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Evaluating Development of Critical Thinking Skills in Simulation Learning

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Executive Summary
Evaluating Development of Critical Thinking Skills in Simulation Learning

Problem

Critical thinking is the key to nurses' ability to make sound decisions in clinical practice. It was determined nurses, hired within the last three years at an Intermediate Care Facility for the Mentally Retarded (ICFMR), required additional education and practice to manage high-risk low frequency events, specifically respiratory emergencies. Project questions for this quality improvement initiative included: Will a high fidelity simulation session improve critical thinking skills for registered nurses hired within the last three years, at the ICFMR? And, will the introduction of simulation learning to develop critical thinking skills, decrease the number of respiratory emergencies at the ICFMR that require hospitalization?

Purpose

The purpose of this quality improvement initiative was to provide education (a respiratory emergency workshop and simulation session) on emergency scenarios for newly hired nurses at the ICFMR to determine the relationship simulation learning had on developing critical thinking skills.

Goal

This project had two goals. The first goal was to evaluate if novice nurses could enhance critical thinking skills to manage respiratory emergencies in an effective manner by attending a high fidelity simulation workshop. The second goal was to decrease the number of individuals hospitalized at the ICFMR secondary to respiratory emergencies.

Objectives

The objectives for this project included: 1) Increase nurses critical thinking acquisition measured by the California Critical Thinking Disposition Inventory (CCTDI) questionnaire after an educational workshop and simulation session on managing respiratory emergencies. 2) Conduct a simulation session for nurses to effectively manage respiratory emergencies in a risk-free safe environment. 3) Provide individual feedback for nurses through debriefing sessions to evaluate performance.

Plan

Education was provided with a workshop on emergency care followed by a high fidelity simulation session. A pre and post questionnaire, the CCTDI, was administered to evaluate the development of critical thinking skills. IRB approval was obtained from the Mendota Mental Health Institute and Regis University. A local college provided access to the high fidelity simulation lab.

Outcomes and Results

Twenty novice nurses attended the didactic emergency care workshop followed by a high fidelity simulation session. Results from a paired samples t- test suggested that overall there was no statistical difference between critical thinking skill development and simulation learning. However, anecdotal comments suggested a positive practice outcome after the workshop and simulation. Further study is recommended.

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Table of Contents

List of Tables

List of Appendices

Evaluating Development of Critical Thinking Skills in Simulation Learning

Contemporary health care environments require nurses to possess critical thinking abilities in order to tackle the complexities of practice which can be compounded by increasing patient acuity, advanced technology and a growing consumer demand for quality of care (Fero et al., 2010). Critical thinking has been discussed extensively in the literature, and in spite of the agreement regarding the significance of critical thinking, there lacks a standardized definition. Brookfield (2012, p. 5) defines critical thinking as "the process of hunting and checking assumptions". A much more detailed definition was submitted by Facione (1990, p. 2) as "critical thinking is to be purposeful, self-regulatory judgment which results in interpretation, analysis, evaluation and inference, as well as explanation of the evidential conceptual methodological, criteriological, or contextual considerations upon which judgment is based." For the purpose of this quality improvement initiative, critical thinking is defined as disciplined thinking that is clear, logical, and open minded as well as guided by evidence.

One teaching strategy that has recently been adopted by some educators to develop nurses' critical thinking, learning and confidence involves high fidelity simulation (Kaddoura, 2010). Simulation provides a mechanism for learners to practice the application of specific knowledge, skills, and attitudes while thinking through possible decisions in standardized patient care scenarios within a safe learning environment (Lane & Mitchell, 2013). High fidelity simulation is an experimental action assessment method using a computerized mannequin that can be programmed to respond to real world inputs (Fero et al., 2010). A number of changes in health care have dictated the expanded use of simulation. Factors include an increased focus on patient safety, lack of clinical sites for nursing students, and the need to practice nursing skills in a safe environment. Simulation should be utilized as an adjunct to patient care experiences, and

its integration into the curriculum should be well planned and outcome driven (Motola, Devine, Chung, Sullivan & Issenberg, 2013).

The development of critical thinking skills for nurses is essential to provide quality patient care in an ever changing, challenging health care system. A quality improvement initiative was conducted to introduce simulation learning as an additional teaching strategy to evaluate the development of critical thinking skills in nurses.

Problem Recognition and Definition

A state operated, two hundred fifty bed, Intermediate Care Facility for the Mentally Retarded (ICFMR) was the practice setting for this project. Federal law and regulations use the term, Intermediate Care Facility for the Mentally Retarded, but the Center for Medicare/Medicaid Services uses the term, "individuals with intellectual disability" (ID) instead of "mental retardation" (Intermediate Care Facilities for Individuals with Intellectual Disabilities [CMS], 2015). However, ICFMR is the designation currently used in this project setting and many other facilities.

The ICFMR hires registered nurses (RNs) on a monthly basis to staff six separate clinical units. Education on emergency care is included in nursing orientation. The nurses are required to participate in an emergency mock code exercise to evaluate their performance in a respiratory emergency. The mock code exercise is taught using a CPR manikin. Two units at the ICFMR provide care for individuals with acute respiratory conditions. These respiratory conditions lead to emergency codes that require the nurses to think critically to respond effectively to resolve the issue.

Fortunately, an emergency code is not a common event at the ICFMR. In the last six months there has been one respiratory emergency that required hospitalization. Patient scenarios

that potentially have a serious consequence and happen rarely are considered high risk, low frequency events. Graham (2012) identifies the most effective way to manage high risk, low frequency patient events is by frequent, scenario specific, preparation and teaching. Benefits of high fidelity simulation includes the ability to learn about rare events from preprogrammed scenarios, repetition of cases and experiences, development of problem-solving, and learning from errors without harm to patients (Beyea,Von Reyn & Slattery, 2007). Therefore, based on the high risk, low frequency occurrence of respiratory emergencies at the ICFMR, it was determined that nurses hired within the last three years require additional preparation and education in order to maintain patient safety and optimize nursing practice.

Problem Statement

A problem was identified by the ICFMR management team that newly hired nurses needed education to identify key steps in managing respiratory emergencies. A lack of knowledge or experience in effectively managing a respiratory emergency could have a negative impact on the individuals that live at the ICFMR. The newly hired nurses at the ICFMR are at the advanced beginner level because they may not have the knowledge and/ or experience specific to the ICFMR patient population. The individuals that reside at the ICFMR have profound intellectual disabilities accompanied by congenital anomalies, medical co-morbidities and significant physical deformities that require specialized adaptive equipment and unique, comprehensive plans of care. For that reason, newly hired nurses require additional education on assessment and management of unique circumstances accompanying respiratory emergencies. Education to identify/manage early signs and symptoms of impending respiratory emergencies may decrease the need for additional advanced medical interventions and or hospitalizations.

Critical thinking skills and attributes are essential to nursing, and represent a search for the best teaching strategies and evidence pertaining to a given situation. Nurse educators are charged with the responsibility of empowering novice nurses to become autonomous thinkers with the capacity to cope with many challenges of modern day practice (Parker & Myrick, 2009). Therefore, this quantitative study assisted in identifying if high fidelity simulation learning improved the critical thinking skills necessary to effectively manage respiratory emergencies.

Project Purpose and PICO Statement

The purpose of this quality improvement initiative was to provide education on emergency situations (respiratory emergency workshop and a simulation session) for newly hired nurses at the ICFMR to determine the relationship simulation learning had on developing critical thinking skills. This initiative addressed the concern identified as the lack of knowledge newly hired nurses at the ICFMR possessed in recognizing key steps in managing respiratory emergencies. Nurses hired within the first three years at the ICFMR are practicing within a new environment in a specialized nursing practice and providing care for a new patient population, therefore are considered novice nurses. At the novice level, nurses have limited experience on which to base their decisions. To gain the knowledge required, these nurses must be taught key interventions to effectively manage respiratory emergencies. Clinical situations, specific to the ICFMR population, require specialized protocols to guide their performance. In general, nurses gain clinical knowledge over time. The dual method of didactic learning (teacher centered) in a respiratory emergency workshop coupled with simulation session (student centered) was the focus of the quality improvement initiative.

One aspect of the role of an advanced practice nurse or Doctor of Nursing Practice includes providing nursing education to improve patient outcomes. Nurse educators constantly seek new information by keeping abreast of current research, theories, and issues in clinical practice for application relevant to teaching situations (Bastable, 2008). A current evidence based teaching/learning strategy is high fidelity simulation. This study introduced high fidelity simulation learning as a means of fostering critical thinking skills. The local community college provided opportunities for the ICFMR nurses to conduct mock code drills incorporating high fidelity manikins in the college simulation lab. This was a new learning strategy/opportunity for recently hired nurses at the ICFMR.

The identified educational need formed a basis for this capstone project to evaluate the effects high fidelity simulation had on the development of critical thinking skills. The acronym "PICO" is used rather than stating a formal research hypothesis. The acronym stands for: Population or Disease (P), Intervention or Issue of Interest (I), Comparison group or Current Practice (C) , and Outcome (O) and is usually framed as a question (Melnyk & Fineout-Overholt, 2011, p. 31). The PICO questions were, "Will a high fidelity simulation session improve critical thinking skills for registered nurses hired within the last three years at the ICFMR?" and "Will the introduction of simulation learning to develop critical thinking skills decrease the number of respiratory emergencies at the ICFMR that require hospitalization?" The PICO statement for this project included:

P - Registered nurses hired within the last three years at the ICFMR.

I - A didactic workshop on respiratory emergency care including a high fidelity simulation session.

C - Current practice at the ICFMR does not include high fidelity simulation learning.

O - Outcomes will be measured by utilizing the California Critical Thinking Disposition Inventory (CCTDI) questionnaire pre and post intervention to determine if the simulation sessions improve nurses' critical thinking skills.

Project Significance, Scope, and Rationale

The scope of this quality improvement initiative included evaluating the development of critical thinking skills of a small convenience group of long term care nurses who practice in the ICFMR. The findings will be published in an education nursing journal as relevant teaching strategies for nurse educators. Nurse educators from both academia and staff development are committed to the development of safe and highly skilled health care practitioners (Lane & Mitchell, 2013**).** The significance of this study was to determine the correlation between high fidelity simulation and the development of critical thinking skills. The introduction of a new teaching strategy at the ICFMR will encourage nurse educators to implement new teaching strategies to foster the development of critical thinking skills. In addition, nurses' ability to manage respiratory emergencies in an effective manner will translate into quality evidence-based patient care.

