EXAMINING THE IMPACT OF EXPERT MODELING VIDEOS ON NURSING STUDENTS' SIMULATION COMPETENCY

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by

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EXAMINING THE IMPACT OF EXPERT MODELING VIDEOS ON NURSING STUDENTS' SIMULATION COMPETENCY (192 pp.)

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The purpose of this study was to examine the impact of expert modeling videos on nursing students' simulation competency. Students in the course Nursing *of Adults* were provided with a nursing process video in the prebriefing period of their scheduled simulation on Congestive Heart Failure (CHF). The experimental group (n = 22) viewed an expert modeling video, while the control group (n = 22) viewed a video discussion. Immediately following the simulation, students participated in a debriefing.

Student simulation outcomes were measured by the *Creighton Competency Evaluation Instrument* (CCEI). Prior to students debriefing session with simulation and clinical faculty, students individually completed a *Video Enjoyment Survey* to assess their enjoyment of the video interventions.

The results found that students in the experimental group performed significantly better in the CHF simulation when evaluated by the CCEI (p=0.001). Evaluation of four domains found a significant difference between control and experimental in the domains of *Communication* (p = 0.009) and *Patient Safety* (p = 0.002). Descriptive trends identified that the experimental group performed one or more levels higher in 11 of the 17 domain behaviors. While no statistically significant differences were found between groups on the *Video Enjoyment Survey*, when analyzed by factor, the experimental group had a statistically significant difference in the factor of engagement (p = 0.005).

This study identified that expert modeling videos may be used in nursing education to improve students' overall simulation competencies and engagement in learning. This contributes to the body of literature on how nursing educators can use expert modeling videos to improve students' clinical competency.

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CHAPTER I

INTRODUCTION

Nursing education is experiencing a "crisis in competency" (Kavanagh & Szweda, 2017, p. 57). In fact, large scale research analyzing the ability of new graduate nurses to apply knowledge through problem-based assessments identified that only 23% of those respondents were able to accurately identify changes in patient condition, raising concerns that new nurses are unable to perform complete assessments (Kavanagh & Szweda, 2017). Current nursing education curriculum is designed to prepare students theoretically and clinically to successfully pass a comprehensive licensure exam; however, once in practice, these students are failing entry-level competency (Benner, 2015). This deficiency has been identified as the *academic-practice gap* or the inability of nursing students to transfer theoretical learning to clinical practice (Huston et al., 2018).

Attempts to mitigate the academic-practice gap have largely focused on improving students' clinical experiences (Huston et al., 2018). In nursing education, students are provided with theoretical knowledge within the classroom and the opportunity to connect theory to practice through hospital-based clinicals and simulation experiences (Kim et al., 2016). Hospital-based clinicals offer students the opportunity to perform patient care under supervision of clinical faculty (Heidari & Norouzadeh, 2015). Simulation experiences offer real-life clinical scenarios in a simulated environment, allowing novice nurses to safely develop clinical skills (Kim et al., 2016; Lavoie et al., 2017). While both of these experiential-learning environments provide students with opportunities to develop clinical competencies, several challenges exist.

Hospital-Based Clinical Practice

The current model of hospital-based clinical practice has proven ineffective, finding that students are provided with very few learning experiences to help build competency in practice (Fusner & Melnyk, 2019). There are several factors contributing to the deterioration of effective hospital-based clinical experiences for nursing students, including the fact that educational institutions are less able to accommodate students due to the closure or merging of hospital facilities (Cobbett & Snelgrove, 2016; Mannix et al., 2006). This, in turn, leads to increased competition for limited clinical placements (Raman et al., 2019), with many sites limiting what nursing students can and cannot do (Young-Hee et al., 2018). This problem is then further exacerbated by increased student admissions, leaving nursing programs with an excess of students and not enough clinical opportunities (Guise et al., 2012; Murray et al., 2008; Wilford & Doyle, 2006). Paradoxically, while increased student admissions are necessary to combat the existing nursing shortage (AACN, 2021), the shortage itself further stresses clinical faculty as faculty-to-student ratios may climb as high as 1:12 (AACN, 2005). This leaves little time to promote clinical learning, determine areas of strength and weakness in assessments and care, and to help the student develop clinical judgment (Langan, 2003).

Nursing Simulation

Due to the limitations imposed on education by current issues within hospital-based clinical practice, simulated learning experiences have been driven to the forefront of experiential learning research to help bridge the academic-practice gap (Huston et al., 2018). In fact, when comparing hospital-based clinical experiences to simulation, Hayden et al. (2014) found that experiential learning through simulation could replace up to 50% of clinical experiences without a reduction in overall knowledge, nursing program completion, or *National Council Licensure Examination* (NCLEX) passage rates.

The simulation experience itself is designed to amplify clinical experiences by replicating hospital-based clinical practice through students' purposeful interaction with a simulated patient (Gaba, 2004). Research has identified many benefits to supplementing clinical practice with simulation, including the reduction of clinical anxiety (Cordeau, 2010; Yockey & Henry, 2019), improved self-efficacy and self-confidence (Cardoza & Hood, 2012; Lucas, 2014), enhancement of communication (Karlsen et al., 2017) and development of clinical judgment (Johnson et al., 2012).

However, despite these findings, simulation falls short in its goal of developing clinically competent students, as many continue to struggle connecting theory to practice (Page-Cutrara & Turk, 2017; Scalise, 2019). Recent research evaluating the ability of students to meet the minimum simulation competencies for patient care has found that students continue to fail in the area of patient assessment (Al-Ghareeb et al., 2019; Cooper et al., 2012). One study showed that students were able to meet only 60% of the prescribed simulation assessment objectives (Al-Ghareeba et al., 2019); a second found that only 54% of students were able to recognize and properly treat a patient with a deterioration in condition (Cooper et al., 2012). Students also report feeling that they lack sufficient information in order to diagnose and address the problem (Titzer et al., 2012), suggesting that they do not know "where to begin or what to do" (Elfrink et al., 2009, p. 84).

Attempts have been made—with varying levels of success—to enhance simulation practices through additional work within the different phases of stimulation, including the presimulation period, prebriefing phase, simulation scenario, and debriefing phase (Aronson et al., 2013; Dileon et al., 2020; Jarvill et al., 2018; Kang, 2018). However, despite these efforts, undergraduate nursing students continue to struggle to meet entry-level competency requirements (Kavanagh & Szweda, 2017). For this reason, nursing educators are being challenged to investigate new educational strategies to promote student learning and facilitate the translation of theoretical knowledge to competent clinical practice (Kavanagh & Szweda, 2017). One such instructional strategy that has proven beneficial for the development of clinical competency is the implementation of expert modeling videos.

Expert Modeling Videos

An expert modeling video (EMV) provides students with a demonstration of exemplar practice in order to contextualize theoretical learning and observe safe and competent patient care (Anderson et al., 2008). EMVs promote development of clinical competency by allowing students to visualize the convergence of theory into practice for which to build and understand clinical care (Rosen et al., 2010). Additionally, EMVs have proven to be effective and efficient for the facilitation of learning within large groups (Loes & Warren, 2016), something that is not available during most hospital-based clinical learning opportunities. EMVs enable students to watch, re-watch, and then cognitively rehearse the viewed behaviors—a practice that promotes retention, reduces the fear of being ill-prepared, and decreases repetitive trial-and-error attempts (Loes & Warren, 2016). Additionally, EMVs provide students with the opportunity to differentiate between good practice, mediocre practice, and poor practice (Guhde, 2010). Finally, they can be used to increase student competency and confidence in practice (Christian & Krumwiede, 2013).

Using expert modeling videos in nursing education is not a novel strategy; in fact, educators have been using it for almost 40 years in the demonstration of clinical skills within classrooms (Chau et al., 2001; McConville & Lane, 2006; Nelms et al., 1993), skills labs (Devi et al., 2019; Yeu-Hui et al. 2018), and simulated environments (Bricker & Pardee, 2011; Craft-Blacksheare & Frencher, 2018). A systematic review completed by Dodson (2022) assessed the use of expert modeling videos in undergraduate nursing education; eight of the 15 studies found were specifically used within nursing simulation. These studies demonstrated the ability of EMVs to improve communication (Layton, 1979), self-efficacy and self-confidence (S.C. Brown, 2008; Coram, 2015; Franklin et al., 2014), motivation (Christian & Krumwiede, 2013), and clinical judgment (Lasater et al., 2014; Weaver, 2015) – behaviors which are outlined as important contributors towards achievement of clinical competency (Fukada, 2018).

However, while research has demonstrated the positive impact EMVs have on students' simulation competency, there are notable gaps in the research. First, available studies are limited in the exploration of expert modeling videos used within the prebriefing period; only three studies were identified in the literature (Dodson, 2022). Prebriefing is defined as the time immediately prior to a student's simulation experience (Page-Cutrara, 2014). The phase is designed to orient the student to the simulated environment and prepare them to enter and be successful within the simulation scenario (INACSL Standards, 2016). Lack of research on this phase of simulation is problematic as the prebriefing phase has been identified as the best time to maximize learning through the promotion of understanding, clarity, and preparedness for the simulation experience (Leigh & Steuben, 2018). Second, the literature has yet to explore how expert modeling videos may be used during the prebriefing phase to help students attain clinical competency when caring for the patient with an acute on chronic medical condition. This presents a significant void as comprehensive patient care has been identified as the missing link in today's new graduate nurses (Kavanagh & Szweda, 2017).

Lastly, the research surrounding expert modeling videos lacks methodological rigor, with an absence of diversity in evaluation tools that have been tested for reliability and validity. One tool that has been used to evaluate the use of EMVs and simulation is the *Lasater Clinical Judgment Rubric* (LCJR); a tool that has been found to be both reliable and valid (Coram, 2015; Lasater et al., 2014). However, while the LCJR is an important evaluation tool in understanding student nurses' development of clinical judgment (Lasater et al., 2014), it does not address the evaluation of overall simulation competencies. Therefore, it is imperative that additional evaluation methods and instruments are instituted to provide a broader picture of the impact expert modeling videos may have on students' overall simulation competencies.

One evaluation tool that has been used to evaluate students' ability to perform clinically competent care is the *Creighton Clinical Evaluation Instrument* (CCEI; Page Cutrara & Turk, 2017; Scalise, 2019). This tool evaluates student performance in four domains under 23 specific behaviors in order to provide an overall percentage of simulation competencies (Todd et al., 2008). Additionally, the CCEI allows for the identification of specific behaviors in which students display competent and/or incompetent behaviors (Todd et al., 2008). With the increase in the use of simulation-based learning in nursing programs to replace lost hospital-based clinical hours, there is an ever-present need to evaluate students appropriately, accurately, and reliably (Zitzelsberger et al., 2017). Evaluation methods such as the CCEI promote this by providing a comprehensive evaluation of a student's skills in assessment, communication, clinical judgment, and patient safety; all indicators of clinical competence (Mancini et al., 2019). Another benefit is that the CCEI is designed to evaluate students in groups (M. Todd, personal communication, July 12, 2021). This differs from the LCJR which focuses solely on a student's development of clinical judgement and was designed for individual student evaluation.

