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Simulated Clinical Experience: An Investigation of Emotion Understanding and Management

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Abstract

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MSN, Walden University, 2008

BSN, University of Tennessee at Martin, 2003

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

Many investigators have documented that lack of emotional intelligence (EI) in professional nursing correlates with patient dissatisfaction, negative patient outcomes, and litigation. However, much less information is available to nurse educators for an effective instructional strategy to increase EI skills, specifically emotion understanding and management (the most influential branches of EI) in nursing students. Grounded in the theory of EI and the theory of simulation, the purpose of this quantitative quasi experimental study was to introduce educational technology as a useful strategy for influencing EI in a convenience sample of 88 second semester students in a baccalaureate program. Research questions for the study examined the treatment (human patient simulators, stressful situational scenarios, and role playing) for changing EI skill levels. Repeated measures, within factors analysis of variance was used to test for a relationship between the variables at three time periods during a semester. Key results for emotion understanding were significant with small effect, $F(1.973, 171.686) = 7.526$, $p = .001$, partial $\omega^2 = .047$. Key findings for emotion management were significant with medium effect, $F(1.827, 158.965) = 9.981$, $p < .0005$, $\omega^2 = .063$. However, conclusions were mixed for influence, as the instructional strategy resulted in negative EI learning (consistent decreased gain) for most participants. By weeding out irrelevancies, this study contributes to current nursing research and informs nursing educators of the need to continue the search for an effective strategy for teaching emotion understanding and management skills in nursing curricula.

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Dedication

This is for you, Mama (RIP). I wish you were here to share my joy.

Acknowledgments

Thank you God for provisions that allowed me to finish this work.

To my committee for the support and inspiration: Dr. Rob Foshay, committee chair, it's been an honor and a privilege; Dr. Rikki McGee, methodologist, for your keen insights, and Dr. Jennifer Lapin, university research reviewer, for your input. I would not have completed this research without your invaluable guidance. Thank you all for the motivation and your immense knowledge.

To Poppy, Dustin, and Alex, for your love and prayers during this process. It was so much harder than I imagined it would be. Andie, for being by my side for the last five years. Good dog.

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Chapter 1: Introduction to the Study

Introduction

Emotional Intelligence (EI) was popularized by cognitive psychologists Salovey and Mayer (1990), who described EI as the ability to detect emotions in self and others. The researchers developed a theoretical ability model to measure EI. Based on competency, the model is hierarchically composed of four branches including the (a) ability to perceive emotions, (b) ability to use emotions to facilitate thought, (c) ability to understand emotions, and (d) ability to manage emotions (Mayer & Salovey, 1997; Salovey & Mayer, 1990).

Nursing is emotional work, and student nurses must learn to respond intelligently during emotional situations to promote quality care and positive outcomes (Adams & Iseler, 2014; Ray & Overman, 2014). Having emotional and clinical judgement is fundamental for a successful nursing career (Littlejohn, 2013). Nursing researchers have found that EI impacts patient care (Adams & Iseler, 2014), impacts professional and personal relationships (Codier & Odell, 2014; Rajput, 2016), and increases nursing instinct and clinical performance (Littlejohn, 2013; MacLean, Kelly, Geddes, & Della, 2017; Patillo, 2013; Ray & Overman, 2014).

Students at the school of interest in this study receive specific instructions for technical skills of nursing; however, no instruction is provided for EI (understanding and management) skills. I believe that I have a responsibility to help students develop these skills because of improved patient outcomes that are associated with higher levels of EI. Educational technology using face-to-face simulation mannequins with stressful scenario situations and nurse role playing could be an instructional strategy to close the knowledge gap for increasing emotion understanding and management skill building. The use of high-fidelity (believability), human patient simulators has been promoted as a safe learning environment where students are placed in the role of the nurse and can develop competence through repetition and by learning from their mistakes (Richardson & Clamen, 2014). Nursing researchers have found that simulation technology is an important aspect for teaching/learning technical skills, improving competence (Foronda, Liu, & Bauman, 2013), and developing communication skills (Kunkel, Kopp, & Hanson, 2016; Ladd, Grimley, Hickman, & Touhy, 2013). Using high fidelity (believability) simulation equipment and surroundings is intended to increase student engagement but may also invoke strong emotional responses in students (Willhaus, 2016).

In this study, I investigated the possibility that student participation with simulation technology could be a useful tool for increasing EI skills of second semester nursing students. This is positive social change. The remainder of this chapter will include a background on EI, the problem statement, and the purpose of this study. The chapter also includes the research questions, discussions of the theoretical basis and nature of the study, definition of terms, and discussions of assumptions, limitations/delimitations, and the significance of the study.

Background

It is widely understood that nursing school graduates must be competent in technical skills to meet their patients' physical needs (Douglas et al., 2016). There is a strong case that task-oriented education alone will not adequately prepare students for the demands of nursing practice and a changing health care industry. The current nursing environment requires nurses to be steeped in technical knowledge, which limits teaching traditional, holistic (mind, body, spirit) nursing care in curricula (Shanta & Gargiulo, 2014). Nursing researchers have found that students who understand and manage emotions are more competent and have improvements in professional behavior, nursing instinct, and clinical performance (Littlejohn, 2013; MacLean et al., 2017; Patillo, 2013; Ray & Overman, 2014). Unfortunately, little has been written in the nursing literature about how to teach emotional competence (understanding and management) skills.

Bellack (1999) was one of the earliest nursing researchers to recognize that technical skills were not enough to be effective in the nursing profession. Bellack called on educators to incorporate EI personal and social competencies into curricula and measure the competencies as a graduation checkpoint. Nineteen years have passed since this recommendation, and effective strategies to promote EI competencies are still inadequately addressed in nursing education literature, as illustrated in Chapter 2. The little research that has explored EI has focused more on self-reflection than active learning.

Horton-Deutsch (2008), studied the use of reflection journals as a strategy to promote emotional competence. The researcher believed that reflection should be an exercise in self-examination to connect education with research and hands-on practice in a psychiatric nursing course. To move through the reflective process, they suggested that students ask themselves four questions; What did I do? What should I have done? How would I act differently? What would I do next time? The researchers concluded that reflective, nurturing learning environments promoted emotionally competent leadership skills in nursing students. However, this research did not give insight to changes in emotion understanding and management skill ability.

Harrison and Fopma-Loy (2010), used 10 progressive, guided journal prompts as a vehicle for stimulating emotional competence in nursing students. The EI competencies included self-awareness, self-management, social awareness, and relationship management, in a psychiatric nursing course. The researchers found journal writing to be an effective teaching strategy for increasing reflection on EI competencies. However, they used a mixed model as a framework for the study and by doing so, the researchers were not measuring EI as ability, but were measuring traits and personality tendencies that they were relating to EI.

Other researchers have examined the impact of the nursing curriculum on nurse's EI. Benson, Ploeg, and Brown (2010) used a mixed model of EI to study the influence of nursing education on the development of EI. Students in the last (fourth) year of nursing study scored higher in interpersonal and stress management categories. However, this literature did not provide insight regarding any improvement in the students' emotion understanding and management abilities.

Shanta and Gargiulo (2014) conducted a quasi-experimental between-groups study comparing education and nursing majors for increase or development of EI. Using the abilities model, Shanta and Gargiulo compared the academic majors by dividing them into four groups (pre-major and senior major group) in each discipline. The senior-level nursing students served as the experimental group, and the senior-level education students as the comparison group. No significant differences in the EI abilities (using and managing emotions) of senior nursing students were found when compared to the three control groups. The researchers concluded that there is no evidence that nursing education increases EI over the level of other undergraduate education. These were important findings, because in my study I investigated the possibility that including student participation with simulation technology in nursing curricula could be a useful tool for increasing EI skills of second semester nursing students.

Some researchers have focused on factors that influence EI development. Szeles (2015) found that EI ability could be developed through active listening and participation. Szeles used a peer coaching activity as a method to increase EI ability in a group of fourth and fifth semester nursing student leaders. Findings in the study were positive with the greatest area of change found in managing emotions in self and others. However, the small number of participants in the study limits the strength of the study findings, and the group of student participants do not represent the general population of nursing students. Part of the requirements for simulation class was that students work together to make decisions regarding the care of the simulation mannequin as the condition deteriorated during each scenario. Peer coaching was part of my treatment design.

Orak et al. (2016) investigated the effects of EI education on pre-test and post-test scores from the Modified Schutte Emotional Intelligence Scale (MSIES) of first year baccalaureate nursing students. In this quasi experiment, students were divided into experiment and control group with experimental group students enrolled in EI classes (8 weeks for 2-hours/week) that consisted of group teaching, brainstorming, lecture, and role playing, while control group students were enrolled in a life skills course. At the end of 8 weeks, all students in both groups took the post-test. After post-testing, students underwent the same course of studies in reverse order to ensure that all students received EI training and life skills training. Study results from MSEIS were not significant for differences between the two study groups before or after the EI intervention. Orak et al. (2016) concluded that this may be due to students being first semester with little to no clinical experience, the small number of study participants for adequate effect ($p = 0.61$), and too little time for students to practice their newly learned EI skills. The instrument used in this study had a test-retest reliability of 0.75, and Cronbach's alpha of 0.85. However, MSIES is a self-report instrument and does not reflect true EI ability, but rather students' perceived EI.

In other contexts, computer-based simulations have shown potential for teaching social and communication skills (Bagnasco et al., 2014; Baile & Blatner, 2014; Kelly, Forber, Conlon, Roche, & Stasa, 2014; MacLean et al, 2017). Nurses must possess these social and communication skills to create therapeutic relationships with patients, patients' families, colleagues, and in interdisciplinary groups (Sharon & Grinberg, 2018). In this study, I tested gain in EI understanding and management defined by the Salovey and Mayer (1990) theory of EI, using simulations designed according to the National League of Nursing Jeffries Simulation Theory (2016). This study was needed because a gap in research exists for a specific way to increase EI skill building in nursing curriculum at the school of interest using an instructional strategy based on computer-based simulation.

Problem Statement

In nursing education, there is a problem related to the potential threat of a lack of EI in nurses. Researchers have found that nursing students with higher EI scores, specifically emotion understanding and management, show greater competence addressing client needs (Adams & Iseler, 2014, Ray & Overman, 2014), and have increased professional behavior, nursing instincts, and clinical performances (Littlejohn, 2013; MacLean et al., 2017; Patillo, 2013; Ray & Overman, 2014). However, despite clear evidence from leaders in the nursing field of the need for improved teaching of EI skills (Littlejohn, 2013; MacLean et al, 2017; Patillo, 2013; Ray and Overman, 2014), a gap exists for an instructional strategy for emotion understanding and management skill building in nursing education. This problem impacts healthcare because nursing researchers have found that nurses who possess higher levels of EI respond intelligently during emotional situations thus promote better patient outcomes and quality care (Adams & Iseler, 2014; Ray & Overman, 2014). There are many possible factors contributing to this problem, among which are that typical nursing programs, including the school of interest, provide students with specific instructions for technical skills of nursing; however, there are no clearly defined instructions for emotion understanding and management skill building. Other possible factors are that there is not a consensus for a single construct definition of EI, as there are multiple constructs and multiple EI testing instruments, and researchers vary on how EI should be measured (Michelangelo, 2015).

Nursing students need EI skills for personal development and to be competent and move from novice to expert nurses who interpret the emotions of patients and families and react intuitively and appropriately (Edwards, 2014). Nursing is emotional work and nursing educators have a responsibility to teach students how to develop specific attitudes and behaviors such as emotional understanding and management because they are relevant to the nursing profession (Larin, Benson, Wessel, Martin, & Ploeg, 2014). I investigated the use of technology-based simulations as a possible way to improve EI skills. This study contributes to the body of knowledge needed to address this problem by advancing simulation theory, technology-based simulations, and using educational technology to develop student nurses' EI skills through instructional use of computer-based simulations.

Purpose of the Study

The purpose of this quantitative quasi experiment was to test gain in EI, defined by the Salovey and Mayer (1990) theory of EI, using simulations designed according to the National League of Nursing Jeffries Simulation Theory (2016) and controlling for fidelity of implementation and experience. Subjects were second semester baccalaureate students at a university-based school of nursing in Southeastern United States. The independent treatment variable was the use of face-to-face high-fidelity, human patient, computer-based simulators with stressful nursing scenarios and role play. The dependent variables were growth of emotional understanding and emotion management.

Research Question and Hypotheses

RQ1: Is there a causal relation between the introduction of high-fidelity computer-based simulation (stressful situation scenarios, human patient simulators, and role playing) and emotion understanding skills?

*H_0*1: There is no causal relation between the introduction of high-fidelity simulation (stressful situation scenarios, human patient simulators, and role playing) and emotion understanding skills.

*H_1*1: There is a causal relation between the introduction of high-fidelity simulation (stressful situation scenarios, human patient simulators, and role playing) and emotion understanding skills.

RQ2: Is there a causal relation between the introduction of high-fidelity computer-based simulation (stressful situation scenarios, human patient simulators, and role playing) and emotion management skills?

*H_0*2: There is no causal relation between the introduction of high-fidelity simulation (stressful situation scenarios, human patient simulators, and role playing) and emotion management skills.

*H_1*2: There is a causal relation between the introduction of high-fidelity simulation (stressful situation scenarios, human patient simulators, and role playing) and emotion management skills.

Theoretical Framework

In this study, I used two theoretical frameworks: Salovey and Mayer's (1990) theory of EI and the National League of Nursing Jeffries Simulation Theory (2016), (NLN-JST). Salovey and Mayer (1990) pioneered EI as an ability model from the premise that a great deal of life's tasks and challenges are full of affective information and not just cognitive information. The model contains four distinct hierarchical branches of abilities including, (a) perceiving, (b) using emotion for effective thinking, (c) understanding emotional information cognitively, and (d) managing responses within self and others. Emotion understanding and management are the two upper constructs this study was based upon because of the positive relationship of these constructs with cognitive ability and coping skills among nurses (Montes-Berges & Augusto-Landa, 2014). Other models of EI currently exist and are discussed thoroughly in Chapter 2.

According to Cherniss, (2010), advocates of EI as a cognitive ability agree that the concept is based on the following assumptions: (a) emotions play a large role in life, (b) people vary in ability to understand and manage emotions, and (c) differences affect adaptation in work and life (Cherniss, 2010). There are four models of EI that currently dominate the field in organizational, psychological, and nursing research; however, the models conceptualize, define, and measure EI differently (Codier & Odell, 2014). For example, Mayer and Salovey’s (1993) model is the ability/intelligence model, which defines EI as an interconnection between intelligence and emotion; they developed a theory to measure EI based on ability.

I used Mayer and Salovey (1997) ability model of EI to guide the emotion understanding and management portion of this study. The ability model defines EI as the ability to accurately perceive emotions in self and others, use emotions to facilitate thinking, understand emotional meaning, and manage emotions (Mayer & Salovey, 1997). This was a good fit because I investigated simulated clinical experiences for influence on student nurses’ emotion understanding and management.

Models other than ability are considered mixed models because of the beliefs that EI is a blend or mixture of ability, skills, and personality traits. For instance, the Bar-On

(1997) model is called the personality trait model because it combines ability with personality traits and includes adaptability and general mood. Goleman (1995) model is called the mixed or performance model and combines emotional abilities from the ability/intelligence model and personality traits from the personality trait. In more recent years, Petrides, Pita, and Kokkinaki's (2007) trait emotional intelligence model emerged as a second-generation model that includes many of the personal qualities of the previous mentioned models. More discussion of the three dominant EI models are included in Chapter 2.

The second theoretical framework for simulation in this research was guided by the NLN-JST. Dr. Pamela Jeffries (2005), assisted by the National League for Nursing (NLN) and Laerdal National Simulation Project Group, published a framework for designing, implementing, and evaluating technology-delivered simulations to be used as teaching strategies for nurse educators. Since the original publication, the framework has been refined until it became an essential handbook for nurse educators who use simulation as a teaching strategy (Rizzolo, Durham, Ravert, & Jeffries, 2016). The framework was moved to a mid-range theory three years ago. I discuss NLN-JST in greater detail in Chapter 2.

Nature of the Study

In this study, I used a quantitative, single case design (SCD) with multiple baseline (MBL). SCDs are an adaptation of time series designs and provide rigorous experimental evaluation of interventional effects (Ledford, 2018). This study involved repeated measurements of the dependent variables (emotion understanding and emotion management) before, during, and after active manipulation of the independent treatment variable (high-fidelity human patient simulator [HPS], stressful nursing case scenarios, and role playing). To measure emotion understanding, I used the Situational Test of Emotion Understanding-Brief (STEU-B) measurement tool. To measure emotion management, I used the Situational Test of Emotion Management-Brief (STEM-B).

In Chapter 3 a timeline diagram shows exactly how the independent variable was varied relative to the time before the simulations, the time of the simulations, the time after simulation classes had ended, and precisely when the EI measurements were taking place. The first testing date/time (A), was the start of baseline observation and was designated for the first 3 weeks of the second semester before participants began simulation classes. The second testing date/time (B), was mid-way through the second semester, and during the treatment phase with the independent variable (stressful simulation scenarios, high fidelity HPS, and role-playing). The final testing date/time (C), was after treatment was removed at the end of the second semester when students were no longer attending simulation classes and were preparing to enter third semester at the school of interest.

SCD with MBL was chosen because the design is particularly relevant for evaluating interventions in educational settings (Radley, Dart, & Wright, 2018). MBL's are used to compare baseline (A) with intervention (B) conditions when there is no withdrawal of the intervention (Ledford, 2018). During the study, interventions were staggered and nonconcurrent, participants served as their own control prior to interventions, and it was highly likely the dependent variables returned to baseline after treatment was removed (see Hitchcock et al., 2014; Radley et al., 2018). It was important for variability to be low between subjects because the study was an educational experiment. SCDs do not require researchers to withhold treatment to a control group. All participants received the same conditions throughout the experiment which helped decrease the effects of individual differences in the results (see Field, 2013).

The setting for the study was a simulation laboratory for second semester nursing students who were enrolled in medical-surgical classes at the school of interest. The target population was a convenience sample from the 112 students who were enrolled in second semester medical surgical classes. According to Kratochwill et al. (2010), there are no agreed upon methods for effect size estimation with SCDs as most researchers base their inferences on visual analysis. A minimum of three data points was needed to determine an effect (Kratochwill et al., 2010). Methods that I used to calculate effect size statistically included calculating the percentage of nonoverlapping data, improvement rate difference, standardized rate difference, and R^2 for proportion variance in the dependent variables (Crumbacher, 2013).

G*Power, *F* tests – ANOVA repeated measures within factors, with number of groups = 1, number of measurements = 3, alpha at .05 ($p < .05$), power (.95) resulted in nonsphericity correction $E = 1$, Effect size $f(V) = 0.2$ which suggested the total sample size $n = 66$. EI understanding scores were measured by STEU-B (Allen, Weissman, Hellwig, MacCann, & Roberts, 2014). EI management scores were measured by the STEM-B (Allen et al., 2015). I reviewed student demographic forms to assess fidelity of implementation, and to characterize the student population in this study.

The beginning of the second semester served as baseline (TA) because participants had not had previous exposure to medical surgical coursework, simulation experiences, high-fidelity HPS, or role playing. STEU-B and STEM-B were administered for the first time during the pre-intervention period. Simulation scenarios were organized by concepts that were being introduced in the medical-surgical classroom. During the experimental period, (TB), participants were introduced to HPS with physical and emotional needs amid stressful scenarios as the HPS spiraled into varying states of deterioration. Study participants were exposed to the interventions in a staggered pattern across time, and the second administration of STEU-B and STEM-B occurred during that period. Simulation classes ended during the 14th week of the semester, and STEU-B and STEM-B were administered for the third (TC), post-intervention. As mentioned previously, the week-by-week timeline in Chapter 3 describes details about the baseline period, the treatment period, and the measurement points.

After I gathered data from Times A, B, and C, I graphed results using scattergrams with regression lines fitted and visually analyzed. For statistical measurements, I used a one-way repeated measures ANOVA. According to Field (2013), if sphericity is violated, PASW will automatically produce multivariate test statistics. Data was screened and cleaned with estimation for sphericity using Greenhouse - Geisser *F* test (1959) and Huynh and Feldt (1976) methods when Mauchly's test of sphericity was significant (probability value less than .05) (Field, 2013). When probability value was greater than 0.5, sphericity was assumed. For greater accuracy, the two *p*-values were averaged. A *post hoc* test (Bonferroni) results box displayed the difference between groups, the standard error, and the significance value. Complete detail about the study and each of the steps is included in Chapter 3.

Construct Definitions

Emotional intelligence: "Emotional intelligence is a type of social intelligence that involves the ability to monitor one's own and others' emotions, to discriminate among them, and to use the information to guide one's thinking and action" (Salovey & Mayer, 1990, p. 189).

Emotion understanding: Emotion understanding is the ability to comprehend emotional information, combine and progress that information through relationships, and appreciate the emotional meanings (Mayer, Salovey, Caruso, & Sitarenios, 2003).

Emotion management: Emotion management is the ability to be open to feelings, be able to regulate feelings in self and others to encourage personal understanding and growth (Mayer et al., 2003).

High-fidelity: High-fidelity refers to believability, or the degree to which a simulated experience approaches reality. As the fidelity increases (low, medium, high), realism of the simulation experience increases (Aebersold & Tschannen, 2013).

Simulation: Simulation is a technique that replaces real life experiences with guided experiences to replicate substantial aspects of a real world situation in an interactive fashion (Gaba, 2004). Simulation in this study refers to face-to-face technology utilizing high-fidelity (believability) computerized mannequins that simulate real-life patients.

Human patient simulator: Human patient simulator refers to the use of mannequins that are computerized to simulate real-life patients and scenarios. The mannequins are used to promote skill acquisition and teach students clinical situations without causing a real patient any unnecessary harm or risk (Flood & Thompson, 2011).

Role play: The term that describes a dramatic technique that encourages participants to improvise behaviors of another person's attitudes and actions in defined situations (Lowenstein, 2017).

Communication strategies: The term refers to the specific, goal directed communication skills that are crucial to forming the nurse-patient relationship and are essential to nursing care (Varcarolis, 2013).

Case study/scenario: The plan that is used for an expected and potential course of events of a simulated clinical experience (Aebersold & Tschannen, 2013).

Operational Definitions

Emotion understanding: The term used to define knowledge and reasoning about emotions based on the third branch of the Mayer and Salovey (1997) conceptual model of EI. Emotion understanding serves as a mediator between perception of emotion and management of emotion (Allen et al., 2014).

Emotion management: The term used to define the regulation of negative emotion and enhancement of positive emotion based on the fourth branch of the Mayer and Salovey (1997) conceptual model of EI (Allen et al., 2015).

Facilitator: The term for teacher in the simulation scenario. The facilitator should be multiskilled as an educator and nurse, able to bring theory to life, yet maintain an emotionally safe learning environment (Topping et al., 2015).

Participant: The term for student in the simulation scenario. Nursing participants are expected to work hard and be prepared for simulation experiences (Hallmark, Thomas, & Gantt, 2013).

Educational practices: The term used for the components to be used as a guide for designing simulation experiences to improve student performances. The components are seven variables including active learning, faculty-student interaction, collaboration, high expectation, diverse learning, time on task, and feedback (Hallmark, Thomas, & Gantt, 2014; Jeffries & Rogers, 2012; Jeffries, Rogers, & Adamson, 2016).

Outcomes: Outcome variables supported by the literature for simulation include learning (knowledge), skill performance, learner satisfaction, critical thinking, and self-confidence (Adamson & Rodgers, 2016). Simulation learning outcomes relate to the participant, the patient, and the system (Jeffries, Rodgers, & Adamson, 2016).

Simulation design: Simulation based experiences should be guided by clear objectives and planned in a way that optimizes the participants' learning outcomes (Jeffries, 2015). Simulation design should consider eleven elements to achieve optimal outcomes from simulation-based learning including, needs assessment, measurable objectives, format of simulation, clinical scenario or case, fidelity, facilitator/facilitative approach, briefing, debriefing and/or feedback, evaluation, participant preparation, and test of the design (Lioce et al., 2015).

Situated cognition: The term situated cognition implies that knowledge is constructed within an activity or culture in which it was learned. In high-fidelity simulation, situated cognition emphasizes the students' necessity of higher-order thinking skills over rote memorized facts (Bailey, 2017). Learning that is built within a situated cognition framework and the application of HPS, is a teaching/learning strategy that helps to bridge students' theory-based knowledge to practice and "social integration" into the nursing profession (Bailey, 2017, p. 250).

Assumptions

There were ten key assumptions made in the research for this study. I assumed that

- EI was measurable and validated by past research (Marvos & Hale, 2015; Mayer, DiPaolo, & Salovey, 1990; Mayer & Salovey, 1993, 1997; Mayer, Salovey, & Caruso, 2004, 2008; Mayer, Salovey, Caruso, & Sitarenios, 2001);
- STEU-B (Allen et al., 2014), measured whether study participants knew what caused emotions (emotion understanding). STEU-B was designed to measure emotion understanding and Cronbach's alpha reliability was .63 (Allen et al., 2014);
- STEM-B, provided by Allen et al., (2015), measured if participants knew what to do when emotional situations occurred (emotion management). STEM-B was designed to measure emotion management and Cronbach's alpha reliability was .87 (Allen et al., 2015);

- There was consistency in the delivery of scenarios (case studies), high-fidelity HPS, role playing, and that fidelity of implementation was equally high for all participants in the study. To reinforce this assumption, the simulation scenarios used in the study were scripted. Simulation faculty were required to follow the scripts, and I observed a sample of the simulation classes;
- Behaviors were functionally independent and would change when the intervention was applied. This assumption was checked with the one-way repeated measures ANOVA test. A *post hoc* test (Bonferroni) results box displayed the difference between groups, the standard error, and the significance value;
- Multiple linear regression requires that the relationship between independent and dependent variables be linear (Field, 2013). To check this assumption, I used scattergrams to show whether the relationship was linear or curvilinear;
- Scores within the continuous variable were normally distributed (normality). Results were graphed using scattergrams with regression lines fitted and visually analyzed. When a probability value was greater than 0.5, sphericity was assumed. For greater accuracy, the two *p*-values were averaged. A *post hoc* test (Bonferroni) results box displayed the difference between groups, the standard error, and the significance value;
- Independent variables were not highly correlated with each other (no multicollinearity). This assumption was tested with variance inflation factor values (Laerd Statistics, 2018);

- Residuals had similar variance (homoscedasticity). Repeated measures, within factors ANOVA for PASW was used to test for relationship between the variables. Mauchly's test of sphericity should be non-significant in the output data. When statistically significant, (assumption of sphericity violated), I looked at alternative statistical tests to see if a one-way ANOVA was significant. Data was screened and cleaned with estimation for sphericity using Greenhouse - Geisser F-test (1959) and Huynh and Feldt (1976) methods. Only first time medical-surgical nursing students could participate in the study. Repeat students were not allowed to participate, and I checked variability between subjects at the pretest. A detailed discussion of analysis is in Chapter 3.

Scope and Delimitations

This study was delimited to second semester undergraduate students in a baccalaureate nursing program in Southeastern United States (convenience sample) and did not include other nursing students at the school. Any conclusions from this study are only generalizable to this population. Generalizability of the results regarding EI understanding quotients are limited to the measurement tool STEU-B and this population/age group, and generalizability of the results regarding EI management quotients are limited to the measurement tool STEM-B and to this population/age group. Research that utilizes other measurement tools should be noted for potential comparison of differences. Second semester students are a sample of convenience because each clinical group attends simulation class mandatorily for four hours a month for three months (12 total hours) as part of the clinical requirements to pass medical-surgical nursing during the 15-week course. Students in earlier and latter semesters attend the simulation laboratory sporadically throughout the 15-week semester, and it would be difficult if not impossible to introduce these interventions evenly to the groups to prevent EI test score biases.

Limitations

Limitations for EI measurements include questionable validity and reliability. Most of the criticisms surrounding EI scales are regarding self-report scales; however, STEU-B (Allen et al., 2014) and STEM-B (Allen et al., 2015) are measures of ability. Questions have been raised as to whether EI is a viable concept (Becker, 2003), and that EI is an elusive concept (Pfeiffer, 2001).

Study participants were expected to do their best when taking STEU-B and STEM-B. A limitation of the study is that participants may not have answered the tests honestly and accurately regarding their level of EI. Another limitation is that participants may have faked or chosen their answers because of social desirability (Spector, 1994; Clark, 2010). Simulation classes are an example of experiential learning, and as such, students enrolled in simulation are required to sign a confidentiality form stating that they will not reveal to other students what happens during their class time. I cannot guarantee that all students honored the confidentiality form, thus a limitation for independence of observations exists.

Significance of the Study

The implications of the study were for the future design of high-fidelity simulation with HPS as an instructional strategy for influence on emotion understanding and management test scores. It is possible for simulations to be realistic, yet students go through the mechanics without building higher level skills (Dean, Williams, & Balnaves, 2016), such as those required of EI. One of the outcomes of the study was to find out if this simulation design was vulnerable to that weakness for EI learning and what, if any, impact simulation learning had on EI. This study broadened previous work about high-fidelity simulation and EI skill building, adding to nursing literature on the use of this simulation design, and for teaching EI in general.

Influencing emotion understanding and management scores, as I proposed in this study, had potential to prepare students to deal with the emotional stressors and social complexities of the nursing profession. Meeting the physical challenges of the nursing profession is a taxing responsibility of its own. Nursing school graduates must be competent in the technical tasks or *hard* skills of nursing to meet the physical needs of their patients. In addition, they must effectively address the emotional needs of patients and families with communication *soft* skills (Minden, 2013; Patillo, 2013; Ray & Overman, 2014). Today's healthcare consumers are complex, physically and emotionally. To provide holistic care, the nurse needs cognitive and emotional intelligence to manage the obligations (Beauvais, Brady, O'Shea, & Griffin, 2011; Benson et al., 2010; Por, Barribell, Fitzpatrick, & Roberts, 2011). Cardillo (2014) found that some employers are as concerned about nurses' EI as they are about their credentials.

