along with implications for future research will also be covered in this section.

Project Strengths and Limitations

One strength of this project is that the literature strongly supported the use of multiple teaching strategies to enhance critical thinking of nursing students. Although simulation was the main variable in my study, other teaching strategies can be just as effective to reach positive outcomes. Another strength is that nursing faculty along with university leadership were very supportive of my study and the subsequent results. The university where I teach is driven by solid evidence-based research when making decisions and was respectful of the contribution I was able to make for nursing students. Another strength is that the project builds upon a framework of excellence at the university where I teach which already is very strong, but the project has the potential to make it even better. The local setting offers a very rich and robust curriculum for nursing students and the application of the latest evidence-based research could further enhance outcomes.

A limitation of this project is for faculty to take one or all of these teaching strategies and embed them into their nursing education practice. Ignatavicius and Chung (2016) stated how it is common for nurse educators to attend conferences or workshops,

learn new strategies and information, but often fail to transfer that new learning into practice. The most common reasons found in a survey study by Ignatavicius and Chung were financial resources, workload, and time. Faculty reported being frustrated with the lack of time to implement new teaching strategies into their curriculum because of increased teaching workloads and other responsibilities. One of the reasons the workshop was chosen to be conducted in May is because nursing classes begin in September and the month of May is typically where faculty prepare and plan for the next academic year. Also, since the workshop includes faculty from all campuses, collaboration can begin on implementation strategies and carry forward into the next academic year.

Recommendations for Alternative Approaches

This study focused on high-fidelity simulation and its effects on the critical thinking skills of nursing students. Although this study focused on increasing critical thinking skills in a simulation lab, that is not the only learning venue for nursing students. The development of critical thinking skills could also be explored in the clinical setting. An alternative approach would be to focus on critical thinking during the clinical rotations students have in acute care hospitals rather than a simulated laboratory environment. There could be exploration of critical thinking during care of actual patients as opposed to mannequins and what kind of similarities or differences are found. Another alternative solution would be a complete revision to the Curriculum Plan. Careful leveling and sequencing of evidence-based critical thinking activities could be implemented throughout the entire curriculum. Long-term and short-term objectives

would need to be established, specific activities developed, assessments (both formative and summative, along with an evaluation plan with feedback from students and faculty.

Another alternative approach would be to examine through separate research questions each of the subscales of critical thinking which were analysis, deduction, evaluation, induction, and inference. This deeper delve could provide valuable information about the intricate aspects of critical thinking to identify strengths and growth areas.

A final alternative approach would be to examine the pre-existing differences between the simulation and written case studies groups. It would be valuable information to revisit the students who chose not to participate, obtain their demographic information, and determine if the two groups would have been more similar if all possible participants had joined the study.

Scholarship, Project Development and Evaluation, and Leadership and Change

The intent of the project was to address an existing problem at the local setting and to provide positive outcomes for our customers which are the nursing students. After I conducted my literature review on the project and analyzed the findings, the formulation of the actual workshop for the nursing faculty followed a logical progression. Using current evidence-based research as the foundation of my project was the critical component to create a quality workshop and to get support from all stakeholders.

Being a scholar and conducting research at the doctorate level has challenged me both personally and professionally. Along with very concrete requirements during this process, I was also able to integrate my creativity and passion for the two things that

inspire me every single day, that being nursing and teaching. This process has made me appreciate the enormous amount of thought and energy that goes into quality research and I have gained new respect for the scholars before me which laid the framework for my study. During an adult theory course, I took through Walden University, I had the opportunity to develop a richer understanding of the transformational learning theory which was developed by Mezirow (1997). One of the key outcomes of this theory is that transformational learning develops autonomous thinking which might include moral decision making, responsibility, being an independent thinker, weighing the pros and cons of a situation, and making decisions that affect social change (Kitchenham, 2008; Mezirow, 1990). Although a novice scholar and researcher, I have richly experienced all of these attributes of the autonomous thinker at different levels and at different points throughout my doctoral journey.

In my practitioner role as a nursing instructor, I talk frequently with my nursing students about evidence-based research in healthcare and that decisions, protocols, and best practice is all based on research. What was enlightening to students is that education is also based on evidence-based research with regard to areas like curriculum, evaluation, and teaching strategies. The nursing students were intrigued to see the volumes of past and present research about my topic of high-fidelity simulation and critical thinking. The most poignant outcome for my students of being a doctoral student is that it has allowed me to role-model being a life-long learner.

As a project developer, it has been exciting to use my individual research as a means to promote positive social change within the actual learning environment where I

teach nursing students. I have developed smaller projects but have never taken a lead role for all faculty between four different campuses. To deliver quality nursing care, there is a well-grounded process of assessment, diagnosis, planning, implementation, and evaluation. This process has also been helpful to me as a project developer to systematically think about the problem as a whole and then use research and evidence to develop a solution. My research and developing this project has broadened my scope as a leader in being more proactive instead of reactive as new situations develop in the educational arena.

Reflection on Importance of the Work

As I reflect on my research, I take pride that it specifically contributed to the university where I teach and examined a teaching strategy that had not previously been evaluated. My study is now a part of past and future research to keep gaining knowledge about the critical thinking skills of nursing students. I also reflect on the importance of evidence-based practice in nursing education and the challenges involved in doing research in an educational setting. To keep my research ethical, there were limitations on how my study could be designed. For example, having a control group with no intervention might have provided very valuable information, but it would have gravely disadvantaged students. I was unable to conduct the study for an extended period of time for similar reasons. While there were many factors I could control during the study, there was equally many variables out of my control. Issues such who decided to participate or not, how engaged participants were during the study, and other unknown stressors such

as school, employment, or personal problems may or may not have been contributing factors.

Evidence based research can and should be used to make positive changes. I am inspired to continue researching various aspects of education including teaching strategies, curriculum, and evaluation. Conducting a study like this also reveals to students how seriously faculty take evidence-based research. Role-modeling the nurse as a researcher is vital to our future generations of new nurses.

Implications, Applications, and Directions for Future Research

A significant benefit for all nursing students to have high critical thinking skills is in preparation for successful passing of the NCLEX-RN. There is evidence that critical thinking skills are a high predictor of first-time NCLEX-RN pass rates (Romeo, 2013). Fewer licensed nurses means fewer practicing nurses in a time of critical nursing shortage (Jung, Lee, Kang, & Kim, 2017; Snavely, 2016). A nurse who has strong critical thinking skills has the potential to impact social change by directly improving patient safety and enhancing patient outcomes (Carvalho et al., 2017; Kaddoura, 2013; Paul, 2014; VonCollin-Appling & Giuliano, 2017).

The roots of this study were based on a cognitive learning theory framework as interpreted by Ausbel which focuses on the development of critical thinking, thought processes, and how individuals learn (McLeod, 2015). As applied to my research study, higher-order meaningful learning (critical thinking) can be developed by using classroom theory and then applying the concepts through a teaching strategy such as high-fidelity simulation where nursing students can act and react to a variety of real-life patient

scenarios. Another theoretical undertone for my study was the Paul-Elder Critical

Thinking Mode which focused on eight elements of reasoning in developing critical

thinking skills and traits. To develop good reasoning, students must identify a purpose or

reason to achieve an objective. Next, students must identify questions that need to be

answered or a problem that needs to be solved. They must be made aware of the data,

facts, observations, and information available to them to solve the problem effectively.

Students should then make appropriate interpretations and inferences to draw conclusions

and give meaning to data. They should identify theories, principles, and rules. They

should be able to identify and articulate implications and consequences. Finally, students

should be able to clearly state their points of view (Paul & Elder, 2014; Naber et al.,

2014; Naber & Wyatt, 2014). High-fidelity simulation was used as the catalyst to take

these elements of reasoning (thought) and develop the intellectual dispositions or skills

which in my research study was measured using the HSRT.

One recommendation for future research is longitudinal studies on critical

thinking and simulation. Following a nursing student from entry through graduation and

measuring critical thinking skills at several points could provide valuable information on

the development of critical thinking skills.   Another recommendation is to do a similar

study, but with many nursing schools and a larger participant pool. Although simulation

might be conducted differently at each school, those variables could be examined and

provide important information.

At the local setting, it is my intent to conduct the workshop identified in my

project, allow a minimum of one-year post-workshop and then conduct another study to

measure critical thinking of nursing students. I could compare the original evidence from this study to the later study and determine if the workshop intervention had positive results. Finally, future research might include a qualitative study which would offer rich feedback from students on common themes related to simulation and critical thinking.

Conclusion

Healthcare in our country is fast-paced, involves complex patient situations, and requires nurses to be strong critical thinkers. Patients' lives depend on nurses being able to make accurate decisions and take the necessary course of action (Kaddoura et al., 2017). It is the responsibility of nurse educators, stated VonCollin-Appling and Giuliano (2017) to promote attributes of independent, analytical and reflective thinking in nursing students as a driving force behind the profession. Jensen (2013) supported an even stronger position that nurse educators have an obligation to ensure that students graduating from nursing programs have critical thinking skills.

I have a passion for nursing and an even greater passion as an educator to help foster the next generation of new nurses. One of the reasons I chose Walden University to pursue my doctorate degree was the high emphasis it placed on positive social change. The evidence from my study can be used to make an impact on nursing students, nursing education, but most importantly positive outcomes for the patients that nurses care for each and every day.

"Save one life you are a hero. Save 100 lives you are a Nurse!"
~ Anonymous

References

Abelsson, A., & Bisholt, B. (2017). Nurse students learning acute care by simulation:

Focus on observation and debriefing. *Nurse Education in Practice, 24*, 6-13.

doi:org.10.1016/j.nepr.2017.03.001

Adib-Hajbaghery, M., & Sharifi, N. (2017). Effect of simulation training on the

development of nurses and nursing students' critical thinking: A systematic

literature review. *Nurse Education Today, 50*, 17-24.

doi:org/10.1016/j.nedt.2016.12.011

Ahn, H., & Kim, H. Y. (2015). Implementation and outcome evaluation of high-fidelity

simulation scenarios to integrate cognitive and psychomotor skills for Korean

nursing students. *Nurse Education Today, 35*(5), 706-711.

doi:org.ezp.waldenulibrary.org/10.1016/j.nedt.2015.01.021

AlSabei, S. D., & Lasater, K. (2016). Simulation debriefing for clinical judgment

development: A concept analysis. *Nurse Education Today, 45*, 42-47.

doi:org/10.1016/j.nedt.2016.06.008

Amakali, K. (2012). Motivations for the use of problem-based learning (PBL) for

preparation of undergraduate nursing students for professional competencies: A

literature review. *International Journal of Nursing Sciences, 2*(5), 53-57.

doi:10.5923/j.nursing.20120205.02

American Association of Colleges of Nursing (AACN). (2008). *The essentials of*

baccalaureate education for professional nursing practice. Retrieved from

http://www.aacn.nche.edu/education-resources/BaccEssentials08.pdf

Andreou, C., Papastavrou, E., & Merkouris, A. (2014). Learning styles and critical thinking relationship in baccalaureate nursing education: A systematic review. *Nurse Education Today, 34*(3), 362-371. doi:org/10.1016/j.nedt.2013.06.004

Aroke, E. N. (2014). Full nursing potential: A concept clarification. *Nursing Forum, 49*(4), 278-287. doi:org/10.1111/nuf.12096

Ausubel, D. P. (1962). Learning by discovery. *Educational Leadership, 20*(2), 113-117. Retrieved from

http://eds.b.ebscohost.com.ezp.waldenulibrary.org/eds/pdfviewer/pdfviewer?vid= 6&sid=821313fb-d7ec-4e62-92e6-3306fad0fe73%40sessionmgr103&hid=114

Azizi-Fini, I., Hajibagheri, A., & Adib-Hajbaghery, M. (2015). Critical thinking skills in nursing students: A comparison between freshmen and senior students. *Nurse Midwifery Stud, 4*(1), 1-5. Retrieved from

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4377532/

Basak, T., Unver, V., Moss, J., Watts, P., & Gaioso, V. (2016). Beginning and advanced students' perceptions of the use of lose and high fidelity mannequins in nursing simulation. *Nurse Education Today, 36*, 34-43. Retrieved from

http://dx.doi.org/10.1016/j.nedt.2015.07.020

Behar-Horenstein, L. S., & Niu, L. (2011). Teaching critical thinking skills in higher education: A review of the literature. *Journal of College Teaching and Learning, 8*(2), 25-41. doi:10.19030/tlc.v8i2.3554

Benner, P., Sutphen, M., Leonard, V., & Day, L. (2010). *Educating nurses: A call for radical transformation.* San Francisco, CA: Jossey-Bass.

Blevins, S. (2014). The impact of simulation on patient care. *Medsurg Nursing, 23*(2),

    120-121. Retrieved from https://amsn.org/professional-

    development/periodicals/medsurg-nursing-journal

Booth, T. L., Emerson, C. J., Hackney, M. G., & Souter, S. (2016). Preparation of

    academic nurse educators. *Nurse Education in Practice, 19*, 54-57.

    doi:org/10.1016/j.nepr.2016.04.006

Bowman, K. (2017). Use of online unfolding case studies to foster critical thinking.

    Journal of Nursing Education, 56(11), 701-702. doi:10.3928/01484834-

    20171020-13

Brown, D., & Chronister, C. (2009). The effect of simulation learning on critical thinking

    and self-confidence when incorporated into an electrocardiogram nursing course.