Purpose of the Study

Expert modeling videos provide students with the ability to view an exemplar performance of patient care in order to contextualize theoretical knowledge (Song et al., 2005). While research has demonstrated promising results of the use of this educational strategy within undergraduate nursing education, significant gaps remain in its use within simulation. Literature surrounding the use of EMVs as a preparatory method in the prebriefing phase of simulation are scant, with available literature lacking the methodological rigor needed to determine best practices for the utilization of this education strategy. Additionally, there was no literature identified that explored the use of EMVs during the prebriefing phase in the care of a patient with an acute on chronic medical condition such as congestive heart failure. Therefore, this study first sought to discover the impact of EMVs implemented in the prebriefing period of simulation on students' simulation competencies. A second goal of the study was to determine students' enjoyment of the video interventions by evaluating them in the debriefing period using a modified web enjoyment scale (Lin et al., 2008). With the knowledge that students will more likely engage in additional learning activities that they feel are beneficial (Dodson & Ferdig, 2021), these findings will help to guide future researchers in the construction and implementation of prebriefing activities such as expert modeling videos.

Research Questions

RQ1: What is the impact of expert modeling videos (EMV) on undergraduate nursing student outcomes?

RQ1A: What is the impact of EMV on simulation outcomes as measured by the CCEI total score?

H_o: There will be no statistically significant differences between control and experimental groups as measured by the CCEI total scores.

H_1: There will be statistically significant differences between control and experimental groups as measured by the CCEI total scores.

RQ1B: What is the impact of EMV on simulation outcomes as measured by the four CCEI domain scores (assessment, communication, clinical judgment, and patient safety)?

RQ1C: What is the impact of EMV on simulation outcomes as identified by trends within CCEI behaviors?

RQ2: How does student enjoyment of the nursing process videos compare between experimental and control groups as measured by a tool developed to evaluate students' enjoyment of a video intervention?

RQ2A: How does student enjoyment of the nursing process videos compare between experimental and control groups as measured by the overall video enjoyment survey?

H_o: There will be no statistically significant differences between control and experimental groups as measured by the overall video enjoyment survey.

H_1: There will be statistically significant differences between control and experimental groups as measured by the overall video enjoyment survey.

RQ2B: How does student enjoyment of the nursing process videos compare between experimental and control groups as measured by the three factors of engagement, positive affect, and fulfillment within the video enjoyment survey?

Definition of Terms

Expert Modeling: the "Observation of others modeling correct behaviors allowing learners to absorb information about the performance and then create an image in their mind" (Anderson et al., 2013, p. e123).

Enjoyment: students' perceptions of likeability of a tool or intervention and their related desire to want to engage with it.

Hospital-Based Clinical Practice: the time where nursing students perform care of the live patient, within the hospital. This is the time in which students are expected to translate theoretical knowledge to the care of a patient with complex medical needs in the preparation for future nursing practice.

Nursing Clinical Competency: the ability of the nursing student to integrate knowledge and skills in order to provide safe and effective nursing care.

Prebriefing: The time immediately prior to entering the simulated environment which allows for orientation to the simulation environment, the establishment of trust, the suspension of disbelief, and an overview of the patient situation.

Presimulation: The time (days to weeks) leading up to the simulation experience in which students are provided didactic instruction and additional learning opportunities to prepare for the simulated experience.

Simulation: a type of experiential learning where nursing students develop clinical competency while caring for a simulated patient, programmed to mimic a live patient, in a safe no-fault learning environment.

Simulation Scenario: the action phase where students engage in the care of the simulation patient; a time which concludes when a specified time allotment has been met or students have demonstrated satisfactory outcomes.

CHAPTER II

REVIEW OF THE LITERATURE

This chapter discuss the academic-to-practice gap present in nursing education and the resulting deficiency in the level of clinical competency required of registered nurses today. The review will discuss the emphasis placed on nursing simulation to aid in the development of clinical competency in undergraduate nursing education. It will then explore how the use of expert modeling videos may positively impact students' ability to attain clinical competency within the simulated environment.

Clinical Competency

Clinical competency is the ability of the nurse to coalesce their knowledge, skills, attitudes, values, beliefs, and previous experiences to perform duties related directly to the provision of competent patient care (Nabizadeh-Gharghozar et al., 2021). Within nursing education, students are taught the theoretical element of patient care and the development of nursing skills and assessments through (a) didactic lecture, (b) the skills laboratory, (c) hospital-based clinical practice, and (d) high-fidelity simulation (Günay & Kılınç, 2018). However, there is a palpable gap between students' attainment of theoretical knowledge and their ability to perform clinically competent care in the practice environment.

Academic-Practice Gap

Novice nurses are ill-prepared to care for patients in complex situations (Kavanagh & Szweda, 2017). In fact, large scale studies have been implemented to assess novice nurses' ability to detect changes in the patient condition, finding that 70% to 76% of new graduates were unable to meet performance-based assessments (Del Bueno, 2001; Hezaeh et al., 2014;

Kavanagh & Szweda, 2017). These findings were further validated by research conducted by the *National Council for State Boards of Nursing* (NCSBN) who found that students have difficulty detecting subtle changes in patient condition, focusing more on concrete-level thinking than the bigger picture at hand (Huston et al., 2018). This is outlined in Benner's novice-to-expert model, which identified that novice nurses emphasize tasks as opposed to developing the higher order level of thinking needed to provide safe, quality patient care (1982). These findings describe a well-documented issue in nursing education known as the academic-practice gap—that is, the gap between theoretical knowledge and the ability to translate that knowledge into the care of a clinical patient (Huston et al., 2018).

There are two prevailing theories as to why the academic-practice gap exists. Critics blame academia for producing new graduate nurses who are incapable of providing the expected level of care for today's patients; conversely, hospitals are accused of having unrealistic expectations for new graduate nurses (Kellehear, 2014). Regardless of where the blame lies, the reality is that new graduate nurses are underprepared to care for patients with complex medical conditions (Benner, 2015). Therefore, nursing education has been called to develop strategies that help build clinical competencies and better prepare new graduate nurses (Kavanagh & Szweda, 2017).

Nursing education has attempted to answer this call by employing strategies to build clinical competency in the classroom (Konrad et al., 2021; Tohidi et al., 2019), clinical (Rusch et al., 2018), and simulation settings (Franklin et al., 2014; Scalise, 2019). Although the research is showing promising results in the development of teaching strategies to improve clinical competency, arguments persist regarding best methods for teaching the missing links of critical thinking, clinical reasoning, clinical judgment, and clinical decision making within nursing education (R.M. Phillips, 2014). Such strategies are needed in order to develop graduate nurses who can enter and be proficient in a complex healthcare system (Page-Cutrara, 2014). Suggestions include curricular revisions that incorporate the measurement of clinical competency through performance evaluations to help determine students' strengths and weaknesses (Benner et al., 2010; Kavanagh & Szweda, 2017). Additionally, there is a call for nursing education reform (with an increased focus on critical thinking and clinical reasoning) and an increase in guided opportunities for clinical practice (Ironside et al., 2014; Kavanagh & Szweda, 2017). One solution is the provision of learning opportunities that are experiential, guided, and clinically evaluated.

Hospital-Based Clinical Practice

Clinical experiences are the hallmark of nursing education; it is within this environment that students begin to bridge theory to practice and develop new knowledge and clinical skills (Heidari & Norouzadeh, 2015). However, changes in clinical practice including high student-to-instructor ratios, the support of healthcare professionals at the clinical site, and the physical environment itself are all factors that may negatively impact students' clinical learning (Aktas & Karabulut, 2016). Additionally, the ability of students to learn clinical skills at the bedside are confounded by (a) the lack of availability of in-hospital clinical practice opportunities, largely due to the closure or merging of hospital facilities (Cobbett & Snelgrove, 2016; Mannix et al., 2006), (b) increased student admission (Guise et al., 2012; Murray et al., 2008; Wilford & Doyle, 2006), (c) competition for clinical placements in large healthcare systems (Raman et al., 2019), and (d) the constraints that remaining clinical sites are placing on what students can and cannot do (Young-Hee et al., 2018). These limitations have caused nursing education to shift its focus towards implementing high-fidelity simulation to determine how this educational pedagogy may complement bedside clinical experiences and enhance the development of clinical competency.

High-Fidelity Simulation

High-fidelity simulation (HFS) has been used in education dating back to the early 20th century, with the term fidelity referring to "the degree that the object mimics reality" (Nehring & Lashley, 2004, p. 536). Within nursing education, simulation has been found to develop students' clinical reasoning in patient care in approximately 25% of the time it takes the same to develop during hospital-based clinicals (Jeffries, 2020). These findings have led to endorsements by the *National League for Nursing* (NLS), citing HFS as a complement to both classroom and clinical experiences (Jeffries, 2020). Additionally, the American Association for Colleges of Nursing's *Baccalaureate Essentials* identify simulation as a way to bridge theory to reality as students connect simulated care to the care of patients in the clinical setting (2008). In fact, the NCSBSN defines the role of simulation as more than a mere teaching strategy, but also an evaluation method to determine a student's clinical competency (Hayden et al., 2014).

Research has identified several advantages of simulation over traditional bedside clinical experience. These include the ability to be customized to the learner's level of understanding and practice, allowance of immediate feedback, opportunities to practice in both rare and critical events, and offering the opportunity for students to make and learn from their mistakes (Li, n.d.; NCSBN, 2020). Simulation provides an opportunity for students to manage complex situations in a safe environment prior to caring for a client in the clinical setting, (Bond et al., 2004; Craft-Blacksheare & Frencher, 2018; Norman, 2012) as well as the opportunity to develop an understanding of interpersonal relationships (Kim et al., 2011). This is particularly important because students have insufficient experience in managing the care of a complex patient and have little to no exposure interacting with care teams such as physicians and surgeons (Page-Cutrara, 2014).

Additional benefits of HFS include the ability to advance critical thinking skills in time-sensitive situations (Mills et al., 2014), increase self-efficacy and self-confidence (Cardoza and Hood, 2012; Lucas, 2014), improve clinical competence (Bultas et al., 2014), and provide significant improvement in knowledge acquisition and retention (Tawalbeh & Tubaishat, 2014). With research providing evidence that simulation supports acquisition of clinical competency, HFS has become an attractive educational tool to support clinical competency and to provide the skills required of today's registered nurses.