The goal of this study was to add to nursing knowledge about influencing emotion understanding and management skills through simulation interventions of stressful scenarios, HPS, and role playing. This study has the potential to provide a practical application for nursing school curriculums to include specific interventions to influence emotion understanding and management gain scores. Increasing these scores continues to be relevant to societal change because of the possibility to improve nursing students' self-awareness and performance, which ultimately affects patient outcomes (Richardson & Clamen, 2014).

Summary and Transition

In Chapter 1, I introduced the rationale for the study, reflected in the purpose and statement of the problem. Research was limited to second semester nursing students in a baccalaureate program. The purpose of this quantitative, single case design (SCD) with multiple baseline study was to compare EI understanding and management gain scores of second semester nursing students for influence with intervention of nursing scenarios/case studies, high-fidelity HPS, and role playing during the semester. The theoretical foundation for EI in this research was guided by Salovey and Mayer theory of EI (1990). The theoretical foundation for simulation in this study was guided by the NLN- JST (2016).

Chapter 2 presents a literature review of research on EI regarding nursing students and implications for the nursing profession, the foundational theories of EI, simulation theory, and the importance of including EI training in nursing schools' curriculum.

Chapter 2: Literature Review

Introduction

Nursing researchers have found that students with higher levels of EI, specifically emotion understanding and management, are more competent addressing client needs (Adams & Isler, 2014, Ray & Overman, 2014) and have improvements in professional behavior, nursing instinct, and clinical performance (Littlejohn, 2013; MacLean et al., 2017; Patillo, 2013; Ray & Overman, 2014). It is vital for student nurses to respond intelligently during emotional situations to promote better patient outcomes and quality of care (Adams & Iseler, 2014; Ray & Overman, 2014). Nursing students need EI skills for personal development and to be competent and move from novice to expert nurses who interpret the emotions of patients and families and react intuitively and appropriately (Edwards, 2014). Nursing is emotional work, and nursing educators have a responsibility to teach students how to develop specific attitudes and behaviors such as emotional understanding and management because they are relevant to the nursing profession (Larin, Benson, Wessel, Martin, & Ploeg, 2014).

One strategy proven to support nursing students as they shift from theoretical to applied skills is simulated clinical experiences (SCE), also known as simulated learning experiences (SLE), which have effectively prepared nursing students to transition from laboratory to actual patient care (Aebersold & Tschannen, 2013; Marvos & Hale, 2015; Rajput, 2016; Shinnick & Woo, 2014). Little research has been conducted to explore ways to incorporate emotional understanding and management training into curriculum by way of HPS. Some nursing researchers support the belief that self-reflective exercises and bedside experiences such as SCE provide opportunities to develop higher levels of EI (Adams & Iseler, 2014; Harrison & Fopma-Loy, 2010). However, nursing literature is unclear regarding specific, purposeful ways to integrate emotion understanding and management training into curriculum. Emotional skill building is needed to help prepare students for the emotional work of nursing.

The goal in nursing education has changed in the past decade to include developing reflective practitioners who can understand how to mentally frame situations when making decisions and self-correct (Fey & Jenkins, 2015; Forneris & Fey, 2018; Morse, 2015; NLN, 2015). There is evidence that critical communication, and self-regulation skills can be enhanced by technology-facilitated activities. The National Council of State Boards of Nursing (NCSBN) landmark, longitudinal study explored the role and outcomes of simulation in pre-licensure clinical nursing education in the United States (Hayden, Smiley, Alexander, Kardong-Edgren, & Jeffries, 2014). Study findings showed there is substantial evidence that SLE can be substituted for up to 50% of traditional clinical experiences.

Some nursing schools are turning to HPS to assist with training therapeutic communication skills (Brown, 2015; MacLean et al., 2017). Rosen and Provost (2014) noted that therapeutic communication between patients, nurses, and other members of the healthcare team is essential to providing care, reducing errors, and enhancing patient safety. Motivation and self-control are also essential to clinical performance and to be an effective practicing nurse (Marvos & Hale, 2015). Educators need to assist learners to move past applying facts and move toward sense-making processes.

The problem is a potential threat of lack of EI in nurses. A gap exists for effective instructional strategies, particularly emotion understanding and management skill building. Typical nursing school curricula, including that of the school of interest, do not routinely include EI training even though researchers have suggested that inclusion is linked to an increase in self-awareness and nursing performance (Beauvais, Stewart, DeNisco, & Beauvais, 2014; Kunst, Mitchell, & Johnston, 2017; Lewis, Neville, & Ashkanasy, 2017; Michelangelo, 2015; Ranjbar, 2015; Shanta & Gargiulo, 2014). Nurse educators are encouraged to move past linear rules and facts applications and toward sense-making skills to prepare students' to critically think and act like a nurse (Forneris & Fey, 2018; Gore & Thomson, 2016).

Clinical facilities frequently allow student observations, but do not allow students to be in the role of the nurse. Unfortunately, new graduate nurses struggle when they transition to professional nursing. Technology such as high-believability HPS is promoted as a safe learning environment where students are placed in the role of the nurse and can develop competence through repetition and by learning from their mistakes (Richardson & Clamen, 2014). Using face-to-face simulation mannequins with stressful scenario situations could be one way to close the knowledge gap for increasing emotion understanding and management skill building.

The purpose of this quantitative SCD with multiple baseline (MBL) study was to investigate the use of technology-based simulations (SLE and HPS) as one possible way that emotion understanding and management training could be integrated into curricula. Students at the school of interest receive clear, detailed instructions for technical skills in nursing. However, specific, purposeful interventions that integrate effective collaboration and communication skills to cope with emotional situations using HPS have received less attention. To advance understanding at the program of interest and address the problem, I investigated the possibility that EI understanding and management skills could be integrated through use of face-to-face technology during emotional situations with SLE using high-fidelity HPS to influence emotion understanding and management gain scores of second semester nursing students.

The purpose of Chapter 2 is to provide information about previous research and to relate that information to this study. Chapter 2 includes discussion of the literature search strategy I used, the four major models of EI, incorporating EI training into nursing curriculum, and four popular EI measurement tools. I also examine the literature regarding simulation theory and the use of SLE and HPS to aid progression, development, and skill acquisition in nursing education. This chapter concludes with a table that compares the EI measurement tools.

Literature Search Strategy

In searching the literature, I included books about EI and peer-reviewed, scholarly journal articles of empirical research from primary sources and dissertations regarding the effects EI has on leadership abilities, nursing school success or failure, nursing students' EI and coping styles in simulated care scenarios, the impact that HPS and SLE have on EI, and clinical judgment and performance. The initial and subsequent search strategies began with a computer-based search through the Walden University Library site, and through the Western Kentucky University Library. The following keywords, terms, and phrases were used: *caring*, *emotional intelligence (EI)*, *EI measurement tools, EI development, empathy, leadership, MSCEIT (Mayer-Salovey-Caruso Emotional Intelligence Test), STEU-B and STEM-B tests, nursing curriculum, nursing faculty, nursing students, schools of nursing, health sciences, high-fidelity human patient simulation,* and *simulation learning experiences*.

The topic of EI was too broad and resulted in over 2 million articles. I limited the search to full-text scholarly articles, narrowing the search by restricting EI to nursing and nursing education for the years 2013-2019. For *simulation*, I searched English-language, full-text, peer-reviewed journal articles and dissertations that focused on high-fidelity simulation and undergraduate nursing education. The following online databases were used: Academic Search Complete, Business Source Complete, CINAHL Plus with Full Text, Dissertations and Theses, EBSCO, Nova, OVID SP, ProQuest, PubMed, Sage, ScienceDiet, and Harper's Magazine Archives. When I found relevant and useful articles, I reviewed their references and was able to find a lot of references for this study. Additionally, I created a Google Alert to send EI articles of interest to my Gmail account. This made it easy to eliminate articles that were not useful to my topic of interest. To find the roots of EI and a fuller history, the search of materials included the year 1920 to 2019 in the form of current and past peer-reviewed articles, scholarly journal articles, dissertations and theses, books, and/or book chapters.

Theoretical Foundations

In this study, I used two theoretical foundations: theory of EI (Salovey & Mayer, 1990) and the NLN-JST (Jeffries, 2005). Each theory is explained in detail with a description of research in each area regarding nursing.

Theoretical Foundation and Overview of Emotional Intelligence

Salovey and Mayer (1990) were innovators for EI as an ability model based on the premise that tasks and challenges are composed of affective and cognitive information. Some scholars credit the EI concept to the ancient Greek philosopher Socrates who acknowledged the role that emotions play in human behavior (Smith & Sanderman, 2005). At least once scholar proposed that the roots of EI correlate with Darwin's work on emotional expression for adaptation (Rajput, 2016). For this study, however, I began the theoretical foundation of EI with Charles Spearman (1904), who created the first psychometric theory of intelligence. Spearman believed that two factors intellectually affected cognitive performances, one general ability, factor *g* (common to all tasks), and one specific, factor *s* (specific) to the task (Williams, Zimmerman, Zumbo, & Ross, 2003). Spearman believed that people differ in the amounts of *g* and *s* they have, which explains differences that are seen when different people perform the same cognitive tasks (Fogarty, 1999).

Building on Spearman's work, Edward L. Thorndike (1920) argued that intelligence was not a single factor like general intelligence, but rather three mutually independent intelligences: mechanical, social, and abstract. Thorndike defined (a) mechanical intelligence as ability to see relationships between objects with understanding about how the physical world works, (b) social intelligence as ability to understand and manage men, women, boys, and girls, acting wisely in these relationships, and 3) abstract intelligence as ability to understand and manage verbal and mathematical symbols. Thorndike proposed distinct differences between the three classes and warned that standard intelligence tests only measured abstract intelligence, and he called for instruments to be developed that measured the other intelligences. His development of this multi-factored approach to intelligence caused a great debate with Spearman who believed in the one general intelligence. It has been noted that their debate lasted 25 years (Plucker & Esping, 2014).

Leon Thurstone (1938) theory of primary abilities also challenged Spearman's theory. Thurstone argued that a single factor "*g*" could not explain complex human intellect (Plucker & Esping, 2014). Thurstone proposed that intelligence did not arise from '*g*' but from 7 independent factors called primary abilities including space, perceptual speed, number facility, verbal relations, word fluency, memory, and induction (reasoning). When Thurstone tested his theory on a group of children, he did not find the seven primary abilities were entirely separate, but incidentally found evidence of '*g*'. Afterwards, Thurstone organized a mathematical solution rectifying the mathematical contradictions and his final theory was a compromise which accepted '*g*' and 7 specific abilities. Thurstone's study laid the groundwork for further theories of multiple intelligences and hierarchical theories of intelligence (Ruzgis, 1994).

David Wechsler (1940), a United States Army psychologist, was sent to the University of London to work with Spearman in the mid-20th century. However, Wechsler's views were much broader than Spearman and he decided that Spearman's general intelligence 'g' theory was too narrow. Wechsler proposed that factors other than intellect were important for one to succeed in life and that personality and other non-intellective factors contributed to intelligence (Plucker & Esping, 2014).

Raymond Cattell (1941), a former student of Spearman's, proposed that genetics were responsible for a large part of intelligence. Cattell believed that there was more than one higher-order factor and developed the theory of fluid and crystallized intelligence. Cattell defined fluid intelligence (*Gf*) as the ability to reason and acquire knowledge regardless of education and culture, and he defined crystallized intelligence (*Gc*) as knowledge and skills that are acquired through culture and education and measurable through vocabulary and other tests (Fogarty, 1999).

Philip Vernon (1950), a colleague of Spearman, proposed the first well known hierarchical model of intelligence (Fogarty, 1999). Like Spearman, Vernon favored factor analysis and presented his theory as hierarchical group factor. The top of the hierarchy '*g*' was responsible for most intelligence, with all other group factors below '*g*'. Vernon's theory seemed to balance the debate between Spearman's two factor theory (no group factors) with Thurstone's multiple factor theory (no general factor) (Plucker & Esping, 2014).

John Horn (1965), elaborated Raymond Cattell's theory in his doctoral thesis. The Cattell-Horn theory of fluid and crystallized intelligence suggested that general intelligence combines abilities differently in different people which brings out varying intelligences. In 1968, Horn expanded the *Gf-Gc* theory suggesting that older adults did not have to depend on fluid reasoning because they were able to channel abilities into expert reasoning skills enabling them to reason at high levels with wide-span memory instead (Plucker & Esping, 2014).

Howard Gardner (1983) was influenced by Thurstone's 7 primary abilities and proposed there were 7 social intelligences derived from a set of eight criteria. In his book *Frames of Mind: The Theory of Multiple Intelligence*, Gardner's model introduced the social intelligences as linguistic, logical-mathematical, spatial, bodily-kinesthetic, musical, interpersonal, and intrapersonal (1983). Gardner reasoned that the multiple, social intelligences worked together to maintain balance and enable problem solving skills. Gardner rejected the idea that '*g*' was common to all tasks and argued that to be considered intelligence, the following 8 criteria had to be met; 1) the potential isolation by brain damage, 2) an evolutionary history, 3) the presence of core operations, 4) susceptibility to encoding in a symbol system, 5) a distinctive developmental progression, 6) the existence of idiot-savants, prodigies and other exceptional individuals, 7) support from experimental psychological tasks, and 8) support from psychometric findings (Gardner, 1983).

Gardner (1998) did not consider the 7 social intelligences an exhaustive list and added three additional candidate intelligences including; naturalist, spiritual and existential intelligence. Gardner's theory has met criticism from scholars who believe that the 7 multiple intelligences are cognitive style rather than construct (Plucker & Esping, 2014). Gardner argued that *g* has a scientific place in intelligence theory, however his work is governed by intellectual processes that *g* fails to explain. Further criticism of

Gardner's theory is that standard assessments have failed to show high levels of psychometric validity evidence which, incidentally, are one of Gardner's criteria for an intelligence (Kaufman, Kaufman, & Plucker, 2012). Gardner argued that traditional IQ tests restricted the human potential by measuring linguistic and logical/mathematical intelligences exclusively (Plucker & Esping, 2014). Despite the stated criticisms, Gardner's theory continued to influence educators because it rationalized poor student performance on standardized tests (Morgan, 1996).

The term emotional intelligence appeared in a doctoral dissertation entitled A Study of Emotion: Developing Emotional Intelligence; Self-integration; Relating to Fear, Pain and Desire by W.L. Payne (1985). Payne's study suggested that EI was the means to handle the emotions of fear, pain, and desire and suggested that people who lack EI behave emotionally illiterate. Payne's research led him to believe that emotional ignorance led to a gamut of social issues including illness, violence, depression, religious conflicts, addictions, and war. Payne reasoned that intellectual intelligence was different from emotional intelligence because solving an emotional problem requires emotions, and solving a mathematical problem requires intellect. Payne has often been accredited with coining the phrase 'emotional intelligence', however, Rajput (2016) argues that the term appeared much earlier in an article by Leuner (1966). Rajput (2016) also acknowledged that an EI model was first proposed by Greenspan (1989).

Salovey and Mayer (1990; Mayer & Salovey, 1997) proposed EI as an ability to understand and manage feelings of self and others which helps facilitate thoughts and actions. Grewal, Brackett, and Salovey (2006), credit Thorndike's (1920) social intelligences and Gardner's (1983) intrapersonal and interpersonal intelligences as the origins for their EI theory. Since its origin, Salovey and Mayer (1990) theory of EI has been used extensively in behavioral science and nursing research. Mayer and Salovey (1997) created a model titled the *Multifactor Emotional Intelligence Scale* (MEIS) that divided the skills and abilities of EI into four branches; 1) perceiving, 2) assimilating, 3) understanding, and 4) managing emotion. Mayer, Caruso, and Salovey (2000) identified EI as a measurable ability and believed that the other EI measurements were simply measuring personality traits. The Mayer, Salovey, and Caruso Emotional Intelligence Test, (MSCEIT), (2002) was developed later and included eight subtests, two subtests each for the original four branches of the MEIS .

Mayer et al., (2004) defended their EI ability model as a scientific model and refuted that EI was separate from personality or other personal traits. Mayer et al., (2008) continued to discuss EI from the ability model as a superior, scientific model to maintain validity of the term. Ability based research of EI have traditionally measured with the Multifactor Emotional Intelligence Scale (MEIS), (Mayer, Caruso, & Salovey, 2000) and mostly with Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT; Mayer et al., 2003). MEIS and MSCEIT measure EI as a set of abilities in performance tests that require the participant to solve problems about emotions or solve problems that require the use of emotion. Both instruments are based on the four-branch hierarchical model and EI is measured based on performance of a range of tasks (Mayer & Salovey, 1997; Salovey & Mayer, 1990). These instruments differ from other EI measurement tools because of the focus on mental ability, not on self-report measures or personality attributes.

Emotional Intelligence Models

There are basically three categories of EI models including; ability model, trait model, and mixed model. I included all three of the models in this literature review because research in nursing varies on the definition of EI and tends to use mixed models with self-rating measurements most frequently (Lewis et al., 2017). Ability model, specifically, Mayer and Salovey (1997), was used to guide the emotion understanding and management portion of my study. The ability model defines EI as the ability to accurately perceive emotions in self and others, use emotions to facilitate thinking, understand emotional meaning, and manage emotions (Mayer & Salovey, 1997). Trait model integrates wellbeing, sociability, self-control, and emotionality and includes personality facets that are specifically related to one's affect (Petrides et al., 2007). Mixed models combine EI with personality traits such as optimism, motivation, and stress tolerance (Cherniss, 2010).

Cherniss (2010) stated that most EI researchers including Boyatzis and Goleman (1995), Petrides et al., (2007), and Bar-On (2000) accept the basic definition of EI that was proposed by Mayer et al. (2000) in which EI was defined as "the ability to perceive and express emotion, assimilate emotion in thought, understand and reason with emotion, and regulate emotion in self and others" (p. 396). Some of the models do not fit this basic definition but rather go beyond by including traits and other qualities. Boyatzis (1982) noted that a competency is a characteristic that leads to effective or superior performance.

Broader models of EI may need to be considered as models of emotional and social competencies (ESC) (Cherniss, 2010). These traits or competencies such as empathy and charisma are controlled by emotion and clearly are a part of EI although they do not fit the basic definition. A distinction between EI and ESC could be applied to the four major models of EI such that the abilities found in the Mayer et al. (1990) model would represent EI and the other three major models of EI would represent ESC (Cherniss, 2010).

Mayer and Salovey (Ability) Model

The Mayer and Salovey ability model guided the EI portion of this study. Peter Salovey and John D. Mayer have been leading researchers for EI since they defined the term and theorized that EI was based on mental ability in two research articles that were published in 1990 (Mayer et al., 1990; Salovey & Mayer, 1990). EI was defined as a subset of Gardner's social intelligence with the exception that EI focused more on recognizing your own emotional status and others and using that information to solve problems and manage behavior (Salovey & Mayer, 1990). This work suggested that individuals that possessed high emotional clarity had personal and social advantages because of the mental ability to recognize their own feelings and the feelings of others.

Mayer, DiPaolo, & Salovey (1990), concluded that EI was a skill set of mental abilities. In this work, the authors identified specific EI qualities, such as empathy, insisting they were not merely attitudes or personality attributes. Further, the authors stated that people who lacked the ability to perceive emotions in others, also lacked the ability to be empathetic (Mayer et al., 1990).

Mayer and Salovey (1997) revised their original concept of EI which involved perceiving and regulating one's emotion, to one that included thinking about feelings. The researchers also added a four-branch model of EI that consisted of stages (hierarchies) of abilities: 1) ability to perceive emotions in self and others (recognize how you and those around you are feeling), 2) ability to use emotions to enable thinking (generate emotion and reason with that emotion), 3) ability to understand emotions (ability to understand complex emotions and the signals emotions convey), and 4) ability to manage emotions (managing emotions in yourself and others to attain goals) (Mayer & Salovey, 1997). Mayer and Salovey's (1997) four branch model of EI serves as a framework for the EI portion of this study, as illustrated in Figure 1. Shanta and Gargiulo (2014) used the model in their quasi experimental study of baccalaureate nursing students and concluded that senior nursing students scored higher on the ability to understand/reason about emotions than pre-nursing students.

The principal belief of Mayer and Salovey (1997) model is that EI is regarded as a mental ability that boosts the connection between emotion and reasoning (cognition). They argued that mixed models such as Goleman (1995) blended personality traits and talents (skills unrelated to intellect) which were different than mental abilities and should be eliminated from the EI definition. Caruso, Mayer, and Salovey (2002) argued that for EI to be of any valuable and unique, it must be distinct from standard personality traits. Some researchers have questioned the concept, theory, and measurements to assess EI (Landy & Conte, 2004; Matthews, Zeidner, & Roberts, 2004).

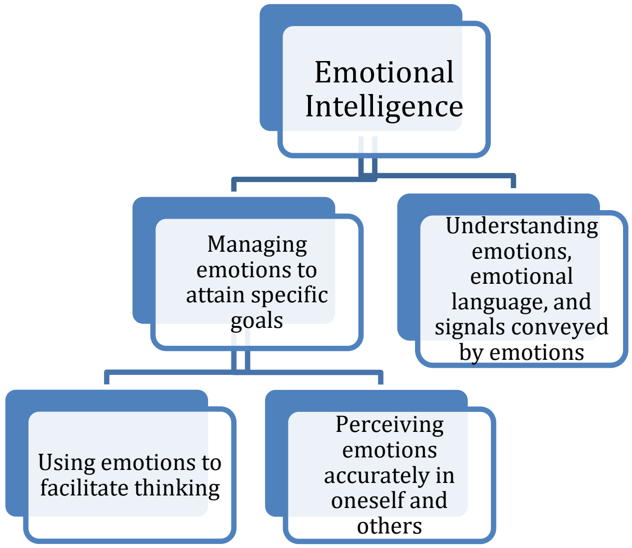


Figure 1. Four branch model of EI. Adapted from "Emotional Intelligence: New Ability or Eclectic Traits?" by J.D. Mayer, P. Salovey, and D.R. Caruso, (2008), *American Psychologist*, 63, p. 507.

Goleman (Mixed) Model

Goleman (1995) conceptual (mixed) model is grounded in his theory about performance and leadership roles in the workplace. Goleman (1995) interpreted EI in a much broader sense than Mayer et al. (1990) including self-motivation, controlling impulses, problem-solving and social responsibility, empathy, and relationship skills into the definition. Like Mayer et al. (1990), he believed the key to EI was having the ability to read nonverbal cues (voice tone, gestures, facial expression), and Goleman also emphasized empathy and caring.

Goleman believed that EI competencies were not so much innate abilities as they were capabilities that needed opportunities to develop and emphasized, they could be improved when learned and practiced. Much of his work was inspired by the earlier research of Salovey and Mayer (1990), but he included the social and emotional competencies that are associated with outstanding performance and leadership in the workplace. Unlike Salovey and Mayer (1990) model which was built on the relationship between emotion and cognition, Goleman (1995) focused on the importance of social and emotional learning and viewed EI as a mixture of ability and personality.

Goleman's work moved EI into a greater public awareness due to the focus on leadership abilities and competencies that contribute to success in the workplace. His bestselling book *Emotional Intelligence* (1995), created widespread interest among corporate executives looking for certain characteristics that distinguished extraordinary from ordinary performance in business leaders. The widespread interest led to a consortium for research on EI founded in 1996 by the Fetzer Institute. The consortium brought researchers from academia, government, private consulting, and the business world together (Druskat, Sala, & Mount, 2006). Goleman grounds his work specifically for work performance, thus his theory is specific for the work domain and leadership roles (Emmerling & Goleman, 2003)

Goleman included emotional literacy through education into his work noting that basic life skills such as conflict resolution, anger management, and dispute avoidance were necessary components of EI that all young people could and should be taught (1995). Goleman compared individuals who lacked the ability to sense the nonverbal cues of others as being "emotionally tone-deaf" (1995, p. 96). Later, he refined his model based on the work of Boyatzis, Goleman, and Rhee (2000) and separated EI capabilities into four domains which include self-awareness, self-management, social awareness, and relationship management. Goleman (2006) has distinguished between emotional intelligence (EI) and social intelligence (SI) and has proposed that the last two domains in his earlier model be changed to social awareness and social facility because they are components of SI.

Bar-On (Mixed) Model

Bar-On's (2000) conceptual (mixed) model of EI includes self-awareness and emotional and social competencies. This model is considered mixed because it contains a general mood component highlighting happiness and optimism, thus fusing competencies and personality traits as Goleman (1995). Bar-On considers the model an emotional and social intelligence model because he was interested in identifying the traits and skills that help people to adapt to life's social and emotional demands (Cherniss, 2010).

Bar-On identified EI as a 15-aspect model arranged in five-level hierarchical structure; Level 1) Intrapersonal (self-awareness and self-expression), such as self-regard, emotional self-awareness, assertiveness, independence, and self-actualization, Level 2) Interpersonal (social awareness and interaction), such as empathy, social responsibility, interpersonal relationship, Level 3) Adaptability (change management), such as reality testing, flexibility, and problem-solving, Level 4) Stress management (emotional management and control), including stress tolerance, impulse control, and Level 5) General mood EI (self-motivation), including optimism and happiness. Like Mayer et al. (1990) and Goleman (1995), Bar-On (2000) believed EI to be the ability to express and understand emotions and included self-awareness and empathy into his model. However, Mayer et al. (1990) model does not include any general mood component that highlights happiness or optimism.

Petrides and Furnham (Trait) Model

Petrides and Furnham (2003) Trait model, also known as trait emotional self-efficacy, is the most recent model to emerge and was designed to include many of the personal qualities that were included in earlier models of EI (Petrides et al., 2007). The trait model consists of four general components: well-being (self-confidence, happiness, and optimism), sociability (social competence, assertiveness, and emotion management of others), self-control (stress management, emotion regulation, and low impulsiveness), and emotionality (emotional perception of self and others, emotion expression, and empathy) (Petrides et al., 2007). The trait EI model "comprise personality facets that are specifically related to affect" (Petrides et al., 2007, p. 273). David Wechsler, who developed the first IQ test in the 1940's, was the first to suggest that affective components of intelligence were also essential to be successful in life (Cherniss & Goleman, 2001). According to Petrides and Furnham (2003), tests of ability capture maximal performance, and tests of personality capture typical performance. This model measures personality trait and therefore is measured with a self-report instrument rather than an ability measure. Trait Model conceives EI as a constellation of "emotion-related dispositions" that must be assessed through self-report questionnaires (Mikolajczak, Luminet, Leroy, & Roy, 2007, p. 338).

National League for Nursing Jeffries Simulation Theory

Jeffries (2005, 2007), Jeffries and Rodgers (2012), aided by the NLN, published a framework for designing, implementing, and evaluating simulation for nursing educators. The NLN-Jeffries Simulation Framework (NLN-JSF) has been used extensively as an essential handbook for nurse educators involved in SLE. Recently, NLN-JSF has moved to a mid-range theory, the NLN-Jeffries Simulation Theory (NLN-JST). The theory consists of five components including facilitator, participant, educational practices, outcomes, and simulation design characteristics which were described in detail previously in this chapter. The use of human patient simulators (HPS), and SLEs for the current study is framed by NLN-JST. Jeffries (2016) challenged nursing education researchers to test and use the theory to guide research in the study of simulation phenomena and contribute to the science of nursing education.

High-fidelity simulation (HFS) with HPS has been found to be a useful tool to enhance clinical learning and critical thinking skills among nursing students, to improve students' entry level clinical judgment, and students perceived self-competence (Eikara & Baykara, 2017). Shinnick & Woo (2014) found that nursing students gained self-efficacy and knowledge with HPS experiences. HPS is a teaching strategy that uses experiential learning conducted in a simulation lab designed to look like an actual patient care setting (Shairet, Shairet, Sauls, & Belflower, 2015). Dunn, Osborne, and Link (2014) found that HFS helped to increase reasoning skills, self-efficacy, as well as help to bridge the theory to practice gap. Richardson and Clamen (2014) noted that students' confidence and competence were increased with the use of HFS and augmenting clinical rotations with HFS could help nursing students to increase psychomotor skills.

My study related the EI model that Salovey and Mayer (1990) and the simulation framework that NLN-JST (Jeffries, 2016) theorized to be used in different combinations by students in a simulation laboratory. High fidelity HPS provide a high degree of accuracy when compared to an actual phenomenon (Gore & Thomson, 2016). In addition, HPS use in various clinical scenarios not only encourages emotional management, but augments students' capabilities for coping with complex clinical challenges (Kunst et al., 2017). However, a gap exists in the literature as to the influences that high fidelity simulation using stressful scenarios, HPS, and role playing have on emotion understanding and management skills of nursing students. This single case design with multiple baseline study examined the influences these have on emotion understanding and management gain scores of second semester BSN students at the school of interest.

MacCann and Roberts (2008), suggested that having much of the ability EI research relying on one instrument, specifically MSCEIT, was substandard. The researchers noted that MSCEIT assessed emotion understanding through multiple choice items, and emotion management through rate-the-extent items. They argued that MSCEIT and MEIS lacked a strong theoretical background, and that test effects could not be discriminated from construct effects. Afterward, MacCann and Roberts developed two alternative EI ability assessment tools based on understanding and management branches because these branches are considered the strategic EI areas of the four-branch model (MacCann & Roberts, 2008; Mayer et al., 2001). Situational Test of Emotional Understanding (STEU), and the Situational Test of Emotion Management (STEM), were developed and validated. A more thorough discussion regarding STEU and STEM are included in Chapter 3.