    Clinical Simulation in Nursing, 5(1), e45-e52. doi:org/10.1016/j.ecns.2008.11.001

Burbach, B., Barnason, S., & Thompson, S. A. (2015). Using "think aloud" to capture

    clinical reasoning during patient simulation. *International Journal of Nursing

    Education Scholarship, 12*(1), 1-7. doi:org/10.1515/ijnes-2014-0444

Bussard, M. E. (2016). Self-reflection of video-recorded high-fidelity simulations and

    development of clinical judgment. *Journal of Nursing Education, 55*(9), 522-527.

    doi:10.3928/01484834-20160816-06

Bussard, M. E. (2017). Postdebriefing activities following simulation. *Teaching and

    Learning in Nursing, 12*, 220-222. doi:org/10.1016/j.teln.2017.03.010

Bureau of Labor Statistics (2013). *Occupations with the largest projected number of job

    openings due to growth and replacement needs, 2012 and projected 2022.*

Washington, D.C. Retrieved from

http://www.bls.gov/news.release/ecopro.t08.htm

Burke, S. M. (2017). Cultivating critical thinking using virtual interactive case studies. *Journal of Pediatric Nursing, 33*, 94-96. doi:org/10.1016/j.pedn.2016.12.001

Burrell, L. A. (2014). Integrating critical thinking strategies into nursing curricula. *Teaching and Learning in Nursing, 9*, 53-58. doi:org/10.1016/j.teln.2013.12.005

Caffarella, R. S., & Daffron, S. R. (2013). *Planning programs for adult learners: A practical guide* (3rd ed.). San Francisco, CA: Jossey-Bass.

Cant, R. P., & Cooper, S. J. (2017). Use of simulation-based learning in undergraduate nurse education: An umbrella systematic review. *Nurse Education Today, 49*, 63-71. doi:org/10.1016/j.nedt.2016.11.015

Carter, A. G., Creedy, D. K., & Sidebotham, M. (2016). Efficacy of teaching methods used to develop critical thinking in nursing and midwifery undergraduate students: A systematic review of the literature. *Nurse Education Today, 40*, 209-218. doi:org/10.1016/j.nedt.2016.03.010

Carter, J. T., & Welch, S. (2016). The effectiveness of unfolding case studies on ADN nursing students' level of knowledge and critical thinking skills. *Teaching and Learning in Nursing, 11*, 143-146. doi:org/10.1016/j.teln.2016.05.004

Carvalho, D. P., Azevedo, I. C., Cruz, G. K., Mafra, G. A., Rego, A. L., Vitor, A. F.,...Ferreira, M. A. (2017). Strategies used for the promotion of critical thinking in nursing undergraduate education: A systematic review. *Nurse Education Today, 57*, 103-107. doi:org/10.1016/j.nedt.2017.07.010

Cazzell, M., & Anderson, M. (2016). The impact of critical thinking on clinical judgment during simulation with nursing students. *Nursing Education Perspectives, 37*(2), 83-90. doi:10.5480/15-1553

Center for Medical Simulation. (2018). Debriefing assessment for simulation in healthcare (DASH). Retrieved from https://harvardmedsim.org/debriefing-assessment-for-simulation-in-healthcare-dash/

Chamberlain, J. (2017). The impact of simulation prebriefing on perceptions of overall effectiveness, learning, and self-confidence in nursing students. *Nursing Education Perspectives, 38*(3), 119-125. doi:10.1097/01.NEP.0000000000000135

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, 34*, 52-56. doi:org/10.1016.j.nedt.2013.02.012

Cohen, J. (1992). Statistical power analysis. *Current Directions in Psychological Science, 1*(3), 98-101. Retrieved from http://journals.sagepub.com/home/cdp

Creswell, J. W. (2012). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research* (4th ed.). Boston, MA: Pearson Learning Solutions.

Del Bueno, D. (2005). A crisis in critical thinking. *Nursing Education Perspectives, 26*(5), 278-282. Retrieved from https://www.ncbi.nlm.nih.gov/labs/journals/j-pract-nurs/

Dufrene, C., & Young, A. (2014). Successful debriefing. Best methods to achieve positive learning outcomes: A literature review. *Nurse Education Today, 34*, 372-376. doi:org/10.1016/j.nedt.2013.06.026

Everett-Thomas, R., Valdes, G. R., Fitzpatrick, M., & Birnbach, D. J. (2015). Using simulation technology to identify gaps between education and practice among new graduate nurses. *The Journal of Continuing Education in Nursing, 46*(1), 34-40. doi:org/10.3928/00220124-20141122-01

Facione, P. A. (2015). Critical thinking: What it is and why it counts. *Insight Assessment,* 1-29. Retrieved from http://www.insightassessment.com

Facione, P. A. (1990). Critical thinking: A statement of expert consensus for purposes of educational assessment and instruction. Executive Summary: "The Delphi report*."* Millbrae, CA: The California Academic Press. Retrieved from https://assessment.trinity.duke.edu/documents/Delphi_Report.pdf

Farashahi, M., & Tajeddin, M. (2018). Effectiveness of teaching methods in business education: A comparison study on the learning outcomes of lectures, case studies, and simulations. *The International Journal of Management Education, 16*, 131-142. doi:org.10.1016/j.ijme.2018.01.003

Faul, F., Erdfelder, E., Lang, A. G., & Buchner, A. (2007). G*Power3: A flexible statistical power analysis program for the social behavioral and biomedical sciences. *Behavioral Research Methods, 39*(2), 175-191. doi:org/10.3758/BF03193146

Fey, M. K., & Jenkins, L. S. (2015). Debriefing practices in nursing education programs: Results from a national study. *Nursing Education Perspectives, 36*(6), 361-366. doi:10.5480/14-1520

Fisher, M. D. (2014). A comparison of professional value development among prelicensure nursing students in associate degree, diploma, and bachelor of science in nursing programs. *Nursing Education Perspectives, 35*(1), 37-42. doi:10.5480/11-729.1

Forneris, S. G., O'Neal, D. O., Tiffany, J., Kuehn, M. B., Meyer, H. M., Blazovich, L. M., Holland, A. E. (2015). Enhancing clinical reasoning through simulation debriefing: A multisite study. *Nursing Education Perspectives, 36*(5), 304-310. doi:org/10.5480/15-1672

Frye, B., Alfred, N., & Campbell, M. (1999). Use of the Watson-Glaser critical thinking appraisal with BSN students. *Nursing and Health Care Perspectives, 20*(5), 253-255. Retrieved from https://www.researchgate.net/journal/1094-2831_Nursing_and_health_care_perspectives

Gholami, M., Moghadam, P. K., Mohammadipoor, F., Tarahi, M. J., Sak, M., Toulabi, T., & Pour, A. H. (2016). Comparing the effects of problem-based learning and the traditional lecture method on critical thinking skills and metacognitive awareness in nursing students in a critical care nursing course. *Nurse Education Today, 45*, 16-21. doi:org/10.1016.j.nedt.2016.06.007

Gibbs, J., Trotta, D., & Overbeck, A. (2014). Human patient simulation versus case study: Which teaching strategy is more effective in teaching nursing case for the

hypoglycemic patient? *Teaching and Learning in Nursing, 9*, 59-63.

doi:org/10.1016/j.teln.2014.01.002

Giddens, M., & Gloeckner, G. W. (2005). The relationship of critical thinking to

performance on the NCLEX-RN. *Journal of Nursing Education, 44*(2), 85-89.

Retrieved from http://nursingcertificationprograms.org/journal-of-nursing-

education-perspectives/

Goodstone, L., Goodstone, M. S., Cino, K., Glaser, C. A., Kupferman, K., & Dember-

Neal, T. (2013). Effect of simulation on the development of critical thinking in

associate degree nursing students. *International Journal of Nursing Education

Scholarship, 34*(3), 159-162. doi:org/10.5480/1536.5026.34.3.159

Grant, J. S., Dawkins, D., Molhook, L., Keltner, N. L., & Vance, D. E. (2014).

Comparing the effectiveness of video-assisted oral debriefing and oral debriefing

alone on behaviors of undergraduate nursing students during high-fidelity

simulation. *Nurse Education in Practice, 14*, 479-484.

doi:org/1016/j.nepr.2014.05.003

Griffiths, B. (2018). Preparing tomorrow's nurses for collaborative quality care through

simulation. *Teaching and Learning in Nursing, 13*, 46-50.

doi:org/10.1016/j.teln.2017.08.005

Gul, R. B., Khan, S., Ahmed, A., Cassum, S., Saeed, T., Parpio, Y.,...Schopflocher, D.

(2014). Enhancing educators' skills for promoting critical thinking in their

classroom discourses: A randomized control trial. *International Journal of*

Teaching and Learning in Higher Education, 26(2), 37-54. Retrieved from http://www.isetl.org/ijtlhe/

Ha, E. H. (2014). Attitudes toward video-assisted debriefing after simulation in undergraduate nursing students: An application of Q methodology. *Nurse Education Today, 34*, 978-984. doi:org/10.1016/j.nedt.2014.01.003

Hall, S. W. (2014). The impact of high-fidelity simulation in enhancing critical thinking in senior maternity nursing students. *International Journal of Nursing, 1*(2), 1-5. doi:org/10.15640/ijn.v1n2a1

Harding, M., & Snyder, J. S. (2016). *Winningham's critical thinking cases in nursing: Medical-surgical, pediatric, maternity, and psychiatric* (6th ed.). St. Louis, MO: Elsevier Mosby.

Hayden, J. K., Smiley, R. A., Alexander, M., Kardong-Edgren, S., & Jeffries, P. R. (2014). The NCSBN national simulation study: A longitudinal, randomized, controlled study replacing clinical hours with simulation in prelicensure nursing education. *Journal of Nursing Regulation, 5*(2), S1-S64. doi:org/10.1016/j.ecns.2012.07.070

Health Science Reasoning Test (HSRT) User Manual and Resource Guide (2017). San Jose, CA: The California Academic Press. Retrieved from http://insightassessment.com

Herrington, A., & Schneidereith, T. (2017). Scaffolding and sequencing core concepts to develop a simulation-integrated nursing curriculum. *Nurse Educator, 42*(4), 204-207. doi:10.1097/NNE0000000000000358

Hoffman, J. J. (2006). *The relationships between critical thinking, program outcomes,*

    and NCLEX-RN performance in traditional and accelerated nursing students

    (Unpublished Dissertation). University of Southern Mississippi, Hattiesburg.

Hooper, B. L. (2014). Using case studies and videotaped vignettes to facilitate the

    development of critical thinking skills in new graduate nurses. *Journal for Nurses*

    in Professional Development, 30(2), 87-91.

    doi:10.1097/NND.00000000000000009

Hunter, S., Pitt, V., Croce, N., & Roche, J. (2014). Critical thinking of undergraduate

    nursing students: Description and demographic predictors. *Nurse Education*

    Today, 34, 809-814. doi:org/10.1016/j.nedt.2013.08.005

Ignatavicius, D., & Chung, C. E. (2016). Professional development for nursing faculty:

    Assessing transfer of learning into practice. *Teaching and Learning in Nursing,*

    11, 138-142. doi:org/10.1016/j.teln.2016.05.005

Jensen, R. (2013). Clinical reasoning during simulation: Comparison of student and

    faculty ratings. *Nurse Education in Practice, 13*, 23-28.

    doi:org/10.1016/j.nepr.2012.07.001

Jeppesen, K. H., Christiansen, S., & Frederiksen, K. (2017). Education of student nurses:

    A systematic literature review. *Nurse Education Today, 55*, 112-121.

    doi:org/10.1016/j.nedt.2015.05.005

Jones, T. (2017). Playing detective to enhance critical thinking. *Teaching and Learning in*

    Nursing, 12, 73-76. doi:org/10.1016/j.teln.2016.09.005

Jung, D., Lee, S. H., Kang, S. J., & Kim, J. H. (2017). Development and evaluation of a

    clinical simulation for new graduate nurses: A multi-site pilot study. *Nurse*

    Education Today, 49, 84-89. doi:org/10.1016/j.nedt.2016.11.010

Kaddoura, M. (2013). New graduate nurses' perceived definition of critical thinking

    during their first nursing experience. *Educational Research Quarterly, 36*(3), 3-

    21. Retrieved from https://www.questia.com/library/p62369/educational-

    research-quarterly

Kaddoura, M., Vandyke, O., Smallwood, C., & Gonzalez, K. M. (2016). Perceived

    benefits and challenges of repeated exposure to high fidelity simulation

    experiences of first degree accelerated bachelor nursing students. *Nurse*

    Education Today, 36, 298-303. doi:org/10.1016/j.nedt.2015.07.014

Kaddoura, M., VanDyke, O., Cheng, B., & Shea-Foisy, K. (2016). Impact of concept

    mapping on the development of clinical judgment skills in nursing students.

    Teaching and Learning in Nursing, 11, 101-107.

    doi:org/10.1016/j.teln.2016.02.001

Kaddoura, M. A., VanDyke, O., & Yang, Q. (2017). Correlation between critical thinking

    skills and national council licensure examination for registered nurses in

    accelerated bachelor nursing students. *Teaching and Learning in Nursing, 12*, 3-7.

    doi:org/10.1016/j.teln.2016.08.004

Kim, E. (2018). Effect of simulation-based emergency cardiac arrest education on

    nursing students' self-efficacy and critical thinking skills: Roleplay versus lecture.

    Nurse Education Today, 61, 258-263. doi:org/10.1016/j.nedt.2017.12.003

Kim, S. S., Kim, E. J., Lim, J. Y., Kim, G. M., & Baek, H. C. (2018). Korean nursing

students' acquisition of evidence-based practice and critical thinking skills.

Journal of Nursing Education, 57(1), 21-27. doi:10.3928/01484834-20180102-05

Kirkman, T. R. (2013). High fidelity simulation effectiveness in nursing students' transfer

of learning. *International Journal of Nursing Education Scholarship, 10*(1), 1-6.

doi:org/10.1/515/ijnes-2012.0009

Kitchenham, A. (2008). The evolution of John Mezirow's transformative learning theory.