According to Houser and Oman (2011), evidenced-based practice is an effective, efficient means to achieve the best outcomes for patients. The rationale supporting this quality improvement initiative included researching methods/approaches to help nurses develop critical thinking skills to manage respiratory emergencies. Nurse educators strive to promote learners' critical thinking skills, learning and confidence through various teaching approaches because they cannot prepare nurses for every situation that they may encounter in clinical practice (Kaddoura, 2010). This initiative provided information to guide nurse educators at the ICFMR to utilize evidence-based best practice for teaching. The didactic workshop and the simulation

session presented nurses with additional information and methods to approach respiratory emergencies in an effective manner.

Theoretical Foundations

The three theories that were the foundation for the quality improvement initiative included Patricia Benner's, Novice to Expert Theory; Pamela Jeffries's, Framework for Simulation in Teaching Used in Teaching Strategies in Nursing; and Kurt Lewin's, Linear Change Theory.

Benner (2001) suggested that nurses move through five levels/stages as they develop clinical knowledge and establish their professional practice: novice, advanced beginner, competent, proficient and expert. The theory, Novice to Expert differs from many nursing theories as it focused on education. The vast majority of nursing theories use the nurse patient model but Benner's theory model incorporates the teacher student model. This theory identifies the metaparadigm concepts as nursing, person, health and situation (environment). There is a logical sequence that exists between the levels of skill acquisition. Nurses with three or more years of experience begin practicing at the level of competence in which nursing actions can be seen as long term goals and plans (Benner, 2001). These nurses exhibit mastery of skills and the ability to cope with changes and contingencies seen in the clinical arena (Benner, 2001). Repetition of skills and routines performed over time leads to nurses progressing from competent to proficient to expert. The expert nurse no longer relies on rules to guide behavior; rather, he/she utilizes experience to guide nursing actions (Benner, 2001). Nurses entering a new practice arena with patients are practicing as a novice or advanced beginner. Dr. Benner's theory was appropriate and applicable to the population that included nurses that were hired within the last three years at the ICFMR.

The second theory used to guide this quality improvement initiative was the Framework for Designing, Implementing and Evaluating: Simulation Used as Teaching Strategies in Nursing (Jeffries, 2005). This framework encompasses five conceptual components that are operational through several different variables: teacher factors, student factors, educational practices integrated into curriculum, simulation design characteristics and finally student outcomes. According to this framework, the teacher is essential to successful learning and all simulation learning is student-centered. Teachers and students influence the overall instruction in the following aspects: demographic characteristics of the teacher as well as the demographics, age, and level of the student; these aspects also influence the type of activities that happen in the classroom and /or during instruction (Jeffries, 2005). Active learning, collaborative feedback and student-faculty interaction occur concurrently to constitute educational practices of instruction.

Simulation design is influenced by the above mentioned characteristics of teachers, students and educational practices. Fidelity, problem solving, student support and debriefing are objectives that impact the degree of quality for simulation learning. Interactions of all components described influence student outcomes, which as defined by this framework, include learning, skill performance, learner satisfaction, critical thinking and self-confidence (Jeffries, 2005). This quality improvement initiative incorporated active learning and feedback that included two teaching/learning strategies vital to the education and achievement of student outcomes as outlined in this framework.

The third theory that had application to this quality improvement initiative was a non-nursing theory, Kurt Lewin's Linear Change Theory. Lewin defines change as the interruption in an organization's homeostasis (Marquis & Huston, 2009). The PICO statement identified the

need for change for nurses to develop critical thinking skills to manage respiratory emergencies. The basic concepts outlined in this change theory are three stages (unfreezing, moving stage and refreezing). Unfreezing assesses the need and prepares individuals to move to an improved level of practice (Zaccagnini & White, 2011). The unfreezing stage transpired when the nurses were introduced to an alternative way of learning the steps to provide emergency care while participating in a mock code utilizing high fidelity simulation. According to Burnes (2004) change is a constant feature of organizational life and the ability to manage it is seen as a core competence of successful organizations. The core concepts of each theoretical framework utilized in this quantitative study, along with the relevance to this project, are outlined in detail (see Appendix A for the Theoretical Foundation).

Literature Selection

A review of literature was conducted to evaluate existing knowledge pertaining to high fidelity simulation in relation to promoting the development of critical thinking skills for nurses in the clinical setting (see Appendix B for the Systematic Review of Literature Exemplar). The initial step in selecting appropriate literature was to differentiate critical thinking skills from other terms used interchangeably. The sequential steps in this process were to perform a succinct comparative analysis of the existing literature, identify common themes and voids in the literature. An extensive literature review is completed in order to develop an understanding of the nature and scope of the problem and to determine what research has already been done (Zaccagnini & White, 2014).

Scope of Evidence

Currently, high fidelity simulations are widely used in nursing education and are being introduced in the acute care setting to assist with orientation programs, continuing education,

certification courses and staff development. The use of high fidelity simulation in both orientation programs and staff development activities has potential to meet many learning needs (Hallenbeck, 2012). Evidence supports the use of simulation in conjunction with additional teaching methodologies as an effective approach to enhance nurses' clinical skills. There is limited research to support the concept that simulation learning, as the sole teaching method, is effective. High fidelity simulation is used as a tool to assist with the acquisition of knowledge, confidence, and possibly critical thinking skills for both graduate and experienced nurses in a risk-free, experiential learning environment (Kaddoura, 2010). This quality improvement initiative incorporated a workshop on managing respiratory emergencies in conjunction with a high fidelity simulation session to help evaluate the development of critical thinking skills in relation to high fidelity simulation. Incorporating both didactic content in a workshop and high fidelity simulation learning together allowed nurses the opportunity to apply the concepts/knowledge they acquired in a risk free non-threatening environment. According to Jeffries (2007) innovative ways to teach students about the real world of nursing in a cost-effective, efficient and high quality manner are needed to prepare nurses for safe and efficient practice. Pamela Jeffries is a world renowned author on simulation who has authored a series of articles on simulation learning.

Review of Evidence

Background of the Problem

There are very few studies in current literature substantiating the relationship between simulation learning and the development of critical thinking skills. This quality improvement initiative was a quantitative study to address that identified void.

Systematic Review of the Literature

Over 10,000 articles were found utilizing the databases CINAHL, PubMed, PsychINFO, Google Scholar and EBSCOhost, originating in 1990 to current day practice. Key words used to gather these articles included critical thinking, staff development, simulation learning, debriefing, education and nursing. To narrow the search to a more manageable number the words critical thinking, simulation and staff nurses were used which resulted in 65 articles. To aid in obtaining articles that used the same measurement tool as proposed in this study an additional search was conducted adding the term California Critical Thinking Disposition Inventory (CCTDI). This search produced 20 articles that specifically addressed the purpose statement.

High Fidelity Simulation. **A**ccording to Jeffries (2005) simulation is an activity that essentially mimics the reality of patients and the clinical environment. This view provided the basis for the definition of high fidelity simulation for the purpose of this study. A patient care scenario re-created in a controlled atmosphere utilizing an interactive manikin was used in the simulation session. This allowed nurses to practice performing specialized resuscitative measures encountered with ICFMR individuals in a safe, non-threatening environment. The use of clinical simulation with predetermined scenarios was an ideal way for nurses to experience high-risk situations within a safe and predictable clinical environment.

High fidelity simulation is a well debated topic in the academic arena as there is a shortage of clinical sites for nursing students. Hayden, Smiley, Alexander, Kardong-Edgren & Jeffries (2014), authored the landmark study titled, The National Council of the State Boards of Nursing **(**NCSBN) National Simulation Study: A Longitudinal, Randomized, and Controlled Study Replacing Clinical Hours with Simulation in Prelicensure Nursing Education**.** This comparison study used a randomized, controlled, longitudinal, multisite design that was

conducted in three phases over a period of two and a half years. Incoming nursing students from 10 prelicensure programs across the United States were randomized into one of three study groups. The first group consisted of students who had traditional clinical experiences (no more than 10% of clinical hours spent in simulation). The second group consisted of an experimental group of students who had 25% of their traditional clinical hours replaced by simulation. The final group was comprised of students that had 50 % of their traditional clinical hours replaced by simulation.

The study began in the 2011 fall semester with the first clinical nursing course and continued throughout the core clinical courses to graduation in May 2013. At the end of the nursing program, there were no statistical significance differences in clinical competency and nursing knowledge as assessed by clinical instructors ($p=0.688$); there were no statistically significant differences in comprehensive nursing knowledge assessments ($p= 0.478$); and there were no statistically significantly differences in NCLEX pass rates ($p=0.737$) in the three groups (Hayden et al., 2014). Study participants were also followed into their first six months of clinical practice. The study concluded that there were no meaningful differences between the control and experimental groups in critical thinking, clinical competency and overall readiness for practice as rated by managers at six weeks, three months and six months after working in a clinical position. This longitudinal study provided substantial evidence that 50% of simulation can be effectively substituted for traditional clinical experience in all prelicensure core nursing courses under conditions comparable to those described in the study. The results from this study provided guidance for nursing schools seeking alternative solutions to clinical experiences along with the implications for the significance of incorporating simulation learning in staff development departments.

To further substantiate the importance of simulation learning in nursing education, Gore, Hunt and Raines (2008) conducted a study with 24 first semester baccalaureate nursing students. The students spent a total of 4 hours over the course of 7 weeks caring for simulation patients with various diagnoses in a mock hospital unit setting including realistic props, medical records, lab reports, EKGs, history and physical reports and physician orders. These virtual interactions were scheduled prior to any real patient contact in the clinical setting. The results of the study identified that the simulation teaching method was viewed positively by both faculty and teachers. In addition, the advantages of utilizing simulation learning with preclinical experiences included: students were less apprehensive, faculty had opportunities to assess and evaluate critical thinking and psychomotor skills before patient contact, and clinical information helped faculty to make appropriate clinical assignments. The proposed change in nursing curriculum secondary to this study was the adoption of simulation education preclinical for all junior nursing students. The disadvantage of this study was the additional time commitment required for the nursing faculty. The need for developing a reliable tool for monitoring outcomes was identified.