Allen et al., (2014) developed the Situational Test of Emotional Understanding – Brief (STEU-B) in response to requests by researchers in time-sensitive studies who preferred a short-form of the STEU. Allen et al., (2014) found areas of the original STEU that overlapped and provided less information regarding emotion understanding. By utilizing item response theory (IRT) instead of classical test theory, the researchers revised STEU into the brief form. Allen et al., (2014) found psychometric characteristics that were considerably comparable to STEU providing validity for assessing emotion understanding, and the measurement takes half the time to be completed.

Allen et al., (2015) developed the Situational Test of Emotional Management – Brief (STEM-B) and provided validity for the emotion assessment. The long form STEM was analyzed using IRT and latent class analysis. The researchers found the shorter STEM-B to be comparable to the long form with acceptable psychometric properties. Allen et al., (2015) suggested that STEM-B may be a more reliable, efficient assessment of emotion management than STEM. STEM-B can be taken in half the time as its predecessor for time-sensitive studies. A thorough discussion of STEU-B and STEM-B is included in Chapter 3.

Emotional Intelligence and Nursing

A review of the literature revealed that nursing researchers have been exploring the impact of EI for decades (Andrew, 1998; Amendolair, 2003; Brewer & Cadman, 2000; Cadman & Brewer, 2001; Chang, 2006; Codier, Kooker, & Shoultz, 2008; Cox, 2002; Evans & Allen, 2002; Grace, 2004; Kerfoot, 1996; McQueen, 2004; Rochester, Kilstoff, & Scott, 2005; Strickland, 2000; Vitello-Cicciu, 2002; Wilson & Carryer, 2008).

I found no opposition to the theory of EI, however, after 20 or more years of EI in nursing research, a lack of consensus concerning definitions, models, and measures of EI continues (Michelangelo, 2015). What is known about EI and nursing is that higher EI scores are correlated with higher GPA scores in nursing programs (Codier & Odell, 2014), enhancement of compassion (Rankin, 2013), greater clinical performances (Marvos & Hale, 2015), and increased ability to respond to patient needs (Adams & Isler, 2014). Nursing researchers have also found a correlation between ability to understand and manage emotions with competence, professionalism, and nursing instinct (Littlejohn, 2013; MacLean et al., 2017; Patillo, 2013; Ray & Overman, 2014). The positive impact of EI and nursing is well established in the literature as Michelangelo (2015) meta-analysis of 395 studies concluded 100% positive results for the impact of EI in enhancing skills for nurses and nursing students.

Lewis, Neville, and Ashkanasy (2017) literature review revealed four themes that included, 1) EI serves to buffer stressful situations, 2) EI reduces stress when caring for dying clients, 3) EI promotes effective communication skills, and 4) EI improves overall nursing performance. Lewis et al., (2017), meta-analysis found that self-report tests and mixed-model tests were used the most frequently in nursing literature, citing costs and availability as the reason that ability model tests were used less frequently. Different variables being studied, and different measurements being used, all added to the confusion of the definition of EI and increased the heterogeneity in the nursing literature (Lewis et al., 2017). The nursing profession prides itself on evidence-based practice (EBP) models, unfortunately there is not a consensus for a single definition of EI or how

EI should be measured (Alconero-Camareroa et al., 2018; Cant & Cooper, 2017; Michelangelo, 2015).

Two nursing studies found that students who managed emotions had a significant correlation with enhanced clinical performance for responding to patients in a caring manner with clear communication (Marvos & Hale, 2015; Rankin, 2013). Rankin (2013) study results also found significant relationships with higher levels of managing emotions and retention and academic performances. However, Rankin used a self-report measurement in the study, and student perceptions of their emotion management may differ from their actual emotion management. My study was an investigation of emotion understanding and management that is guided by ability-based theory and measured by ability-based measurement tools.

What is lacking (gap) in the nursing literature is research on methodologies and interventions to improve emotion understanding and management in nursing students. Nursing is considered one of the most stressful professions (Orak et al., 2016). Nurses who can control their emotions have greater control of the stress that is caused from caring for others (Cherry, Fletcher, O'Sullivan, & Dornan, 2014; El Sayed, El Zeiny, & Adeyemo, 2014). Nurses who can control their emotions are less likely to leave nursing to pursue other professions later (Beauvais et al, 2013). Currently, students receive explicit instructions for technical skills of nursing; however, there are no specific interventions to improve emotion understanding and management abilities to handle the emotional work of nursing.

The theoretical foundation for EI in this study was guided by Salovey and Mayer (1990) theory of EI. Of the four hierarchical branches, emotion understanding, and management are the two (upper) constructs the study was based upon. There is a positive relationship in the nursing literature of these constructs with cognitive ability and coping skills (Montes-Berges & Augusto-Landa, 2014). I chose to distinguish the study results as EI ability rather than self-report because there is a difference in true ability and self-reported ability (Michelangelo, 2015).

Theoretical Foundation for Simulation in Nursing

Simulation in this study referred to face-to-face technology utilizing high-fidelity (believability) mannequins. The school of interest uses SimMan Essential mannequins in second semester classes. These mannequins are realistic, adult, full-body, wireless mannequins with airway, breathing, cardiac, and circulation functionality (Laerdal, n.d.). The mannequins' also have patient voice, pre-recorded, customized, and/or instructor voice-over capability. Simulation-based learning allows students to practice communication and technical skills in a safe environment, with the goals of improving patient safety, and learning how to think and act like a nurse (Gore & Thomson, 2016).

The theoretical foundation for the simulation portion of the research was guided by National League of Nursing Jeffries Simulation Theory (NLN-JST). Jeffries (2005), Jeffries and Rodgers (2012), assisted by the National League for Nursing (NLN) and the Laerdal National Simulation Project Group, published a framework for designing, implementing, and evaluating simulations to be used as teaching strategies for nurse educators. Since the original work was published, the framework was refined to a vital handbook of teaching strategies for nurse educators and more recently, the framework has been moved to a mid-range theory to facilitate best practices (Jeffries, 2016).

National League for Nursing Jeffries Simulation Theory

NLN-JSF was moved to a mid-range theory after extensive research, testing, and synthesis of the literature from nurses immersed in simulation (Bradshaw & Hultquist, 2017; Durham, Cato, & Lasater, 2014; Groom, Henderson, & Sittner, 2014; Hallmark et al., 2014; Jones, Reese, & Shelton, 2014; O'Donnell, Decker, Howard, Levette-Jones, & Miller, 2014; Ravert & McAfooes, 2014). NLN Jeffries Simulation Theory (NLN JST) consists of five components including facilitator, participant, educational practices, outcomes, and simulation design characteristics (see Fig. 2). In the following paragraphs, I described why this is an appropriate framework to accomplish EI skill building in the simulation laboratory.

Figure 2. **NLN-JST** From "Chapter 3: NLN Jeffries Simulation Theory: Brief Narrative Description," by P.R. Jeffries, B. Rodgers, and K.A. Adamson, in P.R. Jeffries (Ed.), *The NLN Jeffries Simulation Theory* (p. 40), 2016, Philadelphia: Wolters Kluwer.

Facilitator. Adamson and Rodgers (2016) suggested that the facilitator (teacher), in the simulation scenario should embrace a learner-centered approach and facilitate comprehension while preparing and supporting students emotionally. According to Forneris and Fey (2018), contemporary educators believe that the facilitator role entails moving students beyond application of rules and facts to a sense-making process. The International Nursing Association for Clinical Simulation and Learning (INACSL), defines facilitator as one who has the education and skill to provide guidance and support during SBL (INACSL, 2016). Topping et al., (2015) found that facilitators should be multiskilled as educators and nurses, able to bring theory to life, yet maintain an emotionally safe learning environment. McDermott (2015) recommended the facilitator should make the expectations known prior to the SBL. Other researchers have written that facilitators should promote an atmosphere of mutual respect in a safe learning environment prior to the beginning of each simulation (Alinier et al., 2014; Gantt, 2013; Sharpnack, Goliat, & Rogers, 2013). One of the strengths of using HPS in my sturdy was that it utilized both the emotional and sensory components of learning.

Participant. The role of participant (student) requires self-direction, group-work, and reflective activities. The nursing literature suggests that four to six participants with one facilitator and one manikin is the best practice (Adamson & Rodgers, 2016). Nursing participants are expected to work hard and be prepared for simulation experiences (Hallmark, Thomas, & Gantt, 2013). However, there are no evidence-based guidelines as to how much and what type of information that facilitators are to provide for the participants prior to the SBL in the pre-briefing period (McDermott, 2015). Multiple variables have been identified in the literature that influence a participant's performance in simulation scenarios including, age, gender, readiness to learn, being prepared for the simulation, self-confidence, learning style, anxiety level, and cognitive load (Jeffries, 2016). Variables that could impact a participant's learning during simulation scenarios include role assignment, group size, prebriefing, simulated practice scenario, and debriefing (Jeffries, Dreifuerst, Kardong-Edgren, Hayden, 2015; Page-Cutrara, 2014).

Educational practices. The educational practices component of the NLN/JST has seven variables including active learning, faculty-student interaction, collaboration, high expectation, diverse learning, time on task, and feedback (Hallmark et al., 2014; Jeffries & Rogers, 2012; Jeffries, 2016). These components were developed from the principles of good practice in undergraduate education. Jeffries and Rogers (2012) recommended these components be used as a guide for designing simulation experiences to improve student performances.

Active learning skills in nursing education are vital because workplaces are complex and require nurses to think critically and be self-directed. Simulation immerses students in decision making skills in a learning environment that closely resembles a clinical setting (Bailey, 2017). Students are actively learning to make clinical decisions while providing care to the HPS (Bailey, 2017). Faculty-student interaction plays a vital role in simulation learning, serving as a benchmark of effective practice. According to Hallmark et al., (2014), faculty-student interaction affects retention, confidence levels, motivation, and provides for deeper learning experiences.

Feedback in SLEs can help improve student learning and performance. INASCL (2016), defines feedback as one-way communication from the facilitator, peers, or simulator, to the participant to improve performance. The team approach in simulation learning is a form of peer collaboration that often incorporates role play (Bradshaw & Hultquist, 2017). Like feedback, collaborative learning also improves communication skills, thinking, and understanding (Hallmark et al, 2014). Faculty should maintain high expectations for student success during SLEs and provide provisions with clear objectives and guidelines to encourage student success. Faculty feedback and encouragement has a positive impact on participants motivation and improves performance during SLEs (Abe, Kawahara, Yamashina, & Tsuboi, 2013).

Time on task and learning to use time wisely are necessary skills for student nurses to develop. How much time should be devoted to each simulation scenario is unclear. For example, Beebe (2012), found that increasing the number of hours of simulation increased the critical thinking and knowledge scores. Kennedy, Maldonado, and Cook (2013) agreed that longer simulation exposure equates to improved learning outcomes. However, learner diversity affects abilities, learning styles, and learning needs. SLEs use multiple types of media including auditory and visual to enhance these diverse learner needs. Hallmark et al., (2014) suggested that best practice for SLEs included limiting the length of time for the simulation experience and limiting the number of learning objectives. Breaking down learning materials into smaller segments may help prevent cognitive overload from multiple media used in SLEs. Simulations at the school of interest are approximately 20 minutes in length, immediately followed by 30 to 40-minute debriefing or feedback sessions to reinforce the learning objectives.

Outcomes. Outcome variables supported by the literature for simulation include learning (knowledge), skill performance, learner satisfaction, critical thinking, and self-confidence (Adamson & Rodgers, 2016). Simulation learning outcomes relate to the participant, the patient, and the system (Jeffries, 2016). According to Bradshaw & Hultquist (2017), participant outcomes include satisfaction, building of self-confidence, and an ability to transfer the learning from the simulation to the clinical environment. McGaghie, Issenberg, Barsuk, and Wayne (2014) research concluded that participant outcomes included self-confidence, learning, and translating the learning into the clinical environment.

There is evidence that simulation learning has contributed positively to patient care (Aebersold & Tschannen, 2013; Gore, Hunt, Parker, & Raines, 2011; Marvos & Hale, 2015; O'Donnell et al., 2014; Rajput, 2016; Shinnick & Woo, 2014). However, Finan et al., (2012) concluded that learning which took place in a simulation environment did not necessarily transfer to the clinical environment to impact patient care. Shinnick and Woo (2014) found no correlation between student self-efficacy and knowledge when using HPS. Centrella-Nigro, Blackwell, Coughlin, and Voorhees (2016) also concluded that SLEs increase student nurse self-competence, but do not affect knowledge.

Simulation design characteristics construct. Selecting simulations for positive student outcomes is one of the most important parts of SBL. Simulation based experiences should be guided by clear objectives and planned in a way that optimizes the participants' learning outcomes. According to Jeffries et al. (2015), optimal simulation characteristics should include learning objectives, fidelity, problem-solving, student support, and debriefing. INACSL standards of best practice, (Lioce et al., 2015), stated that to achieve optimal outcomes from SBL, simulation design should consider the following eleven elements, 1) needs assessment, 2) measurable objectives, 3) format of simulation, 4) clinical scenario or case, 5) fidelity, 6) facilitator/facilitative approach, 7) briefing, 8) debriefing and/or feedback, 9) evaluation, 10) participant preparation, and 11) test of the design.

Literature Review Related to Key Variables and/or Concepts

Emotional Intelligence Assessment Tools

The four major models of EI tend to be associated with different measurement strategies and critics as well as supporters of EI concept have concerns about the many models and measurements that have emerged (Cherniss, 2010). Mathews, Roberts, and Zeidner (2004) argued that there is not a consensual definition of EI and therefore the assessment tools have very few commonalities. Ashkanasy and Daus (2002) warned that there are distinct differences between ability and mixed models. Currently there are two classifications of EI assessment tools; self-report and performance based. Self-report assessments typically are used to measure mixed-models because of the diversity of constructs (personality and ability) examples are Bar-On (2000) and Goleman (1995), and trait models example (Petrides et al., 2007). Performance-based assessments are generally used to measure mental ability models such as Salovey and Mayer (1990). (See Table 1. Comparison of EI Assessment Tools).

Table 1

Comparison of EI Assessment Tools

Author(s)	Tool	Test Type	TRR	Tests
Mayer, Salovey, & Caruso (2002)	MSCEIT	ability measure	r =.86	EI demonstrated by actions; Connects intelligence to ability
Bar-On (1997)	EQ-I	self-report mixed measure	r = .72M r = .80F	Behavioral measure of emotional & social constructs related to EI
Boyatzis & Sala (2004)	ESI	multi-rater	r = .78	Behavioral measure of EI & social intelligence competencies
Petrides & Furnham (2001)	TEIQue	mixed measure	r = .78	Self-concept perceived ability of EI, not actual ability
Allen et al., (2015)	STEM-B	ability measure	r = .87	EI demonstrated by actions; Connects intelligence to ability
Allen et al., (2014)	STEU-B	ability measure	r = .70	EI demonstrated by actions; Connects intelligence to ability

Note. TRR = Test-Retest Reliability; M = male; F = female

According to Matthews et al. (2004), an ideal EI assessment tool should satisfy four standard psychometric criteria; content validity, reliability, predictive validity, and construct validity. Current assessment tools are questioned because of weak content validity and instability of factor structures (Cherniss, 2010), reliability, construct, and predictive validity (Matthews et al., 2004). Another criticism is the scoring process of a measure of EI. Traditional intelligence tests have a definite correct answer, whereas with EI tests, it is difficult to know whether an answer is right or not (Matthews, Emo, Funke et al., 2006). EI ability models are based on the concept that EI is a subset of cognitive abilities in relation to the processing and manipulation of emotion information.

Mayer-Salovey-Caruso Emotional Intelligence Test

The most commonly applied test that measures EI as ability is the MSCEIT test (Mayer, Salovey, & Caruso, 2012). This assessment tool is like an IQ test with the exception that it is based on ability. MSCEIT is a performance test that provides an estimation of EI ability by having test takers solve problems that require the use of emotion or have them solve problems about emotion. Like its predecessor the MEIS, the first comprehensive instrument of EI (Mayer et al., 2000), MSCEIT is the current instrument of the four-branch ability model of EI consisting of 1) the ability to perceive emotions in oneself and others accurately, 2) the ability to use emotions to facilitate thinking, 3) the ability to understand emotions, emotional language, and the signals conveyed by emotions, and 4) the ability to understand emotions so as to attain specific goals (Mayer et al., 2012). Sims (2017) used MSCEIT to measure levels of EI in psychiatric mental health nurses. Codier and Odell (2014) used the measurement to explore the relationship between EI ability and grade point average of first year nursing students.

The MSCEIT is a performance measure of EI directly connecting intelligence to ability (Hurley & Linsley, 2012). This assessment tool requires the test taker to solve problems that entail the use of emotion to solve problems. MSCEIT consists of 141 items and takes approximately 30-45 minutes to complete. There are 15 main scores to this assessment tool including; total EI score, two Area scores, four Branch scores, and eight Task scores, and three Supplemental scores (Mayer et al., 2012). Szeles (2015) used MSCEIT in a mixed method, exploratory study to measure the impact of peer coaching on the measured EI of student nurse leaders. I did not use MSCEIT to measure EI in the current study, however Szeles (2015) study is relevant because student teams coached each other during simulation scenarios.

Situational Tests of Emotion Management and Emotional Understanding

Situational Test of Emotion Management (STEM) and Situational Test of Emotional Understanding (STEU) were developed and validated by MacCann and Roberts, (2008). Prior to these two new measurements, most of the EI ability research was measured with MSCEIT. MacCann and Roberts suggested that MSCEIT lacked theoretical background because it is empirically and not theoretically scored. Additionally, MacCann and Roberts suggested that MSCEIT test effects were indistinguishable from construct effects. To address the issues, STEM test characteristics were manipulated, and test effects were distinguishable from construct effects, and the researchers used appraisal theory to score STEU and provide a theoretical basis for emotional understanding.

Situational Test of Emotional Understanding-Brief

The Situational Test of Emotional Understanding–Brief (STEU-B), was developed by Allen et al., (2014). STEU-B focuses on the third branch of ability models, emotion understanding. Emotion understanding is acquired knowledge and highly related to cognitive ability in several studies (Joseph & Newman, 2010; Roberts, Schultze, & MacCann, 2008). STEU-B requires the test taker to choose which one of five emotions is most likely to result from an emotional situation (Anguino-Carrasco, MacCann, Geiger, Seybert, & Roberts, 2015). There are 19 items in the STEU-B multiple choice test that was derived from the original 42-item STEU (MacCann & Roberts, 2008). According to Allen et al. (2014), STEU-B is reliable and reasonably like the full 42-item STEU. Although Cronbach's alpha dropped from .74 to .63, this was expected because the original test had been reduced by greater than 50% in length.

Situational Test of Emotion Management-Brief

Allen et al., (2015) developed STEM-B with emphasis on the fourth branch of the four-branch ability model of emotional intelligence (Allen et al., 2015). STEM-B is an 18-item multiple choice situational judgment test that requires the test taker to select the most effective response to manage an emotional situation (Allen et al., 2015). According to MacCann and Roberts (2008), for an individual to manage their emotions, they must be able to regulate negative emotions and improve positive emotions. The original 44-item STEM assessment tool (MacCann & Roberts, 2008), was reduced by more than 50%

for STEM-B. Surprisingly, the Cronbach's alpha increased from .83 to .84 with STEM-B. The reliability decreased from .91 to .84 and may signify that STEM-B is a better predictor of emotion management than STEM.

Emotional Quotient Inventory

Bar-On (2006) combined the emotional and social components of EI and referred to the construct as emotional-social intelligence (ESI). The Emotional Quotient Inventory (EQ-i) is a self-report measure of emotionally and socially intelligent behavior that was developed to assess Bar-On model of emotional social-intelligence. EQ-i is a self-report assessment tool that measures several constructs related to EI. This EI measurement tool takes approximately 30 minutes to complete and gives an overall score for five composite scales and 15 subscales. The scales and subscales include; 1) intrapersonal (self-awareness and self-expression) [self-regard, emotional self-awareness, assertiveness, independence, self-actualization], 2) stress management (emotional management and regulation) [stress tolerance, impulse control], 3) adaptability (change management) [reality-testing, flexibility, problem-solving], and 4) general mood (self-motivation) [optimism, happiness] (Bar-On, p. 21, 2006).

Emotional and Social Competency Inventory

The Emotional and Social Competency Inventory (ESCI) was developed by Boyatzis and Goleman (Boyatzis & Sala, 2004) and is the primary measure for the Goleman model of EI. Initially, the measurement tool was the Emotional Competence Inventory (ECI) a tool by Boyatzis et al., (2000) that reflected Goleman's model of EI (1995). The ESCI assesses five emotional intelligence competencies, seven social intelligences, two cognitive intelligences for a total of fourteen competencies. This assessment tool is a multi-rater and has been validated through its wide use as a behavioral measure of emotional and social intelligence at the undergraduate, Masters, and doctoral levels in several countries (Consortium, 2015). The feed-back from this assessment tool provides a base for developing critical emotional and social competencies that help to boost performance in a variety of management, leadership, and professional roles (Consortium, 2015). The ESCI assessment tool takes approximately 30-45 minutes to complete. The competency scales that are being measured include; 1) emotional self-awareness (recognizing emotions and their consequences), 2) emotional self-control (keeping disruptive emotions and impulses in line), 3) adaptability (being flexible to handle changes), 4) achievement orientation (striving to meet or beat a standard of excellence), 5) positive outlook (persistence in pursuing goals, regardless of obstacles), 6) empathy (being sensitive to others feelings and perspectives, taking active interest in their worries), 7) organizational awareness.

Trait Emotional Intelligence Questionnaire

The TEIQue intelligence questionnaire was developed by Petrides and Furnham (2003) and provided a theoretical distinction between trait EI and ability EI to cover the EI concept more comprehensively. Trait EI is measured with self-report questionnaires, and ability EI are measured with maximum performance tests that have correct and incorrect answers (Petrides & Furnham, 2001). Although Trait EI definitions overlap with ability EI, they are measured differently because ability measurements fail to allow for intrapersonal components. The TEIQue consists of 144 items responded to on a 7-

point scale. According to Mikolajczak et al., (2007) the TEIQue provides discriminant and incremental validity for personality.

Emotional Intelligence in Nursing and Nursing Education

Gore and Thomson (2016) overview of simulation use in nursing programs reported that simulation-based learning is changing the traditional models of nursing education. The authors noted that nursing educators create training experiences through simulation that meet nursing student learning needs without the risk of harming human patients. In traditional clinical, students wait and hope for learning opportunities and the number of clinical hours vary among nursing programs. Whereas one nursing program may require 700 hours, another requires 800 clinical hours for fulfillment. Unfortunately, the number of hours spent in clinical is not an indicator of competence, skill, or knowledge of the graduate (Gore & Thomson, 2016). What matters most is the quality of the learning experiences and the time the student spends thinking and acting like a real nurse.

Learning experiences created in the simulation laboratory put the student nurse into clinical situations (scenarios) and the HPS outcomes are driven by the student nurse's decisions. Patient safety has spearheaded this new trend because it ensures that students have learning experiences that help them to manage complex patients as they enter the nursing profession. Other factors that have increased simulation use in nursing education include the national shortage of nursing faculty, lack of clinical sites, and the increasing complexity of the health care environment (Gore & Thomson, 2016). Simulation creates transformational learning experiences that replace passive learning and emphasizes experiential learning (Forneris & Fey, 2016). All simulation experiences should be followed by facilitated debriefing which allows students to reflect and hopefully understand cause and effects, actions and reactions that occurred during the simulation scenario (Adamson & Rodgers, 2016). In the current study, the simulation team encouraged quality learning experiences by utilizing scenarios and team nursing that required students to think and act like real nurses as their actions drove the outcomes of the HPS.

Montes-Berges and Augusto-Landa (2007) studied the relationship between perceived EI, coping, social support, and mental health of one hundred and nineteen first year nursing students. In the study, students were involved in simulation learning experiences involving stressful situations. The role of perceived EI in coping with stressful situations was evaluated using the Trait Meta-Mood Scale. Student perceptions regarding their own emotional abilities were measured using a 5-point Likert scale. Students rated themselves on subscales of interpersonal factors which included emotional attention, emotional clarity, and emotional repair. The researchers concluded that students with higher emotional clarity had greater adaptive coping strategies. This study is not current; however, it had some similarities to my study. Montes-Berges and Augusto-Landa (2014), studied the relationship between perceived EI, subjective and psychological wellbeing of professional nurses and found that nurses who understand emotional experiences are better prepared to respond to the demands of professional nursing.

Self-report measures of EI are commonly used in the nursing literature. In searching the literature, I found that EI self-assessments reflect participants perceptions of emotional abilities and that may differ considerably to actual abilities. Like Montes-Berges and August (2007) research, I studied first year, 2nd semester nursing students involved in stressful simulation experiences. Unlike their study however, evaluation measurements in my research (STEU-B and STEM-B) were actual EI ability measurement tools, not self-measurements.

Cant and Cooper (2017) reviewed over 700 primary studies about simulation research and concluded that simulation-based education contributed to student knowledge, self-confidence, competence, and self-efficacy. However, many different tools were used to measure the outcomes in these studies, including self-report instruments. The researchers warned that these produced gaps in evidence of effects that need to be addressed. One way the researchers suggested that this issue could be addressed would be to utilize identical clinical simulation procedures and use the same evaluation tools to measure effects of the simulation on clinical knowledge.

I used a single case design with multiple baseline and each clinical group received the same treatment. I measured emotional understanding and management scores of the participants with the EI ability measurement tools (STEU-B and STEM-B). This was not a measurement of knowledge per se, but it did show changes in abilities for some students to manage stressful situations, which is a necessary attribute for a professional nurse (Cherry et al., 2014; El Sayed et al., 2014; Farshi, Vahidi, & Jabraeili, 2015).

Zhu and Wu (2016) research was based on NLN-JSF in a study with (*N* = 200) nursing student participants. The study utilized the Simulation Design Scale (SDS), and the Student Satisfaction and Self-Confidence Scale, which were developed by the National League for Nursing (NLN). The scales were used to evaluate the training effectiveness and influencing factors of a simulation to provide theoretical basis for better implementation of HFS in China. All five conceptual components of NLN-JSF simulation design (facilitator, participant, educational practices, outcomes, and simulation design characteristics) were positively correlated with student satisfaction and clinical self-confidence. Simulation design characteristics include objectives, information, fidelity (believability), problem solving, participant support and cues, and reflective thinking (debriefing).

Zhu and Wu (2016) noted that providing clear objectives and support and assistance were highly correlated for student satisfaction with the HFS and clinical self-efficacy of students. They concluded that making simulation objectives clear and providing adequate pre-briefing information had a great impact on the effectiveness of HPS. It is noteworthy that medical researchers found that learner's ability to learn is reduced as the number and complexity of learning objectives increase (Van Merrienboer and Sweller, 2010). For this reason, two or three clear, specific learning objectives were used prior to each simulation in a 10-minute pre-briefing period to help students have a more effective SLE. I did not utilize the SDS or the Student Satisfaction and Self-Confidence Scale in my study because they did not pertain to my investigation of emotion understanding and management.

Irwin (2016) study also sought to evaluate a simulation design utilizing the SDS. In this study, ($N = 81$) associate degree program nursing students participated in a simulation designed to take two hours for some cohorts and four hours for other cohorts to complete the assignment. Irwin sought to determine if there was a difference in the presence and importance of SDS characteristics when evaluated for the length of time spent in high fidelity simulation where students worked through applying the steps of the nursing process. Results for presence of characteristics were not significant ($p > .05$) between the two-hour and four-hour groups. However, the groups differed when evaluating for the importance of design characteristics, with the two-hour group scoring Objective and Information and Fidelity characteristics significantly higher ($p < .05$). Another finding in the study was that increased time in simulation led to decrease in scoring for importance of the characteristics of Objectives and Information and Fidelity.

Irwin (2016) concluded that students may become physically and mentally fatigued with longer SLE which threatens learning effectiveness. Irwin recommended continued research for the length of time for SLEs now that schools of nursing are substituting simulation for clinical experiences. To avoid student exhaustion, simulation faculty spent approximately 10 minutes pre-briefing students for the scenario, 20 minutes for the SLE, and approximately 40 minutes for debriefing. According to the *Standards of Best Practice: Simulation* (INACSL Standards Committee, 2016), most learning occurs during debriefing in a SLE.

A great amount of research that guides simulation in nursing education is based on NLN-JSF (Jeffries, 2005) which focuses on the concrete experience of simulation scenarios and the reflective observations of debriefing. Using this design, nursing students engage in experiential learning that involves nursing concepts and the nursing process. The goal is that experience will develop clinical judgment and competent evidence-based practice in the learners.

Chmil, Turk, Adamson, and Larew (2015), argued that traditional simulation design in nursing was not adequately theory based. They set out to design a simulation based on Kolb's Model of Experiential Learning including four components, 1) abstract conceptualization, 2) active experimentation, 3) concrete experience, and 4) reflective observation. Additionally, Chmil et al., (2015) set out to examine how the simulation affected clinical nursing judgment and describe the relationship between clinical nursing judgment development and student performances when a simulation is designed on Kolb's model.

Chmil et al. (2015), quasi-experimental research design study utilized Kolb's model on the experimental group, and NLN-JSF for the control group. In the control group, learners had independently completed unstructured activities for thinking and planning, followed by 30-minute activity for performing, and a 30-60-minute activity for debriefing. In the experimental group, the learning experience consisted of structured, instructor-facilitated activities, pre-briefing with a 15-minue planning activity, followed by 30-minute performing activity, and 30-60-minute debriefing activity. Clinical nursing judgment development was measured with Lasater Clinical Judgment Rubric (LCJR) for both groups. Simulation performance was measured using the Creighton Simulation Evaluation Instrument (C-SEI). Students in the experiential learning simulation design scored significantly higher [SD], 27.81, than students engaged in the traditional design [SD], 20.75, and using Cohen d, the researchers noted a moderate effect size (0.63) with power of 0.95 for the LCJR score. The C-SEI evaluated behaviors of competency, safety, communication, and confidence. A significant positive relationship was noted between clinical nursing judgment development and simulation performance. Since Chmil et al., (2015) study was published, the NLN-JSF has moved to mid-range theory and is now NLN-JST (Jeffries, 2016).