Journal of Transformative Education, 6(2), 104-123. Retrieved from

http://journals.sagepub.com/doi/abs/10.1177/1541344608322678

Ko, E., & Kim, H. Y. (2014). Effects of multi-mode simulation learning on nursing

students' critical thinking disposition, problem solving process, and clinical

competence. *Korean Journal of Adult Nursing, 26*(1), 107-116.

doi:org/10.7475/kjan.2014.26.1.107

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-analysis. *International Journal of Nursing Studies,

51*, 458-469. doi:org/10.1016/j.ijnurstu.2013.06.009

Laerdal Medical. (2017). Simulation scenario: Bowel obstruction with fluid and

electrolyte imbalance. *Laerdal Learning Applications (LLEAP), Learning

Technologies, Simulation in Nursing Education*.

Laerdal Medical (2018). *Sim Man 3G*. Retrieved from

http://www.laerdal.com/us/SimMan3G

Lauer, M. E., & Yoho, M. J. (2013). HESI exams: Consequences and remediation. *Journal of Professional Nursing, 29*(25), 22-27. doi:10.1016/j.profnurs.2013.01.001.

Lawton, J. T., Saunders, R. A., & Muhs, P. (1980). Theories of Piaget, Bruner, and Ausubel: Explications and implications. *Journal of Genetic Psychology, 136*, 121-136. Retrieved from http://www.tandfonline.com/loi/vgnt20

Lee, J., & Oh, P. J. (2015). Effects of the use of high-fidelity human simulation in nursing education: A meta-analysis. *Journal of Nursing Education, 54*(9), 501-513. doi:10.3928/01484834-20150814-04

Leigh, G. T., Miller, L. B., & Ardoin, K. B. (2017). A nurse educator's guide to student-led debriefing. *Teaching and Learning in Nursing, 12*, 309-311. doi:org/10.1016.j.teln.2017.03.012

Lestander, O., Lehto, N., & Engstrom, A. (2016). Nursing students' perceptions of learning after high-fidelity simulation: Effects of a three-step post-simulation reflection model. *Nurse Education Today, 40*, 219-224. doi:org/10.1016/j.nedt.2016.03.011

Lewis, R., Strachan, A., & Smith, M. M. (2012). Is high-fidelity simulation the most effective method for the development of non-technical skills in nursing? A review of the current evidence. *The Open Nursing Journal, 6*, 82-89. doi:10.2174/1874434601206010082

Lin, C. C., Han, C. Y., Pan, I. J., & Chen, L. C. (2015). The teaching-learning approach and critical thinking development: A qualitative exploration of Taiwanese nursing

students. *Journal of Professional Nursing, 31*(2), 149-157.
doi:org/10.1016/jprofnurs.2014.07.001

Lodico, M. G., Spaulding, D. T., & Voegtle, K. H. (2010). *Methods in educational research: From theory to practice* (2d ed.). San Francisco, CA: Jossey-Bass.

Mahoney, A. E., Hancock, L. E., Iorianni-Cimbak, A., & Curley, M. A. (2013). Using high-fidelity simulation to bridge clinical and classroom learning in undergraduate pediatric nursing. *Nurse Education Today, 33*, 648-654. doi:org/10.1016/j.nedt.2012.01.005

Mammen, J. R. (2016). Computer-assisted concept mapping: Visual aids for knowledge construction. *Journal of Nursing Education, 55*(7), 403-406. doi:10.3928/01484834-20160615-09

Maneval, R., Fowler, K. A., Kays, J. A., Boyd, T. M., Shuey, J., Harner-Britner, S., & Mastrine, C. (2012). The effect of high-fidelity patient simulation on the critical thinking and clinical decision-making skills of new graduate nurses. *The Journal of Continuing Education in Nursing, 43*(3), 125-134. doi:10.3928/00220124-20111101-02

Mariani, B., Cantrell, M. A., & Meakim, C. (2014). Nurse educators' perceptions about structured debriefing in clinical simulation. *Nursing Education Perspectives, 35*(5), 330-331. doi:10.5480/13-1190.1

McLeod, S. (2015). *Jean Piaget*. Retrieved from http://www.simplypsychology.org/piaget.html

Merriam, S. B., Caffarella, R. S., & Baumgartner, L. M. (2007). *Learning in adulthood: A comprehensive guide* (3rd ed.). San Francisco, CA: Jossey-Bass.

Mezirow, J. (1997). Transformative learning: Theory to practice. In P. Cranton (Ed.), *Transformative learning in action: Insights from practice - New directions for adult and continuing education* (Vol. 74, pp. 5-12). San Francisco, CA: Jossey-Bass.

Mills, J., West, C., Langtree, T., Usher, K., Henry, R., Chamberlain-Salaun, J., & Mason, M. (2014). Putting it together: Unfolding case studies and high-fidelity simulation in the first-year of an undergraduate nursing curriculum. *Nurse Education in Practice, 14*, 12-17. doi:org/10.1016/j.nepr.2013.03.003

Montenery, S. M., Walker, M., Sorensen, E., Thompson, R., Kirklin, D., White, R., & Ross, C. (2013). Millennial generation student nurses' perceptions of the impact of multiple technologies on learning. *Nursing Education Perspectives, 34*(6), 405-409. doi:10.5480/10-451

Morris, B. C. (1999). *Relationship among academic achievement, clinical decision making, critical thinking, work experience and NCLEX-RN pass status* (Unpublished Dissertation). Arizona State University, Tempe, AZ.

Naber, J. L., Hall, J., & Schadler, C. M. (2014). Narrative thematic analysis of baccalaureate nursing students' reflections: Critical thinking in the clinical education context. *Journal of Nursing Education, 53*(9), 90-96. doi:10.3928/01484834-20140806-06

Naber, J., & Wyatt, T. H. (2014). The effect of reflective writing interventions on the critical thinking skills and dispositions of baccalaureate nursing students. *Nurse Education Today, 34*, 67-72. doi:org/10.1016/j.nedt.2013.04.002

National Advisory Council on Nurse Education and Practice (NACNEP) (2010). *Addressing new challenges facing nursing education: Solutions for a transforming health care environment*. Eighth Annual report. Retrieved from http://www.hrsa.gov/advisorycommittees/bhpradvisory/nacnep/reports/eighthreport.pdf

National League for Nursing. (2012). *NLN Research Priorities in Nursing Education 2012-2015*. Retrieved from http://www.nln.org/docs/default-source/default-document-library/researchpriorities.pdf?sfvrsn+2

National League for Nursing (2016). *Accreditation standards for nursing education programs*. Retrieved from http://www.nln.org/docs/default-source/accreditation-services/cnea-standards-final-february-201613f2bf5c78366c709642ff00005f0421.pdf?sfvrsn=4

National League for Nursing. (2018). Simulation innovation and resource center. Retrieved from http://www.nln.org/professional-development-programs/simulation

Nelson, A. E. (2017). Methods faculty use to facilitate nursing students' critical thinking. *Teaching and Learning in Nursing, 12*, 62-66. doi:org/10.1016/j.teln.2016.09.007

Nursing Executive Center (2008). *Bridging the preparation-practice gap: Volume 1: Quantifying new graduate nurse improvement needs*. Washington, D.C.: The

Advisory Board Company. Retrieved from

https://www.advisory.com/Research/Nursing-Executive-

Center/Studies/2008/Bridging-the-Preparation-Practice-Gap-Volume-I

Oprescu, F., McAllister, M., Duncan, D., & Jones, C. (2017). Professional development

needs of nurse educators: An Australian case study. *Nurse Education in Practice,*

27, 165-168. doi:org/10.1016/j.nepr.2017.07.004

Orique, S. B., & McCarthy, M. A. (2015). Critical thinking and the use of nontraditional

instructional methodologies. *Journal of Nursing Education, 54*(8), 455-459.

doi:10.3928/01484834-20150717-06

Padden-Denmead, M. L., Scaffidi, R. M., Kerley, R. M., & Farside, A. L. (2016).

Simulation with debriefing and guided reflective journaling to stimulate critical

thinking in prelicensure baccalaureate degree nursing students. *Journal of Nursing*

Education, 55(11), 645-650. doi:10.392801484834-20161011-07

Page-Cutrara, K. (2014). Use of prebriefing in nursing simulation: A literature review.

Journal of Nursing Education, 53(3), 136-141. doi:10.3928/01484834-20140211-

07

Patterson, B. J., & Krouse, A. M. (2015). Competencies for leaders in nursing education.

Nursing Education Perspectives, 36(2), 76-82. doi:10.5480/13-1300

Paul, S. A. (2014). Assessment of critical thinking: A delphi study. *Nurse Education*

Today, 34, 1357-1360. doi:org/10.1016/j.nedt.2014.03.008

Paul, R., & Elder, L. (2014). *The miniature guide to critical thinking concepts and tools*

(7th ed.). Tomales, CA: Foundation for Critical Thinking.

Pierce, L. L., & Reuille, K. (2018). Instructor-created activities to engage undergraduate nursing research students. *Educational Innovations, 57*(3), 174-177. doi:10.3928/01484834-20180221-10

Pitt, V., Powis, D., Levett-Jones, T., & Hunter, S. (2014). The influence of critical thinking skills on performance and progression in a pre-registration nursing program. *Nurse Education Today, 35*, 125-131. doi:org/10.1016/j.nedt.2014.08.006

Przybyl, H., Androwich, I., & Evans, J. (2015). Using high-fidelity simulation to assess knowledge, skills, and attitudes in nurses performing CRRT. *Nephrology Nursing Journal, 42*(2), 135-147. Retrieved from https://www.annanurse.org/resources/products/nephrology-nursing-journal

Ravert, P. (2008). Patient simulator sessions and critical thinking. *Journal of Nursing Education, 47*(12), 557-562. doi:10.3928/01484834-20081201-06

Raymond, C., Profetto-McGrath, J., Myrick, F., & Strean, W. B. (2018). Nurse educators' critical thinking: A mixed methods exploration. *Nurse Education Today, 66*, 117-122. doi:org/10.1016/j.nedt.2018.04.011

Reed, S. J. (2015). Written debriefing: Evaluating the impact of the addition of a written component when debriefing simulations. *Nurse Education in Practice, 15*, 543-548. doi:org/10.1016/j.nepr.2015.07.011

Reierson, I. A., Haukedal, T. A., Hedeman, H., & Bjork, I. T. (2017). Structured debriefing: What difference does it make? *Nurse Education in Practice, 25*, 104-110. doi:10.1016/j.nepr.2017.04.013

Robert, R. R., & Petersen, S. (2013). Critical thinking at the bedside: Providing safe

    passage to patients. *Medsurg Nursing, 22*(2), 85-92. Retrieved from

    https://amsn.org/professional-development/periodicals/medsurg-nursing-journal

Robert Wood Johnson Foundation (2010). The future of nursing: Leading change,

    advancing health. *Institute of Medicine of the National Academies*. The National

    Academies Press, Washington, D.C. Retrieved from

    http://www.nationalacademies.org/hmd/Reports/2010/The-Future-of-Nursing-

    Leading-Change-Advancing-Health.aspx

Robinson, B. K., & Dearmon, V. (2013). Evidence-based nursing education: Effective

    use of instructional design and simulated learning environments to enhance

    knowledge transfer in undergraduate nursing students. *Journal of Professional*

    Nursing, 29(4), 203-209. doi:10.1016/j.profnurs.2012.04.022

Rojas, D. E., Parker, C. G., Schams, K. A., & McNeill, J. A. (2017). Implementation of

    best practices in simulation debriefing. *Nursing Education Perspectives, 38*(3),

    154-156. doi:10.1097.01.NEP.0000000000000111

Romeo, E. M. (2013). The predictive ability of critical thinking, nursing GPA, and SAT

    scores on first-time NCLEX-RN performance. *Nursing Education Perspectives,*

    34(4), 248-253. doi:org/10.5480/1536-5026-34.4.248

Sarasnick, J. A., Pyo, K. A., & Draper, J. (2017). Using simulation and case studies

    combined to improve student knowledge: A retrospective study. *Nursing*

    Education Perspectives, 38(3), 126-130. doi:10.1097.01.NEP.0000000000000139

Schmehl, P. (2018). Using concept mapping to foster critical thinking. Retrieved from

    https://www.nursingconceptmapping.com/

Schwartz, C. E., Chesney, M. A., Irvine, M. J., & Keefe, F. J. (1997). The control group

    dilemma in clinical research: Applications for psychosocial and behavioral

    medicine trials. *Psychosomatic Medicine, 49*, 362-371. Retrieved from

    https://journals.lww.com/psychosomaticmedicine/pages/default.aspx

Serembus, J. F. (2016). Improving NCLEX first-time pass rates: A comprehensive

    program approach. *Journal of Nursing Regulation, 6*(4), 38-44.

    doi:org/10.1016/S2155-8256(16)31002-X

Shelestak, D. S., Meyers, T. W., Jarzembak, J. M., & Bradley, E. (2015). A process to

    assess clinical decision-making during human patient simulation: A pilot study.