Limitations on Simulation

Despite the known benefits and advantages of simulation, students continue to fall short of intended instructional outcomes (Page-Cutrara & Turk, 2017; Scalise, 2019). Studies evaluating nursing students' ability to meet simulation objectives have found that students continue to struggle in the area of assessment and communication as well as patient safety, prioritizing, and safe medication administration (Page-Cutrara & Turk, 2017; Scalise, 2019). Aronson et al. (2013) found similar results, documenting low student achievement at 49% of simulation outcomes, performing poorly in areas of: concise and complete assessment, recognizing data and anticipating patient needs, national patient safety standards, and in providing a thorough report to the doctor with significant data.

One identifiable barrier affecting students' clinical competency is inadequate preparation prior to entering the simulated environment (Page-Cutrara & Turk, 2017). Within nursing simulation, simulation preparation occurs both in the presimulation period and the prebriefing phase. Adequate preparation during these time frames is essential to students' simulation success. Studies have shown that students felt that they had inadequate information in order to diagnose and address the problem (Titzer et al., 2012) and did not know "where to begin or what to do" (Elfrink et al., 2009, p. 84). This creates a powerful argument against traditional didactic lectures presented to a passive audience with the expectation that this learned knowledge will translate into a competent simulation performance with little time or context in which to build upon (Baron, 2017). Findings such as these have driven simulation research to look within the preparatory phases of simulation, presimulation, and prebriefing, to identify strategies to help students culminate their knowledge and skills into safe and competent care within the simulation environment.

Presimulation

Tyerman et al. (2019) defined presimulation as "any course-related content, materials, or activities in any format shared with the learner in advance of a simulation scenario, to optimize learning" (p. 13). Presimulation activities include but are not limited to: reading and video assignments, review of lecture content, chart reviews, plan of care or care mapping, pre-quizzes, scenario demonstrations, self-reflection, prep sheets, additional open laboratory hours (Leigh & Steuben, 2018; Tyerman et al., 2016), and expert modeling videos (Franklin et al., 2014). Work in the presimulation period has yielded promising results, identifying that additional presimulation activities may improve students' understanding of caring and noncaring behaviors (Blum et al., 2010; Nelms et al., 1993), therapeutic and nontherapeutic behaviors (Bussard & Lawrence, 2019), and the importance of a complete head-to-toe assessment (Guhde, 2010). EMVs can also aid students self-efficacy (LeFlore et al., 2007), communication at end-of-life (McConville & Lane, 2006), and the development of clinical reasoning (Betty et al., 2019).

However, while these findings indicate the benefit of additional presimulation preparation, limitations have been found. For instance, Aronson et al. (2013) and Franklin et al. (2014) identified a negative correlation between timing of exposure to presimulation activities and simulation demonstration. Additionally, Dodson & Ferdig (2021) found inconsistent completion of presimulation activities due to reasons such as lack of time, apathy, and overall failure to recognize the activity as beneficial to their simulation success.

Prebriefing

Prebriefing, as outlined by the INACSL, is the period immediately prior to the simulation scenario (INACSL Standards Committee, 2016). Although the literature asserts that prebriefing practices vary by institution and educator (Chamberlain, 2017), nursing educators largely follow the INACSL standards for prebriefing. They include setting the stage based on experience, establishing trust, integrity, and respect; establishing ground rules and a fiction contract; and providing orientation to the environment, time allotment, roles, and patient situation (INACSL Standards Committee, 2016). Within simulation research, the prebriefing phases has been identified as a time to maximize learning through the promotion of understanding, clarity, and preparedness for the simulation experience (Leigh & Steuben, 2018).

Research exploring the impact of active prebriefing strategies, as measured by the CCEI (Todd et al., 2008), have found promise in utilizing concept mapping (Scalise, 2019) and educational worksheets with guided reflection (Page-Cutrara & Turk, 2017). There has been a noted increase in the ability to assess the environment, maintain professionalism, interpret data (Scalise, 2019), and improve clinical judgment (Page-Cutrara & Turk, 2017). However, students continued to struggle in basic competencies such as assessment, communication (with team, patient, or significant others), patient safety (Page-Cutrara & Turk, 2017), obtaining pertinent data, prioritizing, appropriate use of patient identifiers, and safe medication administration (Scalise, 2019).

Summary

Simulation in nursing education has proven to be a beneficial adjunct to hospital-based clinical practice. Research has demonstrated the ability of simulation to promote clinical competencies such as professionalism, data interpretation, and evaluation of evidence-based interventions in novice nursing students (Scalise, 2019). However, limitations remain as students continue to struggle to meet many basic competencies both at the bedside and during the simulated experience when measured by tools such as the CCEI (Page-Cutrara & Turk, 2017). Attempts to address this issue have been made both in the presimulation period and the prebriefing phases, recognizing this as a preparatory time to promote engagement within simulation (Franklin et al., 2014; Leigh & Steuben, 2018; Tyerman et al., 2016). However, despite these efforts, deficiencies remain in the clinical competencies necessary to care for today's complex patients within professional practice (Benner, 2015). This necessitates further research to identify best practices to improve simulation experiences for the development of overall clinical competency in novice nursing students. One promising area created to respond to this need is the use of expert modeling (Song et al., 2005).

Expert Modeling

The idea of modeling behaviors, also known as observational learning, is accredited to Albert Bandura's *Social Learning Theory* (Bandura, 1977). In 1961, Bandura undertook an experiment utilizing an inflated doll named *Bobo* (Bandura et al., 1961). In the experiment, adults performed actions on the doll such as shoving, kicking, or punching while young children watched. When children were then left with the doll, they modeled the same behaviors as the adults, shoving, kicking, and punching the doll. This work developed Bandura's theory that learning a behavior is largely a socially mediated event and an efficient method of developing new skills and knowledge (Bandura, 1986).

Developed from this blueprint, expert modeling may be defined as the ability to leverage an expert's knowledge to provide guidance towards the learning of a desired or required skill and/or behavior (Song et al., 2005). Educational research has shown that, in the absence of expert models, there is a disconnect in student learning, causing the acquisition of learning to happen through repeated trial and error (Salisu & Ransom, 2014). This trial-and-error method has been noted to increase novice learners' failures, cause them to adopt strategies that may later impair learning, and evoke a sense of frustration with their abilities (Williams, 1993). Williams (2002) discussed the role of expert modeling in the promotion of learning through cognitive apprenticeship; the ability to externalize cognitive processes thus allowing the expert and novice to both observe one another and compare thought processes.

Theoretical Framework

The use of expert modeling as an instructional pedagogy may be seen in educational fields such as mathematics, speaking and listening, and reading and writing (Braaksma et al., 2002). Expert modeling may also be found in kinetic-based fields such as dance (Chan et al., 2011), posture (Eaves et al., 2011), motor learning (Le Naour et al., 2019), and sports training (Barzouka et al., 2015). Research has demonstrated that modeling an expected performance with feedback may significantly improve an athlete's performance (Dyal, 2016). For instance, De Stefani et al. (2020) utilized expert modeling to teach eight-year-old children novel soccer actions. The authors found that modeling the actions of basic soccer movements (e.g., throwing and kicking a soccer ball, proper throws, and run ups) through viewing an expert model resulted in an increase in students' performance ability (De Stefani et al., 2020).

Expert models are a keystone to student learning in nursing education. In the skills laboratory, modeling through faculty demonstrations and role-play are identified as essential components towards students' clinical development (Jeffries et al., 2002). Likewise, clinical faculty within hospital-based clinicals provide students with exemplar practice; students often consider clinical faculty as role models, attempting to emulate observed patient care (Mohammadi et al., 2021).

Expert Modeling Videos

While expert modeling has been proven to be a successful educational strategy to teach new behaviors and skills (Song et al., 2005), the use of video technology has further advanced expert modeling as a pedagogical strategy. Expert modeling videos allow for repeated exposure to a modeled behavior (Bandura, 1977) and the provision of an exemplar standard to be referenced for future practice (Anderson et al., 2008). Anderson et al. (2013) defined the use of expert modeling videos as the "observation of others modeling correct behaviors, allowing learners to absorb information about the performance and then create an image in their mind" (p. e123). Research on expert modeling videos has demonstrated the ability to promote competence, as the learner is able to view the exemplar behavior and symbolically retain the viewed behavior for future use (Bandura, 1961). Expert modeling videos have been used by the United States military to teach the fundamentals of marksmanship, finding that an expert modeling simulator provided the ability to evaluate shooter performance more accurately (Goldberg et al., 2018). Additionally, expert modeling videos have been used to demonstrate and perfect technique in gymnastic training (Boyer et al., 2009), improve golf swing performance (Guadagnoli et al., 2002), increase performance accuracy in foundational rock-climbing skills (Walker et al., 2020), and to improve Olympic weight-lifting technique (Mulqueen et al., 2014; Napoles, 2017).

Within educational fields, expert modeling videos have been found to be a relevant and effective tool for educating students by targeting multiple learning domains (Arslanyilmaz & Abbas, 2010). Examining the role of expert modeling videos for use in an online e-commerce course, Arslanyilmaz and Abbas (2010) found that students felt the videos provided them time to be conceptually prepared for the in-class topics; it also promoted their social, emotional, and attitudinal readiness for learning. Additional research by Moreno & Valdez (2007) validated that video examples—both in text and video format—significantly affected students' learning perceptions and their ability to transfer theoretical knowledge into novel classroom conditions. Students in the study who were provided with expert modeling videos outperformed all others as well as demonstrated retention of both theory and practices over the groups who did not receive expert modeling videos for content learning (Moreno & Valdez, 2007).

Expert Modeling Videos in Nursing Education

In nursing education, the use of expert modeling videos spans over 40 years within the classroom (Chau et al., 2001; McConville & Lane, 2006; Nelms et al., 1993), skills lab (Devi et al., 2019; Yeu-Hui et al. 2018), and simulation (Bricker & Pardee, 2011; Craft-Blacksheare & Frencher, 2018; Jarvill et al., 2018; Franklin et al., 2014). Expert modeling videos have been used in the nursing classroom to teach the difference between caring and noncaring behaviors (Nelms et al., 1993), difficult discussions at end-of-life (McConville & Lane, 2006), care of a patient with diabetes mellitus (Gordon et al., 2018), and the importance of complete physical assessments (Guhde, 2010). Within the skills lab, expert modeling videos have been used to demonstrate proper steps in obstetrical palpation (Devi et al., 2019) and proper urinary catheterization (Yeu-Hui et al., 2018). While expert modeling videos have been chiefly used to promote understanding and competency both in the classroom and skill laboratory, a recent systematic review found that expert modeling videos have also been used within simulation research (Dodson, 2022).