Inch (2013) identified the perioperative environment as a nursing practice that required specialized knowledge utilizing Benner's Novice to Expert as a theoretical framework. This article has implications for this quality improvement initiative, as it discussed the need for additional education for nurses entering a specialized nursing practice. However, it is not always possible to expose learners to common situations, yet new nurses are expected to hit the ground running, prioritizing, managing, and following protocols as a basic practice guideline (Murphy, Hartigan, Walshe, Flynn & O'Brien, 2011). This article discussed the use of simulation and identified the importance for the simulation scenario to align with Benner's stages/level of acquisition, in addition to the educator being flexible with role playing and adaptability. The

author concluded that if simulation learning is planned and debriefing done using a high standard, it has the potential to leave it's footprint on conceptual knowledge, self-efficacy, confidence and active reflection in situational learning (Inch, 2013).

Critical Thinking. Various definitions of critical thinking are found in the literature today. The National League for Nursing (2011, p. 282), defines critical thinking in clinical nursing practice as " a discipline specific, reflective, reasoning process that guides a nurse in generating, implementing, and evaluating approaches for dealing with client care and professional concerns." Application of critical thinking to nursing practice is demonstrated by the nurses' ability to interpret, analyze, infer and explain a decision making process necessary to ensure the delivery of quality patient care (Adamson, 2011).

Fero et al., (2010) conducted a quasi-experimental, cross-over design to study the relationship between the metrics of critical thinking and performance in simulated clinical scenarios. The study population consisted of 36 nursing students (14 Diploma, 12 ADN and 10 BSN) who participated in the measurement of critical thinking skills and simulation-based performance using videotaped vignettes, high fidelity simulation, California Critical Thinking Disposition Inventory (CCTDI) and the California Critical Thinking Skills Test (CCTST). The results showed no significant statistical relationship between videotaped vignette performance and the CCTDI scores ($p=0.683$) or CCTST ($p=0.372$) with the nursing students. There was no statistical significance between the CCTDI scores ($p=0.647$) and the high fidelity simulation. Although there was a significant relationship (Cramer's $V=0.413$) discovered between overall high fidelity simulation and CCTDI scores ($p=0.047$).

The author concluded that overall performance in high fidelity simulation appeared to best approximate scores on the standardized measure of the critical thinking disposition

(CCTDI). It was recommended that further research is needed to determine if simulation-based performance correlates with critical thinking in the clinical setting. Additional studies will allow nurse educators and administrators to determine the best, most cost effective method of evaluating and preparing nurses for clinical practice.

In another study, Chaing and Chan (2013) used a mixed method design aimed at evaluating the development of critical thinking disposition and skills among 177 nursing students in Hong Kong. The focus of this study was to identify the nursing faculty's concerns with high fidelity simulation being an acceptable teaching strategy. Quantitative and qualitative data was collected over two semesters using the CCTDI questionnaire as a pre and posttest along with focus group interviews. Although there were significant increased analyticity, confidence and overall critical thinking disposition scores, inquisitiveness decreased after the study period. The overall disposition score for nursing students showed a significant increase in the development of critical thinking after two semesters. The clinical relevance for this study included that the overall positive feedback from students and the increase in the development of critical thinking warranted the implementation of high fidelity simulation as a value-added adjunct to the nursing school's curriculum.

General themes from the literature review included the following:

- High fidelity patient simulation (HFS) is an innovative teaching tool (Beyer, 2012).
- Health care professionals must have critical thinking skills to problem solve and provide quality and safe patient care (Schubert-Bob, 2009).

- Simulation has become the innovative method of incorporating clinical and theoretical knowledge and experience for both BSN and ADN nursing students (Gore, Hunt & Raines, 2008).
- Simulation learning in nursing education is beneficial but lacks adequate quantitative research (Fronterio & Glynn, 2012).
- High fidelity simulation is a safe way to learn (Hallenbeck, 2012).
- More research needs to be done to see if the increased knowledge and skills acquired in simulation learning translates into safer patient care and better patient measured outcomes (Fero et al., 2010).

In conclusion, a summary of the available literature supported the usage of simulation as a teaching strategy that develops confidence and promotes comfort in a safe learning environment. There is a void in the current literature related to the lack of quantitative studies exploring the relationship between simulation learning and the development of critical thinking skills. This quality improvement initiative was a quantitative study to explore that identified gap.

Project Plan and Evaluation

Market and Risk Analysis

A SWOT analysis, also identified as a situational analysis, helps provide focus on the state of affairs of an organization. In this initiative, the SWOT analysis functioned to identify the strengths associated with the project, guided decision making to address weaknesses, located opportunities and distinguished threats that could impede success. The primary strengths directing the success of this initiative were motivated learners, the close proximity of the ICFMR to the simulation lab, and a seasoned nurse educator teaching both the classroom content and

conducting the simulation session. The opposing weaknesses that were identified included the lack of a simulation lab at the ICFMR, a limited project budget, the challenge of scheduling staff nurses off from patient care units, and project collaboration from the administrative staff. The opportunities that were identified included the addition of high fidelity simulation as a new teaching modality, partnering with the local college and new knowledge gained to enhance the management of respiratory emergencies with the objective of improving patient care.

The threats that were identified in the SWOT analysis included nurses' apprehension about learning in a new environment, and the lack of exposure to simulation learning which potentially could cultivate the fear of failure. According to Billings and Halstead (2009), faculty must continually think outside the box as they develop interactive learning environments fostering student's successful integration into an ever changing health care system. A SWOT analysis helped to identify the need for additional teaching methods, such as high fidelity simulation, to provide different learning modalities to enhance nurses' clinical knowledge and performance (see Appendix C for the Strengths, Weaknesses, Opportunities, and Threats (SWOT) Analysis).

Driving/Restraining Forces

The driving force for this project was to provide additional education on key steps to manage respiratory emergencies for newly hired nurses at the ICFMR. The development of critical thinking skills would aid in the ability for new nurses to problem solve and develop strategies to effectively manage respiratory emergencies. Nurses should be knowledgeable about complex patient situations and confident with their skills (Kaddoura, 2010). The restraining forces identified included budgetary constraints, collaboration from the nursing department,

apprehension consequential to a new learning environment, and regulatory constraints secondary to being a state operated facility.

Needs, Resources, and Sustainability

The need to enhance nurse's critical thinking skills to manage respiratory emergencies was the key focus of this quality improvement initiative. The nurses' enhanced critical thinking skills may be one factor to decrease the necessity of transporting an individual to the hospital. In this project, incorporating simulation learning in managing respiratory emergencies allowed the nurses the opportunity to make decisions in a safe practice environment. According to Zaccagnini and White (2014) a thorough assessment of available resources should be conducted early in the project and planning. The resources needed to implement the study were identified as the following:

- Nurse educator (facilitator)
- Nurses hired within the last three years at the ICFMR
- Class time
- Simulation lab
- NLN simulation scenario
- CCTDI questionnaire (measurement tool)
- Funding for the CCTDI questionnaire
- Statistician.

To sustain this project the resources needed included the nurse instructor who would act as the facilitator for the simulation session, nurses, along with classroom time. Funding was required both for purchasing the CCTDI and to utilize the college's simulation lab. The NLN

scenario was provided, at no cost, by the simulation lab. To replicate this study there would be a fee to use the simulation lab. The fee would be discounted secondary to the objective of the local college to partner with community health care facilities to share available resources.

Feasibility, Risks, Unintended Consequences

Preplanning was used to enhance the feasibility of the study. The approach used to solicit cooperation from key managers included discussing the study with an emphasis of improving nurses performance which translated into better patient outcomes. As the ICFMR is a state facility, the need to inform key individuals included the Regional Director, Center Director, Chief of Staff, Director of Nursing, Unit Managers and the nurses qualified to participate in the study. One to one meetings with all key individuals were arranged to provide details about the study, and answer questions. As to not tax the operational budget, negotiations were made to avoid overtime for any of the participants. The IRB process required additional education pertaining to the Doctor of Nursing Practice (DNP) degree and Capstone projects. This education was provided in the form of a synopsis of the DNP role and was shared with members at a board meeting.

The risks for this study included apprehension from nurses being educated in a new learning environment. The simulation sessions were conducted off-site. To neutralize the apprehension, driving directions to the simulation lab and a map of the college's parking areas were provided. An opportunity for a tour of the simulation lab pre session was also offered to each study participant. No unintended consequences were encountered.

Stakeholders and Project Team

The stakeholders are key individuals who will be affected one way, or another by the project (Zaccagnini & White, 2014, p.460). The stakeholders in this quality improvement

initiative included the individuals who live at the ICFMR and their guardians. All individuals who reside at the ICFMR have appointed guardians. The ICFMR management team was also a stakeholder as their objective was to have nurses provide quality care and positive patient outcomes.

The project team was comprised of the following individuals, the DNP mentor who provided guidance for the practicum experience with nursing students in the simulation lab, simulation lab coordinator who was responsible for scheduling all simulation sessions, and the nurse educator as she designed and facilitated the project. Finally, the Capstone Chair who acted as a resource and expert to provide direction throughout this initiative.

Cost Benefit Analysis

The total budget for replicating this capstone project was $5890.00 (see Appendix D for the Budget and Resources analysis). The main expenses that were incurred included the fee for the simulation lab, purchase of the CCTDI standardized questionnaires, the NLN approved simulation scenarios, hourly salary for nurse participants, and the salary for the researcher to develop, conduct, process data and publish the study.

A cost–benefit analysis involves comparing the total expected cost of each option against the total expected benefits, to see whether the benefits outweigh the costs. The development of critical thinking skills for nurses in managing respiratory emergencies has numerous benefits. The primary benefit associated with effectively managed respiratory emergencies was to improve patient care. Critical thinking skill development for novice nurses may encourage early recognition of potential signs of a condition change that would warrant key nursing interventions. The identification and early nursing interventions may decrease the need for additional advanced medical interventions or hospitalization.

The individuals at the ICFMR have profound intellectual and developmental disabilities with complex medical co-morbidities. The majority of the individuals is non-communicative and have very specialized plans of care. The costs associated with individuals being hospitalized consists of additional ICFMR staff being needed to assist individuals while hospitalized. When individuals from the ICFMR are hospitalized, a direct patient care staff from the ICFMR remains with the patient throughout the hospitalization. The ICFMR staff assists the hospital staff to become familiar with the patient's specialized care and provides comfort/familiarity to the patient. The nurses utilizing enhanced critical thinking skills in effectively managing respiratory emergencies may negate the need for hospitalization. Benefits attained from this project included the following:

- Opportunity to experience simulation learning.
- Knowledge gained from a workshop on emergency care.
- Active learning.
- Better understanding of key strategies to manage respiratory emergencies effectively.