    Nursing Education Perspectives, 36(3), 185-187. doi:org/10.5480/13-1107.1

Shin, H., & Kim, M. J. (2014). Evaluation of an integrated simulation courseware in a

    pediatric nursing practicum. *Journal of Nursing Education, 53*(10), 589-594.

    doi:10.3928/01484834-20140922-05

Shin, H., Ma, H., Park, J., Ji, E. S., & Kim, D. H. (2015). The effect of simulation

    courseware on critical thinking in undergraduate nursing students: Multi-site pre-

    post study. *Nurse Education Today, 35*, 537-542.

    doi:org/10.1016/j.nedt.2014.12.004

Shinnick, M. A., & Woo, M. A. (2013). The effect of human patient simulation on

    critical thinking and its predictors in prelicensure nursing students. *Nurse*

    Education Today, 33, 1062-1067. doi:org/10.1016/j.nedt.2012.04.004

Skinner, G. (2014). Reflective learning journal. Retrieved from

     http://www.garethskinner.co.uk/reflective-learning-journal/

Snavely, T. M. (2016). Data watch: A brief economic analysis of the looming nursing

     shortage in the United States. *Nursing Economics, 34*(2), 98-100. Retrieved from

     http://www.nursingeconomics.net/cgi-bin/WebObjects/NECJournal.woa

Sommers, C. L. (2018). Measurement of critical thinking, clinical reasoning, and clinical

     judgment in culturally diverse nursing students: A literature review. *Nurse*

     Education in Practice, 30, 91-100. doi:org/10.1016/j.nepr.2018.04.002

Sullivan-Mann, J., Perron, C. A., & Fellner, A. N. (2009). The effects of simulation on

     nursing students' critical thinking scores: A quantitative study. *Newborn and*

     Infant Nursing Reviews, 9(2), 111-116. doi:org/10.1053/j.nainr.2009.03.006

Swart, R. (2017). Critical thinking instruction and technology enhanced learning from the

     student perspective: A mixed methods research study. *Nurse Education in*

     Practice, 23, 30-39. doi:org/10.1016/j.nepr.2017.02.003

Theisen, J. L., & Sandau, K. E. (2013). Competency of new graduate nurses: A review of

     their weaknesses and strategies for success. *The Journal of Continuing Education*

     in Nursing, 44(9), 406-414. doi:org/10.3928/00220124-20130617-38

Topping, A., Boje, R. B., Rekola, L., Hartvigsen, T., Prescot, S., Bland, A.,...Hannula, L.

     (2015). Towards identifying nurse educator competencies required for simulation-

     based learning: A systemised rapid review and synthesis. *Nurse Education Today,*

     35, 1108-1113. doi:org./10.1016/j.nedt.2015.06.003

Tosterud, R., Hedelin, B., & Hall-Lord, M. L. (2013). Nursing students' perceptions of high and low fidelity simulation used as learning methods. *Nurse Education in Practice, 13*, 262-270. doi:org/10.1016/j.nepr.2013.02.002

Trofino, R. M. (2013). Relationship of associate degree nursing program criteria with NCLEX-RN success: What are the best predictors in a nursing program of passing the NCLEX-RN the first time? *Teaching and Learning in Nursing, 8*, 4-12. doi:org/10.1.016.j.teln.2012.08.001

Tutticci, N., Coyer, F., Lewis, P. A., & Ryan, M. (2017). Student facilitation of simulation debrief: Measuring reflective thinking and self-efficacy. *Teaching and Learning in Nursing, 12*, 128-135. doi:org/10.1016/j.teln.2016.11.005

Victor-Chmil, J. (2013). Critical thinking versus clinical reasoning versus clinical judgment. *Nurse Educator, 38*(1), 34-36. doi:org/10.1097/NNE.0b013e318276dfbe

VonCollin-Appling, C. V., & Giuliano, D. (2017). A concept analysis of critical thinking: A guide for nurse educators. *Nurse Education Today, 49*, 105-109. doi:org/10.1016/j.nedt.2016.11.007

Wacks, G. J. (2005). *Relationships among pre-admission characteristics in associate degree nursing programs as predictors of NCLEX-RN success* (Unpublished Dissertation). University of Alabama, Birmingham, AL.

Ward, M., Knowlton, M. C., & Laney, C. W. (2018). The flip side of traditional nursing education: A literature review. *Nurse Education in Practice, 29*, 163-172. doi:org/10.1016/j.nepr.2018.01.003

Waznonis, A. R. (2014). Methods and evaluations for simulation debriefing in nursing education. *Journal of Nursing Education, 53*(8), 459-465. doi:10.3928/01484834-20140722-13

Weatherspoon, D. L., Phillips, K., & Wyatt, T. H. (2015). Effect of electronic interactive simulation on senior bachelor of science in nursing students' critical thinking and clinical judgment skills. *Clinical Simulation in Nursing, 11*, 126-133. doi:org/10.1016/j.ecns.2014.11.006

White, M. (2017). Keep calm and simulate on: Faculty experiences and insights into implementing best practices in simulation. *Teaching and Learning in Nursing, 12*, 43-49. doi:10.1016/j.teln.2016.10.003

Wosinski, J., Belcher, A. E., Durrenberger, Y., Allin, A. C., Stomacq, C., & Gerson, L. (2018). Facilitating problem-based learning among undergraduate nursing students: A qualitative systematic review. *Nurse Education Today, 60*, 67-74. doi:org/10.1016/j.nedt.2017.08.015

Young, A., Rose, G., & Willson, P. (2013). Online case studies: HESI exit exam scores and NCLEX-RN outcomes. *Journal of Professional Nursing, 29*(25), 17-21. doi:org/10.1016/j.profnurs.2012.06.010

Yue, M., Zhang, M., Zhang, C., & Jin, C. (2017). The effectiveness of concept mapping on development of critical thinking in nursing education: A systematic review and meta-analysis. *Nurse Education Today, 52*, 87-94. doi:org/10.1016/j.nedt.2017.02.018

Zhang, J. (2017). Perceptions of simulation-assisted teaching among baccalaureate nursing students in Chinese context: Benefits, process and barriers. *Journal of Professional Nursing, 33*, 305-310. doi:10.1016/j.profnurs.2016.12.002

Zori, S. (2016). Teaching critical thinking using reflective journaling in a nursing fellowship program. *The Journal of Continuing Education in Nursing, 47*(7), 321-329. doi:10.3928/00220124-20160616-09

Zweighaft, E. L. (2013). Impact of HESI specialty exams: the ninth HESI exit exam validity study. *Journal of Professional Nursing, 29*(25), 10-16. doi:org/10.1016/j.profnurs.2012.06.011

Appendix A: The Project

Brief Overview of the Project

Project Description and Purpose

The project is a 3-day workshop entitled *Keep Calm and Teach On: An Evidence-Based Review of Teaching Strategies to Enhance Critical Thinking Skills of Nursing Students*. The purpose of my chosen project is to provide nursing faculty with the training and practical application to deliver a variety of teaching strategies that enhance critical thinking skills of nursing students using research-driven and evidence-based practice techniques.

Project Outcomes

The learning outcomes are that at the conclusion of this workshop, participants would be able to:

1.   Describe the rationale for multiple types of teaching strategies in nursing education to enhance critical thinking skills of nursing students;

2.   Discuss and apply current evidence-based practice of simulation as a teaching strategy to enhance critical thinking skills of nursing students;

3.   Discuss and apply current evidence-based practice of case studies as a teaching strategy to enhance critical thinking skills of nursing students;

4.   Discuss and apply current evidence-based practice of concept mapping as a teaching strategy to enhance critical thinking skills of nursing students;

5.   Discuss and apply current evidence-based practice of reflective journaling as a teaching strategy to enhance critical thinking skills of nursing students;

6.   Discuss and apply current evidence-based practice of problem-based learning as a teaching strategy to enhance critical thinking skills of nursing students.

Project Format and Documents

The following workshop documents are included: (a) A detailed workshop agenda which sets forth the time schedule and topics to be covered during the 3-day workshop, (b) Power point slides which will be used interchangeably with group discussions and application of teaching strategies, (c) Formative evaluations in the form of short posttests at the end of each workshop day, and (d) A summative workshop evaluation in the form of a survey which will be emailed to the participants following completion of the workshop.

An Evidence-Based Review of Teaching Strategies to Enhance Critical Thinking Skills of Nursing Students

Workshop Agenda

Day 1	
0800 - 0830	Continental Breakfast
0830 - 0845	Welcome and Review of Workshop Objectives
0845 - 0930	Review of Janine Blakeslee's Doctoral Study: "*Effects of High-Fidelity Simulation on the Critical Thinking Skills of Nursing Students*"
0930 - 0945	Break
0945 - 1030	Continued review of Janine Blakeslee's Doctoral Study (Data analysis results and direction for the Project)
1030 - 1145	What Does the Research Show? A look at the current evidence-based practice of **simulation** in nursing education.
1145 - 1300	Lunch
1300 - 1400	Round Table Discussion: Strengths and growth areas of current use of simulation at each campus
1400 – 1430	Prebriefing Best Practice: What does the research show?
1430 – 1445	Break
1445 – 1600	Prebriefing Application
1600 - 1630	Round Table Discussion: Strengths and growth areas of current use of prebriefing and debriefing

1630 – 1645	Wrap-up Day 1

Day 2

0800 - 0830	Continental Breakfast
0830 - 0845	Welcome and Review of Workshop Objectives
0845 - 0945	Debriefing Best Practice – what does the research show? Debriefing Options
0945 - 1000	Introduction to DASH: Debriefing Assessment for Simulation in Healthcare tool.
1000 – 1015	Break
1015 – 1100	Use of Videotape Playback for Debriefing: Tips, Techniques, and Troubleshooting
1100 – 1200	Putting it All Together: Hands-on practice of scenarios with application of Prebriefing and Debriefing Techniques
1200 – 1300	Lunch
1300 – 1445	**Case Studies**: Best Practice – what does the research show?
1445 – 1500	Break
1500 – 1600	Case Study Application
1600 – 1630	Round Table Discussion: Strengths and growth areas of current use of case studies
1630 – 1645	Wrap-up Day 2

Day 3

0800 – 0830	Continental Breakfast
0830 – 0845	Welcome and Review of Workshop Objectives
0845 – 0930	**Concept Mapping**: Best Practice – what does the research show?
0930 – 1015	Round Table Discussion: Strengths and growth areas of current use of concept mapping

1015 – 1030	Break
1030 – 1100	**Reflective Journaling**: Best Practice – what does the research show?
1100 – 1145	Round Table Discussion: Strengths and growth areas of current use of reflective journaling
1145 – 1300	Lunch
1300 – 1345	**Problem-Based Learning**: Best Practice – what does the research show?
1345 – 1430	Round Table Discussion: Strengths and growth areas of current use of problem-based learning
1430 – 1445	Break
1445 – 1600	Recap and Discussion on Content and Application
1600 – 1630	Final Remarks and Dismissal
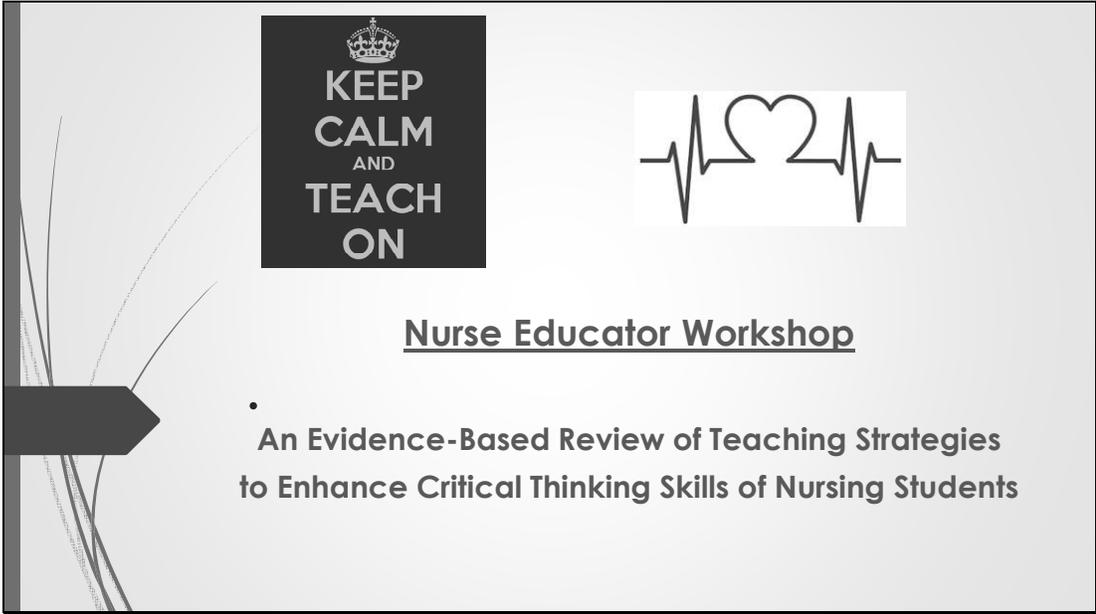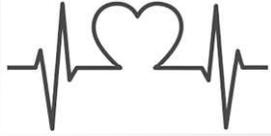
An Evidence-Based Review of Teaching Strategies to Enhance Critical Thinking Skills of Nursing Students
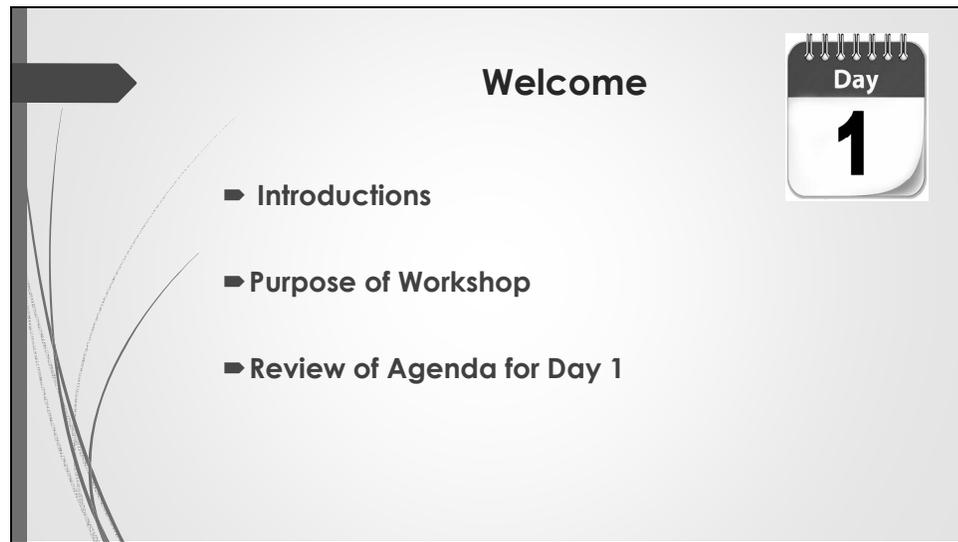
- Review Purpose of Workshop and Agenda for Day 1
- History of Simulation
- What Does the Research Show?   A look at the current evidence-based practice of simulation in nursing education.
- Round Table Discussion: Strengths and growth areas of current use of simulation at each campus
- Critical components of a simulation
 - Prebriefing: Best Practice: What does the research show?
- Prebriefing Options
- Round Table Discussion: Strengths and growth areas of current use of prebriefing and debriefing

Describe the rationale for multiple types of teaching strategies in nursing education to enhance critical thinking skills of nursing students;

Discuss and apply current evidence-based practice of simulation as a teaching strategy to enhance critical thinking skills of nursing students;

Discuss and apply current evidence-based practice of case studies as a teaching strategy to enhance critical thinking skills of nursing students;

Discuss and apply current evidence-based practice of concept mapping as a teaching strategy to enhance critical thinking skills of nursing students;

Discuss and apply current evidence-based practice of reflective journaling as a teaching strategy to enhance critical thinking skills of nursing students;

Discuss and apply current evidence-based practice of problem-based learning as a teaching strategy to enhance critical thinking skills of nursing students.