The literature surrounding the use of expert modeling videos within a student's simulation experience has shown promising results in improved performance, communication, professionalism, and interpretation of data (Page-Cutrara & Turk, 2017; Scalise, 2019). This may be due to the ability of expert modeling videos to provide students with an exemplar model of the care of patients with complex needs or in an acute state of their disease process; opportunities students are unlikely to be exposed to during their clinical rotations (Chau et al., 2001).

Expert modeling videos allow students to review the content of the exemplar demonstration multiple times and the ability to stop the video for reflection on specific elements. For instance, EMVs enhance student engagement by allowing students to watch and then cognitively rehearse the viewed behaviors before demonstration, a practice that promotes retention, without the fear of being ill-prepared or repeated trial- and-error (Loes & Warren, 2016). Additionally, they have been shown to increase student competency and confidence in practice (Christian & Krumwiede, 2013). Within the body of simulation research, the use of expert modeling videos is predominantly found within the presimulation period and prebriefing phase.

Expert Modeling Videos in Presimulation

Presimulation is the period, weeks to days, leading up to a student's simulation experience (Tyerman et al., 2019). Historically, this period is aimed at improving engagement and ensuring students are adequately prepared to perform in their simulation (Leigh & Steuben, 2018; Tyerman et al., 2019). A systematic review on expert modeling videos in nursing education found that while the majority of research identified the use of expert modeling videos in the presimulation period and prebriefing phase, studies are more so concentrated in the presimulation period (Dodson, 2022). While research has found that the use of EMVs in presimulation improved a wide range of clinical competencies (Betty et al., 2019; Blum et al., 2020; Guhde, 2010; LeFlore et al., 2007; McConville & Lane, 2006; Nelms et al., 1993), there is one consistent drawback: timing.

An example is found in a randomized control trial conducted by Franklin et al. (2014). Students were randomly divided into three groups to provide three different interventional learning methods: expert modeling, voice over PowerPoint, and additional reading assignments. Students were provided their assigned intervention five weeks prior to their scheduled simulation experience and were asked to view their respective intervention a minimum of four times. The authors found that, on average, students accessed the videos one to two times over the course of five weeks. When assessing the students' simulation competency using the CSEI (Todd et al., 2008; now known as CCEI; Hayden et al., 2012), the interventions of modeling and voice-over PowerPoint demonstrated overall improved scores when compared to the reading group, however these results were not significant (Franklin et al., 2014). One explanation posited by the authors was the length of time between students viewing the intervention of modeling and the opportunity to demonstrate competency, which averaged five weeks.

The concern of timing was further expressed by Aronson et al. (2011). In their study, nursing students cared for a simulated patient with the chronic health condition congestive heart failure (CHF). After the simulation, they viewed an expert-modeling video with verbal reinforcement of expected behaviors; at a later date students repeated the same simulation. The authors reported the timing between watching the expert modeling video and repeating the simulation as anywhere between 35 and 99 days. The *Heart Failure Simulation Competency Evaluation Test* (HFSCET) was used to measure simulation competency. The intervention group had a considerable increase in HFSCET scores at 47% from first simulation to second; however, while not significant, the authors found a negative correlation between number of days between video and mean posttest scores (Aronson et al., 2011).

Expert Modeling Videos in Prebriefing

NACSL criterion number seven suggests that simulation instructors begin all simulation-based experiences with a prebriefing; this is defined as a time to prepare students to enter the simulated environment (2016). Reviewing the use of expert modeling videos in the presimulation period provides substantial research with an identified limitation of timing. However, there is a dearth of literature demonstrating the use of this educational strategy within the prebriefing phase. It is important to note that research on the simulation prebriefing phase specifically has been linked to improved competency performance (Jarvill et al., 2008; Page-Cutrara, 2014). Unfortunately, it remains an understudied component of nursing simulation overall (Page-Cutrara & Turk, 2017). Regardless, the research that does exist is promising. For instance, expert modeling videos during prebriefing can be used to: teach the correct steps in a central line dressing change (Jarvill et al., 2018), improve self-confidence in care (Coram, 2016), and positively impact the ability to notice and identify patient issues (Lasater et al., 2014)—all of which are identified as necessary components toward the development of clinical competency (Fukada, 2018). However, while this research has shown promising results, three significant gaps have been identified.

Literature Gaps

Research in nursing education is essential to the development of best nursing practices; it is necessary for the educational growth of future nurses (Tingen et al., 2009). Within nursing simulation research, understanding best practices for this interactive teaching strategy is also paramount to the development of clinically competent students (World Health Organization, 2019). A systematic review found only three studies which utilized expert modeling videos in the prebriefing period of nursing simulation (Dodson, 2022).

Jarvill et al. (2018) examined the use of a 5-minute expert modeling video in the prebriefing phase on students' competencies in a simulated central line dressing change. Utilizing a control (prebriefing without expert modeling video) and experimental (expert modeling video) group, the authors used a faculty-created competency checklist to grade the ability of students to correctly perform the steps in a central line dressing change. Their findings demonstrated that the experimental group performed significantly better ($p<0.001$) than the control group, including skills determined to be critical action items ($p=0.04$).

Using a standardized patient, Coram (2016) provided prebriefing expert modeling videos to demonstrate exemplar care. The scenario focused on two separate simulated patients, each presenting with an acute diagnosis as well as developing complications. Students were evaluated by expert staff utilizing the *Lasater Clinical Judgment Rubric* (Lasater, 2007). Coram (2016) found expert faculties' LCJR scores were significantly different ($p=0.00$) between the control and treatment group. Results showed a *novice* rating for the control group and a *developing* rating for the treatment group.

Lastly, Lasater et al. (2014) conducted a qualitative study utilizing two groups that both received standard prebriefing. The treatment group had the additional intervention of watching a video of an expert modeling the care of a patient similar to the patient that students would encounter in their simulated experience. The scenario followed along with the perioperative care of a patient status-post fall with a hip fracture. The major finding from analysis of the LCJR was that both groups had the ability to notice and identify the main patient issues such as pain, respiratory management, delirium, and patient safety. However, both groups struggled in the clinical judgment dimensions of interpretation and knowing how to respond. One supportive finding was that those in the treatment group (i.e., with expert modeling) provided more holistic responses to the patient's needs, congruent with the dimension of responding. While this study provides compelling evidence as to the efficacy of expert modeling videos, its qualitative focus with student reported LCJR scores reflects students' perceptions of ability as opposed to a demonstration of clinical competency.

In sum, while these three studies provide compelling evidence as to the benefits of expert modeling videos when used in prebriefing, more studies are needed to further explore the capabilities of videos used in this phase.

Care of Acute on Chronic Conditions

Research literature provides evidence for the effectiveness of prebriefing EMV in teaching nursing tasks such as changing a central line dressing (Jarvill et al., 2018). They have also been used to improve care of the hospitalized client with acute conditions such as urinary tract infection and delirium, necrosis of the toes with acute onset confusion (Coram, 2016), and perioperatively of the patient with a hip fracture (Lasater et al., 2014). However, an extensive review on the use of expert modeling videos in the prebriefing period was void of research investigating their use in the care of a patient with exacerbations of chronic medical conditions such as congestive heart failure (CHF). This lack of exploration is surprising, given the well-documented deficit of new graduate nurses' ability to detect subtle changes in patient condition (Hezaeh et al., 2014; Huston et al., 2018; Kavanagh & Szweda, 2017).

Furthermore, research has emphasized the need for new graduate nurses to develop clinical competency in the care of patients with high acuities (Kavanagh & Szweda, 2017), such as those with exacerbations of chronic disease processes. Current statistics from the Centers for Disease Control (CDC) report congestive heart failure as occurring in 6.8 million adults in the United States (CDC, 2021) with an estimated 30-40 percent of these patients having a history of hospitalization due to complications of the disease (CDC, 2021). For these reasons, it is important to investigate how expert modeling videos, utilized in the prebriefing period, impact clinical competency in patients with acute on chronic medical conditions, specifically in the care of a patient experiencing an acute exacerbation of a chronic disease such as CHF.

Methodological Rigor

Research on the use of expert modeling videos in the prebriefing period has focused on the impact of this pedagogical strategy on students' simulation outcomes (Jarvill et al., 2018). However, available research is limited in the methodological rigor needed to provide a strong, foundational understanding of the impact of prebriefing expert modeling videos on students' simulation competencies. While findings from Jarvill et al. (2018) demonstrated a significant impact of expert modeling videos on students' simulation competency, their evaluation tool was faculty created, lacking reliability and validity testing to ensure accuracy of findings. This may, in part, be due to the paucity of tools available that measure a student's ability to meet the learning objectives and overall simulation effectiveness (Kardong-Edgren et al., 2010). However, the importance of reliability and validity testing cannot be understated as both are considered important principles in high-quality assessments for determining consistency of findings and the accurate measurement of the intervention (The Center for Standards & Assessment Implementation, 2018).

Some standardized measures do exist. For instance, research by Coram (2016) and Lasater et al. (2014) featured the use of the *Lasater Clinical Judgment Rubric* (LCJR) to evaluate students' simulation performance. The LCJR has been found to be a valid and reliable tool with an internal consistency of 0.884 (Cronbach's α) and an intraclass correlation coefficient of 0.839 (Shim & Shin, 2015). Tanner's (2006) *Clinical Judgment Model* is credited in the development of the specific domains outlined within the LCJR, consisting of noticing, interpreting, responding, and reflecting (Tanner, 2006). Within each of these domains is a specific subscale designed to evaluate student behaviors. By analyzing students' performance within each subscale, educators may assign a level of development of clinical judgment as beginning, developing, accomplished, or exemplary (Lasater, 2007). The benefits of this tool are the provision of evidence as to students developing clinical judgment and the ability to identify specific behaviors needing addressed for developing clinical judgment (Lasater, 2007).

However, while Coram (2016) and Lasater et al. (2014) have used a rigorous assessment method, the utilization of a singular evaluation tool provided an understanding of students' competency in one area, as opposed to their overall simulation competency. The LCJR evaluates specific cognitive, behavioral, and affective behaviors, providing educators with the student's level of clinical judgment. However, with the knowledge that nursing competency involves a "complex integration of knowledge, including professional judgment, skills, values, and attitude…" (Fukada, 2018, p. 1), the understanding of a student's clinical competency must be viewed holistically. Therefore, while these studies offer compelling evidence as to role of prebriefing expert modeling videos on students' *clinical judgment*, further studies are needed to evaluate nursing students' clinical competency comprehensively.