The conclusion of this analysis was that the benefit of evaluating the development of critical thinking skills in simulation learning far outweighed the potential cost of an individual at the ICFMR being hospitalized.

Mission

The mission of this quality improvement initiative parallels the ICFMR's Staff Development department's mission, which is to create an enriching, evidence-based learning environment that is conducive to meeting the educational needs of every nurse to perform to the best of their ability to provide quality patient care. This mission was established secondary to

the philosophy that recognizes evidence-based practice as an essential component to nursing practice today. According to Houser and Oman (2011) a written philosophy that recognizes evidence based practice (EBP) as a central tenet and a definition of EBP that is reflective of organizational culture can accelerate the acculturation of EBP within an organization.

Vision

The vision for this quality improvement initiative was competent nurses providing exemplary emergency care. "A visionary entrepreneur constantly thinks in terms of innovation, and continually searches for opportunities and implementation" (Love, 2005). The ability to think outside the box is imperative in the sustainability of an ever changing healthcare delivery system. These days, leadership must involve facing the challenges occasioned by living in this piece of time, recognizing where the world is going, avoiding problems that can be anticipated and seizing the opportunities that might now exist that weren't heretofore realizable (McBride, 2011). The vision of the project included the introduction of high fidelity simulation as a new teaching strategy which reinforces the concept to think outside the box. This vision exposed newly hired nurses to acquiring knowledge and critical thinking skills in a safe, low risk learning environment to cultivate exemplary emergency care.

Goals

According to Zaccagnini and White (2014, p. 436) goals are broad statements that identify future outcomes, provide overarching direction to the project, and point to the expected outcomes of the project. The primary goal for this capstone project was nurses hired within the last three years ICFMR will effectively manage respiratory emergencies. The second goal identified was that there will be a decrease in individuals hospitalized at the ICFMR secondary to

respiratory emergencies. This is important because hospitalization of individuals with profound intellectual disabilities requires additional resources that are not available in most hospitals.

Process/Outcomes Objectives

For the development of this initiative the outcome objectives were categorized into short and long term outcomes. The short term outcomes identified included newly hired nurses at the ICFMR learning key steps in recognizing/managing respiratory emergencies. In addition they were exposed to high fidelity simulation learning as a new method to problem solve in a safe, low risk environment. The long term outcomes for this study included an improvement in the ability for newly hired nurses effectively managing respiratory emergencies. An additional outcome was the establishment of a working relationship between the ICFMR's Staff Development department and the local college's simulation lab.

Objectives need to be clear, realistic, specific, measureable, and time-limited statements of action, that when completed will move this quality improvement initiative towards achieving the above stated goals (Zaccagnini & White, 2014 p. 436).

Objectives established for the capstone project included the following:

1) Increase nurses critical thinking acquisition measured by the CCTDI questionnaire after an educational workshop and simulation session on managing respiratory emergencies.
2) Conduct a simulation session for nurses to learn how to effectively manage respiratory emergencies in a risk free, safe environment.
3) Provide individual feedback for nurses through debriefing sessions to evaluate performance.

Specific benchmarks associated with the implementation of the capstone project included the permission to conduct the study that occurred in January, 2015 followed by the sequence of events that concluded with the dissemination of the project findings presented to the ICFMR administrative staff in November, 2015 (see Appendix E for the Project Timeline).

Logic Model

A program logic model links outcomes (both short and long term) with program activities /processes and the theoretical assumptions/principles of the program (Kellogg W.K., 2006). This quality improvement initiative evaluated critical thinking skills development with high fidelity simulation learning based on the previously stated research questions and the PICO statement. The logic model was developed for this project to provide organization and illustration of the correlation/influence between resources, inputs, and activities secondary to identified outcomes and outputs (see Appendix F for the Logic Model).

The inputs essential for this initiative included a nurse educator to develop/teach the emergency care workshop and conduct the simulation scenario, newly hired nurses, the simulation lab and NLN scenario, along with the CCTDI questionnaire. A statistician was required to lend expertise in interpreting statistical data for the final report. The constraints identified included funding, project collaboration from staff and apprehension secondary to a new teaching methodology, and regulatory constraints.

The following activities listed in sequential order were identified as crucial for the implementation of this initiative.

- Candidates were identified for the study with the assistance of the Human Resources Department at the ICFMR.

- Conducted a one hour workshop on respiratory emergency care
- Conducted a high fidelity simulation session
- CCTDI administered pre and post intervention to evaluate the development of critical thinking skills

Outputs identified included the educational intervention that consisted of a one hour didactic workshop on managing respiratory emergencies and a simulation session followed by debriefing to provide feedback for the participants. The sample size was 20 registered nurses hired within the last three years at the ICFMR.

There were two identified short term outcomes that are relevant to this initiative. The first short term outcome was the nurses would acquire knowledge about key steps in managing respiratory emergencies. The second short term outcome was nurses would possess enhanced critical thinking skills. The long term outcome focus was for nurses to capitalize on their newly acquired knowledge to identify key interventions necessary to effectively manage respiratory emergencies. The intended impact identified with this initiative included a decrease in the number of hospitalized ICFMR patients secondary to respiratory emergencies, and respiratory emergency care workshops with a simulation session to be included in all nursing orientation programs to provide learning in a safe environment. Lastly, a collaborative working relationship would be created with the local college. In relation to nursing best practice standards, nurses should be able to identify and appropriately treat any medical emergency. As an advanced practice nurse, the DNP must be constantly attuned to and knowledgeable about changes in practice to ensure that current best practice is maintained within the context of empirical evidence and patients' preferences (Zaccagnini & White, 2014).

Population /Sampling Parameters

The population for the study consisted of sixty registered nurses employed at the ICFMR. The sample size was limited to twenty registered nurses who had been hired within the last three years at the ICFMR, which matched the inclusion criteria of nurses who practice at the novice level. This was based on the criteria defined in Benner's Novice to Expert theory, in which nurses practicing within the first three years in a new environment qualified as novice practitioners. These nurses were not familiar with the specialized care and modifications necessary for the ICFMR's specialized patient population. Newly hired nurses must be trained how to assess and manage the unique circumstances accompanying respiratory emergencies for this special patient population (see Appendix G for the Project Sample Criteria).

Setting

The setting for this quality improvement initiative was a state residential and short-term treatment facility for individuals with developmental disabilities located in the Midwest. The ICFMR is managed by the State Department of Health Services, Division of Long Term Care. This setting is the home for 250 individuals with profound intellectual disabilities. The nursing services department is comprised of registered nurses, licensed practical nurses and nursing assistants. The project focused on registered nurses hired within the last three years at the ICFMR.

Methodology and Measurement

This was a quality improvement initiative project which utilized a quantitative design addressing two study questions. The first question employed a pre-test/post-test evaluation and assessed the effect of the development of critical thinking in simulation learning. The second

question utilized an internal 911 report to assess an increase or decrease in the number of hospitalized individuals secondary to respiratory emergencies.

Quantitative research is concerned with patterns that are unique to a population of patients and can be particularly useful for investigating the effectiveness of an intervention (Terry, 2012). This study provided the opportunity for the evaluation of the development of critical thinking skills for a group of novice nurses by introducing simulation learning as an additional teaching method. Quantitative research allows the researcher to establish the correlation and casual relationships between variables.

The project's sequence included the following: a) completion of the CCTDI questionnaire; b) nurses attended a one hour didactic workshop on managing respiratory emergencies; c) nurses attended one hour simulation session utilizing a NLN respiratory failure scenario; d) debriefing done after the simulation session to provide feedback on performance; e) completion of the CCTDI one week post intervention. The project was internal to the ICFMR and focused on the evaluation of newly hired nurses' critical thinking skill development secondary to simulation learning.

The implementation of the capstone project began with the administration of the CCTDI questionnaire. This measurement tool was a standardized test which was purchased from the Insight Assessment Company. The CCTDI is specifically designed to measure the disposition to engage problems and make decisions using critical thinking. One must be disposed to think critically as well as have the skills to do so. The CCTDI is based on the expert consensus characterization of the ideal critical thinker articulated in the APA Delphi Report (California Critical Thinking Disposition Index User Manual, 2014). The CCTDI is calibrated for use with

the general adult population including workers and working professionals at all levels and students in grades 10 and above, including undergraduates, technical and professional school students, and graduate students. This paper and pencil test takes twenty minutes to complete and has established validity and reliability.

The rationale and correlation of the CCTDI questionnaire to the project, was explained by the researcher to all participants prior to the emergency care workshop. An overview of the study's purpose had previously been distributed, via email, in the form of a recruitment letter to all participants (see Appendix H for the Participant Recruitment Letter). The option of a computerized CCTDI was available to the researcher but the paper and pencil version was more conducive to this study's classroom setting.

Nurses, in groups of five, attended the emergency care workshop. The emergency response team at the ICFMR consists of five team members, so grouping the nurses in sets of five was intentional. Each nurse would assume a specific role of an emergency response member which was taught in the workshop. The curriculum was designed secondary to the objectives identified for the study. The teaching plan consisted of a PowerPoint presentation, role playing exercises, and a demonstration of emergency equipment (see Appendix I for the Teaching Plan). The workshop was conducted at the ICFMR during nurses' scheduled work hours.

The study participants then attended a one hour high fidelity simulation session at the local college's simulation lab. Immersing nurses in lecture content while providing limited clinical experience can impart technical knowledge but is inadequate to prepare nurses for the complexities of the workforce (Jeffries, 2007). This two-step educational method supported the theory that teachers use numerous teaching strategies to help students learn. Student participants were divided into cohorts of five to model, five emergency response team members, at the

ICFMR. An objective to replicate the same emergency equipment used at the ICFMR was designed to familiarize the participants' with the equipment and to decrease any potential anxiety. A pre briefing session, consisting of an overview of the scenario, was conducted with the researcher and each cohort at the beginning of the simulation session. The NLN scenario was adapted to include a few modifications specific to the nurses' patient population. A thirty minute debriefing was conducted by the researcher facilitating post simulation session. The debriefing session provided an opportunity for the participants to critique their performances. The nurses were receptive to any suggestions or guidance for best practice provided by the researcher. Debriefing is critical to learning from simulation experiences (Lavoie, Pepin and Boyer, 2013).