Kunst, Mitchell, and Johnston (2017) research included a mixed method study of (N = 112) nursing students in a baccalaureate program. Students were introduced to a stressful situation during a mental health simulation utilizing communication skills. The study used a pre-test and post-test self-assessment survey to monitor students' self-reported confidence, ability, and knowledge scores to determine if simulation scenarios were an effective format for improving these attributes. The study quantitative results revealed that simulation increased mean scores for all three domains but increased in knowledge the most (mean pre-post simulation difference for knowledge 0.63). Qualitative results were similar with three themes, confidence, ability, and knowledge increasing as students reported from open-ended survey questions. The researchers concluded that using simulation in stressful situations had a statistically significant positive effect on students' confidence, ability, and knowledge. This related to my study in that I measured emotion abilities in a repeated-measures study utilizing stressful SLEs and monitored for changes in knowledge of emotions and emotion management.

More than a decade ago, Clark (2007), found that helping students to develop critical thinking abilities are essential for long-term learning. Simulation learning is believed to increase student nurses' self-efficacy (Ji-Young & Eun-Jung, 2015). Traditional clinical settings often prove difficult to provide the variety of settings that all students need for developing extensive knowledge. Using simulation with HPS, faculties can provide a variety of clinical scenarios that all the students can participate equally. The broader range of experiences can help students gain extensive knowledge, satisfaction, and attain clinical skills (O'Donnell et al., 2014). However, McGarry, Cashin, and Fowler (2014) discredits this finding stating that most nursing studies have relied on self-reporting and small samples. McGarry et al., (2014) warn that simulation may lead to a simulation of learning because students may be learning to drive the HPS instead of learning patient care.

McGaghie et al., (2014) critical review found that lessons learned in the simulation environment transferred to the clinical environment to impact patient care. This related to my research because SLEs prepare students for real-world nursing. Our students at the program of interest are hired directly into high-risk units as soon as they graduate the program and are expected to care for acutely ill patients and their families. By using SLEs, I tried to recreate nursing clinical experiences where emotion understanding, and management skills are vital, and the students at the school of interest would perform as the nurse, make decisions, develop critical thinking abilities, and learn these important communication skills to provide the best patient care and improve patient outcomes.

The National Council of State Boards of Nursing (NCSBN) completed a longitudinal study about replacing clinical (in-person) hours with simulation hours (Hayden et al., 2014). In this three-phase, five-year study, the researchers utilized the NLN-JSF to guide the study and reviewed the effectiveness of simulation in undergraduate nursing education. Clinical experiences are becoming increasingly challenging for nursing schools due to the following; 1) more programs competing for limited clinical sites, 2) shorter patient length of stays, 3) disparities in learning experiences, 4) facilities denying student access to electronic medical records, and 5) patient safety issues restricting students on the patient unit or restricting their activity to observation only (Hayden, et al., 2014).

Hayden et al., (2014) concluded that up to 50% simulation can be “effectively” substituted for traditional clinical in all Prelicensure core nursing courses (p. 38). Conditions that the study suggested included; 1) faculty members be formally trained in simulation pedagogy, 2) adequate staffing to support the student learners, 3) subject matter experts to conduct theory-based debriefing, and 4) simulation equipment and supplies should create a realistic environment (Hayden, et al., 2014). I researched SLE use as a valid and useful tool for increasing the soft skills (communication) such as emotion understanding and management skills. There are steps in patient care that are not experienced by nursing students in traditional clinical sites. This type of experience can be offered in simulated clinical experiences (SCE’s).

Dean, Williams, and Belnaves (2016) argued that increased use of high fidelity HPS in nursing programs negatively affected the communication skills of students. To be empathetic, the learner must be able to read and interpret the non-verbal ques of others. HPS, including high-fidelity (believability), have limitations in that they cannot exhibit non-verbal behaviors. Dean et al. (2016) suggested that rather than being empathetic and caring, student responses to HPS will more than likely lack authenticity because students are speaking to a plastic mannequin. The authors also warned that simulation learning supported technology that is driven by data with many disparate elements.

Nursing is an art and a science led by holistic, patient-centered care. At the school of interest students are taught to treat the patient holistically and use a patient-centered approach to nursing care. As a professional nurse, I know that good communication skills are imperative. Lack of these skills has been correlated to patient dissatisfaction, patient complaints, and negative patient outcomes. I acknowledged the limitations of the HPS and used alternative strategies such as stressing importance of empathy, caring, and non-verbal communication skills during class lectures, and encouraged simulation faculty to debrief using these components to preserve the human component of nursing.

Michelangelo (2015) found that healthcare employees complain that newly licensed nurses lack emotional competency and critical thinking skills. Michelangelo reviewed 395 diverse EI studies to explore EI impact on nursing critical thinking and emotional confidence scores to evaluate if inclusion of EI training was warranted in nursing curricula. Eight EI traits and abilities were included in the review, 1) leadership, 2) health, 3) reflection, 4) nursing student performance, 5) ethical behavior, 6) caring, 7), critical thinking, and 8) job retention and satisfaction. Michelangelo found that every study in the meta-analysis reported positive correlation with the traits and abilities being tested and results ranged from weak to strong, with cumulative effect size of $r = 0.3022$ across the studies. Additionally, Michelangelo found 100% positive results for the impact EI has on enhancing skills necessary for nurses and student nurses and concluded that EI training and instructions should be considered for inclusion in nursing school curricula. According to Michelangelo (2015), the moderate effect size and the success of EI training and instruction in United Kingdom, Australia, and Singapore warrants the need for possibly adopting similar academic strategies for EI training in the United States. This study relates to my research in that I investigated an academic strategy for increasing emotional management whose inclusion might be considered for nursing curricula at the school of interest.

Like Michelangelo (2015), Richardson and Clamen (2014) agreed that new graduate nurses are not prepared for the complexities of professional nursing and found that a third of new nurses lack the entry-level clinical judgment skills. Lack of critical judgment leads to poor patient outcomes because of the inability to recognize and intervene when a patient is in crisis. Richardson and Clamen (2014) evidence-based review was framed by Kolb's experiential learning theory and fifteen nursing studies (qualitative and quantitative) over an 11-month period (2010-2011) were included that focused on HFS in nursing education. They found no significant differences in student learning outcomes when comparing HFS effectiveness with traditional clinical rotations for skill acquisition and critical thinking competencies. Several studies in their review regarded HFS to be an effective method for promoting knowledge and skill acquisition that transfers to the clinical setting. Richardson and Clamen (2014) recommended using technology in nursing curriculum that maintains the human component which they believed created a more talented nursing workforce. This related to my research of simulation technology as a teamwork approach for increasing emotional understanding and management skills.

Cantrell, Meyer, and Mosack (2017) selected 17 nursing studies that were conducted or published between the years (2010 – 2015) for an integrative literature review about HFS with student stress measured or discussed in the outcome. The purpose of the review was to critically look at the literature relating to the type and amount of stress that is experienced before, during, and after HFS sessions. The review included quantitative, qualitative, and mixed-methods studies which Cantrell et al. (2017) synthesized separately because many of the studies being reviewed had been comprised of convenience samples from individual research sites. However, Cantrell et al. stated that the research studies that were reviewed represented results accurately and precisely, which helped to decrease potential researcher bias.

Cantrell et al. (2017) review concluded that simulation is a high-stress environment which places students at emotional risk because they find simulation preparation and participation terrifying and felt that simulation stress was greater than clinical stress. This review finding is problematic because simulation has been promoted by the NLN for a decade, proven an evidence-based teaching methodology to help students increase clinical reasoning skills in a safe learning environment. Simulation has gained popularity since the NCSBN landmark study (Hayden, et al., 2014) which concluded that simulation could be substituted for up to 50% of traditional clinical experience. Surprisingly, Cantrell et al. (2017) found that most students in the review, found simulation to be a valuable learning tool even though it created anxiety for them. To reduce student anxiety and provide a learning environment that promoted safety, I encouraged simulation faculty to prebrief students with clear learning objectives, and to reduce the threat of failure by avoiding high stakes simulations in the study. During debriefing, simulation faculty encouraged students to vent any feeling/frustrations they may have about the simulation(s). According to Cantrell et al., (2017) decreasing anxiety can improve learning, and improve therapeutic nurse-patient relationships and patient outcomes.

Unlike Cantrell et al., (2017), Szpak and Kameg (2013) nonrandomized, quasi-experimental study found that experience with the HPS helped to decrease student anxiety. Szpak and Kameg investigated the impact of high-fidelity HPS on (n = 44) nursing students' anxiety prior to attending clinical rotations and interacting with mentally ill clients. The study included a two-hour lecture over communication skills, followed by pre-briefing for patient information, and a simulation days later that depicted a depressed patient with suicidal ideation, or an anxious patient with alcohol withdrawal. The students had to role play as the nurse in the simulation and were expected to use the therapeutic communication techniques provided in the previous lecture. The study took place over two semesters and students' anxiety levels were measured with two anxiety measurement tools pre-and post-simulation with the mentally ill client. Results from t tests measurement 4.9 demonstrated significant changes (p < .01) in student anxiety

(Time 1 mean score of 1.8; Time 2 mean score 1.5). Limitations of this study were the small sample size, the self-report measurements, and nonrandomized participants.

Shinnick and Woo (2014) study utilized repeated measures to monitor differences in nursing student self-efficacy and the correlation with knowledge when using HPS. Using a 2-group, randomized, clinical trial design, the researchers found that significant score increases in self-efficacy and knowledge were seen between the testing points for the participants who had HPS, but not in the control group who did not have HPS. However, there was no correlation between self-efficacy and knowledge, and self-efficacy was not a predictor of deep knowledge scores. Self-efficacy is commonly believed to be associated with nursing knowledge especially when HPS is used in skill training. Shinnick and Woo (2014) warned that educators should not apply so much importance to self-efficacy and put more effort on measuring outcomes that affect patient safety such as knowledge and skill levels. This related to my study because I utilized repeated measures using HPS and SLEs to measure gains in emotion understanding and management which effect patient outcomes.

Summary and Conclusions

During this literature review, I did not find opposition to the theory of EI from nursing researchers; however, a lack of consensus concerning definitions, models, and measures of EI continues (Michelangelo, 2015). A mixture of models was found during this literature review including mixed models of EI that utilized Bar-On (1997), Goleman (1995), or Petrides et al., (2007) models. Mixed models focus on self-perceived abilities, and include personality traits, and skills (Harrison, Fopma-Loy, 2010). Roberts, Matthews, and Zeidner (2010) warn about using EI models that include personality traits and skills that exclude cognitive intelligence.

There is a gap in the literature regarding the influences that nursing case scenarios, therapeutic communication, and educational technology such as HFS with HPS have on the emotional understanding and management skill building. This SCD with MBL quantitative study extended nursing knowledge and helped fill a gap in the literature by examining the influences that stressful nursing situations, role playing, and face-to-face technology of HFS with HPS have on emotional understanding and management scores in a time series study. Study results may open doors for further studies regarding emotion understanding and management at the school of interest.

Chapter 2 presented a literature review of research on EI regarding nursing students and implications for the nursing profession, the foundational theories of EI, tools for measuring EI, the importance of including EI training in nursing schools' curriculum, and acceptability of using simulation to effectively teach communication skills (component of EI) in nursing schools. Chapter 2 provided information about previous research and related that information to the current study. Chapter 2 included discussion about the four major models of EI (Bar-On, 2000; Goleman, 1995; Salovey & Mayer, 1990; & Petrides & Furnham, 2001), incorporating EI training into nursing curriculum, and four popular EI measurement tools (MSCEIT; EQ-i; ESCI; and TEIQue), and two newer measurement tools, (STEU-B, STEM-B). This chapter included a table that compared the EI measurement tools and transitions to Chapter 3.

I have concluded from this literature review that participation in simulation technology may be a valid and useful tool to help fill the gap of increasing emotional understanding and management skills of nursing students. Increasing these skills will better prepare students to deal with acutely ill patients and their families through better communication. Improved communication skills will help prepare students for the demands of professional nursing. Understanding the emotions of self and others and the ability to manage those emotions is imperative for practice. Lack of these skills has been correlated with patient dissatisfaction, patient complaints, negative patient outcomes, and litigation.

Chapter 3 will focus on the EI understanding and management tools, STEU-B and STEM-B used by the study participants, using simulation scenarios and high-fidelity HPS to influence EI understanding and management scores, the sample, the setting, the data collected, and how the data was analyzed.

Chapter 3: Research Method

Introduction

The purpose of this quantitative, SCD with MBL study was to find out if the instructional strategy of introducing educational technology (high-fidelity HPS), simulation with stressful situation scenarios, and role playing had any influence on emotion understanding and management test scores at the school of interest. Major sections in this chapter include research design and rationale, methodology (population, sampling and sampling procedures, procedures for recruitment participation and data collection; instrumentation and operationalization of constructs, data analysis plan, threats to validity, and ethical procedures. The chapter concludes with a summary of design and method inquiry with transition to the next chapter.

Research Design and Rationale

I chose a quantitative SCD with MBL design for this study because SCD's do not require researchers to withhold any treatments to the control group. SCD with MBL design was the most rigorous design that was feasible for my setting. Additionally, SCD with MBL was chosen because the design is particularly relevant for evaluating interventions in educational settings such as this one at the school of interest (Radley et al., 2018). MBL's are appropriate to use when comparing baseline (A) with intervention (B) conditions when no withdrawal of the intervention is done (Ledford, 2018). Kratochwill et al. (2013), wrote the SCD standards which require four criteria be met to fit the standard for this design. First, to minimize threats to internal validity, the researcher must systematically manipulate the independent variable (intervention).

Second, the outcome variables must be measured over time by more than one assessor, with the assessors in agreement range (0.80-0.90) if measured by percentage for the dependent variable. Third, to demonstrate intervention effect, the study must have a minimum of three attempts at different points in time. Fourth, to qualify as an attempt to demonstrate effect, the phase must include a minimum of three data points because any less would not offer enough information to allow confident documentation of the data pattern (Barton, Blair, Spriggs, & Gast, 2018).

My study met the four required criteria for SCD with MBL. I staggered the treatment (independent variable) of educational technology interventions (high-fidelity HPS), simulation with stressful situation scenarios, and role playing nonconcurrently, and participants in the study served as their own control prior to interventions. The outcome variables were measured by more than one assessor on three attempts, at three different points in time, (Time A, Time B, and Time C). As data were collected, they were graphed and analyzed during the study as suggested by Barton et al. (2018). It is highly unlikely that the dependent variables returned to baseline after treatment was removed (Kratochwill et al., 2013; Radley et al., 2018). The study was designed for all participants to receive the same conditions during simulation class time to help decrease the effects of individual differences in the results (Field, 2013). Study participants were volunteers in a sample of convenience. No grades were associated with participation in the research, which may have affected students' willingness to participate and do their best.

I used the EI measurements STEU-B (Allen et al., 2014) and STEM-B (Allen et al., 2015) because they are specific for measuring emotion understanding and emotion management scores, the two upper branches of EI hierarchy that this study was based upon. Greater detail regarding these two measurement tools are in this chapter under *Analysis Plan* and under *Instrumentation*. STEU-B and STEM-B instruments were administered at (TA) start of baseline observation, (TB) during treatment, and (TC) after treatment is removed. Comparison of STEU-B and STEM-B scores at the three points TA, TB and TC provided answers to the following research questions;

RQ1: Is there a causal relation between the introduction of high-fidelity computer-based simulation (stressful situation scenarios, human patient simulators, and role playing) and emotion understanding skills?

$H1_0$: There is no causal relation between the introduction of high-fidelity computer-based simulation (stressful situation scenarios, human patient simulators, and role playing) and emotion understanding skills.

$H1_1$: There is a causal relation between the introduction of high-fidelity computer-based simulation (stressful situation scenarios, human patient simulators, and role playing) and emotion understanding skills.

RQ2: Is there a causal relation between the introduction of high-fidelity computer-based simulation (stressful situation scenarios, human patient simulators, and role playing) and emotion management skills?

$H2_0$: There is no causal relation between the introduction of high-fidelity computer-based simulation (stressful situation scenarios, human patient simulators, and role playing) and emotion management skills.

$H2_1$: There is a causal relation between the introduction of high-fidelity computer-based simulation (stressful situation scenarios, human patient simulators, and role playing) and emotion management skills.

Population, Sampling and Sampling Procedures

Traditional group designs require large numbers of participants for adequate statistical power (Kratochwill et al., 2010). Fewer subjects are needed in a SCD with MBL design to detect an effect size (estimation of overall magnitude of behavior change) because of greater statistical power due to each participant being involved in multiple treatments (Kratochwill et al., 2010; Moeyaert, Zimmerman, & Ledford, 2018). The target population for this study comprised second semester, prelicensure, baccalaureate nursing students at the program of interest. The students were a convenience sample from a total population of 105 second semester students at the program.

According to Kratochwill et al. (2010), there are no agreed upon standards or methods for effect size in a SCD study, and most researchers use visual methods. Pallant (2013) stated that the effect size in ANOVA is eta squared, which varies between 0 and 1 with 0-0.1 (weak effect), 0.1-0.3 (modest effect), 0.3-0.5 (moderate effect), and > 0.5 is a strong effect. Eta squared is possibly biased and overestimates the true effect size. For this reason, I used partial eta squared which is interpreted as r^2, the unbiased correction to eta squared. To be more specific and compensate for further bias, I calculated the estimate of the population effect size (partial omega squared or ω^2). By running a G*Power, *F* tests – ANOVA repeated measures within factors, with number of groups = 1, number of measurements = 3, alpha at .05 ($p < .05$), power (.95) resulted in nonsphericity correction *E* = 1, Effect size *f*(V) = 0.2 suggested the total sample size *N* = 66. However, *N* = 88 volunteered to be in the study and all were qualified.

Procedures for Recruitment, Participation, and Data Collection

Study participants were a sample of convenience (second semester) at a nursing school in the southeastern United States where I am an instructor, however, at no time were students coerced or forced to participate in the study. I had no direct authority over the student participants as instructor or supervisor in the simulation classes. Student participants were assured that all data collected in the study were protected and anonymous (once data elements were associated for each student) and held in strict confidence, and that participation or non-participation had no effect on academic standing at the university and did not affect their grades in the medical-surgical simulation coursework.

Recruiting participants began following approval from the Walden Institutional Review Board and from the nursing program of interest. The first day of medical surgical I class of the semester, I approached students following lecture with a brief explanation of the study (see Appendix A). Additionally, I placed an announcement on BlackBoard on the medical surgical I class announcements page (see copy Appendix F), with information about the study, my contact information, email address, and office number.

There were parameters for the students who participated in this study. For instance, participants who withdrew from the course would be disqualified. Study participants had to be enrolled in Medical-Surgical I class and be at least 19 years of age. STEU-B and STEM-B are designed to be administered to adults. Repeating students were excluded from the study because they had experienced similar simulation scenarios in a past semester, which would have added confounding variables to the data.

Students who agreed to participate in the study filled out the consent form (see Appendix B) using their names and Campus Wide ID 9-digit (800) numbers. Simulation faculties gave students a code name/number to replace their CWID to de-identify them prior to taking the EI ability tests. Students were instructed to fill out demographic sheets using their code names (see Appendix C), which consisted of demographic information (age, sex, and ethnicity) to judge representativeness of the sample of convenience with the entire program of nursing. Data gathering sheets and the signed consent forms were separated and placed in two manila envelopes and kept in a fire/flood proof safe in my private home. Throughout the study, I only had access to students' reassigned code name/numbers to maintain anonymity of participants.

My contingency plan was to remind nursing students during Week 2 of the semester that the study was beginning soon. Students who agreed to participate at that time were given the brief description of the study (Appendix A), asked to fill out consent forms using their name and CWID, and demographic forms using new code names as identification instead of CWID (Appendix B). Data gathering sheets and the signed consent forms were separated and placed in two manila envelopes and kept in a fire/flood proof safe in my private home. I reached out to simulation instructors (gatekeepers) to approach their student groups and remind them about the study that was upcoming. Originally, I had planned to offer students a $5 (appreciation) gift card to encourage participation. That was not necessary, as 91 students volunteered to participate.

Data collection was conducted over a 15-week semester for changes in EI understanding and management scores. EI understanding scores were measured by STEU-B (Allen et al., 2014). EI management scores were measured by the Situational STEM-B (Allen, et al., 2015). I reviewed student demographic forms to assess fidelity of implementation. Study participants took the multiple-choice tests STEU-B and STEM-B with pencil and paper in the nursing school conference room (in place of the testing/computer lab) and used their coded name/numbers instead of CWID on the test answer sheets. This served to de-identify each participant. Score sheets were secured in three manila folders, one for each of the three testing times (TA baseline, TB experimental, & TC post-intervention), and placed in fire/flood proof safe at my residence.

The first weeks of the second semester were baseline, preintervention period (TA). Data was anticipated to be gathered (STEU-B and STEM-B administered) during weeks 1 through 3 of the baseline periods. However, final IRB approval was not granted until Week 3 which delayed the first set of data to be gathered during Week 4. Students began simulation classes during Week 5 of the semester. Simulation scenarios were organized by concepts being introduced in the medical-surgical classroom. During the experimental period, Weeks 5 through 14, (TB), participants were introduced to the treatment, HPS with physical and emotional needs amid stressful scenarios as the HPS spiraled into varying degrees of deterioration. Study participants were exposed to these interventions in a staggered pattern across time, and data was gathered (STEU-B and STEM-B administered) during Week 9 of the semester. Simulation classes ended Week

14 of the semester, and data were gathered for the last time (STEU-B and STEM-B administered) post-intervention (TC) during Week 15 of the semester.

The timeline diagram (Fig. 3) shows how the independent variables are varied such as the time before the simulations, the time of the simulations, the time after simulation classes had ended, and precisely when the EI measurements were taking place. The first testing date/time (A), was the start of baseline observation and was designated for the first weeks of the second semester before participants began simulation classes. The second testing date/time (B), was during the next 9 weeks of the semester, and during which the treatment (independent variable) stressful simulation scenarios, high fidelity HPS, and role-playing were introduced. The final testing date/time (C), was after treatment was removed at the end of the second semester when students were no longer attending simulation classes.

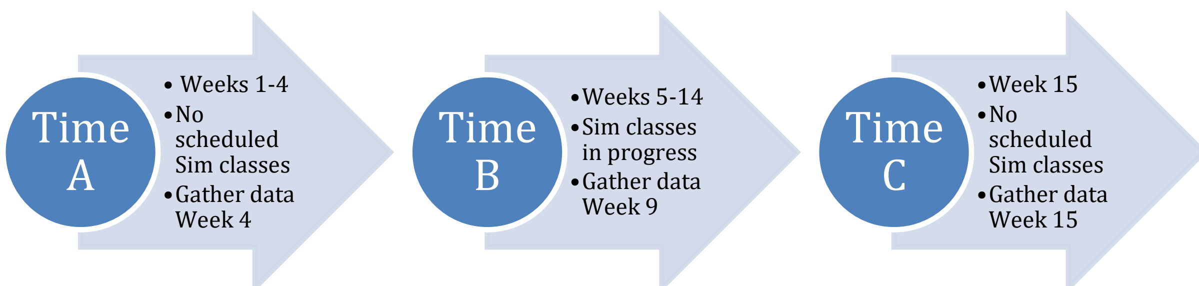


Figure 3. Timeline diagram for TA, TB, and TC.

On the designated testing dates/times, students were given the STEU-B and STEM-B EI tests which took approximately 15 minutes to complete each test. Once all data has been gathered, I coded the data and electronically produced an Excel spreadsheet format. I was responsible for handling and storing all paper data in a flood/fireproof safe in my private home, and Excel spreadsheet data was saved in a password protected secret file on my computer in a private iCloud account.

No debriefing, follow-up interviews, or treatments were required following the STEU-B and STEM-B multiple choice item tests. Students were given the option to have their STEU-B and STEM-B test results emailed to their college email accounts. By marking “yes,” on the designated release of information box on the consent form (see Appendix B), students were to receive tests results after TC was over and all data collection was completed. No students requested test results. All paper data is currently being kept in the flood/fireproof safe in my home, with the time span to be for five years as required by Walden University. At the end of the five years, paper data will be destroyed in an industrial size shredder. Excel spreadsheet data will be kept in the secret iCloud file for a minimum of 5 years as required by Walden University and will then be deleted.

Interventions

During the span of the study, simulation clinical lab groups participated in two designated simulation scenarios per month for the three months of the data gathering period (6 total simulations per student group). Each of the six scenarios lasted approximately 30 minutes for a total of 3 hours cumulative treatment time per student. The post-conference debriefing portion of simulation lasted approximately 1 hour after each simulation for a total of 6 hours per student.

Simulation students were given a role assignment each time they met for simulation class which included one of the following; primary nurse, secondary nurse, medication nurse, charting nurse, infection control observer, policy-procedure observer, safety observer, basic care and comfort observer, psycho/social care observer, or rapid-response team player. Students role assignments varied throughout the semester. For instance, if a student was an observer in Simulation #1, they were assigned an observer role in Simulation #24. Utilizing the Elsevier Simulation Learning System that the school of interest purchased, study participants were guided by simulation lab staff and medical surgical faculty through evidence-based scenarios (see Table 2) that were organized by concepts being learned in the medical-surgical classroom. Each simulation clinical group of 9-10 students were randomly assigned to their group according to registration ordinance, (first come, first serve) until all clinical labs were filled with maximum of 10 students per lab.

Four student participants from each group of 9-10 students participated in the simulation lab scenario/case study at the bedside of the high fidelity HPS during designated lab time. The remaining students in that lab group watched the scenario from the observation area, performed their assigned roles, and responded as members of the rapid response team when the high fidelity HPS condition deteriorated to near-death or death. Designated simulation faculty were in the control booth of the simulation lab observing the student participants, and role played as needed to assist the skills lab personnel with the scenario script.

Immediately following simulation scenarios, each simulation student group attended a post-conference discussion session led by their simulation instructor(s). The purpose of the discussions was to review group simulation performance, and to allow simulation observers to critique their peers. Table 2 below summarizes simulation classes.

Table 2

Summary of Simulation Classes: Team Challenges, Educational Technology, and Post Conference Discussion

	Team Challenges	Educational Technology	Post conference Discussion
#1 Wallace	COPD, pneumonia, hypoxia; manage care, anxiety, disruptive family member	Case study, role play, HFS/HPS, human actor(s)	Evaluate team communication skills, review patient care performances – physical and emotional
#24 Lou	Hypotension, tachycardia, fluid loss; manage care, manage anxious, culturally diverse family member	Case study, role play, HFS/HPS, human actor(s)	Evaluate team communication skills, review patient care performances – physical and emotional
#5 Margaret	Lung cancer, vomiting, pain, potassium imbalance, manage care, manage anxiety	Case study, role play, HFS/HPS, human actor(s)	Evaluate team communication skills, review patient care performances – physical and emotional
#32 Arthur	Diabetes mellitus, hypoglycemia, wound infection, knowledge deficit, manage care, disruptive neighbor	Case study, role play, HFS/HPS, human actor(s)	Evaluate team communication skills, review patient care performances – physical and emotional
#22 Dee	Seizure disorder, medication noncompliance, moderate learning disability, manage care, anxious parent	Case study, role play, HFS/HPS, human actor(s)	Evaluate team communication skills, review patient care performances – physical and emotional
#28 Cynthia	Anaphylactic, erythema, pruritis, low blood pressure; manage care, disruptive family member	Case study, role play, HFS/HPS, human actor(s)	Evaluate team communication skills, review patient care performances – physical and emotional

Instrumentation and Operationalization

This study explored the influence on EI understanding and management scores (dependent variables) of second semester baccalaureate students using treatment (independent variable) of educational technology using stressful nursing scenarios with high fidelity HPS, and role playing. EI understanding is the term used to define knowledge and reasoning about emotions based on the third branch of the Mayer and Salovey (1997) conceptual model of EI and will be measured by STEU-B (Allen et al., 2014). Emotion understanding serves as a mediator between perception of emotion and management of emotion (Allen et al., 2014). Emotion management is the term used to define the regulation of negative emotion and enhancement of positive emotion based on the fourth branch of the Mayer and Salovey (1997) conceptual model of EI and will be measured by STEM-B (Allen, et al., 2015). In high-fidelity simulation that was used in this study, situated cognition stresses the students' need of higher-order thinking skills over rote memorized data (Bailey, 2017). Learning that is constructed in a situated cognition framework with the application of HPS, is a teaching/learning strategy that helps bridge theory-based knowledge to practice and integrate nursing students into the nursing profession (Bailey, 2017).

MacCann and Roberts (2008) were the developers of the STEU and STEM measurements for EI which preceded STEU-B and STEM-B. STEU and STEM were developed and validated by MacCann and Roberts, who sought to diversify EI ability assessment tools. Most of the previous research on ability EI came from the Mayer-Salovey-Caruso Emotional Intelligence Test [MSCEIT] (2012). MacCann and Roberts

(2008) noted that using one EI test was not optimal because test effects could not be differentiated from constructs. In addition, the MSCEIT was empirically keyed and not theoretically based. MacCann and Roberts (2008), addressed the theory issue by using Roseman's (2001) appraisal theory to score the STEU. Test characteristics of the STEM were manipulated to distinguish test effects from constructs. MacCann and Roberts, quasi-experimental study consisted of 207 undergraduate participants from rural and urban colleges who completed the STEU and STEM. STEU was developed according to Roseman's (2001) theory of emotions appraisal (MacCann & Roberts, 2008). STEU, a paper and pencil situational judgment EI test, measured an individuals' ability to identify the emotions that are most likely to occur from specified situations. STEM was developed according to the Situational Judgment Test paradigm with two alternative response formats, (multiple choice and rate-the-extent) (MacCann & Roberts, 2008). The results from the study validated that STEU and STEM were reasonable measurements of ability and not personality with the highest correlation at .24. The tests found a moderate relationship for STEU and STEM with a vocabulary test of verbal intelligence (r = .49 and r = .41).