Instructor – Discussion and field questions about objectives

Purpose and Research Question – Review purpose – review research question -----
Discuss how research study developed – problem statement - rationale – significance of
the study
-   Review Research question: Null and alternative hypothesis
-   Review of the literature: Theoretical Foundation----- Cognitive Learning Theory ---
    Paul Elder critical thinking model
-   Review of the literatures– broad overview ---

Methodology - Design an approach – discuss causal-comparative methodology with a
pretest/posttest design; why design was selected; other options considered
-    Setting and Sample – three campuses; med-surg juniors; 69 participants (lower than
    power analysis recommendation of 102 participants)
-   Instrumentation and Materials - HSRT

Data Collection – Pretest --- Simulation or Written case studies group --- Posttest

Data Results - Describe demographics; Repeated measures mixed ANOVA; Results not
statistically significant; explain possible reasons/limitations regarding results…..and that
brings us to today…. Multiple teaching modalities to increase critical thinking skills

Critical Thinking – Discuss different definitions of critical thinking; HSRT tool and what it measured: Analysis, Deduction, Induction, Inference, Evaluation.

Relevance of critical thinking to nursing profession – Discuss link of critical thinking to NCLEX success, patient safety, increases patient outcomes.

Responsibility of nursing programs and nurse educators to promote critical thinking – Discussion with group about what is the responsibility/obligation of nurse educators? Viewpoints of NLN and AACN. Literature review discussion.

History and contemporary use of simulation in nursing education –Review different types of simulation (low, medium, high); current uses and potential uses.

Benefits of simulation to nursing students – Discuss safe learning environment; discuss trifecta of theory, simulation and clinical experiences to promote critical thinking. Literature review discussion.

High-fidelity simulation and critical thinking skills - Overview of Studies – Review research studies – qualitative and quantitative

Go-round Group Sharing Technique

Supplies: Flipchart; markers

1 – 3 minutes per person

Instruction: Everyone takes a turn to speak on simulation without interruption or comment from other people.

Gorounds are useful for equalising participation and giving everyone some clear space to express their opinion.

Allowing people to 'pass' means that no one feels put on the spot. To keep it focused clearly state what the purpose of the goround is and write the question on a flipchart where everyone can see it.

Facilitator - Review all comments at the end.

Definition – Foundation for a successful simulation so that learners can direct their true focus on learning; discussion other definitions

Elements - Although the debriefing portion of simulation has often received the greatest attention in the past, there is now much credence given to the prebriefing portion of simulation). The elements of prebriefing can include goals, objectives, orientation, time allotment and specifics about the patient.

Review of Literature - A quasiexperimental study by Chamberlain (2017) evaluated the impact of simulation prebriefing on nursing students' perceptions of overall effectiveness, learning, and self-confidence. There were statistically significant increases in those perceptions and those students were more apt to list to given cues and apply them accordingly.

White (2017) contended that group planning and building that collaborative learning environment is an essential component.

Goals and objectives - (1) Performs appropriate patient assessment; (2) Evaluates patient assessment data; (3) Identifies primary patient care problem; (4) Prioritizes patient care; (5) Implements patient care that meets quality, safety, and evidence-based standards; (6) Collaborates with team members; (7) Communicates effectively with patient, family, and health care team; (8) Provides patient education; all reviewed in prebriefing and debriefing. Time Allotment – prebriefing, actual simulation, debriefing

Specifics about patient - (1) Patient Information Sheet; (2) Medical History; (3) Nursing Notes; (4) Physician Orders; (5) Lab Values; (6) SBAR; discuss use of pre-printed hand-outs

Role of participants - (1) Primary nurse; (2) Secondary nurse; (3) Support person (spouse or relative); (4) Patient's voice (in control room); (5) Charge nurse; (6-8) Observer(s).
Environment – safe and trusting environment; focus on learning.
Nursing Process – assessment, diagnosis, planning, implementation, and evaluation

Days Prior to Simulation - Self-study modules, Text readings, Journal articles, You Tube Videos, Lectures (Alridge, 2016).

Round Table Discussion

Topic:
Strengths and Growth Areas of Prebriefing and Debriefing at Your Campus

Let's Talk

Time: 60 Min   Equipment Needed: Whiteboard or flip chart, Markers, Pen & Paper for all   Set Up: Chairs in a circle

This is a group discussion so remember:

o   To talk to everyone in the group not just the facilitator.

o   To keep your comments brief and to the point

o   That everyone is welcome to share so please feel free to ask or share whatever you think will be helpful

Collect discussion points 5-8 minutes; Take out a sheet of paper. I'm going to give us 1-2 minutes to brainstorm all of the possible topics that we can discuss.

Take a look at your list of topics and highlight the top 3 topics that you think would be the most beneficial for you to discuss.

Discussion Topics 5-15 minutes per topic

Closure - Let's go around the circle and share a keyword or phrase that describes this round table for you?

Day 1 - Posttest

1. There has been no evidence-based research to demonstrate a relationship between critical thinking skills of nursing students with successful passing of the National Licensure Exam for Registered Nurses (NCLEX-RN).

    True or False

2. Which of the following is considered a benefit of high-fidelity simulation to nursing students?

    a. Demonstrate application of theory and clinical skills in a safe environment.

    b. Foster critical thinking skills.

    c. Facilitate the transition from education to practice.

    d. All the above

3. The current trend in research is that multiple evidence-based teaching strategies should be used by nurse educators to increase critical thinking skills of nursing students.

    True or False

4. _____is the first phase of an effective simulation and might include simulation objectives, orientation to the simulation lab, time allotment, roles, and specifics about the simulated patient?

    Fill in the blank

Day 1 Posttest - Answer Key

1. False - Several studies have demonstrated a relationship between critical thinking and NCLEX-RN pass rates (Frye, Alfred, & Campbell, 1999; Hoffman, 2006; Kaddoura, VanDyke, & Yang, 2017, Morris, 1999; Romeo, 2013; Wacks, 2005).

2. D. Demonstrating application of theory and clinical skills in a safe environment, fostering critical thinking skills, and facilitating the transition from education to practice are all considered benefits of high-fidelity simulation to nursing students.

3. True - The current trend in research is that multiple evidence-based teaching strategies should be used by nurse educators to increase critical thinking skills of nursing students.

4. Prebriefing is the first phase of an effective simulation and might include simulation objectives, orientation to the simulation lab, time allotment, roles, and specifics about the simulated patient. objectives, participant evaluation, and debriefing.
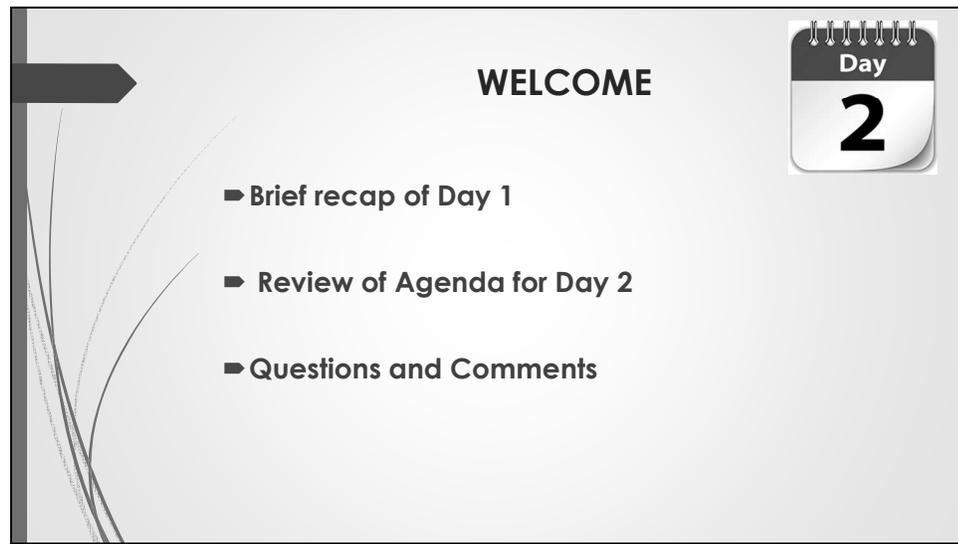
Debriefing Best Practice – what does the research show?

Debriefing Options

Introduction to DASH: Debriefing Assessment for Simulation in Healthcare tool.

Use of Videotape Playback for Debriefing: Tips, Techniques, and Troubleshooting

Putting it All Together: Hands-on practice of scenarios with application of Prebriefing and Debriefing Techniques

Case Studies: Best Practice – what does the research show?

Round Table Discussion: Strengths and growth areas of current use of case studies

Debriefing

- **Best Practice: What does the research show?**
- Definition
- Elements of Debriefing
- INACSL Standards of Debriefing
- Review of Literature
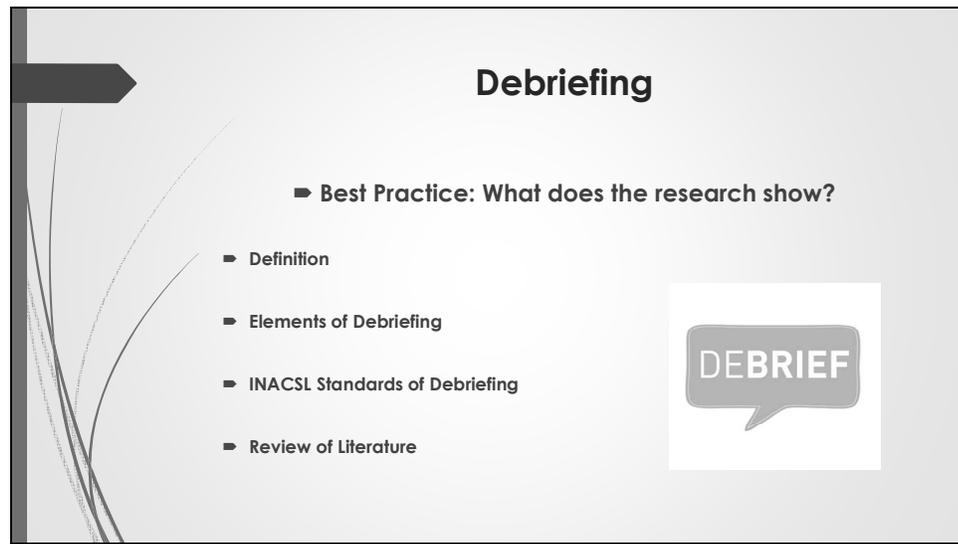
DE**BRIEF**

Definition – Also be known as reflective thinking was first introduced by John Dewy back in 1910 with active engagement as a defining characteristic (Dufrene & Young, 2014). Debriefing is often referred to as the cornerstone of simulation and where the real learning takes place (Waznosis, 2014).

Elements of Debriefing - Used to consolidate nursing knowledge and skills (Ha, 2014) and where students can engage in cognitive, affective, and psychomotor performance (AlSabei & Lasater, 2016). As described by Lestander et al. (2016), debriefing is a way to learn from the simulation experience and should be seen as obligatory. Solid debriefing incorporates both feedback and self-reflection. Feedback is the one-way communication from facilitator to students about their behaviors and performance while self-reflection allows students to internalize the experience and verbalize both positive behaviors and growth areas.

INACSL Standards - Review components and required elements.

Review of Literature – Discuss studies which focused on debriefing and outcome – an increase in critical thinking

Led by simulation facilitator - Facilitator uses the simulation objectives as a guide and follows a pre-determined series of open-ended question to all participants as the debriefing unfolds (Bussard, 2016).

Guided reflection – Reflective debriefing allows all participants to assume an active role during the debriefing process (AlSabei & Lasater, 2016) and the participants' own reflections become a valuable learning opportunity for the entire simulation team (Abelsson & Bisholt, 2017).

Videotaping – The use of video playback, described Reierson et al. (2017) can provide an accurate perspective of the simulation for both observers and nurses.

Observer led – Though normally the observer role is a passive activity, having the observers lead the debriefing session fosters all participants to be more engaged, motivated, and attentive.

Reflective journaling - Bussard (2017) videotaped sim and students could access it later to complete a reflective journal. Students would be given questions or cues to guide their thought process and faculty would provide feedback on the journals.