The CCTDI questionnaire was then repeated one week post intervention to evaluate the development of critical thinking skills secondary to simulation learning. The Insight Assessment Company recommended the CCTDI be administered one to two weeks post simulation session. The rationale for this time frame was to allow the nurses to process the information that was learned while attending the workshop and participating in the simulation session. The researcher administered the CCTDI questionnaire to all study participants. Each nurse completed the CCTDI, which took twenty minutes, on their scheduled work time. The unit director was instrumental in allowing this to happen by covering the unit during the time the nurse was completing the questionnaire. After completion, all CCTDI questionnaires were secured in a locked file cabinet in the ICFMR's Staff Development department, until being sent via certified mail, to the Insight Assessment Company for data analysis.

Protection of Human Subjects Category

Three principles, or general prescriptive judgments, that are relevant to research involving human subjects are respect to persons, beneficence and justice. According to the

federal guidelines, generated by the Department of Health and Human Services, there are five categories that qualify a research study as exempt status (Terry, 2012). This quality improvement initiative met the criteria for two of those five identified categories. This initiative was research conducted with an educational focus and involved a test in which participants could not be identified. Insuring protection of human subjects during this initiative included the presentation to and approval from two Internal Review Boards. Institutional Review Board (IRB) approval was received from the ICFMR's research panel in January, 2015 (see Appendix J for the Mendota Mental Health Institute approval). The project received Regis University IRB approval in March, 2015 (see Appendix K for the Regis University approval). Justification for exempt status included:

- Performances during the emergency care workshop or simulation session was not shared with the participants' supervisor or reflected on their performance evaluations.
- Participation was voluntary.
- Participants were instructed to use a code, determined by and specific to each participant, as opposed to their name on tests to assure anonymity. This specific code was used for identification of each individual on the pre and post CCTDI questionnaire.
- The data from all tests was considered confidential and secured in a locked file cabinet in the researcher's office for the duration of three years then destroyed as part of the study protocol.
- Moreover, the researcher is not responsible for hiring or termination of any nurses and did not perform annual performance reviews of RN participants.

The Human Research Curriculum Completion Report certificate (CITI Training Documentation) was submitted with the IRB application (see Appendix L for the CITI documentation).

Instrumentation Reliability and Validity

The CCTDI is a sixty question instrument, which seeks to determine an individual's overall disposition towards using critical thinking to form judgments about what to believe or what to do. A six point Likert scale continuum, ranging from agrees strongly to disagree strongly was used for the participant's responses. The tool was scored using an interval ratio measurement.

According to the CCTDI User Manual (2014) there were seven scales on the CCTDI consisting of truthseeking, open-mindedness, analyticity, systematicity, confidence in reasoning, inquisitiveness and maturity of judgment. Defining each attribute is essential to understanding the measurement tool. Truthseeking is the habit of always desiring the best possible understanding of any given situation; it is following reasons and evidence where ever they may lead, even if they lead one to question cherished beliefs. Open-mindedness is the tendency to allow others to voice views with which one may not agree. Open-mindedness, as used in the CCTDI, is important for harmony in a pluralistic and complex society where people approach issues from different religious, political, social, family, cultural, and personal backgrounds. Inquisitiveness is intellectual curiosity. It is the tendency to want to know things, even if they are not immediately or obviously useful. Analyticity is the tendency to be alert to what happens next. This is the habit of striving to anticipate both the good and the bad potential consequences or outcomes of situations, choices, proposals, and plans. Systematicity is the tendency or habit of striving to approach problems in a disciplined, orderly, and systematic way. Confidence in

reasoning is the habitual tendency to trust reflective thinking to solve problems and to make decisions. As with the other attributes measured here, confidence in reasoning applies to individuals and to groups. Maturity of judgment is the habit of seeing the complexity of issues and yet striving to make timely decisions. A person with maturity of judgment understands that multiple solutions may be acceptable while yet appreciating the need to reach closure at times even in the absence of complete knowledge. Each of the seven attributes was scored according to the participants responses to related questions in the CCTDI questionnaire.

The internal consistency (reliability) for the CCTDI reported by the Insight Assessment Company was determined by Cronbach's alpha that ranged between .80 -.98, demonstrating very strong internal consistency reliability. Scale score statistics demonstrate similar strength. Crohnbach's alpha determined from this study's specific data revealed .909 which also indicated a very strong internal consistency reliability.

The validity of the CCTDI instrument was derived from the cross disciplinary conceptual definition of critical thinking that emerged from the APA Delphi Research Study (1988-1990) and was replicated by the Department of Education supported by the Pennsylvania State University Research study in the mid 1990's (California Critical Thinking Disposition Inventory User Manual, 2014). Validation samples typically have samples composed of test taker groups inside and outside the United States (California Critical Thinking Disposition Inventory User Manual, 2014).

Data Collection and Procedure Protocol

The data collected for this study consisted of the responses from the pre and post CCTDI questionnaires from each participant. This specific data was to address the first study question which was, will a high fidelity simulation improve critical thinking skills for nurses hired within

the last three years at the ICFMR? The study's focus was to gain a deeper understanding of the relationship between critical thinking skills development and simulation learning. The answer sheets, pre and post intervention, from each participant were collated by the researcher and sent to the Insight Assessment Company for analysis. Each participant had a unique nine digit number for identification that was used on both the pre and post questionnaire to protect confidentiality.

To address the second study question, data was collected three months post study from an internal 911 report at the ICFMR. The timeframe of three months was determined to see if there would a decrease in individuals with respiratory emergencies, who reside at the ICFMR, transported to the hospital. This data determined the number of respiratory emergencies that required hospitalization at the ICFMR. This information was compared to the previous statistics to evaluate the influence simulation learning had on developing critical thinking skills to manage respiratory emergencies. Outcome research addresses a broader question about the ultimate impact of care. In this quality improvement initiative the outcome analysis evaluated the effectiveness of introducing a new teaching strategy to educate newly hired nurses.

Project Findings and Results

Key Elements

The study consisted of twenty nurses who completed the CCTDI pre and post intervention. The data was initially submitted for analysis to the Insight Assessment Company which was included in the purchase price of the tool. The company assigned group one to represent the pretest scores and group two to represent the posttest scores. The results yielded scores from twenty pairs with seven scored attributes for each pair based on the tool design. The report that accompanied the CCTDI study results included both individual and group feedback

including the overall score of thinking ability, a categorical interpretation of the strengths of the overall score, a norm reference percentile ranking for skills, and scale rated scores indicating strong and weak skills area. Descriptive statistics displayed in graphs were included for overall scores and scale scores for the group. In addition, graphs explaining the size of the group, mean, median, standard deviation, standard error of the mean, lowest score, highest score, first quartile score and third quartile score were part of reporting the outcome data.

Statistical Data

The nature of the outcome variables affects what statistical tests are used (Kane and Radosevich, 2011). The two basic statistical tests of choice for this quantitative study were the paired samples t-test and the Pearson r correlation. These statistical tests were selected based on the dependent outcome variable (critical thinking skills) that was measured using an interval ratio interval. Also, the study question was relational as opposed to measuring a difference in evaluating the relationship between simulation sessions and the ability to develop critical thinking skills. In addition, the study utilized a single independent variable (simulation session). Thus, considering these variables a paired samples t-test and the Pearson r correlation test were the tests of choice.

In addition, according to Polit (2010), the paired samples t- test is a statistical test for comparing group means when individuals are in groups being compared as the same or as paired. The paired samples t-test was appropriate as the nurses qualified as a dependent group who were paired in the pre and posttest results. The second test run was the Pearson r correlation to determine the relationship between the pre and posttest results. The Pearson r correlation is a measure of the strength of a linear association between two variables and is denoted by *r* (Pearson Product-Moment Correlation, 2014).

The data received from the Insight Assessment Company was first paired according to pre and posttest results and imported into an Excel spread sheet. Paired data from the Excel spread sheet was then entered into the Statistical Package for the Social Sciences (SPSS) software to obtain a paired sample t- test. A Pearson r correlation test was then run to analyze the correlation between the pre and post test results of each pair.

The second study question was evaluated by utilizing a 911 report, available at the ICFMR, with information specific to respiratory emergencies requiring hospitalizations. The data collected from internal reports was pre intervention and three months post intervention. The results revealed a decrease in the number of hospitalizations of individuals that reside at the ICFMR secondary to respiratory emergencies. Also, anecdotally, an unsolicited email from a nursing supervisor stated that a study participant had done an exceptional job in participating in a recent respiratory emergency by "jumping right in and doing a fantastic job" (supervisor, personnel communication, August 6, 2015).

Objective One

The goal of objective one was to increase nurses' critical thinking acquisition measured by the CCTDI questionnaire after attending an educational workshop and simulation session on managing respiratory emergencies. To deliver care that will benefit patients, nurses must be informed and able to make judgments about good practice for individual patients. Nurse educators are challenged to provide meaningful and effective opportunities for both new and experienced nurses (Kaddoura, 2010). After the initial data was received from Insight Assessment a paired-samples t-test was run through the SPSS software to compare the critical thinking scores pre intervention and the critical thinking skill scores post intervention.

The participants who had the highest score, lowest score, and the aggregate scores were examined to give an overview of the results. An interpretation of the highest score revealed there was a significant difference in the pre intervention scores (M=45.57, SD= 3.8323) and post intervention (M=49.29, SD = 4.680) scores: t (-5.766, $p < 0.05$). The Pearson r correlation was strong at .939 which indicated there was a strong correlation between the pre and post test scores. This result suggests that with this individual there was development of critical thinking skills after the intervention (workshop and simulation session). See Table 1 for the Highest Individual Score.

Table 1 Highest Individual Score

Highest Score	Pre Intervention Mean and Standard Deviation	Post Intervention Mean and Standard Deviation	T test	Sig 2 tailed
	M = 45.57 SD = 3.8323	M = 49.29 SD = 4.680	-5.766	$p < 0.05$

The lowest score revealed there was no significant difference in the scores for the pre intervention (M= 35.14 SD = 2.193) and post intervention (M=35.14, SD = 5.080) scores; t (.000, p = 1.000) The Pearson r correlation was .357 which means there was not a strong correlation between the pre and post test scores. This result suggests that there was no development of critical thinking skill with this individual after the intervention (simulation session). See Table 2 for the Lowest Individual Score.