Published reliability and validity values relevant to my study includes Austin (2010), and Libbrecht and Lievens (2012). Austin (2010), validated the STEU and STEM in a study that examined the association of Situational Judgment Test (SJT) EI tests with performance-based tests. Austin's results were positive between STEU and STEM and MSCEIT (r = .33 and r = .36). In another study, Libbrecht and Lievens (2012) validated the STEU and STEM as measures of emotional abilities. In their study of 850 Belgian medical students, the Cronbach's alpha was acceptable for STEU .72. The STEM was also validated in the same study with test-retest reliability of .85.

STEU-B is grounded on the Situational Test of Emotional Understanding (STEU; MacCann & Roberts, 2008) and focuses on the third branch (understanding) of Mayer and Salovey's (1997) four-branch (perceiving emotions, using emotions, understanding emotions, and managing emotions) conceptual model of EI. Of the four branches in the Mayer and Salovey (1997) model, emotional understanding reveals the most significant association with cognition (Joseph & Newman, 2010; Roberts, Schultze, & MacCann, 2008). STEU-B is a 19-item multiple choice test that requires the test taker to choose which one of five emotions that is most likely to result from an emotional situation (Anguino-Carrasco et al., 2015). According to Allen et al. (2015), emotional understanding is a form of "acquired, declarative knowledge" (p. 3) and STEU-B is a useful tool when all four branches of EI are not required for a study. Reliability index for STEU-B in an analysis of the 822-person sample (resulted in the brief form with reliability index of .70 and the Cronbach's alpha for the test is 0.63 (Allen et al., 2014).

STEM-B is based on the Situational Test of Emotional Management (STEM; MacCann & Roberts, 2008) and focuses on Mayer and Salovey (1997) fourth branch (management) of the four-branch (perceiving emotions, using emotions, understanding emotions, and managing emotions) conceptual model of EI. Emotional management includes regulating negative emotions and improving positive emotions (MacCann & Roberts, 2008). STEM-B is an 18-item multiple-choice situational judgment test in which test-takers select the most effective response to manage the emotional situation

(Allen et al., 2015). Reliability index for STEM-B in a sample of 900 people was .87 and the Cronbach's alpha was .84 (Allen et al., 2015). The authors noted that STEM-B had "similar evidence of validity to the STEM" (Allen et al., 2015, p. 4). According to Allen, et al., (2014), and Allen et al., (2015), STEU-B and STEM-B assessment instruments connect ability to intelligence. This type of measurement tool is appropriate for quantitative method of inquiry. My study explored the influence of stressful nursing scenarios, high fidelity HPS, and role playing in a simulation lab on EI understanding and management scores (dependent variables) of second semester baccalaureate students at the school of interest. Permission to use STEU-B and STEM-B for this study was granted from two of the developers (MacCann & Roberts), and permission letters are included in the Appendix (see Appendix D).

Preparation of the data. The codebook and coding procedures for this research is included in Appendix G. For each of the 19 items on the STEU-B, study participants will choose which of the 5 multiple-choice emotions that is most likely to result from the given situation. This test assesses emotion understanding, a key component of EI. IBM SPSS (version 25) will be used to measure the results. The following SPSS Syntax will be used to score the 19 items which are STEU01, STEU02, STEU03, STEU04, etc. up to STEU 19 and responses are coded as A=1, B=2, C=3, D=4, and E=5. Example:

RECODE STEU01 (1=0) (2=1) (3=0) (4=0) (5=0) INTO STEU_R01, etc. up to

RECODE STEU19 (1=1) (2=0) (3=0) (4=0) (5=0) INTO STEU_R19.

STEM-B is an 18-item situational judgment instrument that utilizes a multiple-choice format. Study participants are asked to choose the most effective response for the person in the situation. Participants are told not to choose necessarily what they would do, or the nicest thing to do, but rather choose the most effective response for the person in the situation. Reliability index for STEM-B in a study by Allen et al. (2015) was .87 and the Cronbach's alpha was .84 in the study. SPSS syntax used to score the test assumes that the variable names for the items are STEM01, STEM02, STEM03, STEM04 etc. up to STEM18, and that the responses are coded as A=1, B=2, C=3, and D=4. Example: IF STEM01 = 1 STEM_R01 = 0, etc. up to IF STEM18 = 4 STEM_R18 = 0.083333333.

To obtain gain scores from STEU-B and STEM-B, I subtracted pretest from posttests scores. Differences (changes) were considered gain whether they were negative or positive changes (Sukin, 2010), and I measured the same emotional skills between three testing dates. The reason for obtaining gain scores was to examine overall effects of the interventions (high-fidelity HPS, stressful scenarios, role play) over the three designated time periods TA, TB, and TC of each individual study participant and to answer my research questions.

- RQ_1 Is there a causal relation between the introduction of high-fidelity computer-based simulation (stressful situation scenarios, human patient simulators, and role playing) and emotion understanding skills?
- RQ_2 Is there a causal relation between the introduction of high-fidelity computer-based simulation (stressful situation scenarios, human patient simulators, and role playing) and emotion management skills?

The method I used to measure gain score was repeated measures ANOVA to answer the question “What is the effect of the treatment on gain scores from pretest to posttest?” (Sukin, 2010). When reporting ANOVA, I gave details of the *F*-ratio and the degrees of freedom that it was calculated from. Further details are in this chapter under *Analysis Plan*.

According to Frankfort-Nachmias and Nachmias (2008), causality is demonstrated by covariation, elimination of spurious relations, and the establishment of time order of occurrences. As with other experimental research, SCD’s can describe a phenomenon, demonstrate that important change has occurred with the phenomenon, and provide inference that the change was causally connected to the intervention(s) (Horner & Spaulding, 2010). SCD’s are appropriate when determining whether a causal relation exists between introduction of independent variable and change to dependent variable (Kratochwill et al., 2010).

Based on the information participants filled out on the demographic page, I collected data about groups of people with variables for ethnicity, gender, and age. I could not code for ethnicity and age in the output data because participants were anonymous to me. All I had access to on the STEU-B and STEM-B test forms were code numbers of each participant. I inspected the data file for missing data. Pallant (2013), suggested running descriptives to find what percentage of variables are missing for each variable and if the occurrence is random or not. I had missing data on three participants. I deleted these participants from the study because it was necessary to have data from three separate times to do the SCD with MBL. The options button in SPSS offered choices on how to deal with missing data. I used the exclude cases pairwise option to exclude the cases that were missing. Using this option did exclude other analyses that the data had the required information to run.

Analysis Plan

The data in this study was analyzed with repeated measures ANOVA using Statistical Package for the Social Sciences (SPSS) after the following five assumptions were met and/or the s were overcome; 1) the dependent variables (emotion understanding, emotion management) were measured at a continuous level; 2) groups of participants were related in that the groups remained constant throughout the study; 3) no significant outliers existed in the groups; 4) normal distribution existed; and 5) conditions of sphericity were met. Repeated measures ANOVA was appropriate for the study because the same participants were being tested on more than one occasion. The treatment (independent variable) with educational technology using (high fidelity HPS, stressful scenarios, and role playing) were measured at three distinct intervals TA, TB, and TC. Each of the participants provided scores for these three points in time. The dependent variables were outcome scores for emotion understanding and emotion management.

Data from Times A, B, and C, results were graphed using scattergrams with regression lines fitted and visually analyzed. For statistical measurements, a one-way repeated measures ANOVA was used. ANOVA was developed for experimental research for comparisons between groups (Field, 2013; Muijs, 2011). RM-ANOVA is also referred to as within-subjects ANOVA and is used to detect overall differences between related means (Laerd Statistics, 2018). The RM-ANOVA was an appropriate statistical test for this study because I was comparing more the treatment (independent variable) educational technology using high fidelity HPS, stressful nursing scenarios, and role playing with two dependent variables (EI understanding and EI management scores) at three-time intervals. The logic of RM-ANOVA is that differences that are found between treatments can only be explained by treatment effect or error/chance. By using RM-ANOVA design, I avoided inflated error rates and had greater power to detect effect (Laerd Statistics, 2018). This was important to advance knowledge in nursing education because the discipline integrates best evidence from nursing studies into the delivery of health care (Ackley, Ladwig, Swan, & Tucker, 2008).

When sphericity was violated SPSS automatically produced multivariate test statistics (Field, 2013). Data was screened and cleaned with estimation for sphericity using Greenhouse - Geisser F-test (1959) and Huynh and Feldt (1976) methods if Mauchly's test of sphericity is significant (has a probability value less than .05) (Field, 2013). Mauchly's test indicated that the assumption of sphericity had not been violated for STEU-B. However, since Mauchly's test is considered a poor method to detect violations (Laerd Statistics, 2018), I decided to use caution and applied Greenhouse-Geisser correction. Mauchly's test indicated that sphericity had been violated (probability greater than 0.5) for STEM-B. To correct this bias, the degrees of freedom for calculating *p*-value were adjusted. Greenhouse-Geisser correction was applied. A *post hoc* test (Bonferroni) results box displayed the differences between groups, the standard error, and the significance values.

Repeated measure ANOVA generated an *F*-statistic that was used to determine statistical significance. When assumption of sphericity was violated, the regular one-way repeated measures ANOVA F-test could not be used. According to Pallant (2013), effect size in ANOVA is eta squared which varies between 0 and 1 with 0-0.1 (weak effect), 0.1-0.3 (modest effect), 0.3-0.5 (moderate effect), and >0.5 is a strong effect. By running a G*Power, F tests – ANOVA repeated measures within factors, with number of groups = 1, number of measurements = 3, alpha at .05 ($p<.05$), power (.95) resulted in nonsphericity correction E = 1, Effect size f(V) = 0.2 suggested the total sample size n = 66.

According to Kratochwill et al., (2010), there are no agreed upon standards or methods for effect size in a SCD study, and most researchers use visual methods. Using ANOVA, results of STEU-B and STEM-B R^2 were used to represent the portion of variance explained by explanatory variables (independent variables) versus the total variance. Ranges of r^2 from 0 meant no relation between the dependent variables and independent variables, ranges to 1 meant all variances could be explained by independent variable (Hu, 2010). These results provided answers to the following research questions, each with a null and research hypothesis:

RQ1: Is there a causal relation between the introduction of high-fidelity computer-based simulation (stressful situation scenarios, human patient simulators, and role playing) and emotion understanding skills?

$H_0 1$: There is no causal relation between the introduction of high-fidelity simulation (stressful situation scenarios, human patient simulators, and role playing) and emotion understanding skills.

$H_1 1$: There is a causal relation between the introduction of high-fidelity simulation (stressful situation scenarios, human patient simulators, and role playing) and emotion understanding skills.

RQ2: Is there a causal relation between the introduction of high-fidelity computer-based simulation (stressful situation scenarios, human patient simulators, and role playing) and emotion management skills?

$H_0 2$: There is no causal relation between the introduction of high-fidelity simulation (stressful situation scenarios, human patient simulators, and role playing) and emotion management skills.

$H_1 2$: There is a causal relation between the introduction of high-fidelity simulation (stressful situation scenarios, human patient simulators, and role playing) and emotion management skills.

Threats to Validity

Threats to External Validity

According to Frankfort-Nachmias and Nachmias (2008), external validity has two main issues including how well the population is represented and whether the study settings influence participants responses during the research procedure. The characteristics of the participants in my study may not represent the nursing student characteristics in general. Students at the school of interest register for clinical according to who has the most college hours first and down to those with the least hours (e.g. seniors before juniors). I believe this may have added to random assignment to their clinical groups, which contribute to internal validity; however, it doesn't ensure that the participants represent the general population of 2nd semester nursing students universally. Threats to external validity arise if I try to generalize beyond this group of 2nd semester nursing students. Steps to avoid threats to external validity in this study included; 1) I did not generalize to people who do not have the same characteristics as those within this study, and I restricted any claims about groups which cannot be generalized, 2) the characteristics of the setting of this study were not generalized to people in other settings, and 3) I did not generalize the results of this study to past or future situations, but I may choose to replicate the study into other settings at a later time to see if similar results are possible (Creswell, 2009).

The idea of causality is at the heart of all scientific explanations (Frankfort-Nachmias & Nachmias, 2008). Correlation between the independent and dependent variables may indicate a relationship exists without indicating that one causes the other (Pallant, 2013). To demonstrate causality in this study, I looked for the three distinct operations; covariation (empirical relationship between presumed cause and presumed effect), eliminated spurious relations (any relationship that couldn't be explained as being caused by a third variable), and establishment of time order (assumed cause preceded an effect in time) (Frankfort-Nachmias & Nachmias, 2008; Polit & Beck, 2004).

Threats to Internal Validity

Creswell (2009) stated that threats to internal validity are any experience, treatment, or approach of the study participants that would jeopardize my ability to draw correct inferences from the data about the population in the study. Threats to internal validity in this study were related to participants including fidelity of implementation (history), maturation, regression, selection, and mortality. A threat to internal validity related to the experimental treatments was diffusion of treatment. A threat to internal validity involving the procedures in the study was testing. See Table 3 below for a description of each threat and the response/method that I will use to address the threats.

Table 3

Summary of Threats to Internal Validity, Description, and Action

Threats	Description	Action
Fidelity of implementation (history)	During the 15 weeks of the study, events may occur that will influence the outcome beyond the study treatments	All 12 simulation groups in the study will experience same/similar events in the study by following the script for each scenario
Maturation	Participants may mature or change during the 15 weeks of the study which could influence results	Study participants' ages (19-50) with majority of students in early 20's who will mature/change at relatively same rate
Regression	A participant's scores may be extreme but will probably change during the study, regressing toward the mean	I may choose not to use participants with scores that are extreme in the study
Selection	Some participants have characteristics that predisposes them to perform better than others	The participants are a sample of convenience
Mortality	Participants are volunteers who may drop out at any time. The outcomes are unknown for those who drop out	I may compare those who drop out with the participants who continue in terms of outcome
Diffusion of Treatment	Participants in the groups communicate with each other which may influence how the groups score on the outcomes	I will keep groups as separate as possible and require confidentiality forms signed at the beginning of the study
Testing	Participants may become familiar with the tests (STEU-B and STEM-B) and remember responses for later testing	I will have longer intervals between testing dates

Note. Adapted from "Quantitative Methods," by J.W. Creswell (Ed.), *Research Design* (3rd ed., pp. 145-171), 2009, Thousand Oaks, CA: SAGE Publications, Inc.

Threats to Construct Validity

The Construct validity is defined as the extent to which a measurement truly represents the construct it is measuring (Markus & Smith, 2010). Frankfort-Nachmias and Nachmias (2008), suggested using a measuring instrument that relates to the general theoretical framework in a study to establish construct validity. Construct validity was established in this study because STEU-B (specific measurement of emotion understanding), and STEM-B (specific measurement of emotion management), were related to the general theoretical framework in the study (theory of emotional intelligence). Threats to construct validity would have resulted if I had used inadequate definitions or used inadequate measures of variables (Creswell, 2009).

Threats to Statistical Conclusion Validity

Statistical testing results in rejecting the alternative (research) hypothesis or the null hypothesis. Statistical conclusion validity is defined as the conclusion reached (inferences) about the extent of relationships between the variables in a study (Laerd Statistics, 2018). If a correct conclusion is made in the study, the result is statistical conclusion validity. Threats to statistical conclusion validity arise if a researcher draws inaccurate inferences from the data due to violation of statistical assumption or by using inadequate statistical power (Creswell, 2009).

Two types of statistical conclusion validity include Type I and Type II error. Type I error results from rejection of a true null hypothesis. An example of this error would be if the researcher concludes that a significant relationship between variables exists, when it does not. Type II error is a result of failing to reject a false null hypothesis. Type II errors occur when the analysis indicates a significant relationship does not exist between the variables when in fact a relationship does exist (Bannon, 2013).

To avoid threats to statistical conclusion validity, I used the power analysis to determine the sample size required for the study and to detect the relationship between the variables. Using a smaller sample size might have caused the results to be incorrect. I used partial eta squared which is interpreted as r^2 and is the unbiased correction to eta squared. By running a G*Power, F tests – ANOVA repeated measures within factors, with number of groups = 1, number of measurements = 3, alpha at .05 ($p<.05$), power (.95) resulted in nonsphericity correction E = 1, Effect size f(V) = 0.2 suggested the total sample size n = 66. According to Kratochwill et al., 2010, there are no agreed upon standards or methods for effect size in a SCD study, and most researchers use visual methods. I did not violate the statistical assumptions, use bias, or use inadequate statistical test(s). To be more specific and compensate for any bias of partial eta squared, I calculated the estimate of the population effect sizes (partial omega squared or ω^2) for STEU-B and STEM-B data.

Ethical Procedures

I began recruiting participants after receiving approval from the school of interest Institutional Review Board, who served as primary for data gathering, and the program of interest nursing Chair. During the first week of the semester, I approached the students at the end of lecture in one of the first semester classrooms with a brief explanation of my study (see Appendix A). To address ethical concerns, a consent form was signed by those who volunteered for the study (see Appendix B). The consent form acknowledged that the student participants' rights would be protected during collection of the data and that all data would remain confidential (Creswell, 2009).

The study participants were a sample of convenience at the school where I am employed. Student participants were assured that all data collected in the study would be protected and held in strict confidence, and that participation or non-participation had no effect on their academic standing or their grades at the university in any way. As stated in a previous section, I had no direct authority over the student participants as instructor or supervisor in the simulation classes. Students who agreed to participate in the study filled out a separate data gathering sheet (see Appendix B) which consisted of demographic information (age, sex, and ethnicity). Students were asked to use their assigned code names/numbers provided by their simulation instructor(s) which de-identified everyone during data gathering periods TA, TB, and TC on STEU-B and STEM-B measurement tests. Once the data gathering sheets and consent forms were completed and signed, they were separated and placed in two manila envelopes and kept in a locked fire/flood proof safe deposit box in my home.

Study participants took the multiple-choice tests STEU-B and STEM-B with pencil and paper in the nursing school conference room and used their code numbers instead of real names or CWID to maintain anonymity. On the designated testing dates students were given the STEU-B and STEM-B EI tests which took approximately 15 minutes each to complete. Score sheets were secured in two manila folders, (one for each test, STEU-B and STEM-B), which were placed in the fire/flood proof safe in my home to maintain scrupulous guarding of the surveys data.

Student participants repeated the STEU-B and STEM-B tests on their designated date/times in the nursing conference room at the school of interest. Students used their designated code numbers as an identifier each time on the answer sheets to match their scores. Once the EI tests were given the last designated time (TC), the final scores were electronically produced by me onto an Excel spreadsheet format utilizing the code number to maintain privacy/anonymity of the participants. All the written acquired data from the STEU-B and STEM-B paper tests are stored in a fire/flood proof safe in my private home. All electronic data are saved in a password protected secret file on my computer in a private iCloud account. Access to the information is currently available for me, my Chair, and to my committee members.

As stated previously, no debriefing, follow-up interviews, or treatments were required following the STEU-B and STEM-B multiple choice item tests. Students were given the option to have their STEU-B and STEM-B test results emailed to their college email accounts by marking “yes,” in the designated release of information box on the consent form (see Appendix B). However, no students chose this option. To maintain continued anonymity, demographic sheets and consent forms are currently being stored in a fire/flood proof safe in my private home for a minimum of five years at which time I will destroy them in an industrial shredder in the department of nursing at the school of interest. All electronic study data are currently being kept in the password protected secret file on my computer in an iCloud account for a minimum of five years (as required by Walden University) and will be deleted when the time is expired.

Summary and Transition

This study was a quantitative, SCD with MBL design. Field (2013), and Pallant (2013), noted that repeated measure is the term used when the same people participate in all the conditions of an experiment or provide data at multiple periods in time. This study explored the influence on EI understanding and management scores (dependent variables) of second semester baccalaureate students during the semester with educational technology treatment (independent variable) of interventions with high fidelity HPS, stressful nursing scenarios, and role playing. The EI understanding and management scores were measured by two tests, STEU-B (Allen et al., 2014), and STEM-B (Allen, et al., 2015). These EI tests were envisioned from the Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT), (2003), four-branch model of EI which included (1) perceiving emotions, (2) using emotions, (3) understanding emotions, and (4) managing emotions. STEU-B and STEM-B connect ability to intelligence (Allen et al., 2014, Allen et al., 2015) and were quite appropriate for this quantitative method of inquiry.

RM-ANOVA, which was developed for comparisons between groups (Field, 2013; Muijs, 2011) and used to detect overall differences between related means (Laerd Statistics, 2018) was used to analyze the data. I compared the educational technology treatment (independent variable) of interventions with high fidelity HPS, stressful nursing scenarios, and role playing with dependent variables (EI understanding and EI management scores) at three-time intervals. The logic of RM-ANOVA is that differences that are found between treatments can only be explained by treatment effect or error/chance (Laerd Statistics, 2018).

For decades, nursing researchers have been examining the impact of EI in nursing and nursing education (Codier & Odell, 2014). Nursing is emotional work and EI has been found to impact patient care (Adams & Iseler, 2014), clinical performances (Marvos & Hale, 2015), and enhance caring and compassion (Rankin, 2013). Researchers have found that nurses who respond competently and intelligently during emotional situations have better patient outcomes (Adams & Iseler, 2014; Ray & Overman, 2014). Today's healthcare consumers are complex, and nursing is among the most stressful professions (Orak, et al., 2016). Nurses who understand their emotions are better equipped to manage their emotions and function more competently in a complex healthcare environment (Beauvais et al., 2011; Beauvais, et al., 2014; Littlejohn, 2013; MacLean et al., 2017; Patillo, 2013; Ray & Overman, 2014). This study was important to advance knowledge about simulation and emotional understanding and management in nursing education because the discipline integrates best evidence from nursing studies into the delivery of health care (Ackley et al., 2008). Simulation learning with high-fidelity HPS is a form of reflective learning that could influence EI understanding and management test scores.

Chapter 4 describes data collection including period, recruitment, response rates, and any discrepancies from the plan that was described in Chapter 3. A descriptive and demographic sample report is included that describes how representative the sample is of the population of interest and the general population. A description of the treatment and any challenges that were presented is also addressed. Statistical analysis findings are reported as well as any additional statistical tests of hypotheses that emerged from the analysis of the main hypotheses. Findings are included in tables and figures that represent the results. Answers to research questions are summarized and transitional material from the findings are included. The chapter concludes with an introduction to the prescriptive material in Chapter 5.

Chapter 4: Study Findings

Introduction

The purpose of this quantitative, SCD with MBL study was to find out if the treatment (independent variable) of introducing educational technology (high-fidelity HPS), simulation with stressful situation scenarios, and role playing had any influence on emotion understanding and management test scores (dependent variables) at the baccalaureate nursing program of interest. I measured EI using two instruments: STEU-B (Allen et al., 2014) and STEM-B (Allen et al., 2015) specific for measuring emotion understanding and emotion management, the two most influential (upper) branches of EI hierarchy upon which the study was based. To address the research questions, I conducted two repeated measure ANOVAs with Bonferroni corrections. Then, I obtained gain scores to examine the effects of the interventions (high-fidelity HPS, stressful scenarios, role play) over the three designated time periods TA, TB, and TC of each individual study participant and to answer two research questions.

RQ1: Is there a causal relation between the introduction of high-fidelity computer-based simulation (stressful situation scenarios, human patient simulators, and role playing) and emotion understanding skills?

$H_0$1: There is no causal relation between the introduction of high-fidelity simulation (stressful situation scenarios, human patient simulators, and role playing) and emotion understanding skills.

$H_1 1$: There is a causal relation between the introduction of high-fidelity simulation (stressful situation scenarios, human patient simulators, and role playing) and emotion understanding skills.

RQ2: Is there a causal relation between the introduction of high-fidelity computer-based simulation (stressful situation scenarios, human patient simulators, and role playing) and emotion management skills?

$H_0 2$: There is no causal relation between the introduction of high-fidelity simulation (stressful situation scenarios, human patient simulators, and role playing) and emotion management skills.

$H_1 2$: There is a causal relation between the introduction of high-fidelity simulation (stressful situation scenarios, human patient simulators, and role playing) and emotion management skills.

In Chapter 4, I discuss data collection with period, recruitment, response rates, and a few discrepancies from the plan that I described in Chapter 3. A descriptive and demographic sample report is included that describes how representative the sample is of the population at the baccalaureate nursing school of interest and the general population. A description of the treatment and the challenges that were presented are also addressed. I reported statistical analysis findings as well as additional statistical tests of hypotheses that emerged from the analysis of the main hypotheses. Findings of my study are included in tables and figures that represent the results. Answers to research questions are summarized and transitional material from the findings are included. I conclude with an introduction to the prescriptive material in Chapter 5.

Data Collection

The host school for my study had authority over the data collection, and I received permission for the study through the Institutional Review Board (IRB) at the host school (approval # 1310066-1). I began recruitment of participants after I received approval from the IRB at the school of interest, and from the nursing program director. Walden University served as secondary authority for data collection and primary authority for data analysis (approval # 07-17-19-0114183).

Following Medical-Surgical class lecture on September 11, 2018, I briefly explained the study to potential participants (see Appendix A). Additionally, I placed an announcement in BlackBoard on the medical-surgical classroom announcements page (Appendix E), which included information about the study, my contact information, email address, and office number. Students who volunteered were instructed about eligibility parameters: (a) students must be a current student in medical-surgical I class, (b) students who withdrew from Medical-Surgical I course would be disqualified from the study pool, (c) the minimum age requirement to participate was 19 years of age, and (d) repeating students did not qualify to participate.

As noted in Chapter 3, I initially planned to give a $5 appreciation gift card incentive to increase the participant pool. However, a participatory incentive was not needed due to good response. At the beginning of the semester there were $N = 112$ students registered in the Medical-Surgical I course. Two students withdrew from the nursing program prior to data collection. At baseline observation (TA), response rate was 91of 110 remaining Medical-Surgical I students. Those who volunteered to join the study filled out the consent form and demographic sheets anonymously using code name/numbers as identification. At the end of data collection period, 3 of the 91 participants had not completed the measurement tools as directed at TA, TB, and TC and were disqualified from participation. Final participant count was *N* = 88. I have included a descriptive and demographic sample of the 91 original volunteers (see Table 4 for baseline descriptive and demographics sample of participants).

Table 4

Baseline Descriptive and Demographics Sample of Participants

Age (y)	Male (*N* = 17)	Female (*N* = 74)
19-30	14	72
31-45	3	2
Race/Ethnicity		
Caucasian	15	68
African American	0	2
Asian	0	1
Other race/ethnicity	2	3

According to the American Association of Colleges of Nursing (AACN, 2019b), men comprised 9.6 % and women comprised 91% of the nursing workforce in 2015. More recently, the Census Bureau (2019) cited 2,396,467 active registered nurses in the U.S., with 12% male and 87% female. These numbers are representative of the students in my study, the nursing school of interest, and the general nursing population which are predominantly female and White. As I noted in Table 3, the study participants included 15 White male students (18%) and 68 White female students (81%). According to the AACN ethnicity table (2019a), the total minority student population (male and female) in U.S. baccalaureate nursing programs last year was 34.2%. In my study, total minority was quite a bit lower than national averages at 8.7%.

Treatment and/or Intervention Fidelity

During the span of the study, the treatments were administered by simulation faculties as planned with only minor changes. The baseline, preintervention period was originally scheduled for the first weeks of the semester, with data collection for Time A to be during Weeks 1-3 of the semester. However, final approval from the IRB at the school of interest was delayed until Week 3 and Time A data collection began after that time. Weeks 5 through 14 served as the experimental period, with Time B data collections obtained during week 9 of the semester. I collected Time C data during Week 15 of the semester after students had completed all assigned simulation scenarios. I measured EI understanding scores with the STEU-B (Allen et al., 2014), and I measured EI management scores with the STEM-B (Allen, et al., 2015). I did not review student records for GPA because participants were anonymous, and I was not sure whose GPA to exclude in the review since approximately 15 students of second semester students chose not to participate in the study. I reviewed the attendance records for simulation class attendance and student demographic forms to assess fidelity of implementation.

Another change from the original plan in Chapter 3 was the testing site (computer room) where students were to take STEU-B and STEM-B tests. I was unable to reserve the computer/testing room for the 9 days that I needed for data collection. Study participants took the multiple-choice tests STEU-B and STEM-B with pencil and paper in the nursing school faculty meeting room during the collection period. This room had table and chairs to seat 50 people and 20 students at a time took their tests on their designated simulation days. STEU-B and STEM-B were administered by simulation faculty and adjunct clinical faculty. Once students had completed their tests, the score sheets were secured in three manila folders, one for each of the three testing times (TA baseline, TB experimental, & TC post-intervention). Afterwards, the manila folders were given to me and I placed them in a fire/flood proof safe at my residence.

The interventions were conducted as scheduled with simulation clinical lab groups participating in two simulation scenarios per month during the data gathering period. Each of the scenarios lasted approximately 30 minutes, with a cumulative of 3 hours of treatment time per student during the semester. The post-conference debriefing portion of the study totaled 6 hours per student during data gathering. Simulation students were randomly given role assignments which alternated from being an observer to caregiver throughout the semester. The only scenario change from my original plan was the replacement of Scenario #22 with Scenario #10 by simulation faculty. Scenario #10 challenged students to provide care to a 71-year-old African American female patient with hypertension having chest pain and a myocardial infarction (heart attack). There were no adverse events related to the changes in the intervention plans for this study. All student groups in the study participated in this scenario during their designated simulation lab time.