Introduction to Debriefing Assessment for Simulation in Healthcare (DASH) tool

➡ Debriefers are rated on six elements

➡ 1. Establishing an engaging learning environment
➡ 2. Maintaining an engaging learning environment
➡ 3. Structuring the debrief in an organized manner
➡ 4. Provoking engaging discussion
➡ 5. Identifying an exploring performance gaps
➡ 6. Help trainee achieve/sustain good future performance
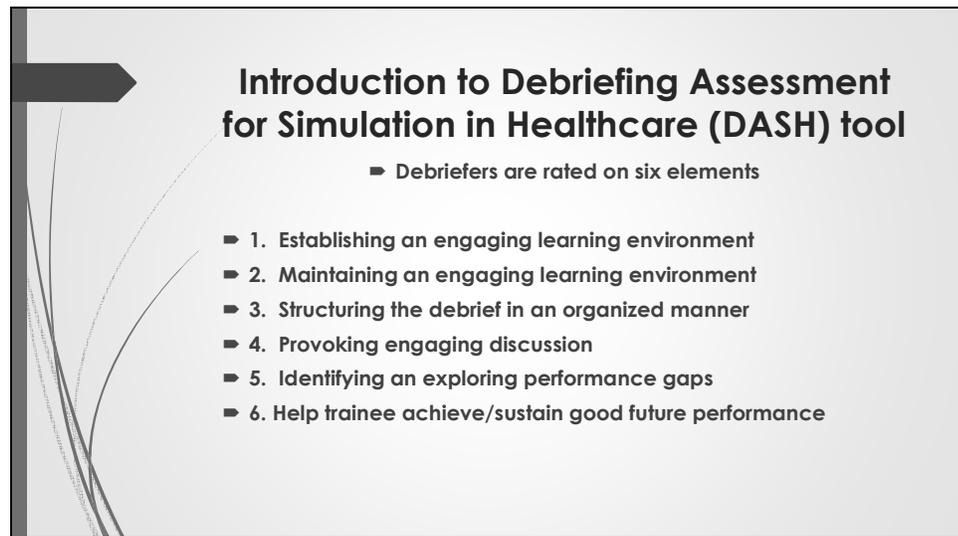
Review DASH tool – created by Center for Medical Simulation at Harvard Medical School. Composed of six elements – each rated on a 7-point Likert type scale.

1. Establishing an engaging learning environment – clarifies course objectives and expectations; attends to logistical details, respects learners
2. Maintaining an engaging learning environment – conveys debriefing objectives; assists learners to engage in a limited realism context
3. Structuring the debrief in an organized manner - encourages trainees to express reactions; guides and analysis of performance; collaborates with learners to summarize simulation and their performance
4. Provoking engaging discussion – Uses –concrete examples and outcomes; facilitates verbal and non-verbal discussion; uses video replay if available
5. Identifying an exploring performance gaps – Provides feedback; identifies source of performance gaps
6. Help trainee achieve/sustain good future performance – Helps close the performance gap through talking and teaching; meets objectives of session (Center for Medical Simulation, 2018).

Group discussion on application of DASH tool.

Videotaping the simulation and then playing it back during the debriefing process can be another useful type of debriefing method (Bussard, 2017). The use of video playback, described Reierson et al. (2017) can provide an accurate perspective of the simulation for both observers and nurses.

Bussard (2016) examined whether self-reflection on video-recorded high-fidelity simulations assisted nursing students in the development of clinical judgment. Four themes: confidence, communication, decision making, and change in clinical practice.

Evidence from a quantitative study by Grant, Dawkins, Molhook, Keltner, and Vance (2014) revealed that video-assisted oral debriefing has positive effects in assisting nursing students to reflect on their simulation performance.

Another study by Ha (2014) found that video-assisted debriefing provides an affirmative self-reflection with regard to what went right during a simulation, what went wrong, what had to be done, and what might be done moving forward.

**Group participants engage in demonstration of videotape playback with assistance of IT Department and simulation coordinators.

(1)Prebriefing -- Scenario Overview, Brief Summary, Learning Objectives, Roles, Report from Charge Nurse, Review of Chart

(2) Actual Simulation - Will use the three different simulations from doctoral study. Participants will take part in different roles. Nursing students from Student Nurse Association assist with set-up, roles, props, etc.
• Core Case: Lower Leg Fracture – Basic Assessment

• Preoperative Bowel Obstruction – Spiritual Needs

• Complex Case: Preoperative Bowel Obstruction – Fluid and Electrolyte Imbalance

(3) Debriefing led by facilitator
• Use of video playback

• Use of DASH tool – formative evaluation

1. <u>Written</u> - My research study involved traditional written case studies that were taken from Winningham's Critical Thinking Cases in Nursing (Harding & Snyder, 2016). They were delivered in a paper and pencil format with a written scenario and then questions to follow. The questions promote higher-level thinking by challenging the learner to apply, analyze, and evaluate a variety of information about a patient scenario. The downside of traditional written case studies, as described by Bowman (2017) is that because they are static, they do not allow the instructor to assess the student's continued thought process for decision making.

2. <u>Unfolding</u> - Information is purposefully incomplete to encourage the student to use critical thinking skills and application of prior knowledge to prioritize and make decisions (Carter & Welch, 2016). Bowman (2017) used an unfolding case study to foster critical thinking skills of students. The case study was rolled out in four parts throughout the day: (1) Initial information was provided to students; (2) A change in the patient status where students were required to relay their thought process to a provider; (3) New orders from a provider where students had to talk about the order; (4) When the patient's condition stabilized and the students could focus on psychosocial issues. The overall results of this study included the development of critical thinking skills, increased confidence in a safe environment.
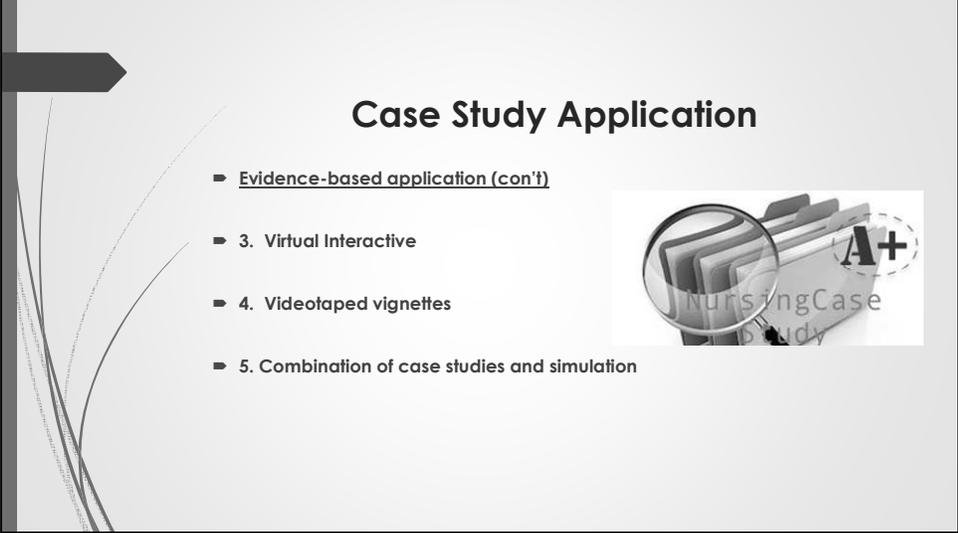
3. <u>Virtual</u> - Burke (2017) conducted a study using an I-Human Patients Case Player which is marketed as a cloud-based virtual patient simulator and case authoring system. As a virtual case study, the student has active engagement and can "talk" with virtual patients, develop solutions, and receive feedback. In the study by Burke, findings revealed a significant improvement in three areas of clinical decision making and critical thinking.

4. <u>Videotaped vignettes</u> - Hooper (2014) conducted research using case studies and videotaped vignettes to examine critical thinking skills of nurses. Six videotaped vignettes on different topics were selected with a case study to follow each vignette. A quantitative one-group pretest/posttest design (n = 18) using the HSRT found a statistically significant increase in overall mean critical thinking scores.

5. <u>Combination of case studies and simulation</u> - A mixed methods research study by Mills et al. (2014) involved a combination where the participants worked through unfolding case studies within a simulation setting. Sarasnick, Pyo, and Draper (2017) examined the two teaching strategies of simulation and computerized case studies. Standardized test scores were statistically significantly improved for the group of participants who received computerized case studies.
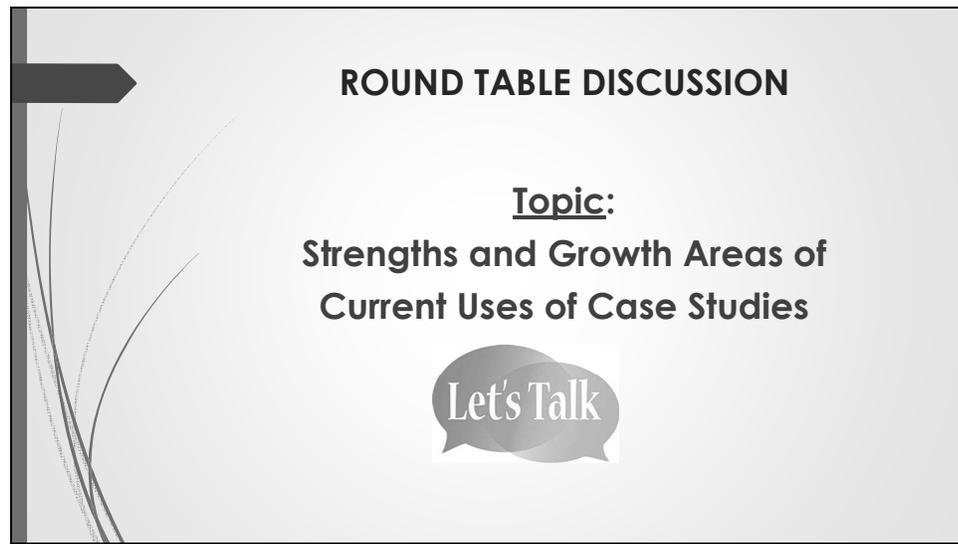
Use Think-Pair-Share Technique

Decide upon the text to be read and develop the set of questions or prompts that target key content concepts.
Describe the purpose of the strategy and provide guidelines for discussions.
Model the procedure to ensure that participants understand how to use the strategy.
Monitor and support participants as they work through the following:

T : (Think) Facilitators begin by asking a specific question about the text. Participants "think" about what they know or have learned about case studies.

P : (Pair) Each participant is paired with another participants or a small group.

S : (Share) Participants share their thinking with their partner. Facilitator expands the "share" into a whole-class discussion.

Day 2 - Posttest

1. Although debriefing can be helpful after a simulation scenario, the experience

    would be just as effective if debriefing were eliminated.

    True or False

2. Which of the following was <u>not</u> identified with evidence-based research as an

    effective strategy to conduct a simulation debriefing?

    a. Videotape feedback and discussion.

    b. Reflective journaling.

    c. Led by simulation facilitator with guiding questions.

    d. Led by first-year nursing students with no previous simulation experience.

3. Using a _____ is an evidence-based teaching strategy shown to foster

    critical thinking skills of nursing students. Different types include written,

    unfolding, virtual interactive, videotaped vignettes, and in combination with

    simulation.

    Fill in the blank

4.   Teaching strategies such as simulation or case studies are just as effective as

    traditional lecture.

    True or False

Day 2 Posttest - Answer Key

1. False - Debriefing is often referred to as the cornerstone of simulation and where the real learning takes place. A multisite quasiexperimental study by Forneris et al. (2015) found HSRT mean scores statistically significant for participants who had the intervention of reflective debriefing.

2. D. Appropriate evidence-based strategies to conduct a simulation debriefing include videotape playback with discussion, reflective journaling, instructor led with guiding questions, and observer-led.

3. Using a <u>case study</u> is an evidence-based teaching strategy shown to foster critical thinking skills of nursing students. Different types include written, unfolding, virtual interactive, videotaped vignettes, and in combination with simulation.

4. False - Evidence continues to suggest that traditional lectures with corresponding multiple-choice tests are not nearly as effective to engage students and promote critical thinking as active, student-centered, and problem-focused teaching strategies (Azizi-Fini, Hajibagheri, & Adib-Hajbaghery, 2015; Nelson, 2017; Ward, Knowlton, & Laney, 2018).   A comparison study by Farashahi and Tajeddin (2018) examined the effectiveness of lectures, case studies, and simulations. Results indicated simulation and case studies were perceived as being similar, but both more effective than the traditional lecture.
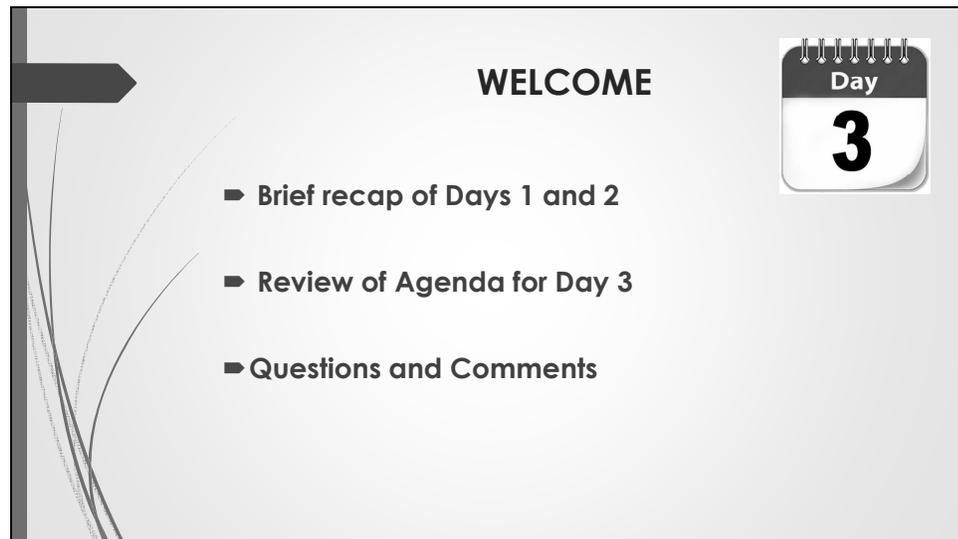
Concept Mapping: Best Practice – what does the research show?