Table 2 Lowest Individual Score

Lowest Score	Pre intervention Mean and Standard	Post Intervention Mean and Standard	t-test	Sig 2 tailed

	Deviation			
	M = 35.14 SD = 2.193	M = 35.14 SD = 5.080	.000	p = 1.000

The aggregate data revealed there was no significant difference for the pre intervention (M= 43.96, SD = 6.761) and the post intervention (M=43.29, SD = 7.388) scores; t (1.830, p = .069). The Pearson r correlation was 1.0 which means there was a strong correlation between the pre and post test scores. This result suggests that overall there was no statistical significant difference between critical thinking skill development and the simulation session. See table 3 for the Aggregate Scores).

Table 3 Aggregate Scores

Aggregate Score	Pre intervention Mean and Standard Deviation	Post intervention Mean and Standard	t –test	Sig 2 tailed
	M = 43.96 SD = 6.761	M = 43.29 SD = 7.388	1.830	p =0.069

Objective Two

Objective two focused on conducting a simulation session for nurses to learn how to effectively manage respiratory emergencies in a risk free safe environment. With high fidelity simulation, educators can replicate many patient situations, and students can develop and practice their nursing skills (cognitive, motor and critical thinking) in an environment that does not endanger patients (Hayden et al., 2014). High fidelity simulation was a learning experience

that only five out of the twenty nurses had participated in while in nursing school. One of the nurses was very negative and shared that her experience with the simulation lab in her nursing school had multiple technical difficulties. The researcher addressed this concern with a discussion, including an overview of the lab, location, and ended with an invitation to visit the lab pre intervention. The rest of the cohort appeared eager to experience this new teaching strategy. The assurance of replicating the ICFMR emergency equipment and modifying the scenario to include characteristics similar to individuals residing at the ICFMR provided an added comfort level.

The second objective was met and will be the foundation for future simulation sessions for the ICFMR nursing staff. The local college simulation lab offered the ICFMR the option of conducting simulation sessions for newly hired RNs on a regular basis. The fee would be offset by the researcher acting as the simulation facilitator. This opportunity affords novice nurses, in a highly specialized nursing practice, the experience to learn important concepts and skills particular to their patient population in a safe, risk free environment.

Objective Three

Objective three was to provide individual feedback through debriefing sessions to evaluate performance. Debriefing is an essential component of simulation, yet educators are not consistently prepared to facilitate it such that meaningful learning, demonstrated through clinical reasoning, occurs from this experience (Thomas-Dreifuerst, 2011). The local college's simulation lab used Kristina Thomas-Dreifurst's model of meaningful debriefing model. This model emphasizes starting the debriefing session with the question "Tell me about your patient" as opposed to "How you think you did?" This approach facilitated the reconstruction of the event which allowed for discussion and problem solving. This researcher asked one cohort of nurses to

draw a picture of their simulation session to help the nurse reflect. This was a wonderful opportunity to diffuse tension which follows any type of skill demonstration. This strategy was helpful in understanding the perception of a simulation session, not only for the nurses but for the facilitator.

Debriefing is vital to provide immediate feedback in any emergency situation as it enables the discussion of good or poor choices and alternative options. Secondary to these effective debriefing sessions the ICFMR is mandating debriefing to be conducted after all medical emergencies. The debriefing form used in the simulation sessions has been adopted as the model used at the ICFMR.

Results

A power analysis was performed to determine if the sample size was sufficient to adequately detect a difference in the outcome variable and to minimize the risk of a Type II error. The sample size for this capstone project was 20 newly hired nurses selected from a total population of 60 nurses. The inclusion criteria for this study was registered nurses, hired within the last three years at the ICFMR, therefore the sample size had specific guidelines. The only alternatives to increasing the sample size was to extend the time frame for the study, seek additional nurses from other long term care facilities or change the selection parameters. According to Polit (2010, p. 202) calculations on a sample size of 20, alpha 0.05 with a power of 0.8 results in a power analysis of .02. The power analysis falls under the category of a small effect size. One hundred and forty nine participants would have provided an adequate power analysis, but this study's research design did not allow for a larger sample size.

The analysis of the data for this study showed the aggregate t- test score of 1.830 indicating the study results did not show a statistical difference between the pre and posttest

intervention scores (p = 0.069). The standard measure of probability of error in health care is p = 0.05 so although the p value of 0.069 is just slightly above that standard it did confirm that the pre and post test scores were not statistically significant. The aggregate data for the Pearson R correlation at 1.0 showed a positive linear correlation. According to Skrepnek (2005) for a Pearson r correlation, the larger the absolute value, the stronger the linear association: a correlation of -1.0 indicates a perfectly negative linear association, 0.0 indicates no linear association, and + 1.0 indicates a perfectly positive linear association. Although there was a positive correlation between the pre and posttests scores there was no statistical significance noted.

Results from the second study question showed a decrease in hospitalized individuals denoting a small result but a positive trend. Originally there was one individual that required hospitalization pre intervention and none needing hospitalization post intervention. Obviously, there are many variables that could have affected this outcome, and with very small numbers in a short period of time, it is not possible to attribute any significance to the results. However, it is an encouraging trend associated with the unsolicited anecdotal comments from a supervisor regarding a study participant's performance during a recent respiratory emergency. Technically, it met the objective that there will be a decrease in individuals hospitalized secondary to respiratory emergencies.

Limitations, Recommendations, and Implications for Change

Limitations

The study had several limitations related to the targeted population and generalization of the findings. The scope of this quantitative project focused on the development of critical thinking skills in simulation learning. The study population was comprised of nurses that

worked three different shifts. For that reason it was only feasible to conduct one simulation session to evaluate critical thinking development. A series of simulation sessions over a longer period of time may have revealed a different outcome. The second limitation identified was the state regulations and guidelines for offsite education. The ICFMR has specific guidelines for attending off site education. This educational offering did not fall under the customary conferences that nurses normally attend; therefore, special negotiations with key administrators were necessary. Learning in a new environment, coupled with, a new teaching strategy that required nurse performance was challenging. The last limitation that was identified was the size of the study population. Twenty nurses constituted one third of the ICFMR's nursing force but was still a relatively small sample size.

Recommendations

A primary reason for disseminating research is to use the findings to improve practice and health outcomes (Zaccagnini and White, 2014). As there is a scarcity of quantitative research on critical thinking skill development with simulation learning, the first recommendation would be to conduct more research to see if the increased knowledge and skills acquired in simulation learning translates into safer patient care and better patient measured outcomes. The second recommendation would be to replicate the same study adding a qualitative component to strengthen results. The addition of a qualitative tool, such as an interview with participants, would help define future strategies for this study. Adding a component of self-efficacy to the existing study may provide greater insight to nurses' performances in managing respiratory emergencies. A longitudinal study linking the impact of simulation and critical thinking skill development on patient outcomes would contribute to evidence-based practice in nursing and health care.

Implications for Change

Doctorally prepared clinical nurses (DNPs) are continually involved in the systematic review of research in preparation for designing a change in nursing practice based on the validated evidence. The introduction of high fidelity simulation exemplifies a design change in nursing education based on validated evidence. It was a new teaching strategy that provided experiential learning for the newly hired nurses at the ICFMR. This study contributed to the evidence based data of the few existing studies exploring the association between simulation learning and developing critical thinking skills. The educational interventions associated with this study, provided direction for further research and potentially positive patient outcomes as evidenced by a stellar performance in an emergency situation by a nurse who participated in the study. Lastly, the continued effort of conducting high fidelity simulation scenarios for all newly hired nurses at the ICFMR can provide the opportunities to build nurses skill sets, develop a comfort level in decision making in emergency situations, embrace the team approach, learn in a safe environment and receive immediate feedback through debriefing sessions. Consequently, enhancing the significance doctorally prepared nurses in clinical practice have on continually reviewing research to support evidence-based nursing care.

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Appendix A

Theoretical Foundations

Dr. Patricia Benner – Novice to Expert Theory	
Core Concepts	Relevance to this Project
Advanced Beginner	• Can demonstrate marginal acceptable performance having coped with enough real situations by a new specialty practice. • Function guided by rules and oriented by task completion. • Needs mentor or experienced nurse to assist with defining situations, set priorities and integrate practical knowledge.
Pamela Jeffries- Framework for Designing, Implementing and Evaluating: Simulation Used as Teaching Strategies in Nursing	
Core Concepts	Relevance to This Project
Framework encompasses five conceptual components	• Teachers are essential to the success of using alternative learning experiences such as simulation activities. • Students (nurses) are generally responsible for their own learning. • Students (nurses) are assumed to learn best through activities that require participation. • Collaborative learning happens with nurses working in a team to solve problems and share decision making. • High teacher/student expectation fosters a self-fulfilling prophecy. • Simulation design needs to be appropriate and support goals (developing critical thinking skills).
Kurt Lewin's Linear Change Theory	
Core Concepts	Relevance to this Project
Unfreezing, Moving Stage, Refreezing	• The unfreezing stage included change and acceptance from one teaching strategy to another. • Moving stage included the opportunity to develop critical thinking skills during a high fidelity simulation session • Refreezing stage included nurse applying critical thinking skills to effectively manage respiratory emergencies.

Appendix B

Systematic Review of the Literature – Exemplar

Article/Journal	The Effects of Simulation on Nursing Student' Critical Thinking Scores : A Quantitative Study -Newborn and Infant Reviews
Author/Year	Joann Sullivan, Carrie Perron, Angela Fellner 2009
Database/Keywords	CINHAL Plus Full Text: Simulation, Scenario, Critical thinking, Associate degree in nursing (ADN) Health Science Reasoning Test (HRST)
Research Design	Quantitative Study- 2 groups x2 times mixed model design
Level of Evidence	Level VI: quantitative
Study Aim/Purpose	To investigate the effects of using simulation as a teaching strategy on the critical thinking skills of nursing students- specifically ADN students.
Population/Sample size Criteria/Power	53 students from a medical surgical course in an Associate Degree nursing program in the Midwest .
Methods/Study Appraisal Synthesis Methods	Consents obtained, HRST pretest was administered and then randomly assigned to experimental and control group. They were assigned to 7 different instructors and according to curriculum went thru the simulations scheduled but one group had 3 additional simulation sessions. All were given the posttest (HSRT).
Primary Outcome Measures/Results	HRST composite scores and 5 subscale scores for inductive and deductive reasoning, analysis, reasoning, and evaluation for the control and experimental groups were done. Tests done using t test , no significant differences between experimental and control groups at pretest (PN .05) There was a significant main effect for time indicating that significantly more correct answers were made on the posttest by both groups.