Said differently, although the LCJR is a powerful tool for determining students' behaviors towards the development of clinical judgment, the use of additional evaluation methods should be explored which expand on findings of the LCJR. One such tool is the *Creighton Competency Evaluation Instrument* (CCEI; Todd et al., 2008) which provides an overview of a student's competency in four domains and 23 specific behaviors. The CCEI focuses on the domains of assessment, communication, clinical judgment, and patient safety – behaviors that students continue to struggle with when evaluated in the simulation environment (Page-Cutrara & Turk, 2017; Scalise, 2019). The CCEI would provide a comprehensive picture of the impact of expert modeling videos in the prebriefing period to determine how this intervention impacts students' specific competencies and how future educators and researchers could use the instrument with EMVs.

Enjoyment Evaluation

While both the LCJR and CCEI are directly tied to nursing simulation, there is a third instrument that potentially could be connected to EMV use. Recent research has discovered that nursing students often choose not to complete elective assignments. In one study, Dodson and Ferdig (2021) found that the majority of students cited the need and desire to be prepared for simulation as their primary reason for completing elective assignments. Common reasons for avoiding the elective materials included a lack of time and apathy towards the materials. A study by Abd-El-Fattah and Salman (2017) also found that student motivation to engage in materials is largely dependent on their perceptions of the activity's relative value. As such, there is value in determining students' perceptions and motivations towards using created materials like EMVs to further facilitate use, particularly for elective assignments.

Lin et al. (2008) developed a tool to measure the enjoyment of web experiences. Their instrument evaluates a student's engagement (focused attention), positive affect, and fulfillment (need or desire). The tool has undergone reliability and validity testing with an alpha reliability of 0.964 (Lin et al., 2008). With motivation being a reliable indicator of a student's engagement with learning tools, the instrument could be used to help educators identify students' enjoyment of the video interventions and, thus, likelihood of engaging with it in the future.

Conclusion

Research has provided evidence that new graduate nursing students fail to meet competencies required of them in today's healthcare environment (Kavanagh & Szweda, 2017). Within nursing education, simulation has been identified as a useful educational strategy to build clinical competence. While nursing simulation research has shown promising results, students continue to miss key competencies (Scalise, 2019). This has driven research to further explore options to improve simulation pedagogy. One area that has been highlighted in nursing education is expert modeling, predominantly used in the form of expert modeling videos within the simulation environment.

Expert modeling videos have the potential to improve simulation competencies as demonstrated by research of their use within the presimulation period and prebriefing phase (Betty et al., 2019; Franklin et al., 2014; Lasater et al., 2014). Within presimulation, expert modeling videos have proven efficacious; however, a negative correlation between time of exposure to the videos and demonstration of clinical competency has been identified (Franklin et al., 2014). Research on expert modeling videos used in prebriefing have also provided compelling results related to improved clinical competency; however, there are significant gaps in the literature. First, there is a dearth of research on the use of expert modeling videos within the prebriefing phase of simulation; a comprehensive review yielded only three studies (Dodson, 2022). Second, available studies lack methodological rigor. Diversity in measurement is needed to develop a deeper understanding of the impact of expert modeling videos on students' competencies when used in simulation preparation (Stavropoulou & Kelesi, 2012). Lastly, although valuable, existing studies on the use of EMVs focus on simple skill sets and acutely ill patients; no identifiable studies focus on the use of EMVs within the prebriefing period to prepare for the simulated care of a client experiencing an acute exacerbation of a chronic health condition. More research could help determine the portability of expert modeling videos across multiple nursing foci.

It is imperative to evaluate nursing simulation due to its focus within nursing education towards building clinical competency; an area where students have been shown to be lacking (Kavanagh & Szweda, 2017). Tools such as the CCEI guide educators towards understanding students' competency behaviors in order to determine areas of strengths and areas of needed reinforcement (Todd et al., 2008). Likewise, scales created to measure enjoyment (e.g., Lin et al., 2008) offer both researchers and educators insight as to students' enjoyment with an innovative teaching strategy—a trait which has been proven to improve students' engagement in learning.

Nursing programs are being called to develop teaching strategies to enhance clinical competencies which extend beyond the traditional lecture (Baxter et al., 2009; Dil et al., 2012). Therefore, the present study was created to determine how expert modeling videos, used in the prebriefing phase, may promote clinical competency when used to guide students' understanding of exemplar patient care.

Research Questions

RQ1: What is the impact of expert modeling videos (EMV) on undergraduate nursing student outcomes?

RQ1A: What is the impact of EMV on simulation outcomes as measured by the CCEI total score?

H_o: There will be no statistically significant differences between control and experimental groups as measured by the CCEI total scores.

H_1: There will be statistically significant differences between control and experimental groups as measured by the CCEI total scores.

RQ1B: What is the impact of EMV on simulation outcomes as measured by the four CCEI domain scores (assessment, communication, clinical judgment, and patient safety)?

RQ1C: What is the impact of EMV on simulation outcomes as identified by trends within CCEI behaviors?

RQ2: How does student enjoyment of the nursing process videos compare between experimental and control groups as measured by a tool developed to evaluate students' enjoyment of a video intervention?

RQ2A: How does student enjoyment of the nursing process videos compare between experimental and control groups as measured by the overall video enjoyment survey?

H_o: There will be no statistically significant differences between control and experimental groups as measured by the overall video enjoyment survey.

H_1: There will be statistically significant differences between control and experimental groups as measured by the overall video enjoyment survey.

RQ2B: How does student enjoyment of the nursing process videos compare between experimental and control groups as measured by the three factors of engagement, positive affect, and fulfillment within the video enjoyment survey?

CHAPTER III

METHODOLOGY

This chapter represents the research methodology used within this study to examine the effects of expert modeling videos on simulation outcomes. Healthcare is facing a change in its environment. Patients are living longer with chronic diseases and the need for new graduate nurses to care for patients in highly complex medical fields is more evident now than ever before (Page-Cutrara & Turk, 2017). Therefore, it is imperative to determine best practices for developing clinically competent nurses.

Theoretical Framework

This chapter discusses the theoretical framework, population, sample, data collection and evaluation, and data management and analysis.

Social Learning Theory

There are three theoretical concepts that set the foundation for this study. The first is Albert Bandura's *Social Learning Theory* (Bandura, 1977). Social learning theory is Bandura's seminal framework; it describes how humans learn vicariously by observing others. It includes the behaviors, ideas, and thought processes that influence the way humans behave and think (Bandura, 1986). In Bandura's book *Psychological Modeling: Conflicting Theories,* Bandura (1977) draws on work by Reichard in 1938 who commented that in many languages, the word for 'teach' is the same as the word for 'show' (Bandura, 1977). Social learning theory places emphasis on the role of vicarious, symbolic, and self-regulatory processes which guide psychological functioning; it also addresses the reciprocal interaction that exists between humans and their cognitive, behavioral, and environmental determinants (Bandura, 1977).

Social Learning Theory posits that cognitive processes are influenced by observation and direct experiences, with learning being a "socially mediated experience" (Bandura, 1977, p. vii). Nursing education largely follows the premise of social learning as students are required to internalize lecture content from the classroom and skills acquisition within the laboratory in order to later reproduce those behaviors in the clinical environment (Nelms et al., 1993).

Expert Modeling

Research studies will often define expert modeling based on the context they are using for their study. However, this study draws more broadly on the definition posited by Anderson et al. (2012). The authors suggested that expert modeling is the process where learners have an "observation of others modeling correct behaviors allowing learners to absorb information about the performance and then create an image in their mind" (Anderson et al., 2012, p. e123). It draws from Social Learning Theory (Bandura, 1977) as expert modeling videos allow observations that promote student coding of a modeled activity and mental rehearsing prior to engaging in the simulation experience (Bandura, 1977, Bandura & Jeffery, 1973). This view of rehearsing and performing within the simulated environment promotes all four key aspects of observational learning: attention, retention (observation), rehearsal (reproduction), and (enhanced) motivation (Bandura, 1977; Dodson, 2022).

Nursing Competencies, Simulation, and Measurement

For purposes of this study, nursing simulation competency is defined as the ability of the nurse to coalesce their knowledge, skills, attitudes, values, beliefs, and previous experiences to perform duties related directly to the provision of competent patient care (Nabizadeh-Gharghozar et al., 2021). Research has provided evidence that those competencies can be taught through simulation, which is both a teaching strategy and a way to evaluate students' clinical competency

(Hayden et al., 2014). Simulation can, in fact, help students with assessing the environment, maintaining professionalism, interpreting data (Scalise, 2019), and improving clinical judgment (Page-Cutrara & Turk, 2017). Other competencies that need additional research include assessment, communication (with team, patient, or significant other), patient safety (Page-Cutrara & Turk, 2017), obtaining pertinent data, prioritizing, appropriate use of patient identifiers, and safe medication administration (Scalise, 2019).

Research-based tools have been developed to measure these competencies. While many, such as the LCJR (Lasater, 2007), are beneficial towards the understanding of student competency in clinical judgment, the *Creighton Competency Evaluation Instrument* (CCEI; Todd et al., 2008) provides an overview of students' competency in four domains and 23 specific behaviors. The CCEI focuses on the domains of patient assessment, communication, clinical judgment, and safety – behaviors that students continue to struggle with when evaluated in the simulation environment (Scalise, 2019; Page-Cutrara & Turk, 2017).

Population and Sample

For this study, participants were selected who were enrolled in the course *Nursing of Adults* (NURS 30035) a nine-credit-hour, junior-level course covering pathophysiology of disease process and care within a large mid-western university. During Fall 2021, the total enrollment for this course yielded 160 students. As part of the program requirements, students in this course were concurrently enrolled in a 10-hour, once weekly, hospital-based clinical. Students participated in hospital-based clinicals in groups assigned according to students' clinical site preference which was determined at the beginning of the semester. These clinical groups remained in place for the duration of the course and were comprised of 18 groups of eight students, three groups of seven students, and one group of five students. The student population demographics within the course consisted of females (*n* =138), males (*n* =22), ranging from 18 years to 54 years of age. All students were within the same program of study, receiving the same prerequisite courses and in the same course progression towards the achievement of a Bachelor of Science of Nursing degree (see Table 1 for specific demographic characteristics). Institutional Review Board approval and student informed consent were received prior to data collection (Appendix A).

Within educational research, a sample is comprised of a group of people (population) which share common characteristics (Elfil & Negida, 2017). Within nursing education research, a common sampling method is that of convenience sampling. This method of sampling allows researchers to recruit participants due to their accessibility, typically due to students meeting the criteria of either course progression or current academic studies (Gravetter & Forzano, 2012). However, while this is considered a nonprobability sample (Curtis & Keeler, 2021), the sample within this study is considered representative of the larger population as nursing programs nationwide follow a consistent method of educating undergraduate nursing students guided by the American Association of Colleges of Nursing *Essentials* (AACN, 2021). Thus, the progression, knowledge level, and experience of the sample used in this study is largely representative of the collective whole. Convenience sampling was used within this study. One issue that may arise in convenience sampling is selection bias (Curtis & Keeler, 2021). To prohibit against selection bias, clinical groups were randomly assigned to either the control or intervention group using the randomization feature of *Microsoft Excel*. This method of group selection promotes the accuracy of the data by protecting against a priori knowledge of specific students or student groups (Suresh, 2011).