Results

To use a one-way repeated measures ANOVA for this study, I had to make sure five assumptions were met. For the first two assumptions, the test required there be a continuous dependent variable and that the within-subjects factor is measured on three or more occasions. This assumption was met as study participants (N = 88) received the treatments (stressful simulation scenarios, high-fidelity HPS, role-play), and were measured with STEU-B for emotion understanding and with STEM-B for emotion management at three time points (Time A, Time B, and Time C). See Table 5 for STEU-B and STEM-B descriptive statistics, means, and standard deviations.

Table 5

STEU-B and STEM-B Descriptive Statistics, Means, Standard Deviations

Time Period	*M*	*SD*	*N*
STEU-B Week 4	65.3295	11.14659	88
STEU-B Week 9	62.0455	15.53484	88
STEU-B Week 15	59.0114	19.10016	88
STEM-B Week 4	72.8750	13.52462	88
STEM-B Week 9	70.8750	16.36496	88
STEM-B Week 15	65.2045	21.12424	88

Assumption three related to how the data fit the model and required no significant outliers in the three levels of the within-subjects factor. To satisfy this assumption, I ran the Explore procedure on IBM SPSS version 25 to detect outliers in the STEU-B and

STEM-B data. Field (2013) defined outliers as any data point that is greater than 1.5 box-lengths from the edge of the box. Extreme outliers, when present, are three box-lengths from the edge of the box and labeled with an asterisk (Laerd Statistics, 2018). I rechecked data to see whether outliers were the result of data entry errors or measurement errors and they were not. I concluded that these were genuinely unusual data points for STEU-B and STEM-B, but none were extreme as defined by Laerd Statistics (2018). The outliers for the STEU-B output are as follows: Participants 67 and 51 in Week 4, Participants 5 and 63 in Week 9, and Participant 79 in Week 15. The outliers for STEM-B are Participants 63 and 22 in Week 9. I did not find outliers in the STEU-B data or STEM-B data, as I assessed the boxplots for values greater than 1.5 box-lengths from the edge of the box.

For the assumption of normality (fourth assumption), the dependent variable should be approximately normally distributed for each level of the within-subjects factor. To see if the distribution of scores deviated from a comparable normal distribution, I reviewed the Kolmogorov-Smirnov and the Shapiro-Wilk tests of normality. STEU-B and STEM-B were not normally distributed at each time point as assessed by Shapiro-Wilk's test ($p < .05$). However, since my sample size was greater than 50 in both data sets ($n = 88$), these tests flagged deviations from normality as statistically significant (Laerd Statistics, 2018). I chose to assess normality graphically with the Normal Q-Q plots for STEU-B and STEM-B data sets. I concluded that the scores in STEU-B and STEM-B were at least approximately normally distributed, and according to Laerd Statistics (2018), approximate normal distribution is enough for most parametric testing.

STEU-B

I assessed sphericity (fifth assumption) for STEU-B data. Field (2013), stated that if Mauchly's test of sphericity is statistically significant ($p < .05$), sphericity is violated, and if Mauchly's test of sphericity is not statistically significant ($p > .05$), sphericity has been met. To test this assumption, I ran Mauchly's test on the STEU-B data sets. Mauchly's test indicated that the assumption of sphericity had not been violated for STEU-B, $X^2(2) = 1.167$, $p = .558$. However, since Mauchly's test is considered a poor method to detect violations (Laerd Statistics, 2018), I decided to use caution and a Greenhouse-Geisser correction was applied ($\varepsilon = 0.987$).

Results that I found from the one-way repeated measures ANOVA from STEU-B data indicated statistically significant changes in emotion understanding scores over time, $F(1.973, 171.686) = 7.526$, $p = .001$, partial $\eta^2 = .080$. To be more specific and compensate for bias, I calculated the estimate of the population effect size (partial omega squared or ω^2). The interventions of stressful simulation scenarios, high-fidelity HPS, role-play elicited statistically significant changes in emotion understanding scores over time, $F(1.973, 171.686) = 7.526$, $p = .001$, partial $\omega^2 = .047$. These changes were decreases in emotion understanding from pre-intervention Week 4 ($M = 65.3$, $SD = 11.1$), to mid-intervention Week 9 ($M = 62.0$, $SD = 15.5$), to post-intervention Week 15 ($M = 59.0$, $SD = 19.1$). When I ran post hoc analysis with a Bonferroni adjustment, the data revealed that emotion understanding scores (skills) were not statistically significantly changed from pre-intervention to mid-intervention ($M = 3.28$, 95% CI [-0.63, 7.2], $p = 0.13$), and from mid-intervention to post-intervention ($M = 3.03$, 95% CI [-0.78, 6.8], $p = 0.17$), but were statistically significantly changed from pre-intervention to post-intervention (*M* = 6.32, 95% CI [2.12, 10.5], $p = 0.001$) which is suggestive of maturational changes of the class as a whole from Time A to Time C. See Table 6.

Table 6

STEU-B Post hoc ANOVA Pairwise Comparisons (Bonferroni Correction)

(I) Time	(J) Time	Mean Difference	SE	*P*	CI (95%)
TA	TB	3.284	1.603	.130	-.628; 7.196
	TC	6.318*	1.718	.001	2.124; 10.513
TB	TA	-3.284	1.603	.130	-7.196; .628
	TC	3.034	1.562	.166	-7.79; 6.847
TC	TA	-6.318*	1.718	.001	-10.513; -2.124
	TB	-3.034	1.562	.166	-6.847; .779

*The mean difference is significant at the .05 level.

Analysis of gain scores. I chose a SCD with MBL for this study because the design is particularly relevant for evaluating interventions in educational settings (Radley et al., 2018), to compare baseline (A) with intervention (B) conditions without withdrawing interventions (Ledford, 2018). All participants served as their own control prior to interventions. The basis of this type of design is that it is highly likely the dependent variables won't return to baseline after removal of the treatment (Hitchcock et al., 2014; Radley et al., 2018). SCD did not require simulation faculties to withhold treatment to a control group. All participants received the same conditions throughout the experiment to help decrease the effects of individual differences in the results (Field, 2013). Due to the nature of the design, only gain scores are interpretable for the RQ's in my study.

I tallied STEU-B gain scores for the baseline period, Week 4 (TA) to week 9 (TB). Participants with positive gains were (*N* = 31), no gains (*N*= 17), and negative gains (*N* = 39). I summarized gains in the frequency distribution table. See Table 7.

Table 7

STEU-B Frequency Distribution of Gain Scores (Week 4 to Week 9)

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 21.00	5	5.7	5.7	5.7
16.00	4	4.5	4.5	10.2
11.00	4	4.5	4.5	14.8
10.00	4	4.5	4.5	19.3
6.00	2	2.3	2.3	21.6
5.00	12	13.6	13.6	35.2
.00	17	19.3	19.3	54.5
-5.00	7	8.0	8.0	62.5
-6.00	3	3.4	3.4	65.9
-10.00	9	10.2	10.2	76.1
-11.00	6	6.8	6.8	83.0
-16.00	5	5.7	5.7	88.6
-21.00	5	5.7	5.7	94.3
-26.00	1	1.1	1.1	95.5
-31.00	1	1.1	1.1	97.7
-42.00	1	1.1	1.1	98.9
-63.00	1	1.1	1.1	100.0
Total	88	100.00	100.00	

I tallied STEU-B gain scores for the treatment period, week 9 (TB) to week 15 (TC). Participants with positive gains were (N = 29), no gains (N = 17), and negative gains (N = 42). I have summarized the gains in the frequency distribution table. See Table 8.

Table 8

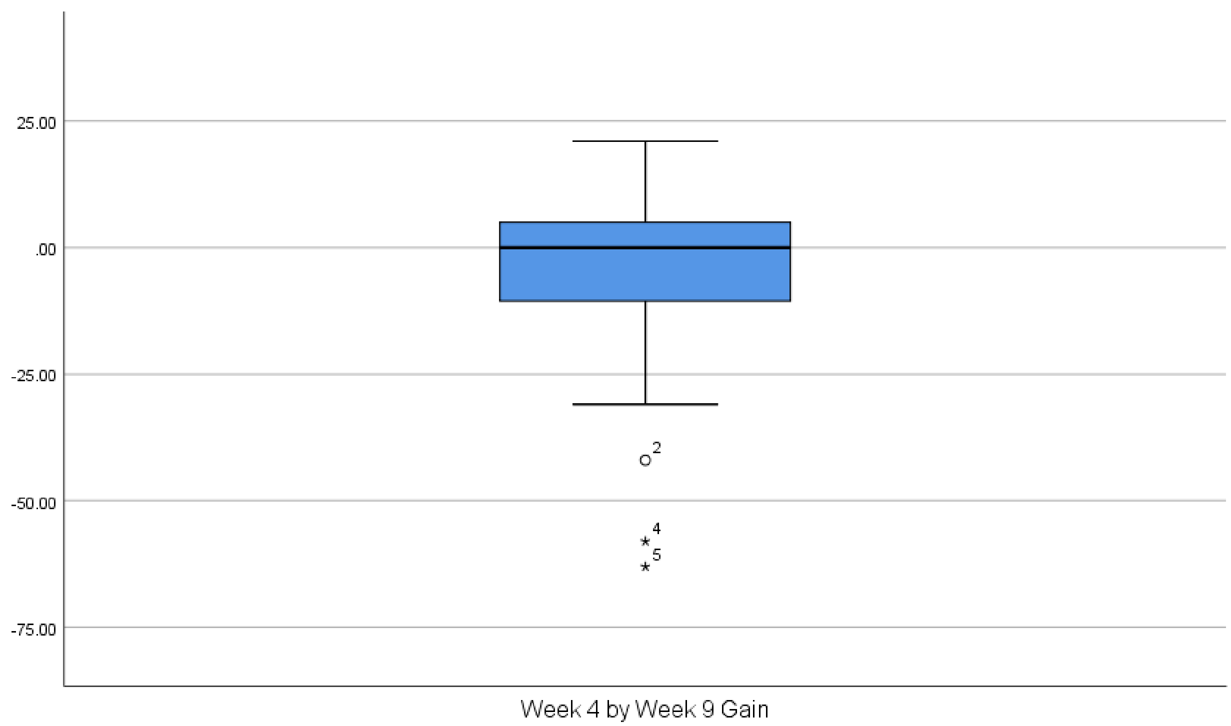
STEU-B Frequency Distribution of Gain Scores (Week 9 to Week 15)

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid -42.00	3	3.4	3.4	3.4
-37.00	1	1.1	1.1	4.5
-31.00	1	1.1	1.1	5.7
-26.00	2	2.3	2.3	8.0
-21.00	3	3.4	3.4	11.4
-16.00	6	6.8	6.8	18.2
-15.00	2	2.3	2.3	20.5
-11.00	5	5.7	5.7	26.1
-10.00	6	6.8	6.8	33.0
-6.00	1	1.1	1.1	34.1
-5.00	12	13.6	13.6	47.7
.00	17	19.3	19.3	67.0
5.00	9	10.2	10.2	77.3
6.00	1	1.1	1.1	78.4
10.00	1	1.1	1.1	79.5
11.00	8	9.1	9.1	88.6
15.00	2	2.3	2.3	90.9
16.00	4	4.5	4.5	95.5
21.00	1	1.1	1.1	96.6
27.00	2	2.3	2.3	98.9
31.00	1	1.1	1.1	100.0
Total	88	100.0	100.0	

For comparison, I created box and whisker plots for STEU-B gains Week 4 to Week 9 (boxplot 1) and for gains Week 9 to Week 15 (boxplot 3). There was a traditional (mild) outlier noted for participant 2 in boxplot 1. I checked STEU-B scores and this participant had negative gain (-42) from TA to TB. There were two extreme outliers in boxplot 1 for Participants' 4 and 5. When I went back and looked at the original scores for these students, I found the gains were extreme. Participant 4 had negative gain (-58) from STEU-B TA to TB, and Participant 5 had negative gain (-63) from STEU-B TA to TB. See boxplot 1.

Boxplot 1

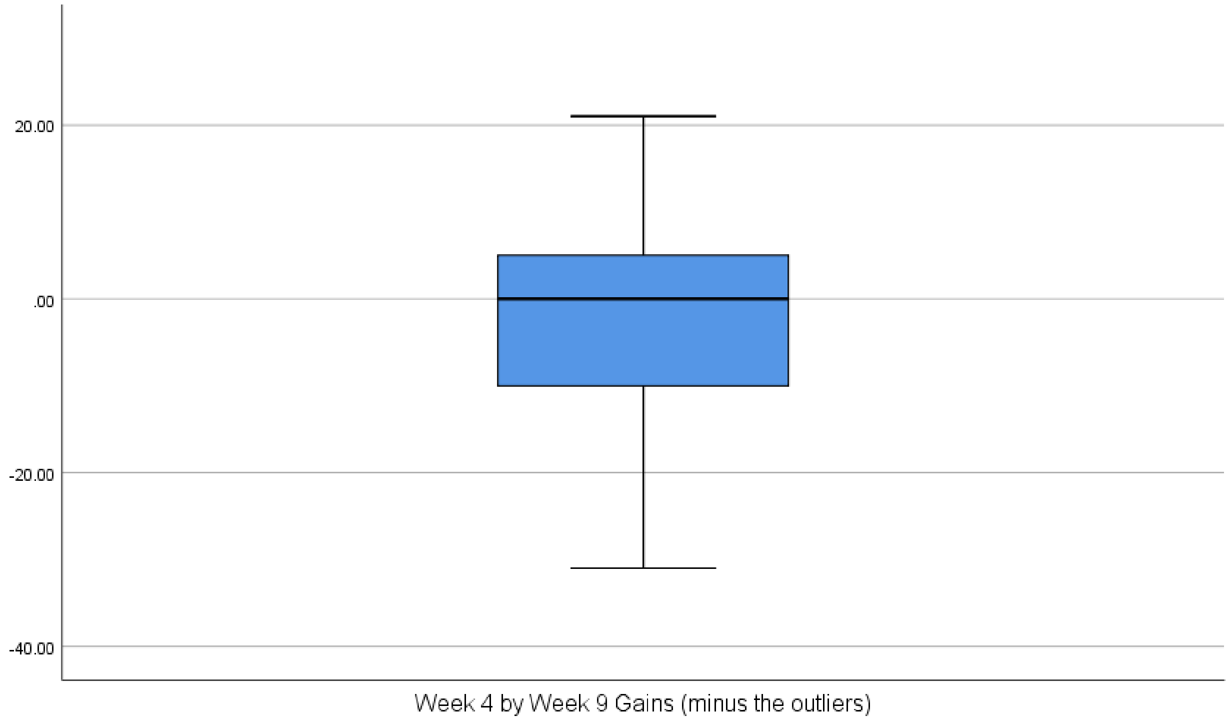
STEU-B Gains from Week 4 to Week 9



I removed the outliers (mild and extreme) and re-ran the analysis. This changed the gain ranges from -31 to +21 in the new analysis. There was not a great deal of difference noted. See boxplot 2.

Boxplot 2

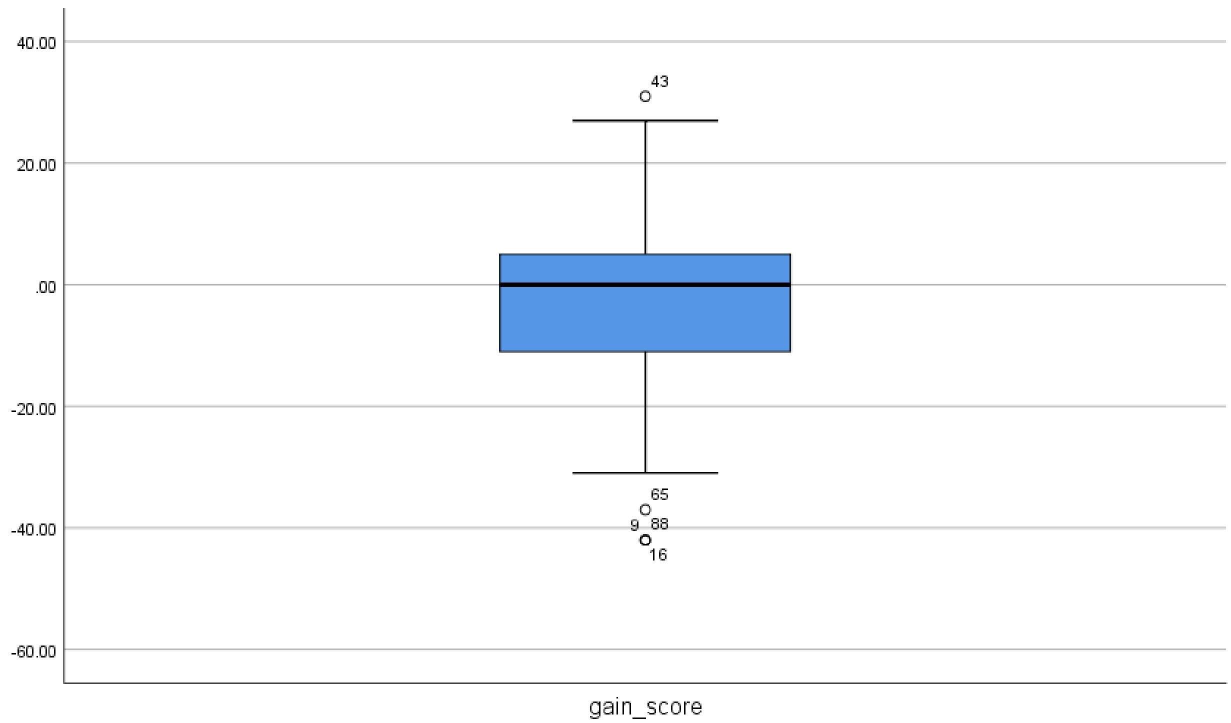
STEU-B Gains from Week 4 to Week 9 (minus the outliers)



Boxplot 3 represents gains from Week 9 to Week 15 in the STEU-B data. There were traditional (mild) gains for Participant 43 above the upper quartile, and for Participants' 9, 16, 65, and 88 who were below the lower quartile. I reviewed the STEU-B scores for Participant 43 and this student had positive gain (+31) from TB to TC. Participant 9 had negative gain (-42), Participant 16 had negative gain (-42), Participant 65 had negative gain (-37), and Participant 88 had negative gain (-42) from TB to TC. I did not find any extreme outliers in the boxplot 3 output. See boxplot 3.

Boxplot 3

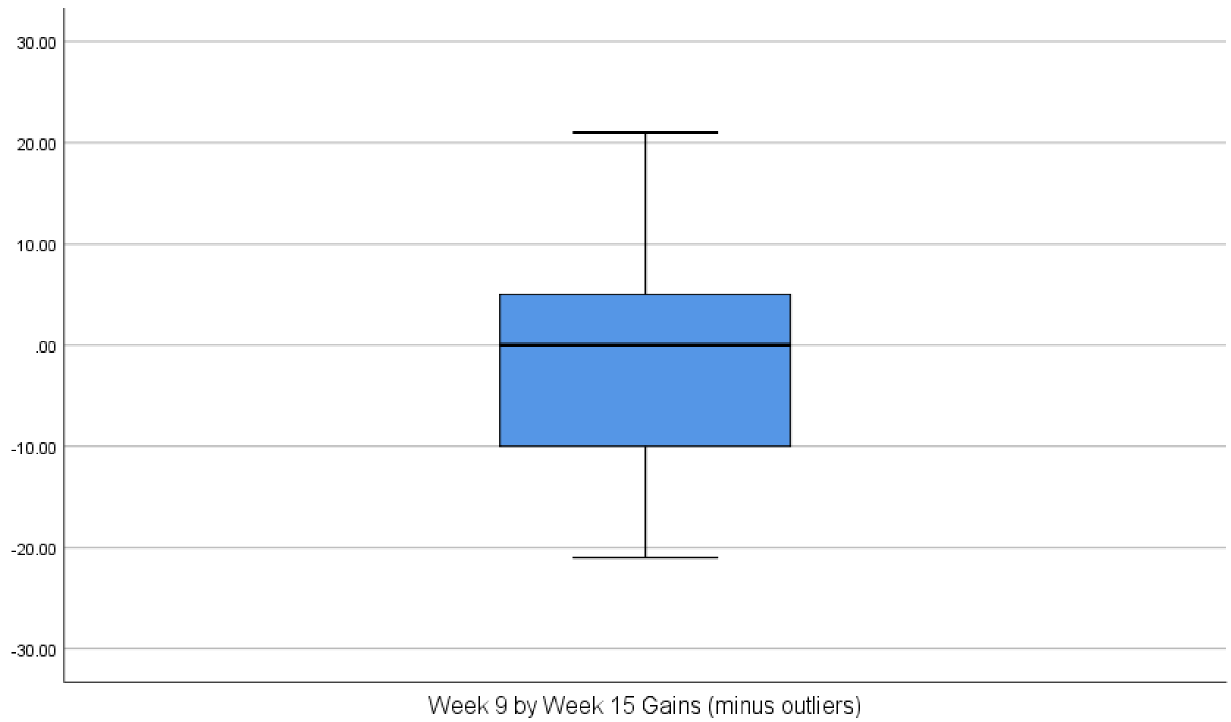
STEU-B Gains from Week 9 to Week 15



I deleted the outliers from Boxplot 3 and re-ran the analysis. I changed the gain ranges from -21 to +21 to see what the boxplot would look like. There was not a huge difference, but it did improve the output somewhat. See boxplot 4.

Boxplot 4

STEU-B Gains from Week 9 to Week 15 (minus the outliers)



As previously stated, when I ran the post hoc analysis with a Bonferroni adjustment, it revealed that emotion understanding scores (skills) were statistically significantly changed from pre-intervention (Week 4) to post-intervention (Week 15), (M = 6.32, 95% CI [2.12, 10.5], p = 0.001). Using stressful simulation scenarios, high-fidelity HPS, and role-play elicited statistically significant changes in emotion understanding scores over time, $F(1.973, 171.686) = 7.526$, $p = .001$, partial $\omega^2 = .047$. According to literature on effect size, values for ω^2 of .01 represents small effect, .06 represents medium effect, and .14 represents large effect, respectively (Kirk, 1996;

Volker, 2006; Field, 2013). I found that a causal relation between the dependent variable (emotion understanding) skills and the introduction of independent variables (stressful situation scenarios, human patient simulators, and role playing) was noted for most of the study participants. There may be some unknown interaction that caused some students to have positive gains in emotion understanding scores, while others did not. I have no sure way of knowing since all study participants were anonymous, and I had no participatory role in the simulation classes, or the distribution of the measurements for TA, TB, or TC. The only study participants to have consecutive positive gains for STEU-B from TA to TB to TC were Participants 2, 13, 21, 30, 34, 74, and 76. The only study participants to have no gains for STEU-B from TA to TB to TC were Participants 18, 19, 20, 28, 45, 51, and 64.

After all the gains were tallied, I asked simulation faculties to review the participants who had positive gains, no gains, or negative gains to see if they were in the same clinical group(s), had any similarities, or any correlation. Simulation faculties told me that no correlation among the students were evident. Respondents were varied among the clinical groups, some were “A” students, others were “C” students. Respondent ages were ranked from traditional to non-traditional with no correlation to gains, and both male and female students were varied as some had positive gain, others with negative or no gain.

Obviously, the treatment did not affect everyone to the same degree, or to the same direction. The treatment worked positively for some students, negatively for others. I will discuss possible causes for decreases in test scores in Chapter 5. Based on STEU-B gain results, I reject the null hypothesis and accept the alternate hypothesis for RQ1. I will further discuss the speculations that I have about these results in Chapter 5.

STEM-B

I ran a second repeated measures ANOVA to assess the STEM-B portion of the study. The assumption of sphericity was assessed and Mauchly's test indicated that sphericity had been violated, $X^2 (2) = 8.544$, $p = .014$. This violation meant that one-way repeated measures ANOVA for STEM-B would be biased and easily return a statistically significant result (Laerd Statistics, 2018). To correct this bias, I adjusted the degrees of freedom for calculating *p*-value and then I applied the Greenhouse-Geisser correction ($\varepsilon = 0.914$).

Results from the one-way repeated measures ANOVA STEM-B data indicated statistically significant changes in emotion management scores over time, $F(1.827, 158.965) = 9.981$, $p < .0005$, partial $\eta^2 = .102$. To be more specific and compensate for bias, I calculated the estimate of the population effect size (partial omega squared or ω^2) for STEM-B. The treatment (interventions) of stressful simulation scenarios, high-fidelity HPS, and role-play elicited statistically significant changes in emotion management scores over time, $F(1.827, 158.965) = 9.981$, $p < .0005$, $\omega^2 = .063$. As stated previously regarding effect, ω^2 of .06 represents medium effect size (Kirk, 1996; Volker, 2006; Field, 2013).The changes in emotion management scores were decreased from pre-intervention Week 4 ($M = 72.9$, $SD = 13.5$), to mid-intervention Week 9 ($M = 70.9$, $SD = 16.4$), to post-intervention Week 15 ($M = 65.2$, $SD = 21.2$). When I ran a post hoc analysis with a Bonferroni adjustment, the data revealed that emotion management scores (skills) were not statistically significantly changed from pre-intervention to mid-intervention (*M* = 2.0, 95% CI [-1.7, 5.7], *p* = 0.6), but were statistically significantly changed from pre-intervention to post-intervention (*M* = 7.68, 95% CI [2.8, 12.5], *p* = 0.001), and from mid-intervention to post-intervention (*M* = 5.7, 95% CI [1.2, 10.1], *p* = 0.01). See Table 9.

Table 9

Post hoc ANOVA Pairwise Comparisons (Bonferroni Correction) STEM-B

(I)Time	(J) Time	Mean Difference	SE	*P*	CI (95%)
TA	TB	2.000	1.515	.571	-1.699; 5.699
	TC	7.670*	1.997	.001	2.795; 12.546
TB	TA	-2.000	1.515	.571	-5.699; 1.699
	TC	5.670*	1.822	.008	1.223; 10.118
TC	TA	-7.670*	1.997	.001	-12.546; -2.795
	TB	-5.670*	1.822	.008	-10.118; -1.223

*The mean difference is significant at the .05 level.

Analysis of gain scores. As I stated previously, all participants served as their own control for this study design. According to simulation faculties, all participants received the same conditions for the STEM-B portion of the study too. Due to the nature of the SCD with MBL design, only gain scores are interpretable for the RQ's in my study.

STEM-B gain scores for Week 4 (TA) to Week 9 (TB) were tallied. Participants with positive gains were (*N* = 33), no gains (*N* = 23), and negative gains (*N* = 32). I summarized the gains in a frequency distribution table for ease in viewing. See Table 10.

Table 10

STEM-B Frequency Distribution of Gain Scores (Week 4 to Week 9)

	Frequency	Percent	Valid Percent	Cumulative Percent
-50.00	1	1.1	1.1	1.1
-44.00	2	2.3	2.3	3.4
-39.00	1	1.1	1.1	4.5
-34.00	1	1.1	1.1	5.7
-28.00	2	2.3	2.3	8.0
-22.00	1	1.1	1.1	5.7
-17.00	3	3.4	3.4	12.5
-16.00	1	1.1	1.1	13.6
-11.00	7	8.0	8.0	21.6
-6.00	6	6.8	6.8	28.4
-5.00	8	9.1	9.1	37.5
.00	23	26.1	26.1	63.6
5.00	6	6.8	6.8	70.5
6.00	9	10.2	10.2	80.7
11.00	9	10.2	10.2	90.9
16.00	2	2.3	2.3	93.2
17.00	3	3.4	3.4	96.6
22.00	2	2.3	2.3	98.9
23.00	1	1.1	1.1	100.0
Total	88	100.0	100.0	

I tallied STEM-B gain scores for Week 9 (TB) to Week 15 (TC). Participants with positive gains were (*N* = 25), no gains (*N* = 17), and negative gains (*N* = 46). I have summarized gains in the frequency distribution table. See Table 11.