Author Conclusions/	The Academic Improvement Strategies course with mentoring sessions proved to be successful in helping at-risk senior nursing

Implications for Key Findings	students to significantly improve semester GPA, graduate, and pass the NCLEX-RN. The IPI plan for improvement forced participants to face these issues in a realistic and concrete fashion, making their issues less abstract. Assisted by a faculty mentor, a plan was developed, evaluated, and modified. This assignment empowered students to be accountable and responsible for their daily work.
Strengths/Limitations	Strength – the Academic Improvement Strategies course and faculty mentoring. Limitations – faculty shortages in some nursing programs that could inhibit the creation of this type of course.
Funding Source	None cited.
Comments	Relevant to the quality improvement initiative for this author's PICO study.
* Levels of Evidence – Melnyk, B. M., & Fineout-Overholt (2005). In Houser, J. & Oman, K. S. (2011). Evidence-Based Practice: An Implementation Guide for Healthcare Organizations. (p.76). Sudbury, MA: Jones & Bartlett.	

Appendix C

Strengths, Weaknesses, Opportunities and Threats (SWOT) Analysis

	Strength	**Weaknesses**
Internal	• Motivated learners • ICFMR is close to college simulation lab • Educational support (educators) • Facilitator with education and simulation experience	• No high fidelity simulation lab • Scheduling education time off the unit • Project collaboration from staff • Limited budget
	Opportunities	**Threats**
External	• Introduction to simulation learning • Partnership with community college • New knowledge gained to enhance management of respiratory emergencies. • Improved patient care	• Apprehension about simulation learning • Experiencing a new learning environment • Fear of failure

Appendix D

Budget and Resources

Provided by researcher	Provided by ICFMR
▸ Madison College simulation lab fee waived ◦ $1,000.00 ◦ Budget for CCTDI $550.00 ◦ Grant (optional) ▸ Time developing, presenting, implementing and evaluating the capstone project ▸ NLN scenario for simulation session available through Madison College ◦ Nonmember -$500.00 ◦ Member - free	▸ Classroom for workshop ▸ 40 nurses at $32.00/hour ◦ 3 hour workshop $96.00/nurse = $3840.00 ◦ Built in salary allotment for CE requirements ▸ No additional fees will be incurred by the ICFMR ▸ Total for replication of project=$**5890.00**

Appendix E

Project Timeline

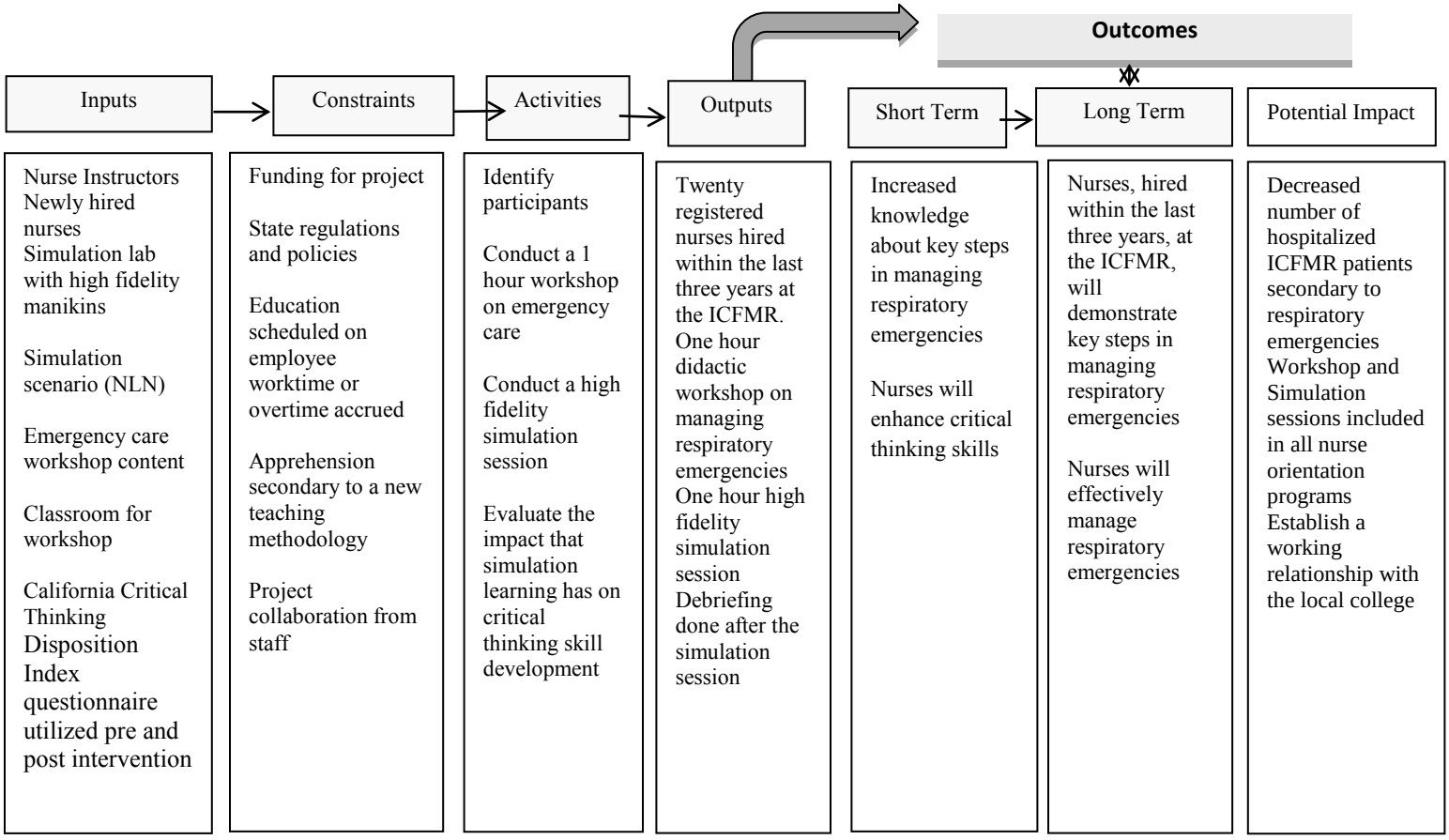
Process	Dates
Proposal presentation	October, 2014
Proposal acceptance	October, 2014
IRB application (ICFMR and Regis)	December, 2014
IRB approvals received	January, 2015
Project planning	January, February, 2015
Project implementation	March, April, 2015
Data collection	April, May, 2015
Capstone defense	August, 2015
Capstone paper approval	October, 2015
Final written submission to Regis faculty/library	October, 2015
Share project findings with ICFMR administrative staff	November, 2015

Appendix F

Logic Model

Project
Evaluating Development of Critical Thinking Skills in Simulation Learning

Problem Identification:
Newly hired nurses need education to identify key steps in managing respiratory emergencies



Logic Model adapted from Zaccagnini & White, 2014

Appendix G

Project Sample Criteria

Inclusion Criteria	Exclusion Criteria
• Registered nurses • Employed by the ICFMR hired within the last three years. • Voluntary participation. Participants could exit project at any point without penalty and loss of benefits • Not a vulnerable population as the participants were 18 years of age or over • Not under the direct supervision of the researcher	• Licensed practical nurses • Registered nurses employed longer than three years • Clinical nurse educators (under the direct supervision of the researcher) • Nurses practicing in a non-patient related position

Appendix H

Participant Recruitment Letter

Dear Nurses,

As a Regis University Doctor of Nursing Practice student, my Capstone research project is evaluating the relationship between simulation learning and the development of critical thinking skills. Nurses hired within the last three years, will be asked if they would like to participate in this study. Participation in this study will be on regular paid time and transportation to Madison College simulation lab will be provided by a state car or you may choose to provide your own transportation. Total amount of participation time will be approximately 2 hours and 40 minutes not including travel time.

Your participation will involve:

1. Complete the CCTDI (California Critical Thinking Skill Disposition Inventory) before and after the workshop and simulation session. This is a paper and pencil test evaluation tool that will take 20 minutes to complete.
2. Attend a medical emergency workshop at Central Wisconsin Center (1 hour).
3. Attend a simulation session at Madison College's simulation lab (1 hour).

This educational strategy will provide valuable data for program quality improvement purposes. Your choice to participate is voluntary and will not impact your employment status in any way. Informed consent will be obtained prior to starting the study. Participants may cease participation at any point without penalty. No demographic data will be collected to assure confidentiality. Maintaining participant confidentiality will be followed by guidelines:

- Test scores and performances associated with the study will be de-identified to ensure confidentiality of all participants.
- Participants will be instructed to use a code, determined by and specific to each participant, as opposed to their name on their test to assure animosity.
- The data from all tests will be considered confidential and secured in a locked file cabinet in the researcher's office for the duration of three years than destroyed as part of the study protocol.
- The data collected from this study will not be shared with any participants' supervisors.
- This study has obtained approval from the Mendota Mental Health Institute's and Regis University internal review boards.

Thank you in advance for consideration of your voluntary participation. If you have any questions or concern about the project please contact (608) 301-1810 or by email at helge@regis.edu or my advisor, Judy Crewell at (303) 453-4365. If you have any questions about your rights as a research subject, please contact the Regis University Institutional Review Board at (303) 458-4206 or via irb@regis.edu. Additionally, you may also contact the Mendota Institutional Review Board at (608) 301-1047. Both Internal Review Boards have reviewed and approved this project.

Sincerely,
Cindy Helgsen DNPc, MS, RN-BC

Appendix I

Teaching Plan

TEACHING PLAN
Evaluating Development of Critical Thinking Skills in Simulation Learning
Cindy Helgesen MS. RN-BC

Part 1. Respiratory Medical Emergency Workshop
1.5 hours including administration of California Critical Thinking Disposition Index (CCTDI) per intervention.
Conducted at ICFMR

Part 2. Simulation session on respiratory medical emergencies.
1.5 hours including travel time, simulation session and debriefing
Conducted at Local College

Part 3. Administration of the CCTDI post intervention
20 minutes
ICFMR

Target Audience Characteristics/Needs Assessment: The intended audience for this respiratory medical emergency workshop is the staff nurses who have been hired within the last three years at the Intermediate Care Facility for the Mentally Retarded. The ICFMR is a state residential and short-term treatment facility for individuals with developmental disabilities. The audience consists of all adult learners, both male and female. The staff nurses employed by the ICFMR come from a variety of educational and culturally diverse backgrounds with an array of experiences including practicing in many different health care settings.