As part of the course requirements for passage, students were obligated to participate in two simulated experiences: congestive heart failure and end-of-life. This research study used the first simulation experience within the course—congestive heart failure—as the platform for the intervention and data collection. All students completed their simulation experience within their assigned clinical group. Although all students within the course were required to participate in the simulation as part of their course requirements, only data for students who consented was included in the analyses for this study. A total of 160 students agreed to participate in the research study.

Table 1

Student Demographics

Characteristic	n	%
Gender		
Female	138	86%
Male	22	14%
Age		
18-24	141	88.1%
25-35	16	10%
36-45	1	<0.625%
46-54	2	1.25%
GPA		
2.5-3.0	6	3.75%
3.1-3.5	52	32.5%
≥3.6	102	63.75%
Cohort		
Traditional	139	86.9%
Accelerated	21	13.1%

Evaluation Instruments

The following section presents the evaluation instruments used in this study. A brief description of each instrument is provided.

The Creighton Competency Evaluation Instrument

The Creighton Competency Evaluation Instrument (CCEI; Todd et al., 2008) was used for analysis of student simulation performance. Permission to use the CCEI for this study was granted by the lead tool author, Martha Todd (M. Todd, personal communication, July 27, 2021). Created by Todd et al. (2008), the CCEI allows educators to identify specific learning objectives within 23 expected nursing behaviors under four domains: assessment, communication, clinical judgment, and patient safety (see Appendix B). The CCEI has been found to have highly acceptable content validity and reliability, with validity ranging from 3.78-3.89 on a four-point Likert scale and a Cronbach's alpha of >0.90 (Hayden et al., 2014). The attractiveness of this tool lies in its portability within nursing simulation; it can be tailored specifically to the simulation encounter based on level of education, clinical experience, and classroom knowledge (Todd et al., 2008). In doing so, the tool allows course educators to determine criteria within each behavior that is needed to demonstrate competency. This is an important factor as research has advised that effective simulations are planned based on the abilities of students and the level of skills which have been acquired (Nehring & Lashley, 2004). The CCEI tool has been used in various simulation studies including those to demonstrate competency in palliative care (Kirkpatrick et al., 2019), nursing care of the postoperative patient (Victor et al., 2017), and multi patient prioritization (Magar & Roberto, 2019). However, of greatest importance to this study, the CCEI has been used to demonstrate the impact that structured prebriefing practices have on clinical competency and judgment (Page-Cutrara & Turk, 2017).

Assessment of Student Enjoyment

Research has identified that students are more likely to engage in an activity that they believe is profitable (Dodson & Ferdig, 2021). This is in line with educational psychologists who have linked enjoyment with improved educational outcomes (Goetz et al., 2006). The scale, developed by Lin et al. (2008), was guided by the work of Warner (1980) who defined three dimensions of enjoyment: engagement, positive affect, and fulfillment. Not formally named, the evaluation tool uses a 7-point Likert scale to assess the above-mentioned constructs of engagement, positive affect, and fulfillment to measure students' enjoyment experiences (Lin et al., 2008). Although the scale was originally developed to measure students' online web experiences, the tool was modified to examine students' enjoyment of a video intervention. Original reliability of all constructs of the tool ranged between 0.94 and 0.98. In this study, reliability of all constructs was similar, ranging between 0.88 and 0.94 (see Table 16). Permission from the tools authors was received for its use in the present study (A. Lin, personal communication, August 4, 2021; see Appendix C).

Student Recruitment

Student recruitment was attained during normal class time, at the end of the lecture on congestive heart failure and following a brief break prior to continuation of the lecture material. This timing was purposefully chosen as students were prepared for continued lecture and were attentive to the instructor, a benefit that is not often realized at the conclusion of class due to competition with distractors (Junco, 2012) and students' conversations as they prepare to exit the classroom (Dodson & Ferdig, 2021). Additionally, a follow up email was sent to all course enrollees to capture students who may not have been present during normally scheduled class.

Students' simulation experiences were completed within their respective clinical groups with each group consisting of five to eight students. This is congruent with other large universities who are unable to provide individual simulation experiences due to large class sizes (Bates et al., 2017; Murray et al., 2008), limited simulation space, and lack of faculty to assist in the delivery of simulation (Berndt et al., 2015). Clinical groups are chosen at the beginning of the semester based on students' location preference (e.g., area or type of facility). Therefore, while students randomly select a site based on their personal preference, they are not truly randomized as it was not within the control of the researcher to place students within their clinical groups. The existing clinical groups, however, were randomly assigned to either the control or experimental group using randomization in *Microsoft Excel*. Within that random assignment, clinical groups were further divided into group A or group B using the same randomization technique, determining whether they would take part during the first 15 minutes or the last 15 minutes (respectively) of the simulation. After the group selection, each of the four members drew a card which assigned them as nurse one, nurse two, medication nurse, and documentation nurse. This is consistent with previous studies which randomly assigned students to similar roles as well as their simulation phase (Johnson et al., 2012). Clinical faculty remained blind as to the designation of their clinical group into the control group or experimental group.

Materials

In the prebriefing period both the control and experimental groups viewed a nursing process video on congestive heart failure (CHF) care which mirrored the content received on the care of a patient with CHF within their didactic lecture. It is important to note that although the use of videos in the prebriefing period is a new practice for this institution, the use of videos as an educational strategy is used throughout the students nursing sequence during didactic lecture. The construction of the nursing process videos, viewed by the control and experimental groups, employed an expert nurse of 21 years with experience as a paramedic and firefighter as well as a nurse within the intensive care unit, life flight, and the emergency department. The latter three positions required the expert nurse actor to have extensive knowledge in the care of a patient experiencing an acute exacerbation of congestive heart failure.

Both videos began with an SBAR formatted nurse-to-nurse report completed by the primary researcher and the expert actor. Situation, background, assessment, and recommendation (SBAR) communication is a way for healthcare workers to streamline and organize pertinent information (Haig et al., 2006; Leonard et al., 2004). Competent SBAR communication is an expectation of new graduate nurses (Day, 2016) as a way to promote effective communication between nurses, physicians, and other healthcare providers. The decision to include this report in both the control and the experimental groups stems from research describing variability within undergraduate nursing education in the approach to delivery of nursing handoff within the clinical environment (Avallone & Weideman, 2015). This, in part, has led to an increased risk of sentinel events (Arora et al., 2005; Starmer et al., 2013) as important patient information is overlooked. In accordance with the QSEN (Abdul-Raheem, 2017), SBAR handoff was included to provide all students with a demonstration of a nursing handoff report (Abdul-Raheem, 2017).

The delivery method of the control and experimental videos was consistent among both groups with the only difference being that the control group viewed a discussion by the expert actor while the experimental group viewed a demonstration by the expert actor. This design was intentional to ensure that the experimental group did not receive additional instructional content or learning opportunities not afforded to the control group.

The videos differed in length due to the content; the demonstration video (experimental) at 15 minutes; the discussion video (control) at 10 minutes. It is important to note that the time difference is not indicative of additional teaching received by the experimental group. The difference of length in the experimental video is due to the additional time necessary for the demonstration of appropriate behaviors such as hand hygiene, a focused physical assessment, education, and medication administration.

Control Video: Discussion

The control video provided a discussion of care that followed the five stages of the nursing process (Toney-Butler & Thayer, 2021). The nursing process is guided by the *American Nurses Association* as a way to deliver client-centered care (American Nurses Association, n.d.). Developed by nursing theorist Jean Orlando, the nursing process consists of five stages: assessment, diagnosis, planning, implementation, and evaluation (Toney-Butler & Thayer, 2021). Following the nursing process, a script was developed, verbally addressing the care of a patient with an acute exacerbation of CHF within each nursing process stage. The discussion of care video was recorded and assessed for validity by the expert nurse actor as well as the course faculty. Both the script and the recording were found to be consistent with current evidence-based care and students' didactic content. Ecological validity was attained by comparing the script against the course lecture content, the course required text (Hinkle & Cheever, 2018), and an acute heart failure care bundle (Freund et al., 2019).

Experimental Video: Demonstration

The expert modeling video was developed using the same expert actor present in the control video (discussion). The video was also a presentation of the five nursing process stages; however, it was created as an expert modeling video. In other words, while the control video provided an expert discussion of the care of a patient throughout the five stages of the nursing process, the expert modeling video provided a demonstration of care throughout these stages.

Research surrounding the use of expert modeling videos as an educational intervention provided guidance in the creation of the experimental video used in this study. Conceptually, research suggests that expert modeling videos should allow for “mastery-based teaching” (Franklin et al., 2014, p. 616) through learner focused approaches (Bergmann & Sams, 2012), allowing for engagement in the content through active teaching strategies (Prober & Heath, 2012). Other common components of expert modeling videos include: (a) an emphasis on critical thinking (Chau et al., 2001), (b) the reference of standard operating procedures, (c) nursing textbooks and applicable literature for accuracy (Chuang et al., 2018), (d) the modeling of clinical judgments based on standards of care (Lasater et al., 2014), and (e) the inclusion of contextually relevant behaviors (McConville & Lane, 2006). Like the control video, ecological validity was verified by comparing the expert modeling script against the course lecture content, course text (Hinkle & Cheever, 2018) and acute heart failure care bundle (Freund et al., 2019). This was done by the expert actor and the course faculty, who all found it to be consistent with current evidence-based practice for the care of a patient with an acute exacerbation of congestive heart failure.

Procedure: Classroom Preparation

Prior to simulation, students received a course lecture on the pathophysiology, pharmacology, assessment, care, potential complications, and education of an individual with congestive heart failure (CHF). Prior to release from class students viewed two videos designed as preparation for their upcoming simulation experience which was either six or eight days after the CHF lecture depending upon students assigned simulation day (Tuesday or Thursday). These videos were previously created by simulation faculty and consisted of an overview of the purpose and goals of simulation (video #1) and an introduction to the 3G SIM manikin (video #2). Traditionally, these videos were provided in a simulation module located inside the learning management system as student assigned viewing. To ensure that students participating in this study engaged with the preparatory videos, viewing occurred during normal class time.