Round Table Discussion: Strengths and growth areas of current use of concept mapping

 **Reflective Journaling**: Best Practice – what does the research show?

Round Table Discussion: Strengths and growth areas of current use of reflective journaling

Problem-Based Learning: Best Practice – what does the research show?

Round Table Discussion: Strengths and growth areas of current use of problem-based learning

Recap and Discussion on Content and Application

Final Remarks and Dismissal
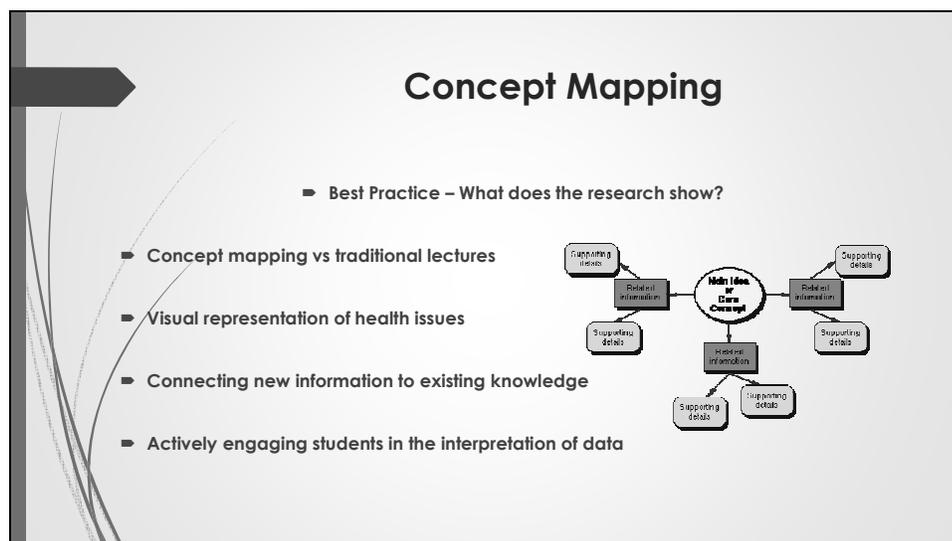
Another teaching strategy which has been shown to have a positive association with critical thinking is concept mapping.

A large systematic review and meta-analysis by Yue et al. (2017) examined the effectiveness of concept mapping versus traditional methods (such as lectures) on the development of critical thinking in nursing education.

The review provided evidence supporting the use of concept mapping in nursing education. The subgroup analyses "suggested that concept map user had significantly higher critical affective dispositions of open-mindedness, truth-seeking, analyticity, systematicity, self-confident, inquisitiveness, and maturity compared with traditional methods" (p. 93).

Concept maps can be used in a variety of ways such as a visual representation of health issues (Orique & McCarthy, 2015), connecting new information to existing knowledge (Yue, Zhang, Zhang, & Jin, 2017), and actively engaging students in the interpretation of data and synthesis of ideas).

Paper and pencil / Computerized - Traditional concept maps are constructed with a paper and pencil format, computer-assisted concept mapping (CACM) is gaining greater attention. The advantages of CACM is greater ability to modify content, size, shape, and examine multiple concepts. Examples of free software for CACM include Virtual Understanding Environment, Xmind, MindMaple, and Prezi (Mammen, 2016).

Concept mapping used with care plans - A quasiexperimental pretest-posttest study by Orique and McCarthy (2015) examined critical thinking and the use of concept mapping during the preparation of care plans. Evidence found a statistically significant increase in critical thinking scores measured by the Holistic Critical Thinking Scoring Rubric.

Concept-mapping with real-life case studies - A qualitative study by Lin et al. (2015) analyzed a teaching-learning strategy of concept mapping, question and answers, and real-life case studies found that these methods alternately influenced and enhanced each other in the development of critical thinking. (Carvalho et al., 2017).

Settings - Concept mapping is versatile and can be used in the classroom, labs, or clinical settings (Burrell, 2014).

ROUND TABLE DISCUSSION

Topic:
Strengths and Growth Areas of
Current Uses of Concept Mapping

Let's Talk

Equipment Needed: Whiteboard or flip chart, Markers, Pen & Paper for all   Set Up: Chairs in a circle

This is a group discussion so remember:
o   To talk to everyone in the group not just the facilitator.
o   To keep your comments brief and to the point
o   That everyone is welcome to share.

Collect discussion points 5-8 minutes; Take out a sheet of paper. I'm going to give us 1-2 minutes to brainstorm all of the possible topics regarding uses of concept mapping that we can discuss.

After the 1-2minutes are up
Take a look at your list of topics and highlight the top 3 topics that you think would be the most beneficial for you to discuss.

Discussion Topics 5-15 minutes per topic. Closure - Let's go around the circle and share a keyword or phrase that describes this round table for you?

Description - Naber et al. (2014) stated that reflective writing focuses on an activity the learner has undergone, such as clinical experiences in the hospital, collaborative group work, or research projects, and connects what was learned from the activity. Burrell (2014) described reflection as being a part of active learning which assists the learner to correlate theory and practice.

Connection to Critical Thinking - A descriptive qualitative study by Zori (2016). Two major themes evolved with the first theme being that critical thinking is a process which progresses over time. The second theme was that using critical thinking dispositions might prevent negative patient outcomes in providing safer patient care.

Naber et al. (2014) identified six narrative themes with regard to critical thinking and nursing students. The themes included transferring knowledge, centering care on the patient, recognizing consequential issues, collaboration, and self-examination.

Reflective journaling can also be used during the debriefing process in simulation. Bussard (2017) described how the simulation could be videotaped and students could access it later to complete a reflective journal. Students would be given questions or cues to guide their thought process, and faculty would provide journals feedback.

ROUND TABLE DISCUSSION

Topic:
Strengths and Growth Areas of
**Current Uses of Reflective Journaling**

Let's Talk

Divide into groups of 4-5.

Have the groups first discuss strengths and growth areas of current uses of reflective journaling.

Have each group then formulate 1-2 questions to be discussed about reflective journaling.

Swap the questions between groups.

Facilitator leads larger groups discussion with scribe on a white board.
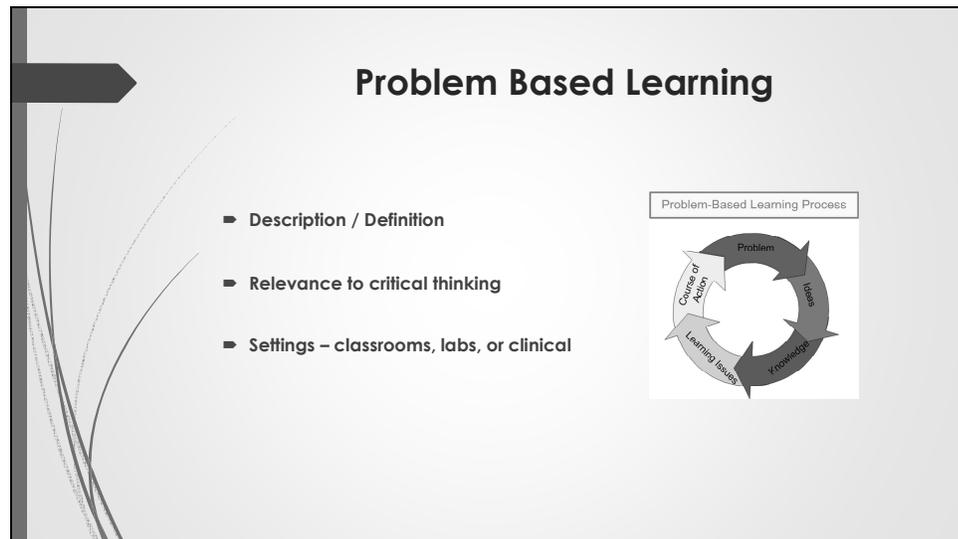
Description – Definitions - Problem-based learning which had its origin at the McMaster School of Medicine in Canada dating back to 1965 and was first used as curriculum teaching strategy in 1988 (Wosinski et al., 2018).

Relevance to critical thinking - It is described as a process-focused teaching strategy as opposed to content-based (Choi, Lindquist, & Song, 2014), building cognitive skills to solve complex problems (Gholami et al., 2016), and is a highly structured group-centered collaborative approach to learning (Carvalho et al., 2017). The self-directed aspect of problem-based learning is crucial in the development of critical thinking (Choi et al., 2014).

 Jeppesen, Christiansen, and Frederiksen (2017) - findings were that problem-based learning as a strategy not only motivates students, but strongly develops their critical thinking and clinical reasoning skills. Another systematic review conducted by Carvalho et al. (2017) found that problem-based learning was the most widely used teaching strategy to promote critical thinking. Another study by explored Kong et al. (2014) indicated problem-based learning was able to improve critical thinking scores compared with traditional lectures.

Settings – classrooms, labs, or clinical settings
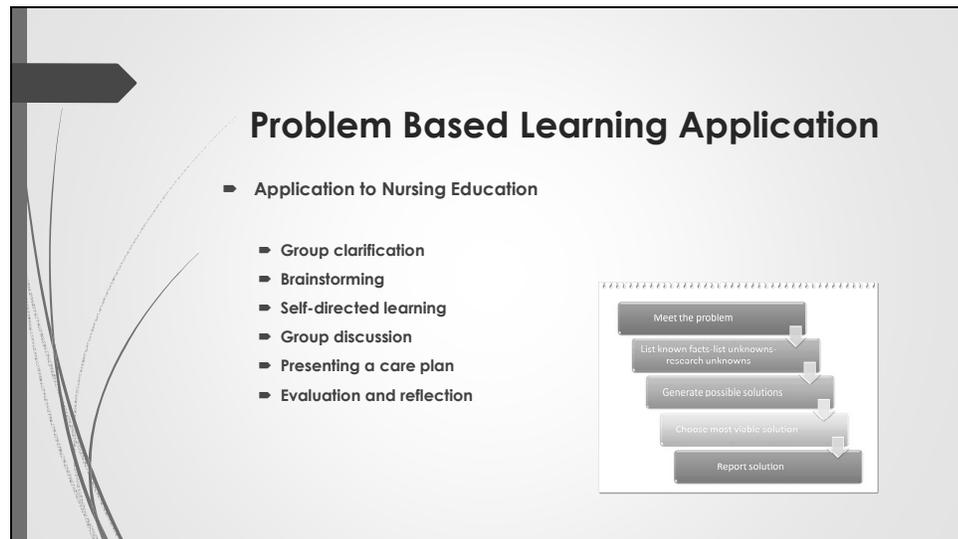
Application to Nursing Education - It generally follows a minimum of five steps to include (1) analysis of an actual or potential health problem (2) review the data on the problem (3) identify knowledge gaps (4) research possible solutions, and (5) create an action plan (Orique & McCarthy, 2015).

Review of Literature - Carvalho et al. (2017) found that problem-based learning was the most widely used teaching strategy to promote critical thinking. A quasiexperimental quantitative study by Gholami et al. (2016) used the following six stages and could be replicated as a teaching strategy into most nursing curriculums:

1. Group clarification. Students clarified the scenario and discussed areas which were undefined.

2. Brainstorming. Students shared their thoughts and potential solutions.

3. Self-directed learning. Students conducted research and supplied summaries and critical thinking questions to the peers in their group.

4. Group discussion. All members discussed possible explanations to the problem.

5. Presenting a care plan. Each group prepared a care plan which outlined their resolution.

6. Evaluation and reflection. All members participated in a peer evaluation and self-evaluation and reflection of this process.
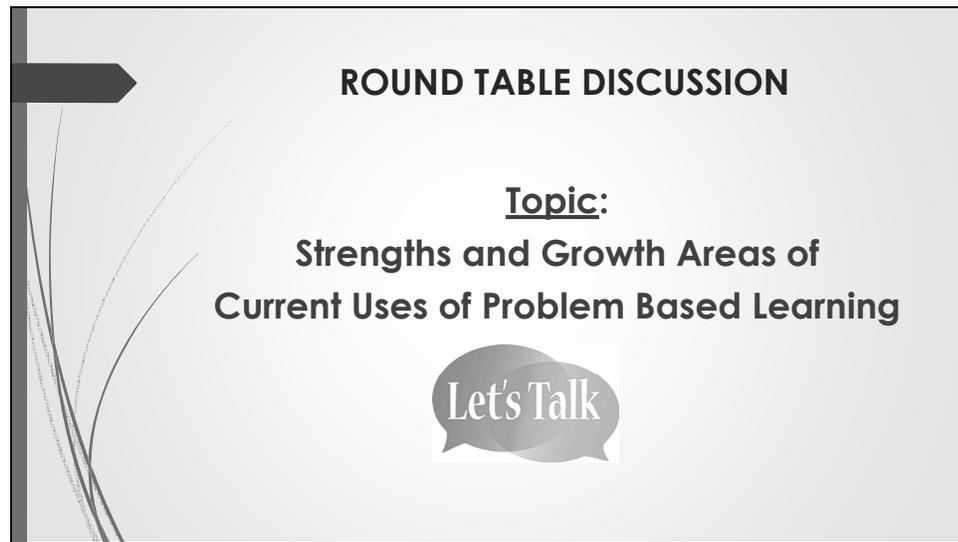
Naslonski, P. (2016). Problem based learning. [Video File]. Retrieved from
https://www.youtube.com/watch?v=bUCbCoDpwD0
- Review video.

Rotating Stations
- Create stations and divide the participants into small groups.

- Each group moves to a station, where they take about ten minutes discuss problem-based learning and record the results of their discussion on a white board located at the station.

- As the groups move from station to station, they base their discussions on what previously has been recorded on the white board.