All identified behavioral objectives will be completed by the end of the respiratory medical emergency workshop.

Teaching Plan

Content Outline	Resources	Behavioral Objectives	Guiding Theory	Methodology	Evaluation
Steps in responding to a respiratory medical emergency. • Activate emergency call button • Call 2222 • Determine code status • Set up oxygen equipment	Handout- "Medical Emergency Response " Emergency call button teaching board	Following a 10 minute lecture on how to respond to a respiratory medical emergency the nurse will: List four steps required to respond to a respiratory medical emergency.	Cognitive Learning Domain -memorize, recall define, recognize or identify specific information such as facts, rules, principles, conditions and terms presented during instruction.	Lecture	Question and answer period to allow for clarification of information
Review of emergency crash cart equipment. • AED • Suction machine • Different Oxygen delivery devices • Documentation form	Emergency crash cart. Inventory equipment list.	After observing a review of equipment on the emergency crash cart the nurse will be able to locate items from an emergency equipment inventory list	Psychomotor Learning Domain- development of manipulative skills	Demonstration	Observation of Return Demonstration

Content Outline	Resources	Behavioral Objectives	Guiding Theory	Methodology	Evaluation
List the five different emergency response team member roles. • Team leader • AED operator • Compressions • Airway stabilizer • Documentation	Handout with description of each team member's role/expectations.	Following a 25 minute lecture, incorporating the use of a training crash cart and AED simulator nurses will be able to identify key skills necessary to perform each role The emergency response team will function efficiently with defined roles.	Cognitive learning Domain- both knowledge and synthesis (ability of the learner to put together parts and elements into a unified whole) comprehension, application and analysis are prerequisite behaviors.	Demonstration Included with supplemental lecture	Observe nurses demonstrating performance of each team member role/observe collaborative effort as a team. Question and answer with time allotted for discussion regarding specific application in the clinical environment.
Review of one and two man adult CPR	American Heart Association (AHA) CPR video AHA CPR manual	After watching a video clip and a 20-minute lecture/demonstration on the procedure for performing one and two man CPR the nurse will be able to demonstrate the steps necessary to perform CPR.	Cognitive Learning Domain using ideas, principles & abstraction, reading writing and utilization of critical thinking skills.	Lecture/Demonstration	Return Demonstration of adult CPR

Teaching Plan

Content Outline	Resources	Behavioral Objectives	Guiding Theory	Methodology	Evaluation
Record events of respiratory medical emergency on the Emergency Code sheet	Emergency code sheet	Following the review of the emergency code sheet all nurses will be able to enter accurate data utilizing the emergency code sheet in a timely fashion.	Cognitive learning process to document accurate /timely data on the emergency code sheet	Demonstration	Return demonstration with observation by the instructor provided for immediate feedback
Analyze and critic situations that require identification of respiratory symptoms that require immediate nursing interventions through resident case scenarios.	Case studies specific to the ICFMR's population	Following group discussion utilizing case studies the nurse will list three respiratory symptoms that require immediate nursing interventions.	Cognitive learning process using the case method promoting the development of critical thinking skills	Discussion	Nurses will generate their own analysis of the problems under consideration and apply their own knowledge theory within a circle of their own peers. Their theories will be debated within the group.

Content Outline	Resources	Behavioral Objectives	Guiding Theory	Methodology	Evaluation
Conduct a respiratory medical emergency using a high fidelity manikin	Simulation lab Emergency crash cart with all emergency care supplies NLN scenario	After attending the respiratory medical emergency workshop nurses will perform a respiratory medical emergency in the simulation lab.	Cognitive learning Domain- both knowledge and synthesis (ability of the learner to put together parts and elements into a unified whole) comprehension, application and analysis are prerequisite behaviors.	Demonstration	Debriefing will be done with feedback from the instructor. Evaluation will include • Comfort level in emergency code situation • Proper use of equipment • Review of documentation form • Performance as team members

Appendix J

Mendota Mental Health Institute IRB Approval

David Lee, PhD, JD
Director of Psychology & Research
David.Lee @dhs.wisconsin.gov

DIVISION OF CARE AND TREATMENT FACILITIES
MENDOTA MENTAL HEALTH INSTITUTE
301 TROY DRIVE
MADISON WI 53704-1521

State of Wisconsin
Department of Health and Family Services

Telephone: 608-301-1047
FAX: 608-301-1390

January 14, 2015

Cynthia Helgesen, MS, RN-BC
Central Wisconsin Center
317 Knutson Drive
Madison WI 53704

Re: Research Proposal and MMHI IRB Response to "Evaluating the Development of Critical Thinking Skills in Simulation Learning"

Dear Cynthia Helgesen:

On behalf of The Mendota Institutional Review Board (IRB), I am pleased to review your proposal for an educational study to investigate a quality improvement initiative involving providing education for newly hired nurses at CWC on respiratory medical emergencies via a medical emergency workshop at CWC and a simulation session at Madison College. This study involves assessing nurses' level of critical thinking acquisition as measured by the California Critical Thinking Disposition Inventory (CCTDI) as well as assessing the impact that simulation learning has on nurses' developing critical thinking skills for respiratory emergencies.

The IRB reviewed your revisions and was satisfied with your responses that clarified several questions. It is our understanding that the study would be exempt from standards of federal regulation and review pursuant to 45CFT46.101.b (i) research on regular and special education instructed strategies, or (ii) research on the effectiveness of comparison among instructional techniques, curricula, or classroom management methods. Nevertheless, the Board has already vetted this proposal and approved it. Human subjects in this study are volunteers who will produce outcome measures that are completely unrelated to their status in their hired positions at CWC.

The IRB would also be interested in receiving written results of your findings.

Please do not hesitate to contact me if you have any questions about the facilitation of this study.
Sincerely,

David Lee, PhD, JD
Director of psychology and Research
Mendota Mental Health Institute

Cc: Greg Van Rybroek,

Appendix K

Regis University IRB Approval

REGIS UNIVERSITY

Academic Grants

3333 Regis Boulevard, H-4
Denver, CO 80221-1099

303-458-4206
303-964-5528 fax
www.regis.edu

IRB – REGIS UNIVERSITY

March 23, 2015

Cynthia Helgesen
3709 North Tuttle Road
Evansville, WI 53536

RE: IRB #: 15-112

Dear Cynthia,

Your application to the Regis IRB for your project, "Evaluating Development of Critical Thinking Skills in Simulation Learning", was approved as an exempt study on March 05, 2015. This study was approved per exempt study category of research 45CFR46.101.b(#1).

The designation of "exempt" means no further IRB review of this project, as it is currently designed, is needed.

If changes are made in the research plan that significantly alter the involvement of human subjects from that which was approved in the named application, the new research plan must be resubmitted to the Regis IRB for approval.

Sincerely,

Patsy Cullen

Patsy McGuire Cullen, PhD, PNP-BC
Chair, Institutional Review Board
Professor & Director
Doctor of Nursing Practice & Nurse Practitioner Programs
Loretto Heights School of Nursing
Regis University

C: Cullen, Patsy

Appendix L

CITI Training Documentation

COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI)

HUMAN RESEARCH CURRICULUM COMPLETION REPORT

Printed on 06/02/2014

LEARNER	Cynthia Helgesen (ID: 4181481)
DEPARTMENT	Nursing
EMAIL	helge858@worldclass.regis.edu
INSTITUTION	Regis University
EXPIRATION DATE	06/01/2017

SOCIAL BEHAVIORAL RESEARCH INVESTIGATORS AND KEY PERSONNEL

COURSE/STAGE:	Basic Course/1
PASSED ON:	06/02/2014
REFERENCE ID:	13088381

REQUIRED MODULES	DATE COMPLETED
Introduction	06/02/14
History and Ethical Principles - SBE	06/02/14
The Regulations - SBE	06/02/14
Assessing Risk - SBE	06/02/14
Informed Consent - SBE	06/02/14
Privacy and Confidentiality - SBE	06/02/14
Regis University	06/02/14

For this Completion Report to be valid, the learner listed above must be affiliated with a CITI Program participating institution or be a paid Independent Learner. Falsified information and unauthorized use of the CITI Progam course site is unethical, and may be considered research misconduct by your institution.

Paul Braunschweiger Ph.D.
Professor, University of Miami
Director Office of Research Education
CITI Program Course Coordinator

Appendix M

Letter of Authorization

Scott Walker
Governor

Kitty Rhoades
Secretary

State of Wisconsin
Department of Health Services

DIVISION OF LONG TERM CARE

CENTRAL WISCONSIN CENTER
FOR THE DEVELOPMENTALLY DISABLED
317 KNUTSON DRIVE
MADISON WI 53704-1197

Telephone: 608-301-9200
FAX: 608-301-9423
TTY: 888-241-9442
dhs.wisconsin.gov

Letter of Agreement

December 15th, 2014

To Regis University Institutional Review Board (IRB):

I am familiar with Cynthia Helgesen's research project entitled *Evaluating Development of Critical Thinking Skills in Simulation Learning.* I understand that Central Wisconsin Center's involvement to be allowing nurses to attend a didactic workshop on medical emergencies and participating in a high fidelity simulation session at Madison College. All consenting nurses that have been hired within the last three years will be eligible to participate. The California Critical Thinking Disposition Inventory (CCTDI) will be administered to participant's pre and post intervention to evaluate the development of critical thinking skills.

Each participant in the study will:

1. Complete a CCTDI (California Critical Thinking Disposition Inventory) pre and post workshop and simulation session. This is a paper and pencil evaluation tool that will take 20 minutes to complete.
2. Attend a respiratory emergency workshop at Central Wisconsin Center. (1 hour)
3. Attend a simulation session at Madison College's simulation lab. (1 hour)

Total amount of participation time is approximately 2 hour 40 minutes not including travel time.
I understand that this research will be carried out following ethical principles and that participant involvement in this research project is strictly voluntary and provides confidentiality of research data, as described in the proposal.

Therefore, as a representative of Central Wisconsin Center, I agree that Cynthia Helgesen's research project may be conducted at our agency/institution.

Sincerely,
Catherine Murray- Director