Table 11

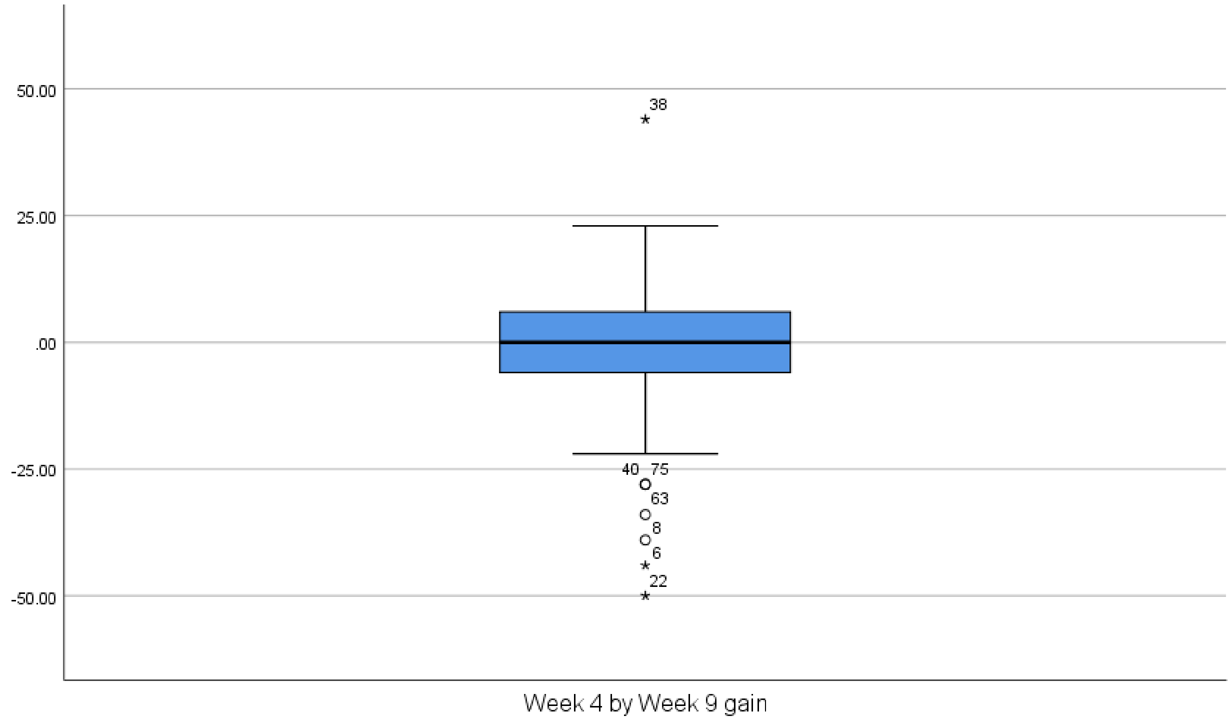
STEM-B Frequency Distribution of Gain Scores (Week 9 to Week 15)

	Frequency	Percent	Valid percent	Cumulative percent
-56.00	1	1.1	1.1	1.1
-50.00	2	2.3	2.3	3.4
-39.00	1	1.1	1.1	4.5
-34.00	1	1.1	1.1	5.7
-33.00	5	5.7	5.7	11.4
-28.00	1	1.1	1.1	12.5
-23.00	1	1.1	1.1	13.6
-22.00	3	3.4	3.4	17.0
-17.00	2	2.3	2.3	19.3
-16.00	2	2.3	2.3	21.6
-12.00	3	3.4	3.4	25.0
-11.00	9	10.2	10.2	35.2
-6.00	8	9.1	9.1	44.3
-5.00	6	6.8	6.8	51.1
-1.00	1	1.1	1.1	52.3
.00	17	19.3	19.3	71.6
5.00	7	8.0	8.0	79.5
6.00	7	8.0	8.0	87.5
7.00	1	1.1	1.1	88.6
11.00	1	1.1	1.1	89.6
12.00	1	1.1	1.1	90.9
17.00	3	3.4	3.4	94.3
22.00	3	3.4	3.4	97.7
33.00	1	1.1	1.1	98.9
45.00	1	1.1	1.1	100.0
Total	88	100.0	100.0	

For comparison, I created box and whisker plots for STEM-B gains Week 4 to Week 9 (See boxplot 5). I found traditional (mild) outliers for Participants' 8, 40, 63, and 75 in boxplot 5. All were below the fourth quartile. I went back to check STEU-B scores and these participants had negative gains from TA to TB. Participant 8 had negative gain (-39), Participant 40 had negative gain (-28), Participant 63 had negative gain (-34), and Participant 75 had negative gain (-28). There were three extreme outliers in boxplot 3 for Participants' 6, 22, and 38. These gains were correct when I went back and looked at the scores. Participant 6 had negative gain (-44), Participant 22 had negative gain (-50), and Participant 38 had negative gain (-44) from TA to TB. See boxplot 5.

Boxplot 5

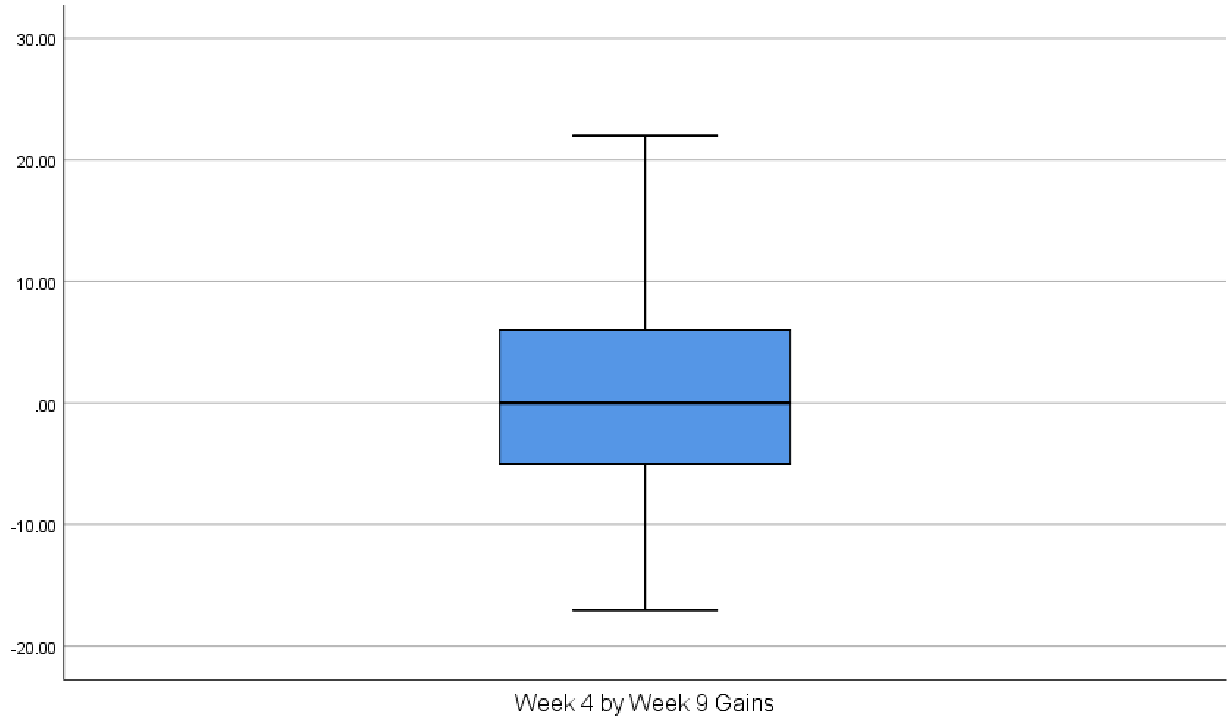
STEM-B Gains from Week 4 to Week 9



I deleted the outliers from Boxplot 5 and re-ran the analysis. There was not a huge difference, but it did improve the output somewhat. See boxplot 6.

Boxplot 6

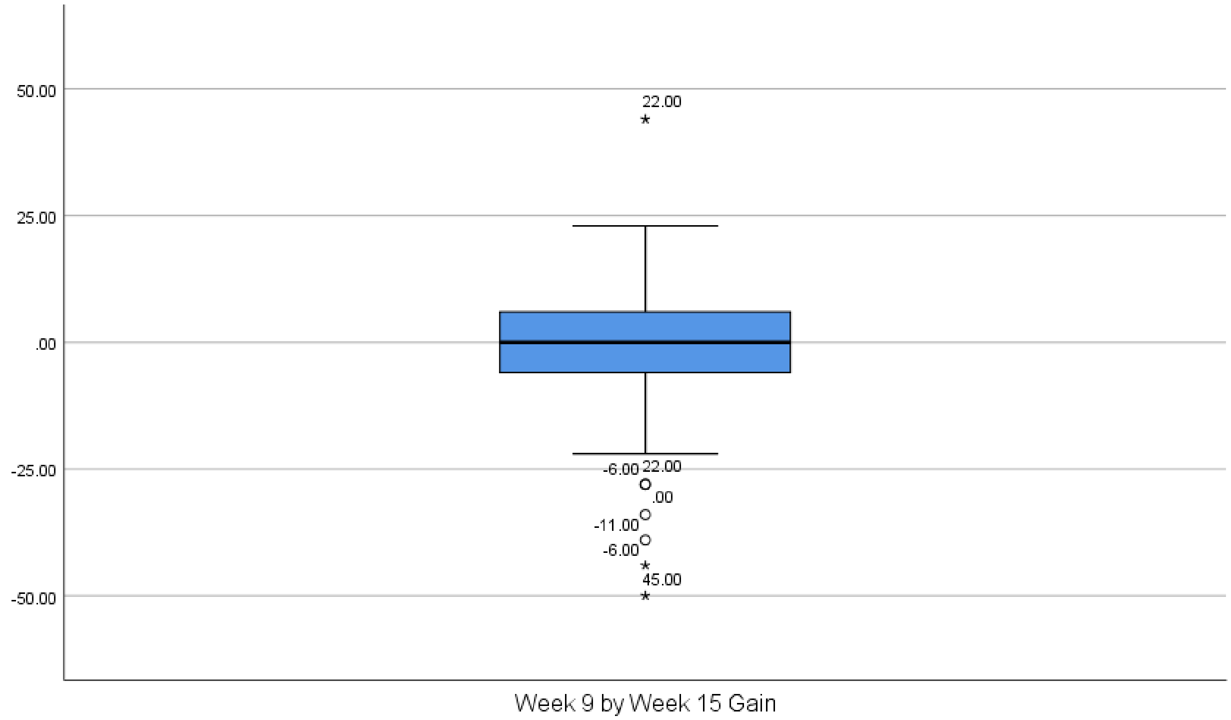
STEM-B Gains from Week 4 to Week 15 (minus the outliers)



Gains for STEM-B Week 9 to Week 15 are noted in boxplot 7. I found traditional (mild) gains for Participants' 22 and 69 above the upper quartile, and for Participants' 5, 14, 86, and 87 who were below the lower quartile. I reviewed the STEM-B scores for Participants' 22 and 69. Participant 22 had positive gain (+45), and Participant 69 had positive gain (+33) for TB to TC. I noted negative gains for Participant 5 with negative gain (-56), Participant 14 had negative gain (-50), Participant 86 had negative gain (-50), and Participant 87 had negative gain (-39) from STEM-B TB to TC. The extreme outliers are noted. See boxplot 7.

Boxplot 7

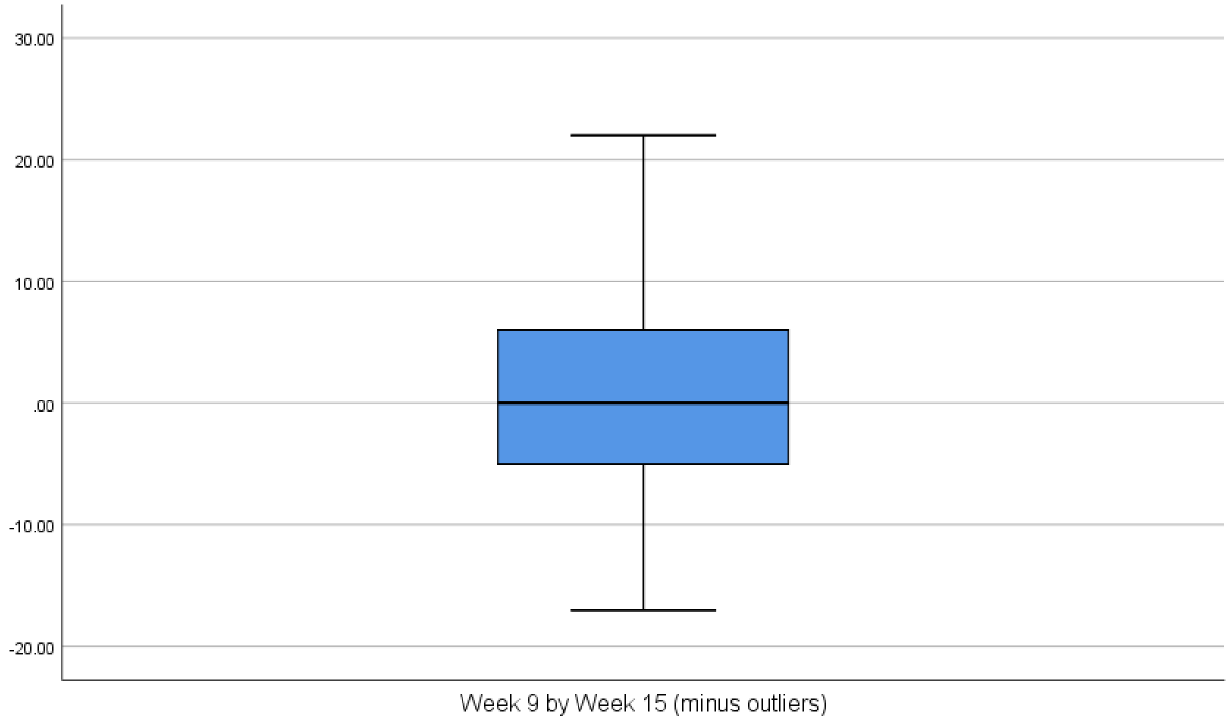
STEM-B Gains from Week 9 to Week 15



I deleted the outliers and re-ran the analysis. Again, there was not a lot of difference in the two, but the output did improve somewhat. See Boxplot 8.

Boxplot 8

STEM-B Gains from Week 9 to Week 15 (minus the outliers)



After I tallied all the gains for STEM-B (TA, TB, TC), I asked simulation faculties to review the gain scores and to look for any correlations such as students in the same clinical group(s) who performed similarly on STEM-B. I was told that no correlation among the students were evident as respondents were as varied among the clinical groups with this measurement as they were with STEU-B measurement. Some students were “A” students, others were “C” students. Respondent ages were varied from traditional to non-traditional, with male and female students scoring positive gain, others with negative or no gain.

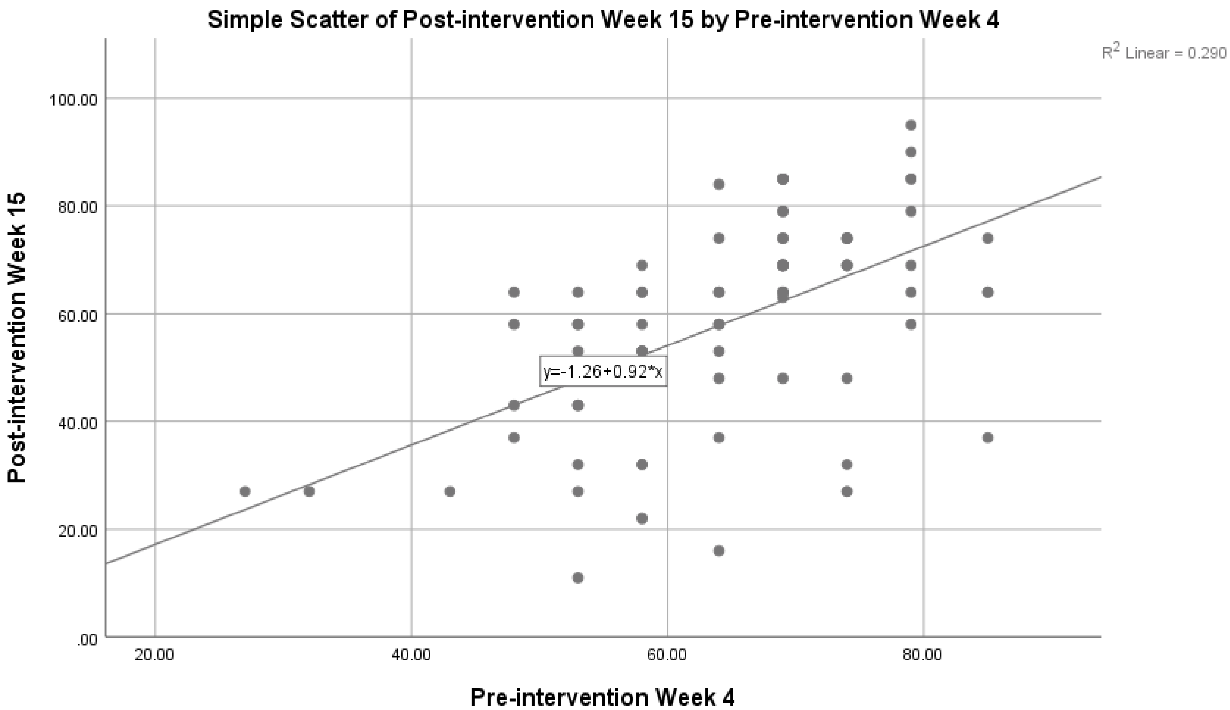
The treatment did not affect everyone to the same degree for STEM-B. The treatment worked positively for some students, negatively for others. I will discuss possible causes for decreases in test scores for some students in Chapter 5. Based on STEM-B gain results, I reject the null hypothesis and accept the alternate hypothesis for RQ2. I will further discuss the speculations that I have about these results in Chapter 5.

Exploratory Analysis

This information is not relevant to RQ1; however, I created a scatterplot (see Scatterplot 1) for pretest and posttest raw scores for the STEU-B measure. For exploratory analysis, I utilized ANOVA with results of STEU-B R^2 used to represent the portion of variance explained by explanatory variables (independent variables) versus the total variance. Pallant (2013) definition for effect size in ANOVA are eta squared totals that vary between 0 and 1 with 0-0.1 (weak effect), 0.1-0.3 (modest effect), 0.3-0.5 (moderate effect), and >0.5 a strong effect. R^2 was 0.29 which is a modest effect for baseline pre-intervention versus post-intervention score. It is quite likely that this upward line reveals a general maturation of the class from Week 4 to Week 15 of the semester.

Scatterplot 1

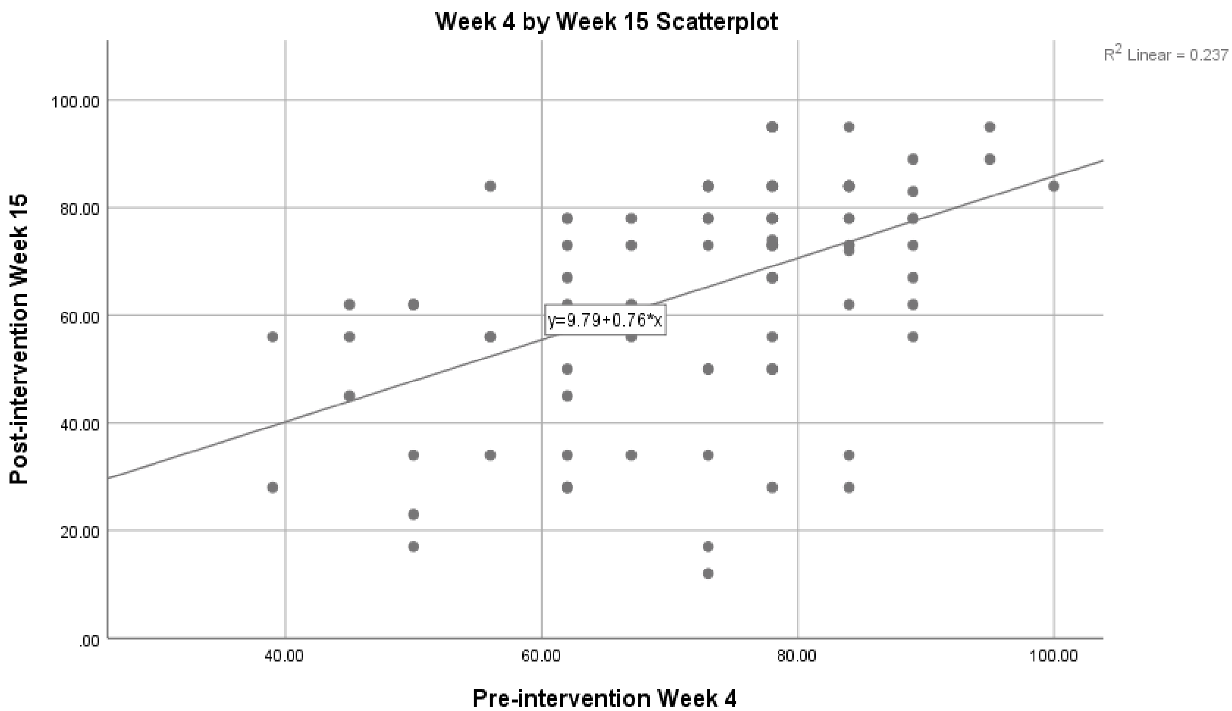
STEU-B Simple Scatterplot with Fit Line for Week 4 by Week 15 Test Scores



This information is not relevant to RQ2; however, I created a scatterplot (see Scatterplot 2) with the Week 4 (TA) and Week 15 (TC) raw scores of the STEM-B measurement. Utilizing ANOVA, the STEU-B R^2 was used to represent the portion of variance explained by explanatory variables (independent variables) versus the total variance. I continued to use Pallant (2013) definition for effect size in ANOVA which is eta squared totals that vary between 0 and 1 with 0-0.1 (weak effect), 0.1-0.3 (modest effect), 0.3-0.5 (moderate effect), and >0.5 a strong effect. For this scatterplot, the STEM-B R^2 was 0.237 which was a modest effect. It is most likely that this upward line is a general maturation of the class from Week 4 to Week 15 of the semester.

Scatterplot 2

STEM-B Simple Scatterplot with Fit Line for Week 4 by Week 15 Scores



Summary

This study was done so that I could find out if the treatment (independent variable) of introducing educational technology (high-fidelity HPS), simulation with stressful situation scenarios, and nurse role playing had any influence on emotion understanding and emotion management test scores (dependent variables). In this chapter I have described data collection including period, recruitment, response rates, and any discrepancies from the plan that was described in Chapter 3. I included a descriptive and demographic sample report that described how representative the sample was of the population of interest and the general nursing population, and I included a description of the treatment and changes from the original plan. I reported statistical analysis findings as well as additional statistical tests of hypotheses that emerged from the analysis of the main hypotheses. My findings were included in tables and charts that represented the results.

Results that I found from the one-way repeated measures ANOVA from STEU-B data indicated statistically significant changes in emotion understanding scores over time, F (1.973, 171.686) = 7.526, p = .001, partial η^2 = .080, however, these changes were decreases in emotion understanding from pre-intervention Week 4 (M = 65.3, SD = 11.1), to mid-intervention Week 9 (M = 62.0, SD = 15.5), to post-intervention Week 15 (M = 59.0, SD = 19.1). When a post hoc analysis with a Bonferroni adjustment was run, the data revealed that emotion understanding scores (skills) were not statistically significantly changed from pre-intervention to mid-intervention (M = 3.28, 95% CI [-0.63, 7.2], p = 0.13), and from mid-intervention to post-intervention (M = 3.03, 95% CI [-0.78, 6.8], p = 0.17), but were statistically significantly changed from pre-intervention to post-intervention (M = 6.32, 95% CI [2.12, 10.5], p = 0.001). R^2 was 0.29 which is a modest effect for baseline pre-intervention versus post-intervention score. As stated previously, I calculated the estimate of the population effect size (partial omega squared or ω^2) to be more specific and compensate for bias. The interventions of stressful simulation scenarios, high-fidelity HPS, role-play elicited statistically significant changes in emotion understanding scores over time, F(1.973, 171.686) = 7.526, p = .001, partial ω^2 = .047. The literature defines this as a small, significant effect size (Kirk, 1996; Volker 2006; Field, 2013), suggestive of a general maturational effect of the class as a whole and unrelated to the simulations. Based on these results, I rejected the null hypothesis and accepted the alternate hypothesis for RQ1.

When I ran a one-way repeated measures ANOVA from STEM-B data, the results indicated statistically significant changes in emotion management scores over time, $F(1.827, 158.965) = 9.981$, $p < .0005$, partial $\eta^2 = .102$ with decreases in emotion management scores from pre-intervention Week 4 ($M = 72.9$, $SD = 13.5$), to mid-intervention Week 9 ($M = 70.9$, $SD = 16.4$), to post-intervention Week 15 ($M = 65.2$, $SD = 21.2$). Then I ran a post hoc analysis with a Bonferroni adjustment which revealed that emotion management scores (skills) were not statistically significantly changed from pre-intervention to mid-intervention ($M = 2.0$, 95% CI [-1.7, 5.7], $p = 0.6$), but were statistically significantly changed from pre-intervention to post-intervention ($M = 7.68$, 95% CI [2.8, 12.5], $p = 0.001$), and from mid-intervention to post-intervention ($M = 5.7$, 95% CI [1.2, 10.1], $p = 0.01$). As previously stated, I calculated the estimate of the population effect size (partial omega squared or ω^2) to be specific and compensate for bias. I found that the interventions of stressful simulation scenarios, high-fidelity HPS, and nurse role-play elicited statistically significant changes in emotion management scores over time, $F(1.827, 158.965) = 9.981$, $p < .0005$, $\omega^2 = .063$. According to my review of the literature, this effect size is medium (Kirk, 1996; Volker, 2006; Field, 2013). Based on the results, I rejected the null hypothesis and accepted the alternate hypothesis for RQ2.

In Chapter 5, I discussed the study results, interpreted the findings, and described the limitations of the study. I included my speculations as to what caused test scores to drop after interventions were implemented. Additionally, my implications of the study and recommendations for future research are included. Chapter 5 concluded with a message that captures the key essence of the study.

Chapter 5: Study Recommendations and Conclusions

Introduction

The purpose of my quantitative, SCD with MBL study was to introduce the treatment (independent variable) of educational technology interventions (high-fidelity HPS), consisting of simulation with stressful situation scenarios and nurse role playing as a strategy to influence emotion understanding and management test scores (dependent variables) at a baccalaureate nursing program in the southeastern United States. I measured EI using two measurements, STEU-B and STM-B. These two measurements are specific for measuring emotion understanding and emotion management, the upper most branches of EI hierarchy that my study was based upon. I ran two repeated measure ANOVAs with Bonferroni corrections to monitor gain scores and to examine the effects of the interventions over the three designated time periods TA, TB, and TC of each individual study participant and to answer the following research questions,

RQ1: Is there a causal relation between the introduction of high-fidelity computer-based simulation (stressful situation scenarios, human patient simulators, and role playing) and emotion understanding skills?

$H_0$1: There is no causal relation between the introduction of high-fidelity simulation (stressful situation scenarios, human patient simulators, and role playing) and emotion understanding skills.

$H_1$1: There is a causal relation between the introduction of high-fidelity simulation (stressful situation scenarios, human patient simulators, and role playing) and emotion understanding skills.

RQ2: Is there a causal relation between the introduction of high-fidelity computer-based simulation (stressful situation scenarios, human patient simulators, and role playing) and emotion management skills?

$H_0$2: There is no causal relation between the introduction of high-fidelity simulation (stressful situation scenarios, human patient simulators, and role playing) and emotion management skills.

$H_1$2: There is a causal relation between the introduction of high-fidelity simulation (stressful situation scenarios, human patient simulators, and role playing) and emotion management skills.

My study tested gain in EI understanding and management (STEU-B and STEM-B) defined by the Salovey and Mayer (1990) theory of EI, using simulations designed according to the NLN-JST (2016). Key findings in my study were results from the one-way repeated measures ANOVA from STEU-B data indicating changes in emotion understanding scores over time, $F(1.973, 171.686) = 7.526$, $p = .001$, partial $\omega^2 = .047$, which was a small effect size as defined by Kirk (1996), Volker (2006), and Field (2013). These changes were contrary to my expectation as scores decreased in emotion understanding from pre-intervention Week 4 ($M = 65.3$, $SD = 11.1$), to mid-intervention Week 9 ($M = 62.0$, $SD = 15.5$), to post-intervention Week 15 ($M = 59.0$, $SD = 19.1$). Participants served as their own control in my study design, and they all received the same conditions for the STEU-B portion of the study. Due to the nature of the SCD with MBL design, only gain scores were interpretable for the RQ’s in my study, and based on

STEU-B gain results, I rejected the null hypothesis and accepted the alternate hypothesis for RQ1.

My key findings from the one-way repeated measures ANOVA from STEM-B data indicated changes in emotion management scores over time, $F(1.827, 158.965) = 9.981$, $p < .0005$, $\omega^2 = .063$, which was a medium effect as defined by Kirk (1996), Volker (2006), and Field (2013). Contrary to my expectation, the changes in emotion management scores decreased from pre-intervention Week 4 ($M = 72.9$, $SD = 13.5$), to mid-intervention Week 9 ($M = 70.9$, $SD = 16.4$), to post-intervention Week 15 ($M = 65.2$, $SD = 21.2$). Participants served as their own control and received the same conditions for the STEM-B portion of the study. As previously stated, only gain scores were interpretable for the RQ's in my study and based on STEM-B gain results, I rejected the null hypothesis and accepted the alternate hypothesis for RQ2.

Interpretation of the Findings

As I explored in Chapter 2, nursing researchers have correlated the ability to understand and manage emotions with greater competence, professionalism, and nursing instinct (Littlejohn, 2013; MacLean et al., 2017; Patillo, 2013; Ray & Overman, 2014). Two nursing studies reported that students who managed emotions had enhanced clinical performance and responded to patients in a caring manner with clearer communication (Marvos & Hale, 2015; Rankin, 2013). Other researchers have reported that SCE provided opportunities to develop higher levels of EI (Adams & Iseler, 2014; Harrison & Fopma-Loy, 2010). However, my study does not support previous research findings for using SCE as a way of developing higher levels of emotional behavioral competency.

Professional nursing is emotional work. Being able to build rapport with patients, co-workers, peers, and managers is a necessary part of being a professional care giver. As a former bedside nurse, I know that caring for others is stressful and may cause joy, sadness, and mental or physical exhaustion all in the same day. Nursing educators' goals should include how to help students mentally frame emotional situations for decision making, and how to self-correct to deal with the stresses of the profession (Fey & Jenkins, 2015; Forneris & Fey, 2018; Morse, 2015; NLN, 2015).

The NCSBN landmark, longitudinal study showed there is substantial evidence that SCE can be substituted for up to 50% of traditional clinical experiences (Hayden et al., 2014). The NCSBN study provided evidence that critical communication, and self-regulation skills can be enhanced by educational-technology-facilitated activities. However, little experimental nursing research has been conducted that examined ways to incorporate emotion understanding and management training effectively into nursing curriculum.

To answer RQ1 and RQ2, I explored using SCE as a valid and useful tool for increasing emotion understanding and management skills in second semester nursing students. SCE has been proven to support nursing students as they move from theoretical to application skills and transition from skills lab to providing real patient care (Aebersold & Tschannen, 2013; Marvos & Hale, 2015; Rajput, 2016; Shinnick & Woo, 2014). One of the strengths of using educational technology, specifically HPS, in my study was to utilize emotional and sensory learning components. Even so, SCE did not prove to be a valid, useful tool for increasing EI understanding and management skills in this group of students.