Simulation Day

Students arrived at the simulation lab the day of their scheduled simulation day (concurrent with their normally scheduled clinical day) and at a time predetermined by course faculty. Two clinical groups were assigned each hour of the simulation day (e.g., two groups from 10am to 11am, two groups from 11am to 12pm). To reduce the risk of sharing information, the clinical groups assigned each hour belonged to either the control group or experimental group. Students arrived one half hour prior to their simulation start time for prebriefing, reporting to their assigned room to view either the control or experimental video as randomly assigned. Prebriefing was chosen as the optimal time for delivery of the videos as this is the time immediately prior to entering the simulation environment (Page-Cutrara, 2014), a time where students are engaged and prepared to learn (Leigh & Steuben, 2018). The INACSL Standards Committee guide states that the prebriefing phase prepares students for success within the simulated environment (2016). As this research aimed to evaluate the use of expert modeling videos on students' simulation competency, the prebriefing phase was identified as the best phase for delivery.

Prior to release to the simulation laboratory, each clinical group was provided with their random assignment as belonging to either group A (participates in the first 15 minutes of the simulation scenario) or group B (participates in the last 15 minutes of the simulation scenario). Each member of group A randomly selected cards assigning them as nurse one, nurse two, documentation nurse, or medication nurse; this procedure was repeated by group B. Students were then released to the simulation laboratory. Immediately prior to the beginning of the simulation experience students were provided with a live prebriefing session conducted by the simulation coordinator. During the first 15 minutes, group A was active in the simulation scenario and group B were observers. When the groups switched, group A became observers, while group B were active in the simulation. This simulation overview was congruent with the *INACSL: Standards of Best Practices for Simulation Design* criterion seven (2016) and current prebriefing practices within the nursing literature (Page-Cutrara & Turk, 2017). This included the establishment of ground rules and fiction contract, orientation to the simulated environment and simulation equipment (monitor, telephone, SIM manikin), time allotment, roles, and the simulation goals / objectives.

At the end of the live prebriefing session, student clinical groups were dismissed to their assigned simulation room and separated into their assigned groups (A or B). Both groups provided care for approximately 15 minutes with the signal to switch being the administration of the first sublingual nitroglycerin tablet. This switch was facilitated by the simulation faculty, upon which time the first group provided SBAR report to the second group and became observers standing at the back of the room.

At the conclusion of the simulation, students were guided to a separate classroom where simulation debriefing took place. Upon entering the debriefing room, and prior to debriefing, students were asked to complete the video enjoyment scale (Lin et al., 2008) See Table 2 for a summary of the procedure.

Table 2

Summary of Prebriefing Procedure

Methods	Control	Experimental
Video 1: Simulation Overview (in class)	X	X
Video 2: Simulation 3G SIM Manikin (in class)	X	X
Live overview (orientation, etc.)	X	X
Expert discussion video	X	
Expert modeling video		X
Creighton Competency Evaluation Instrument (CCEI)	X	X
Survey on enjoyment of video intervention	X	X

Evaluation

Students' simulation performances were recorded to ensure accuracy of evaluation. The CCEI criteria to meet competency was customized based on the simulation objectives in accordance with students' experience and learning level and was agreed upon collectively by the course faculty (see Tables 3 and 4). To promote consistency of findings, the primary investigator completed the CCEI evaluation tool for each clinical group, viewing the simulation performance a minimum of two times. To ensure accuracy of evaluation, two training modules were completed which were designed and reviewed by the tool's creators. In accordance with the authors' suggestions and after discussion with the course faculty, the limit was placed that students must perform each behavior exactly according to its specific criteria, rather than partially, to receive credit for competency. Lastly, five behaviors were determined to not be applicable to the CHF simulation. These behaviors were *documents clearly, concisely, and accurately* (CCEI behavior #6), *interprets lab results* (CCEI behavior #10), *reflects on clinical experience* (CCEI behavior #16), *delegates appropriately* (CCEI behavior #17), and *reflects on* *potential hazards and errors* (CCEI behavior #23). The reason for the omission of these behaviors was due to the inability of students to display these behaviors or that the behaviors are commonly examined during debriefing, of which this study did not analyze. Students will be scored "n/a" for those specific behaviors and the CCEI score will be averaged less those behaviors.

Two CCEI worksheets were used for each simulation group, group A (n=4) and group B (n=4), representing the first four students to participate in the simulation and the second four students which concluded the simulation experience. An exception to this was found in three clinical groups that consisted of seven students and one that consisted of five, rather than eight. In this case, the three groups of seven were divided as group A (n=4) and group B (n =3); the group of five were divided into group A (n =3) and group B (n =2). Although roles were assigned, each group of students was evaluated as a whole because students were encouraged to guide one another and communicate during the simulation experience. This process was consistent with the CCEI evaluation tool as it was designed to provide a group score, with each student in the group assigned the same score, due to the understanding that simulation is a group process (M. Todd, personal communication, July 21, 2021).

Different criteria for evaluating each behavior were assigned to group A and group B due to the evolution of the simulation scenario. For example, recognition of the bed in high position (CCEI behavior #3; criterion #1) and the head of the bed lowered (CCEI behavior #3; criterion #2) is a competency behavior expected of group A and assessment of chest pain after nitroglycerin and morphine (CCEI behavior #2; criterion #1 and #2) is expected of group B. This is due to the simulation being one that evolved; once the bed was lowered and the head of the bed elevated by group A, the ability to recognize and correct these behaviors was not able to be completed by group B. Additionally, the signal to switch from group A to group B was the administration of the first sublingual nitroglycerin tab. Therefore, group A was not able to be evaluated on their assessment of the patient's chest pain following the first nitroglycerin dose. Specific behaviors were deemed as not applicable on the CCEI worksheet due to limitations of the simulation scenario; these were not included in the competency assessment. Examples of the CCEI evaluation worksheets used for group A and group B, with criteria expected and criteria not applicable, can be found in Table 3 and Table 4, respectively.

Table 3

CCEI Evaluation Measures for Group A

CCEI Domain: Assessment	
CCEI Behavior	Criteria to meet behavior
Obtains Pertinent Data	1. Assess patient's vital signs (BP, HR, Respirations, Oxygen saturation). 2. Complete focused assessment (lungs / heart / bilateral legs) 3. Assess IV site (clean / dry / intact) 4. Assess indwelling catheter
Performs Follow-Up Assessments as Needed	1. Re-evaluate after oxygen therapy (nasal cannula up to 6L / nonrebreather) 2. Assess patient after nitro dose and in-between each dose (vital signs / pain)
Assesses the Environment in an Orderly Manner	1. Notice patient's bed in high position and lower bed. 2. Notice patient's head of bed in low position and correct to high Fowlers.
CCEI Domain: Communication	
Communicates Effectively with Intra/Interprofessional Team (TeamSTEPPS, SBAR, Written Read Back Order)	1. Proper SBAR format when calling physician 2. Reads back verbal order from physician
Communicates Effectively with Patient and Significant Other (verbal, nonverbal, teaching)	1. Displays therapeutic communication (listens to patient, displays empathy, provides patient education) 2. Uses therapeutic nonverbal language (smiles, maintains eye contact when listening / talking to client) 3. Educates patient on interventions prior to implementing 4. Educates patient on medications prior to administration
Documents clearly, concisely, and accurately	n/a

(*table continues*)

Table 3 (continued)

CCEI Evaluation Measures for Group A

Responds to Abnormal Findings Appropriately	1. Intervenes (oxygen / NRB) with low pulse ox; monitors for improvement; titrates as needed 2. Completes assessment, obtains recent vital signs, and calls doctor in response to change in patient condition
Promotes Professionalism	1. Introduces self and role (RN) to patient 2. Treats patient professionally 3. Perform professionally as a group
CCEI Domain: Critical Judgment	
Interprets Vital Signs (T, P, R, BP, Pain)	1. Recognizes low oxygen saturation 2. Evaluates pain and location
Interprets lab results	n/a
Interprets Subjective / Objective Data (recognizes relevant from irrelevant data)	1. Objective: low oxygen saturation = need for oxygen 2. Objective: recognizes patient's nasal cannula not on 3. Subjective: questions patient about chest pain with initial complaint 4. Subjective: responds with oxygen administration when patient reports shortness of breath
Prioritizes Appropriately	1. Addresses patient's oxygen first (low oxygen saturation; applies oxygen) 2. Contacts physician when patient not responding to oxygen administration; patient reports chest pain
Performs Evidence Based Interventions	1. Titrates oxygen based on patient's needs
Performs Evidence Based Rational for Interventions	n/a
Evaluates Evidence Based Interventions and Outcomes	1. Evaluates patient response to nitro; chest pain re-evaluation
Reflects on Clinical Experience	n/a
Delegates Appropriately	n/a
CCEI Domain: Patient Safety	
Uses Patient Identifiers	1. Checks patients name / date of birth (DOB) prior to medication administration
Utilizes Standard Practices and Precautions Including Hand Washing	1. Washes hands before entering room 2. Dons gloves prior to patient assessment
Administers Medications Safely	1. Checks patients name / DOB prior to medication administration 3. Administers medications correctly (push furosemide 20mg/minute; places nitro sublingual – assess vital signs before and between doses)
Manages Technology and Equipment	1. Uses monitor to obtain vital signs and look for new orders
Performs Procedures Correctly	1. Completes focused assessment (lungs A&P / legs / indwelling catheter)
Reflects on Potential Hazards and Errors	n/a

Table 4

CCEI Evaluation Measures for Group B

CCEI Behavior	Criteria to meet behavior
CCEI Domain: Assessment	
Obtains Pertinent Data	1. Assess patient's vital signs (BP, HR, Respirations, Oxygen saturation). 2. Complete focused assessment (lungs A&P/ heart / bilateral legs) 3. Assess IV site (clean / dry / intact) and indwelling catheter
Performs Follow-Up Assessments as Needed	1. Assess patient after nitro dose and in-between each dose (vital signs / pain) 2. Re-evaluate patient pain after morphine
Assesses the Environment in an Orderly Manner	n/a
CCEI Domain: Communication	
Communicates Effectively with Intra/Interprofessional Team (TeamSTEPPS, SBAR, Written Read Back Order)	1. Proper SBAR format 2. Reads back verbal order from physician
Communicates Effectively with Patient and Significant Other (verbal, nonverbal, teaching)	1. Displays therapeutic communication (listens to patient, displays empathy, provides patient education) 2. Educates patient on interventions prior to implementing 3. Educates patient on medications prior to administration
Documents clearly, concisely, and accurately	n/a
Responds to Abnormal Findings Appropriately	1. Recognizes that the patient's chest pain is not relieved with nitro. 2. Recognizes patient's oxygen saturation not responding to maxed out nasal cannula. 3. Contacts the doctor in response to these findings.
Promotes Professionalism	1. Introduces self and role (RN) to patient 2. Treats patient professionally 3. Perform professionally as a group
CCEI Domain: Critical Judgment	
Interprets Vital Signs (T, P, R, BP, Pain)	1. Recognizes low oxygen saturation 2. Evaluates pain and location
Interprets lab results	n/a
Interprets Subjective / Objective Data (recognizes relevant from irrelevant data)	1. Objective: recognizes patient's chest pain not controlled with nitroglycerin and need for additional pain relief measures 2. Subjective: questions patient about pain after nitroglycerin administration
Prioritizes Appropriately	1. Contacts physician when patient not responding to nasal cannula oxygen administration; not responding to nitro for chest pain