- The activity ends when each group has been to every station.

- Facilitator reviews the white boards with the large group.

Day 3 - Posttest

1. Concept mapping is teaching strategy which has been shown to have a positive

   relationship with critical thinking of nursing students.

   True or False

2. _____ is a teaching strategy which focuses on an activity the learner

   has undergone, such as clinical experiences in the hospital, collaborative group

   work, or research projects, and connects what was learned from the activity.

3. The steps in a problem-based learning application could include:

   a. Group clarification and brainstorming.

   b. Self-directed learning and group discussion.

   c. Presenting a care plan and evaluation and reflection.

   d. All of the above.

4. Concept mapping, reflective journaling, and problem-based learning, are versatile

   teaching strategies and can be applied to classroom, clinical, and lab settings.

   True or False

Day 3 Posttest - Answer Key

1. True - Concept mapping is teaching strategy which has been shown to have a positive relationship with critical thinking of nursing students. A large systematic review and meta-analysis by Yue et al. (2017) examined the effectiveness of concept mapping versus traditional methods (such as lectures) on the development of critical thinking in nursing education. The review provided evidence supporting the use of concept mapping in nursing education. The subgroup analyses "suggested that concept map user had significantly higher critical affective dispositions of open-mindedness, truth-seeking, analyticity, systematicity, self-confident, inquisitiveness, and maturity compared with traditional methods" (p. 93).

2. Reflective journaling is a teaching strategy which focuses on an activity the learner has undergone, such as clinical experiences in the hospital, collaborative group work, or research projects, and connects what was learned from the activity.

3. D. The steps in a problem-based learning application could include group clarification, brainstorming, self-directed learning, group discussion, presenting a care plan, evaluation, and reflection.

4. True - Concept mapping, reflective journaling, and problem-based learning, are versatile teaching strategies and can be applied to classroom, clinical, and lab settings.

Recap and Discussion on Workshop Objectives (Content and Application)

Open Discussion

Consider how you can implement these teaching strategies into your courses (didactic, clinical, labs)

An email survey will be sent to each participant within a week [summative evaluation].

Wrap-up and Dismissal

References

- Abelsson, A., & Bisholt, B. (2017). Nurse students learning acute care by simulation: Focus on observation and debriefing. *Nurse Education in Practice, 24,* 6-13.

- Aldridge, M. D. (2016). How can nurse educators perform patient simulation efficiently? *Teaching and Learning in Nursing, 11,* 8-14.

- AlSabei, S. D., & Lasater, K. (2016). Simulation debriefing for clinical judgment development: A concept analysis. *Nurse Education Today, 45,* 42-47.

- Bowman, K. (2017). Use of online unfolding case studies to foster critical thinking. *Journal of Nursing Education, 56*(11), 701-702.

- Bussard, M. E. (2017). Postdebriefing activities following simulation. *Teaching and Learning in Nursing, 12,* 220-222.

- Carter, J. T., & Welch, S. (2016). The effectiveness of unfolding case studies on ADN nursing students' level of knowledge and critical thinking skills. *Teaching and Learning in Nursing, 11,* 143-146.

- Burrell, L. A. (2014). Integrating critical thinking strategies into nursing curricula. *Teaching and Learning in Nursing, 9,* 53-58.

- Carvalho, D. P., Azevedo, I. C., Cruz, G. K., Mafra, G. A., Rego, A. L., Vitor, A. F.....Ferreira, M. A. (2017). Strategies used for the promotion of critical thinking in nursing undergraduate education: A systematic review. *Nurse Education Today, 57,* 103-107.

- Center for Medical Simulation. (2018). Debriefing assessment for simulation in healthcare (DASH). Retrieved from https://harvardmedsim.org/debriefing-assessment-for-simulation-in-healthcare-dash

- Chamberlain J 2017 impact of simulation prebriefing on perceptions of overall effectiveness, learning, and self-confidence in nursing students. *Nursing Education Perspectives, 38*(3), 119-125.

- Chml J V 2016 Prebriefing in simulation-based learning experiences. *Nurse Educator, 41*(2), 64-65.

- 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, 34,* 52-56.

- Dufrene, C., & Young, A. (2014). Successful debriefing. Best methods to achieve positive learning outcomes: A literature review. *Nurse Education Today, 34,* 372-376.

- Faulcon, R. Y. (2015). Innovative teaching strategies with simulation technology in nursing education. *Innovative Teaching Strategies with Simulation Technology, 1,* 47-50.

- Gholami, M., Moghadam, P. K., Mohammadipoor, F., Tarahi, M. J., Sak, M., Toulabi, T., & Pour, A. H. (2016). Comparing the effects of problem-based learning and the traditional lecture method on critical thinking skills and metacognitive awareness in nursing students in a critical care nursing course. *Nurse Education Today, 45,* 16-21.

- Grant J S Dawkins D Molhook L Keltner N L Vance D E 2014 Comparing the effectiveness of video-assisted oral debriefing and oral debriefing alone on behaviors of undergraduate nursing students during high-fidelity simulation. *Nursing Education in Practice, 14,* 479-484.

References

- Dawkins, D., Molhook, L., Keltner, N. L., & Vance, D. E. (2014). Comparing the effectiveness of video-assisted oral debriefing and oral debriefing alone on behaviors of undergraduate nursing students during high-fidelity simulation. *Nursing Education in Practice, 14,* 479-484.

- Griffiths B 2018 Preparing tomorrow's nurses for collaborative quality care through simulation. *Teaching and Learning in Nursing, 13,* 46-50.

- Hooper, B. L. (2014). Using case studies and videotaped vignettes to facilitate the development of critical thinking skills in new graduate nurses. *Journal for Nurses in Professional Development, 30*(2), 87-91.

- INACSL Standards Committee. (2016). INACSL standards of best practice: *Clinical Simulation in Nursing, 12*(S), S1-S47.

- Jeppesen, K. H., Christiansen, S., & Frederiksen, K. (2017). Education of student nurses: A systematic literature review. *Nurse Education Today, 55,* 112-121.

- Jung, D., Lee, S. H., Kang, S. J., & Kim, J. H. (2017). Development and evaluation of a clinical simulation for new graduate nurses: A multi-site pilot study. *Nurse Education Today, 49,* 84-89.

- Ko E Kim H Y 2014 Effects of multi-mode simulation learning on nursing students' critical thinking disposition, problem solving process, and clinical competence. *Korean Journal of Adult Nursing, 26*(1), 107-116.

- 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-analysis. *International Journal of Nursing Studies, 51,* 458-469.

- Lee, J., & Oh, P. J. (2015). Effects of the use of high-fidelity human simulation in nursing education: A meta-analysis. *Journal of Nursing Education, 54*(9).

- Lestander, O., Lehto, N., & Engstrom, A. (2016). Nursing students' perceptions of learning after high-fidelity simulation: Effects of a three-step post-simulation reflection model. *Nurse Education Today, 40,* 219-224.

- Lin, C. C., Han, C. Y., Pan, I. J., & Chen, L. C. (2015). The teaching-learning approach and critical thinking development: A qualitative exploration of Taiwanese nursing students. *Journal of Professional Nursing, 31*(2), 149-157.

- Mammen, J. R. (2016). Computer-assisted concept mapping: Visual aids for knowledge construction. *Journal of Nursing Education, 55*(7), 403-406.

- Mills, J., West, C., Langtree, T., Usher, K., Henry, R., Chamberlain-Salaun, J., & Mason, M. (2014). Putting it together: Unfolding case studies and high-fidelity simulation in the first-year of an undergraduate nursing curriculum. *Nurse Education in Practice, 14,* 12-17.

References

• Naber, J. L., Hall, J., & Schadler, C. M. (2014). Narrative thematic analysis of baccalaureate nursing students' reflections: Critical thinking in the clinical education context. *Journal of Nursing Education, 53*(9), 90-96.

• Naslonski, P. (2016). Problem based learning. [Video File]. Retrieved from https://www.youtube.com/watch?v=bUCbCoDpwD0

• Orique, S. B., & McCarthy, M. A. (2015). Critical thinking and the use of nontraditional instructional methodologies. *Journal of Nursing Education, 54*(8), 455-459.

• Przybyl, H., Androwich, I., & Evans, J. (2015). Using high-fidelity simulation to assess knowledge, skills, and attitudes in nurses performing CRRT. *Nephrology Nursing Journal, 42*(2), 135-147.

• Reierson, I. A., Haukedal, T. A., Hedeman, H., & Bjork, I. T. (2017). Structured debriefing: What difference does it make? *Nurse Education in Practice, 25,* 104-110.

• Robinson, B. K., & Dearmon, V. (2013). Evidence-based nursing education: Effective use of instructional design and simulated learning environments to enhance knowledge transfer in undergraduate nursing students. *Journal of Professional Nursing, 29*(4), 203-209.

• Sarasnick, J. A., Pyo, K. A., & Draper, J. (2017). Using simulation and case studies combined to improve student knowledge: A retrospective study. *Nursing Education Perspectives, 38*(3), 126-130.

• Waznonis, A. R. (2014). Methods and evaluations for simulation debriefing in nursing education. *Journal of Nursing Education, 53*(8), 459-465.

• White, M. (2017). Keep calm and simulate on: Faculty experiences and insights into implementing best practices in simulation. *Teaching and Learning in Nursing, 12,* 43-49.

• Wosinski, J., Belcher, A. E., Durrenberger, Y., Allin, A. C., Stomacq, C., & Gerson, L. (2018). Facilitating problem-based learning among undergraduate nursing students: A qualitative systematic review. *Nurse Education Today, 60,* 67-74.

• Yue, M., Zhang, M., Zhang, C., & Jin, C. (2017). The effectiveness of concept mapping on development of critical thinking in nursing education: A systematic review and meta-analysis. *Nurse Education Today, 52,* 87-94.

• Zori, S. (2016). Teaching critical thinking using reflective journaling in a nursing fellowship program. *The Journal of Continuing Education in Nursing, 47*(7), 321-329.

An Evidence-Based Review of Teaching Strategies to Enhance Critical Thinking Skills of Nursing Students

Workshop Evaluation

Thank you for participating in the teaching strategy workshop! Please take a few minutes to provide us with some feedback about your experience.

	Strongly Agree			**Strongly disagree**
1. The material was presented in an organized manner	1 2	3	4	5
2. The program was well paced within the allotted time	1 2	3	4	5
3. The facilitator was knowledgeable on the topic	1 2	3	4	5
4. The facilitator was a good communicator	1 2	3	4	5
5. I feel confident to apply **simulation** as a teaching strategy to enhance critical thinking skills of students	1 2	3	4	5
6. I feel confident to apply **case studies** as a teaching strategy to enhance critical thinking skills of students	1 2	3	4	5
7. I feel confident to apply **concept maps** as a teaching strategy to enhance critical thinking skills of students	1 2	3	4	5
8. I feel confident to apply **reflective journaling** as a teaching strategy to enhance critical thinking skills of students	1 2	3	4	5

9. I feel confident to apply **problem-based learning** as a teaching
   strategy to enhance critical thinking skills of students   1   2   3   4   5

10. Given the topics, was this workshop: ❑ a. Too short   ❑ b. Right length   ❑ c. Too long

11. In your opinion, was this workshop: ❑ a. Beginner ❑ b. Intermediate ❑ c. Advanced

12. Were your expectations fulfilled?   ❑ a. Yes   ❑ b. Partially   ❑ c. No

13. **My overall opinion of this workshop was:**

☐ Excellent

☐ Good

☐ Okay

☐ Needs Improvement

14. How could the workshop have been improved?

15. Are there any other comments, ideas or suggestions you would like to share with us?

Thank you!

Appendix B: Cover Letter

My name is Janine Blakeslee and I am a doctoral student at Walden University. The research I wish to conduct involves an evaluation of whether high-fidelity simulation leads to an increase in critical thinking skills of nursing students more than a traditional case study. If you are interested in participating in this study, you will be asked to complete a survey at the beginning of the semester that measures critical thinking. You will also be asked to complete a similar survey later in the semester which will also measure critical thinking. The date, time, and location for you to complete the first survey is shown below. The date, time, and location of the second survey will also be given to you at that time.

Date of First Survey: Thursday, 9/14/17

Time of First Survey: 1:00 p.m.

Location of First Survey: Room 16

If you choose to participate in this study, you will be asked to sign a consent form. The consent form explains the procedures for the study, the risks and benefits, and that your participation in the study would remain confidential. The consent form also outlines that your participation is voluntary. This means that everyone will respect your decision of whether or not you want to be in the study. No-one will treat you differently if you decide not to be in the study. Your grade will not be affected based on whether you participate or decline participation in the study. If you decide to join the study, you can still change your mind during the study.

Thank you for your consideration. You can direct any questions to me via

telephone (XXX.XXX.6152) or email (janine.blakeslee@waldenu.edu).

Janine R. Blakeslee, MSN, RN, CNE

Appendix C: Authorization Letter to Use HSRT Instrument

INSIGHT
ASSESSMENT

Measuring Thinking Worldwide

11/15/2016

Janine Blakeslee:

This letter is to confirm that you've been approved by Insight Assessment to purchase individual use licenses of the HSRT for use in your dissertation. Please note that no actual HSRT items can be published in your dissertation in any way. However, sample items from our website and anything found in the instrument manual can be included. Please see our website for full privacy and security details and feel free to contact us directly with any questions.

Best,

Joel Roberts
Director, San Jose Business Unit
Insight Assessment
650-697-5628
www.insightassessment.com
jroberts@insightassessment.com
Measuring Thinking Worldwide

INSIGHT ASSESSMENT, A DIVISION OF CALIFORNIA ACADEMIC PRESS

1735 N 1ST STREET, SUITE 306   PHONE (650) 697-5628
SAN JOSE, CA. 95112-4511 USA   www.insightassessment.com   FAX (650) 692-0141