My treatment (interventions) included SCE scripted with stressful situational scenarios, high-believability HPS, and nurse role playing as I monitored STEU-B and STEM-B gain scores for changes in participants' abilities to understand and manage stressful patient care situations. Contrary to my expectation, gain scores were consistently unchanged or decreased in emotion understanding and management skills for 73% of the students for STEU-B and 61% for STEM-B after the treatment period.

My findings do not support previous research for advancing self-regulation skills such as EI understanding and management with educational technology-facilitated activities. My interpretation of the findings is that most students may not have taken the study seriously and did not put forth a lot of effort to answer STEU-B and STEM-B questions honestly and accurately regarding their level of EI. This is speculation on my part but based on the extreme declines in scores from TB to TC, as high as 58 and 63 points, it is possible that participants chose answers randomly and with little thought. I did not administer the tests, and I have no way to assess for test taker sincerity or authenticity. All I have are gain scores.

One of the theoretical foundations for this study was the Salovey and Mayer (1990, 1997) EI ability model. The goal for the EI portion of my study was for students to learn to recognize the emotional status of self and others during stressful nursing situations and use that information to problem solve and manage behavior. Salovey and Mayer proposed EI as a skill set of mental abilities that could be taught and learned, with the premise that ability to understand and manage feelings about self and others guide thoughts and actions (1990, 1997)**.** My study was based upon the two upper constructs (emotion understanding and management) of the four hierarchical branches in the theory.

The ability to manage stressful patient care situations is a skill set needed for professional nursing work. Nurses who control their own emotions can more readily handle the stressfulness of caring for others (Cherry et al., 2014; El Sayed et al., 2014). I expected students to learn to understand and manage EI skills from participation in the emotionally charged scenarios with nurse role play. They did not. Interpreting the findings has been complex. Adequate performance with the HPS did not transfer into EI knowledge or interpersonal skill knowledge. Similarly, Gilpin (2015) found that use of simulation had resulted in negative learning in aviation and medical training. Based on the gain scores, there was evidence of negative learning in my study.

Higher levels of EI are correlated with good patient care and better patient outcomes (Adams & Iseler, 2014; Ray & Overman, 2014), nursing instinct, and clinical performances (Littlejohn, 2013; MacLean et al., 2017; Patillo, 2013; Ray & Overman, 2014). Simulation faculties reported that student groups performed at the expected level. Yet, good patient care of the HPS with a good outcome did not correlate with higher levels of EI in my study. Dean et al. (2016) warned that nursing educators should acknowledge the limitations of machine patients for teaching the ability to understand and share the feelings of others. Students’ responses to the voice-over technology of the HPS may have been superficial instead of truly caring.

The other theoretical foundation and overview for the study was inspired by the NLN-JST (Jeffries, 2016). Nursing researchers have found that simulation-based learning encourages students to practice communication and technical skills in a safe environment with the goal of learning how to think and act like a real nurse (Gore & Thomson, 2016). NLN/JST includes seven variables; active learning, faculty-student interaction, collaboration, high expectation, diverse learning, time on task, and feedback (Hallmark et al., 2014; Jeffries & Rogers, 2012; Jeffries, 2016).

The goal of using HPS in my study was to utilize the emotional and sensory components of learning. NLN-JST (Jeffries, 2016) theory was appropriate for guiding EI skill building techniques through different combinations of SCE. Using HPS and SCE in a simulation laboratory is active learning that encourages decision making skills (Bailey, 2017). The team approach encourages peer collaboration, communication skills, nurse thinking, and understanding (Hallmark et al, 2014). Other outcome variables supported by the nursing literature for simulation include learning (knowledge), skill performance, learner satisfaction, critical thinking, and self-confidence (Adamson & Rodgers, 2016).

Kunst, Mitchell, and Johnson (2017) found that HPS use in various clinical scenarios encouraged emotional management, and augmented students' capacity for coping with complex patient challenges. Gore and Thomson (2016) noted that high fidelity (believability) HPS provided a high degree of accuracy when compared to an actual phenomenon. The design of my study was based on those premises. I chose to use SCE with high fidelity HPS to help students attain greater levels of EI while coping with stressful patient situations. Unlike Kunst et al., (2017) and Gore and Thomson (2016), most of the students in my study did not build emotion understanding and management skills as measured by STEU-B and STEM-B. This may be due to lack of test taker effort, or it is possible that the simulation technology resulted in negative learning as Gilpin (2015), warned about.

According to simulation faculty at the school of interest, all student groups performed technical skills and bedside care well during the stressful patient scenarios, which led to good patient outcomes for the HPS at the end of the simulation. Dean et al., (2016) warned, it is possible for simulations to be realistic, yet students go through the mechanics without building higher level skills, such as those required of EI. As stated previously, students in my study performed well during the SCE according to reports from simulation faculty; however, most of the students did not build emotion understanding and management skills as measured by STEU-B and STEM-B. According to gain scores, using stressful scenarios did not teach a deep cognitive/emotional lesson as I had hoped. Reasons for the outcomes are unclear and I can only speculate that the overwhelming negative gains may have resulted because of timing of the exams, cognitive fatigue, or insufficient test taker effort. My findings are consistent with Dean et al., (2016) who found that simulation, no matter how believable, may not lead to higher skill attainment.

I can only speculate why my findings differed from these nursing researchers. First, there are multiple constructs of EI and multiple testing instruments. This makes comparing study findings a complex work much like comparing apples to oranges. However, I believe that some students put forth more effort while answering EI measurement questions than others. This seems logical based on the extreme outliers noted from the gain scores. Also, the timing of administering STEU-B and STEM-B for TC was a week before final exams, and students may have been cognitively fatigued by that time of the semester. Another consideration is that experiential learning and reflection are foundational for developing EI skills. Post-simulation debriefing may not have been equally effective for all clinical groups, impacting reflection, and impacting EI development.

Interestingly, student evaluations were positive for technical and communication skills. Simulation faculties reported that 100% of students provided patient care to the HPS at the expected level for second semester nursing students. Yet, only 11% had consistent positive gains for STEU-B and STEM-B during treatment period and post-treatment. My conclusion is that performing technical and communication skills at the expected level during stressful simulation scenarios with HPS does not transfer into attainment of EI skills (knowledge) as measured by STEU-B and STEM-B. The treatment did not affect every participant to the same degree, or to the same direction. STEU-B and STEM-B are not knowledge tests per se, but they do measure abilities for understanding and managing emotion in stressful situations.

During the treatment phase of the study, STEU-B gain scores were positive for $N = 29$, no gains for $N = 17$, and negative gains for $N = 42$. STEM-B gain scores were positive for $N = 25$, no gains for $N = 17$, and negative gains for $N = 46$. There was not a correlation that I could find in the study results for the individuals who consistently had positive gains, no gains, or negative gains at Time A, Time B, or Time C. Participants'

(33, 34, 39, 46, 48, 70, 84, 85, & 74) had consistent positive gains for both STEU-B and STEM-B measurements during the treatment period. For these 9 students, the results are consistent with Adamson & Rodgers (2016), and Kunst et al., (2017) study's findings for positive relationships with the use of SLE's and knowledge attainment. However, most participants did not. Participants' (20, 62, 64, 77, & 83) consistently had no gains during the treatment period for STEU-B and STEM-B. I cannot explain why this occurred except to speculate that these students may have somehow remembered previous answers or memorized their answers from Time A and marked STEU-B and STEM-B exam answers the same each time. Contrary to expectation, Participants' (1, 7, 8, 9, 10, 14, 16, 35, 37, 40, 52, 53, 56, 60, 61, 67, 68, 80, 82, 83, 84, 86, 87, & 88) consistently had negative gains during the treatment period for emotion understanding and management ability. I can only speculate that consecutive negative gains may have been due to boredom, exam timing, cognitive fatigue, or insufficient test taker effort. These findings are consistent with Shinnick and Woo (2014), and Centrella-Nigro et al. (2016) who also found that SCE's do not affect knowledge attainment. Interestingly, Marvos and Hale (2015), found that emotion management was positively and significantly correlated to clinical performances of second through fifth semester nursing students.

This study extends previous knowledge about SCE and the influences or lack thereof for knowledge attainment. In searching the literature, I found that schools of nursing are turning to HPS to assist with training therapeutic communication skills (Brown, 2015; MacLean et al., 2017). As a nursing veteran, I know that therapeutic communication between patients, nurses, and other members of the healthcare team are essential to providing care, reducing errors, and enhancing patient safety (Rosen & Provost, 2014). To be an effective practicing nurse, motivation and self-control are also essential to clinical performance (Marvos & Hale, 2015). I believe nurse educators need to assist learners to move past applying facts and move toward sense-making processes.

According to literature, increasing EI skills prepares students to deal with patients and their families through better communication (Marvos & Hale, 2015; Rankin, 2013). However, the gap still exists for a useful, effective instructional strategy, particularly EI understanding and management skill building in nursing curricula. Typical nursing schools, including that of the school of interest, do not routinely include EI training in curricula. Researchers have suggested that inclusion of this training increases self-awareness and nursing performances (Beauvais et al., 2014; Kunst et al., 2017; Lewis et al., 2017; Michelangelo, 2015; Ranjbar, 2015; Shanta & Gargiulo, 2014).

Clinical facilities allow student observations, but many do not allow students to be in the role of the nurse. This often leads to a struggle when new graduate nurses are transitioning to professional nursing. Educational technology such as high-believability HPS is promoted as a safe learning environment where students are placed in the role of the nurse and can develop competence through repetition and by learning from their mistakes (Richardson & Clamen, 2014).

Using face-to-face simulation mannequins during this study was an opportunity for the students at the school of interest to practice technical and communication skills, and nurse role playing. High-fidelity simulation with HPS has been found to be a useful tool to enhance clinical learning, critical thinking skills, and improve students' entry level clinical judgment (Eikara & Baykara, 2017). Educational technology, specifically the high believability HPS used in this study was a teaching strategy that used experiential learning conducted in a simulation lab designed to look like an actual patient hospital room (Shairet et al., 2015). According to simulation faculties at the school of interest, all study participants performed at a satisfactory level for second semester nursing students and passed the clinical course.

Educational technology professionals must have a commitment for experiential learning to promote deep learning that can be applicable in real world contexts (Januszewski & Molenda, 2008). I believe this study contributes to educational technology because of the positive feedback from simulation faculties who said their students advanced their technical and communication skill sets during simulations. Technology facilitated learning improved the efficiency and effectiveness of second semester students. Several nursing students stated (on simulation evaluation) they had learned more in simulation classes than in actual clinical settings during the second semester. This suggests that the simulation technology experiences led to deeper levels of understanding for some participants. However, the technology did not lead to deeper levels of EI for most participants.

One of the outcomes of this study was to find out if this simulation design was vulnerable to the weakness for EI learning, and what impact simulation learning had on EI. I believe my study contributes to current nursing research because of the unexpected (negative) results of gain scores. By weeding out irrelevancies, this study may open the door for nursing educators to continue to search for a useful, effective strategy for teaching EI understanding and management skills in curricula.

Limitations of the Study

This study was no exception to the limitations that are inherent for all research designs. This study was limited to one baccalaureate nursing program in southeastern United States, a sample of convenience, and may not be representative of baccalaureate nursing programs in other geographic areas. Any replications of this study using more than one baccalaureate program may find different results. The sample size of 88 participants may have limited the study findings. Study replication with a smaller sample or a larger sample may produce different results.

Another limitation of the study was that I expected students to do their best; however, insufficient test taker effort may have limited the study findings. Participants completed tests on three different occasions over a 12-week period and may have suffered from cognitive and or test fatigue. Timing of testing was a threat to internal validity as participants may have become familiar with STEU-B and STEM-B responses. Additionally, Time C was the last week of the semester which was a week before final exams. The stresses of this time of the semester may have impacted effort, but I cannot draw any conclusions about the effect this may have had on the STEU-B and STEM-B scores for Time C.

While students should have answered the STEU-B and STEM-B questions honestly and accurately regarding their level of EI, I cannot guarantee that is what transpired. Participants may have faked or chosen answers because of social desirability.

Participants may have hurriedly marked answers without reading questions thoroughly. Findings of a decline in emotion understanding and management scores at Time C in the study called me to question test/re-test (TRR) reliability. However, the literature review assures that STEU-B TRR is acceptable (r = .70), (Allen et al., (2014), and STEM-B TRR (r = .87), (Allen et al., (2015).

Simulation classes involve experiential learning. Students must maintain patient confidentiality about what happens to the HPS during the SLE just like they must maintain confidentiality with a real, human patient in the hospital environment. All study participants signed a confidentiality statement prior to the first simulation class; nevertheless, I cannot guarantee that all study participants honored the confidentiality agreement for the 12 weeks of the treatment period. Therefore, a limitation for independence of observation may have existed.

Simulation classes at the school of interest are structured to be consistent for the delivery of scenarios with fidelity of implementation equally high for all simulation/clinical groups. I encouraged simulation faculty to follow the scripted material for the scenarios to reassure the same learning opportunities for all students in simulation classes. I monitored some of the simulation classes, however, I was unable to monitor all of them. It is unknown if all simulation faculty followed the protocols for class during the twelve weeks of this study, and I must consider this as a possible limitation for the study findings.

Recommendations

Few researchers have explored whether using HPS in a stressful nursing scenario produces any changes in emotion understanding and management skills in nursing students. Duplication of this study as a mixed-method study by adding a qualitative component can provide further insight into nursing student's perspectives about emotional learning and the efficacy of a simulation. A qualitative component would allow the researcher to look for themes and explore if student experiences with stressful scenarios and HPS strengthens their EI to help them control their personal and professional relationships better. This would provide a more open-ended source of data collection for EI understanding and management skill building.

A study design that requires a control group would be helpful to discern if gain scores are due to actual changes in emotion understanding and management skills, as opposed to maturational changes of the class. Perhaps a control group design that includes more participants, over a longer period, could identify insights into teaching deep cognitive/emotional lessons. Another recommendation would be to include more than one baccalaureate nursing program into a duplication of this study. Duplication in additional regions would enhance the generalization of the findings to other nursing schools in the United States. Jeffries et al. (2016), found that age, gender, self-confidence, anxiety levels, and degree of preparedness for role play affect the simulation experience. I recommend adding a demographic section with age, sex, and ethnicity included on each STEU-B and STEM-B test form to see how the variables change the outcomes.

Educational technology promotes promotion of deep learning based on rich experiences applicable to real world situations (Januszewski & Molenda, 2008). A researcher might consider variables such as participant gaming experiences, any workplace experience/training with technology, digital literacy, and any generational expectations about learning through/with technology. These educational technology variables are appropriate for further study about the influences or lack thereof for simulation learning and changes in EI skill building. Perhaps integrating EI educational activities before, during, and after more formal EI training might promote nursing students to understand and manage their emotions better and transfer the new skills into the nursing work force. It would be interesting to see if these variables would promote deep learning EI in nursing students in general.

Lastly, I believe that timing of the STEU-B and STEM-B measurements were critical to the study findings. If researchers duplicated this study, the measurements could be spread out over two semesters. One of the threats to internal validity in this study was the timing of testing. It is possible for participants to become familiar with tests and remember responses for later testing. It is possible for students to become bored with frequent test taking. It is possible there was minimal test taker effort. I recommend longer intervals between testing dates by the researcher to discourage the likelihood of participant test fatigue, cognitive fatigue, and/or insufficient test taker effort, and serve as a response/method to address the threat to interval validity (testing) for Time A, Time B, and Time C.

Implications for Practice and Further Research

Nursing school graduates must be competent in the technical skills of nursing to meet the physical needs of patient care and competent to address the emotional needs as well. Caring for other people is stressful and nurses who can control their emotions have greater control over that stress (Cherry et al., 2014; El Sayed et al., 2014). Influencing emotion understanding and management skills, may help students deal with the stress and social complexities of professional nursing.

The implications of the study were for the future design of high-fidelity simulation with HPS used as an instructional strategy for influencing emotion understanding and management skills. The study findings were contrary to expectation as changes in emotion understanding and management scores decreased for most participants as the study progressed. This study adds to the current knowledge base of nursing education by suggesting that stressful simulation scenarios, high-fidelity HPS, and role-play will only elicit emotion understanding and management skill building for a limited/minimal number of second semester nursing students.

Scenarios designed for this study coincided with the course textbook for students to practice caring for individuals with various disease processes. The scenarios were not specifically designed to influence EI, however, I hoped they would influence EI coincidentally. The scenarios challenged students to care for the HPS, whose condition was deteriorating, while dealing with a disruptive family member, or culturally diverse family member, or disruptive neighbor, or disrespectful physician. These situations were realistic and representative of the stresses and social complexities of professional nursing.

By placing students in an emotionally charged situation, I hoped that the situated cognitive framework and the application of high-believability HPS would bridge students from theory-based knowledge to practice of EI skills. According to simulation faculties, students performed communication and technical skills at an acceptable level. Even so, study findings did not imply that the use of these scenarios with HPS was a practical instructional strategy for influencing EI understanding and management skills of second semester students.

This study broadens previous work about educational technology with high-fidelity HPS because it provided opportunities to transfer knowledge (technical and communication skills), enhanced by the learning environment that resembled a hospital room, calling a physician, giving report, preparing medications, and intervening in stressful situations. By setting up this type of learning environment, students were more likely to transfer learning because students participating in the scenarios had the opportunity to experience patient consequences based on their decisions. According to Bradshaw and Hultquist (2017), high believability simulation environments structured in the cognitive framework, encourage higher order thinking skills over rote memory. By using the higher fidelity simulators for this study, students had to reach higher-level objectives as they prioritized care and made critical decisions about physical condition(s). Students performed at the desired level for second semester nursing students. All the same, the majority did not reach higher-level thinking about emotion understanding and management.

The findings of this study revealed the limitations of simulation technology, particularly in building emotion understanding and management skills in nursing students. Nonetheless, substantive research has indicated that higher levels of EI are necessary to prepare students to deal with the emotional stressors and social complexities of professional nursing. Further research is essential to investigate an effective, relevant method of EI instruction in nursing curricula.

Conclusion

Nursing researchers have been examining the impact of EI in nursing and nursing education for decades (Codier & Odell, 2014), and have found that EI impacts patient care (Adams & Iseler, 2014), patient outcomes (Marvos & Hale, 2015), and professional and personal relationships (Codier & Odell, 2014; Rajput, 2016). Lack of EI skills has been correlated with patient dissatisfaction, negative patient outcomes, and litigation. Today's healthcare consumers are physically and emotionally complex. New graduate nurses struggle with the transition from student to professional nurse. To provide holistic care, the new nurse graduate needs cognitive and emotional intelligence to manage the obligations, stresses, and social complexities of professional nursing (Beauvais et al., 2011; Benson et al., 2010; Por, Barriball, Fitzpatrick, & Roberts, 2011). Nursing educators have a responsibility to help students develop EI skills to promote professional and personal relationships, and better patient outcomes.

For more than a decade, educators have promoted simulation as a teaching methodology for preparing nursing students for practice. Simulation provides a safe learning environment that encourages students to develop competence through repetition, and learn from their mistakes (Richardson & Clamen, 2014). Simulation is a form of reflective learning that promotes strong emotional responses in students (Willhaus, 2016), and helps learners find meaning from the experiences for future decision making (Forneris & Fey, 2018). Using educational technology (SLE with HPS) provided students at the school of interest with the opportunity to perform as the nurse, make nursing decisions, and learn/practice important communication skills.

The findings in my study have identified a deficiency in simulation technology for improving EI understanding and management skills. This is consistent with other studies that have found negative or mixed results for influencing EI. My study suggests that simulation with high-believability HPS is not always simple and straightforward. Occasionally, well-structured simulation scenarios, implemented with good intent, result in negative learning.

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Appendix A: Brief Explanation of Study

There is a problem in nursing education related to the potential threat of a lack of emotional intelligence in nurses. Researchers have found that nursing students with higher emotional intelligence scores, specifically emotion understanding and management, show greater competence addressing client needs, have increased professional behavior, nursing instincts, and clinical performances. As part of my dissertation research project, I am conducting a study regarding emotional understanding and emotional management. The findings in this study will assist with curriculum guidelines for teaching emotion understanding and management skills for 2nd semester nursing students. Study participants will take two brief multiple-choice tests (paper and pencil) that predict emotional understanding and emotion management. The tests will be administered on three occasions; 1) week three of the semester, 2) week 9 of the semester, and 3) week fifteen of the semester. I will monitor for any changes to anonymous student opinions over the course of the semester.

- The first test, **STEU-B** assesses emotion understanding. The test-taker is asked to choose which of five emotions is most likely to result from an emotional situation. The test consists of 19 multiple-choice questions and will take approximately 15-20 minutes to complete. There are no right or wrong answers on the test, only the opinion of the test taker.
- The second test, **STEM-B** assesses emotion management. The test-taker is asked to select the most effective response to manage an emotional situation.

> This test consists of 18 multiple-choice questions and will take approximately 15-20 minutes to complete. There are no right or wrong answers on the test, only the opinion of the test taker.

I am requesting approximately 30 minutes (15 minutes per test) of your time on three separate occasions during the semester. By signing the informed consent, allows me, Neena W. Jones, access to your answer sheets from the above described paper and pencil tests. However, your personal identification CWID (800 #) will be changed to a code name/number by your clinical instructor prior to taking your tests and I will not know your identities. Tests will be answered anonymously using your code name/number and kept strictly confidential in a fire/flood proof safe in my home. Data that are electronically reproduced will be saved in a private file in my private iCloud account. In this way, no identifying information will be associated with any of the individuals in the study.

Appendix B: Demographic Data

Code name/number provided by your Simulation Instructor ___________________

Please check which of the following describes you.

1. My age is:

_____19-30 _____31-45 _____46-60 _____over 60

2. My gender is:

_____female _____male

3. My ethnicity is:

____Caucasian ____African-American ____Asian ____Other

Thank you for your participation in this research!!

Appendix C: Request for STEM-B Use

Greetings Dr. MacCann,

My name is Neena Jones and I am Clinical Assistant Professor at Western Kentucky University and a PhD Education (Educational Technology) student at Walden University. I am currently writing my proposal and would like to inquire about the STEM-B.

I have found through a review of the literature that students who are more emotionally intelligent will more likely graduate from nursing school and stay in the nursing profession. There is currently a nursing shortage and as a nursing professor, I have a great incentive to increase the EI scores of my students to increase retention and graduation rates and promote nursing profession longevity.

My research study at Walden University is titled, "Bridging the Emotional Intelligence Gap in Nursing Education Through Simulation Learning." The purpose of my repeated measures quantitative study is to 1) investigate the influence of interventions with nursing scenarios, case studies, Human Patient Simulators, and strategies to improve EI self-management, social awareness, and relationship management on the EI test scores of second semester students in a Kentucky baccalaureate nursing program during a fifteen week semester, 2) investigate the relationship between EI scores of participants who pass the Medical-Surgical I course versus those who do not, 3) and compare EI scores of participants in relation to their age and gender for differences.

From reading about STEM-B, I feel that it would be a great fit for my study. I have tried to find STEM-B online, but thus far, I have not been unable to do so. May I purchase the exam online or is there a company that distributes the test for researchers? I look forward to all responses from you regarding the use of STEM-B.

Best,

Neena Jones

From: Carolyn MacCann <carolyn.maccann@sydney.edu.au>
Date: Wed, Oct 21, 2015 at 6:48 PM
Subject: RE: Using STEM-B for my research
To: Alex Patterson <dap.patterson93@gmail.com>
Cc: "rroberts@proexam.org" <rroberts@proexam.org>

Hi Neena,

The test is not commercial so there is no company or purchasing fee, and it is freely available for researchers to use. I have given APA PsychTESTS the attached file, but I am not sure how accessible they make this.

I have also attached the brief STEU, just in case you wish to look at this also, and the journal articles outlining the development of the original STEM and STEU (this was my PhD dissertation!) and then the short versions.

Cheers

Carolyn

Greetings Dr. Roberts,

My name is Neena Jones and I am Clinical Assistant Professor at Western Kentucky University and a PhD Education (Educational Technology) student at Walden University. I am currently writing my proposal and would like to inquire about using the STEM-B.

I have found through a review of the literature that students who are more emotionally intelligent will more likely graduate from nursing school and stay in the nursing profession. There is currently a nursing shortage and as a nursing professor, I have a great incentive to increase the EI scores of my students to increase retention and graduation rates and promote nursing profession longevity.

My research study at Walden University is titled, "Bridging the Emotional Intelligence Gap in Nursing Education Through Simulation Learning." The purpose of my repeated measures quantitative study is to 1) investigate the influence of interventions with nursing scenarios, case studies, Human Patient Simulators, and strategies to improve EI self-management, social awareness, and relationship management on the EI test scores of second semester students in a Kentucky baccalaureate nursing program during a fifteen week semester, 2) investigate the relationship between EI scores of participants who pass the Medical-Surgical I course versus those who do not, 3) and compare EI scores of participants in relation to their age and gender for differences.

From reading about STEM-B, I feel that it would be a great fit for my study. I have tried to find STEM-B online, but thus far, I have not been unable to do so. May I purchase the exam online or is there a company that distributes the test for researchers? I look forward to all responses from you regarding the use of STEM-B.

Best,

Neena Jones

PhD Education (Ed Tech) Student - Walden University

10/22/15

From Richard Roberts <RRoberts@proexam.org>

to Carolyn, Alicia, me

Neena

Please call me Rich. I think Carol got your questions ... Having said this you should know there are ways of contextualizing the assessment and that, for various reasons, nursing is a domain I have interest in (was just visiting with the folks from Ascend in Kansas City)

So, let me know also if you'd like a Skype call ... Might be worth doing

Rich

Sent from my iPhone

Appendix D: Permission Letter

7/16/2019

Hello Neena.

Your request to use the figure "NLN Jeffries Simulation Theory" in your dissertation "Simulated Clinical Experience: An Investigation of Emotion, Understanding and Management" at Walden University is granted for print and e-formats. Any website posting must be password-protected.

I have attached a copy of our Terms and Conditions. Please consider those, and this email, your grant of permission.

Thank you.

Caren Erlichman
Wolters Kluwer Permissions

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www.lww.com

Appendix E: BlackBoard Announcement to Participants

Attention Medical-Surgical I (N341-N342) students,

As part of my dissertation research project, I (Neena W. Jones) am conducting a study regarding emotional understanding and emotional management. The findings in this study will assist with curriculum guidelines for teaching emotion understanding and management skills for 2nd semester nursing students. Study participants will take two brief multiple-choice tests (paper and pencil) that predict emotional understanding and emotion management.

The tests will be administered on three occasions; 1) week three of this semester, 2) week 9 of this semester, and 3) week fifteen of this semester. I will monitor for any changes to student emotion understanding and management skill scores over the course of the Fall 2018 semester.

- The first test, **STEU-B** assesses emotion understanding. The test-taker is asked to choose which of five emotions is most likely to result from an emotional situation. The test consists of 19 multiple-choice questions and will take approximately 15-20 minutes to complete. **There are no right or wrong answers on the test**, only the opinion of the test taker.

- The second test, **STEM-B** assesses emotion management. The test-taker is asked to select the most effective response to manage an emotional situation. This test consists of 18 multiple-choice questions and will take approximately 15-20 minutes to complete. **There are no right or wrong answers on the test**, only the opinion of the test taker.

Voluntary Nature of the Study:
This study is voluntary. Everyone will respect your decision of whether you choose to be in the study. No one at Western Kentucky University will treat you differently if you decide not to be in the study. If you decide to join the study now, you can still change your mind later. You may stop at any time.

Risks and Benefits of Being in the Study:
Being in this study would not pose risk to your safety or wellbeing. Being in this study will benefit future nursing students because 2nd semester curriculum decisions will be made based on the study results.

Payment:
No compensation will be provided for participation.

Privacy:
Any information you provide will be kept confidential and anonymous. I will not require your name or any identifiers on the study reports.

Data will be kept secure by de-identifying student CWID (800) numbers with a new anonymous code name/number by your simulation instructor.

Paper data will be kept in a locked fire/flood proof safe in my home. Electronic data results will be saved in a password protected secret file on my private home computer in a private iCloud account.

Thank you for consideration in participating in this study.

Neena W. Jones RN, MSN

Appendix F: Codebook and Coding Procedure

The 19 items on the STEU-B participants choose one of the 5 multiple-choice emotions most likely to result from the given situation. STEU-B assesses emotion understanding, a key component of emotional intelligence. IBM SPSS (version 20.0.00) will be used to measure the results. The following SPSS Syntax will be used to score the 19 items which are STEU01, STEU02, STEU03, STEU04, etc. up to STEU 19 and responses are coded as A=1, B=2, C=3, D=4, and E=5. Example: RECODE STEU01 (1=0) (2=1) (3=0) (4=0) (5=0) INTO STEU_R01, etc. up to RECODE STEU19 (1=1) (2=0) (3=0) (4=0) (5=0) INTO STEU_R19.

STEM-B is a situational judgment instrument, consisting of 18 items utilizing multiple-choice format. Participants choose the most effective response for the person in the given situation. Participants are instructed to choose the most effective response for the individual in the situation. Participants are instructed not to choose what they would necessarily do, or the nice thing to do. SPSS syntax used to score the test assumes that the variable names for the items are STEM01, STEM02, STEM03, STEM04 etc. up to STEM18, and that the responses are coded as A=1, B=2, C=3, and D=4. Example: IF STEM01 = 1 STEM_R01 = 0, etc. up to IF STEM18 = 4 STEM_R18 = 0.083333333.

To obtain gain scores from STEU-B and STEM-B, pretest scores will be subtracted from posttests scores. Differences (changes) are considered gain whether they are negative or positive changes (Sukin, 2010), and will be measured between the three testing dates. Gain scores will be obtained to examine overall effects of interventions (high-fidelity HPS, stressful scenarios, role play) over the three designated time periods TA, TB, and TC of each individual study participant and to answer research questions.