(*table continues*)

Table 4 (continued)

CCEI Evaluation Measures for Group B

CCEI Domain: Assessment	
CCEI Behavior	Criteria to meet behavior
Performs Evidence Based Interventions	1. Switches to NRB when patient's oxygen not responding to nasal cannula (after doctor's orders) 2. Provides morphine for pain relief with nitroglycerin not helping (after doctor's orders)
Performs Evidence Based Rational for Interventions	n/a
Evaluates Evidence Based Interventions and Outcomes	1. Evaluates patient response to morphine administration 2. Evaluates patient response to NRB; oxygen saturation
Reflects on Clinical Experience	n/a
Delegates Appropriately	n/a
CCEI Domain: Patient Safety	
Uses Patient Identifiers	1. Checks patients name / DOB prior to medication administration
Utilizes Standard Practices and Precautions Including Hand Washing	1. Washes hands before entering room 2. Dons gloves prior to patient assessment
Administers Medications Safely	1. Checks patient's name / DOB / allergies prior to medication administration 2. Pushes morphine over 1 (one) minute
Manages Technology and Equipment	1. Utilizes monitor to look for new orders
Performs Procedures Correctly	1. Completes focused assessment (lungs A&P / legs / indwelling catheter)
Reflects on Potential Hazards and Errors	n/a

Data Analysis

Student simulation outcomes were evaluated by the *Creighton Competency Evaluation Instrument* (Todd et al., 2008). This dichotomous instrument provides overall nursing competency percentages and allows for the identification of competency within specific domains and behaviors (Todd et al., 2008). Student enjoyment was evaluated by the *Video Enjoyment Survey*, a 12-question survey evaluating student enjoyment in the factors of engagement, positive affect, and fulfillment (Lin et al., 2008).

Creighton Competency Evaluation Instrument

This study yielded a total of 22 CCEI scores for the control group (*n*=84) and 22 CCEI scores for the experimental group (*n*=87). Simulation competency was measured by the CCEI tool. Student groups, A or B, were evaluated and assigned a CCEI score of either "0" for "does not demonstrate competency" or "1" representing "demonstrates competency." After all evaluations were completed, the total *demonstrates competency* points were added and divided by the number of behavior assessments assigned to each respective group; in this study there were 17 behavior assessments. The final score provides a percentage which represents the simulation score, in other words the percentage of competency.

RQ1a sought to identify the impact that expert modeling videos have on nursing students' simulation competency. After assumptions of normality were met, an independent samples t-test was used to analyze for statistically significant differences between the control and experimental group based on their CCEI competency score. RQ1b sought to further explore the impact of expert modeling videos on students' respective domains and behaviors, comparing the control versus the experimental groups, within the CCEI evaluation. The data was found to violate the assumption of normality; thus, a Mann-Whitney-U test was used to identify differences between the control and experimental group under each domain (assessment, communication, clinical judgment, patient safety). RQ1C further explored the CCEI behaviors by control group and experimental group, however, due to the presence of 17 behaviors and the subsequent risk of a type I or II error, pragmatic evaluation was chosen to identify trends between the control and experimental group within domains and behaviors. This type of evaluation seeks to understand the underpinnings of the findings and the relationship present between the control and experimental groups when statistical analysis is difficult or impossible (Marasco et al., 2004).

Evaluation of Student Enjoyment

The video enjoyment scale, modified from a scale used to understand students' enjoyment in web experiences, sought to understand students' enjoyment within three broad factors. The data was found to violate normality; thus, a Mann-Whitney U test was completed to identify any statistically significant findings between the overall scoring by the control and experiment groups. Further evaluation was completed to identify potential differences in scores between the control and experimental group among the three factors. Due to the violation of normality, a Mann-Whitney U test was again run to identify differences between each group under each of the three factors. Seeking a better understanding of the findings, interaction effect between the groups was also analyzed in addition to the main effects.

Intra-Rater Reliability

The primary researcher was the sole rater for this research study. Intra-rater reliability is calculated to determine the accuracy of the results attained from the measurement tool (CCEI); a measurement needed to verify that the findings of the tool is accurate (Scheela et al., 2018). Due to the variability of student performance, and the need to reevaluate and determine competency standards based on such, a one-rater system was chosen to reduce the complexity that is often involved in the judgment process (Gwet, 2008). Two methods were utilized to ensure intra-rater reliability. The first method was the multi-viewing of the videos. Each video was viewed and scored, after which they were viewed a second time using a new CCEI scoring sheet. The two scores were then compared for accuracy. If discrepancies existed, the researcher viewed the simulation video a third time to detect which evaluation was accurate.

Ethics

Prior to the implementation of research involving human subjects, Institutional Review Board (IRB) approval must be obtained. The IRB is the governing body for research, ensuring the rights and welfare of study participants are protected (Grady, 2015). Informed consent was collected via a Qualtrics survey provided to students during their normal class period, one week prior to their assigned simulation day. For the present study, Institutional Review Board approval was provided prior to the collection of data. An approval of exempt level one was assigned as this study was identified as carrying minimal risk. Although student demographic data was collected in the debriefing survey including age, gender, GPA, and cohort, personal identifying factors were declassified so as to maintain anonymity.

Conclusion

Nursing programs have been charged with the task of developing innovative teaching strategies to improve undergraduate nursing students' simulation competencies (Kavanagh & Szweda, 2017). Research has shown that EMVs may impact students' simulation competencies, however, gaps in the literature exist. A total of 160 students were divided into control (n=22) and experimental (n=22) groups. Both groups received a video intervention which followed the nursing process (Toney-Butler & Thayer, 2021). The control group viewed an expert model discussing the steps in the nursing process through the care of a patient experiencing an acute exacerbation of congestive heart failure. The experimental group viewed an expert modeling video, demonstrating the care of the same. Immediately following the simulation students were asked to complete a *Video Enjoyment Survey* to ascertain, determine, and evaluate students' perceptions of the video interventions.

CHAPTER IV

FINDINGS AND RESULTS

There were two main goals of this study. The first was to determine the impact that expert modeling videos may have on undergraduate nursing students' simulation outcomes. The second goal was to examine student enjoyment of expert versus standard videos used in preparing students for nursing simulations.

Research Question One Findings

The first overarching research question (RQ1) set out to examine any impact expert modeling videos may have on undergraduate nursing student outcomes. To answer this first major research question, three sub-questions were created. These questions helped to identify the impact of expert modeling videos by comparing control and experimental groups and their overall CCEI scores, CCEI domain performance scores, and CCEI behaviors.

Research Question 1A Findings

RQ1A asked: "*What is the impact of expert modeling videos on simulation outcomes as measured by the CCEI total score?"* The null hypothesis was that there was no difference between groups on the overall CCEI percentage score. A total of 22 clinical groups were further divided into control (n=22) and experimental groups (n=22). During the prebriefing period the control groups viewed a nursing process discussion video; the experimental group viewed a nursing process expert modeling video. Immediately following the prebriefing all students completed the simulation. Student group performance was then evaluated using the *Creighton Competency Evaluation Instrument* (CCEI; Todd et al., 2008). The evaluation results were examined using *IBM SPSS* descriptives.

Results showed moderate skewness (-.917; kurtosis .447) for the control group; the results also showed moderate skewness (-.999; kurtosis 1.254) for the experimental group. Total CCEI percentages were transformed to Z scores to examine for outliers. Z scores ranged from -2.37 to 1.24 for the control group and -2.77 to 1.27 for the experimental group; as such, normality was assumed and no outliers were removed (Kim, 2013). See Table 5 for a summary of descriptive data.

Table 5

Normality for Control and Experimental Groups

	Mean %	Std. Dev.	Skewness	Kurtosis
Control	.503	.163	-.917	.447
Experimental	.679	.160	-.999	1.254

Final CCEI percentages from control and experimental groups were compared using an independent samples t-test. Equal variances were assumed using *Levene's Test for Equality of Variances* (p=0.957). The findings of the t-test were statistically significant (p=0.001) between control ($\bar{x}$=.503; SD=.163) and experimental groups ($\bar{x}$=0.679; SD=0.160). Given the result, the null hypothesis was rejected. Cohens d indicated a small effect size (d=0.161).

Research Question 1B Findings

RQ1B asked: "*What is the impact of EMV on simulation outcomes as measured by the four CCEI domain scores (assessment, communication, clinical judgment, and patient safety)?"* Descriptive statistics were run to analyze normality of the data. Results showed moderate skewness for the control group in both assessment (0.35; kurtosis -1.741) and communication (0.338; kurtosis -1.215); high skewness was found in clinical judgment (1.417; kurtosis 1.569) and patient safety (1.395; kurtosis 4.153). The experimental group showed moderate skewness in patient safety (-0.14; kurtosis -1.224); high skewness in assessment (-0.601; kurtosis -1.567), communication (-1.239; kurtosis 1.575), and clinical judgment (-3.132; kurtosis 11.170; see Table 6).

Table 6

CCEI Domain Scores

	Domain	Mean %	Std. Dev.	Skewness	Kurtosis
Control	**Assessment**	0.315	0.285	0.350	-1.741
	Communication	0.333	0.194	0.338	-1.215
	Clinical Judgment	0.777	0.305	-1.477	1.569
	Patient Safety	0.356	0.146	1.395	4.153
Experimental	**Assessment**	0.409	0.299	-0.601	-1.567
	Communication	0.500	0.183	-1.239	1.575
	Clinical Judgment	0.914	0.192	-3.132	11.170
	Patient Safety	0.582	0.230	-0.140	-1.224

Because the data violated the assumption of normality, a Mann-Whitney U test was run. Results found a significant difference in means between control and experimental groups on both *Communication* (z=-2.622; p=0.009) and *Patient Safety* (z=-3.171; p=0.002). However, no statistically significant differences were found between experimental and control groups on either *Assessment* or *Clinical Judgment* (see Table 7).

Running multiple tests can result in a type I error (Sato, 1996); to account for this potential error, post hoc analyses were conducted. Bonferroni Procedure is often used to correct potential errors of this nature. However, Bonferroni can be too conservative and fails to account for correlation of variables (Simes, 1986), therefore a Simes correction was chosen. The Simes correction produced statistically significant differences in means between control and experimental in the domains of *Communication* (adjusted p=0.018) and *Patient Safety* (adjusted *p*=0.008; see Table 3). Calculating effect sizes found a medium effect size for communication (*r*=0.415) and a large effect side for patient safety (*r*= 0.502).

Table 7

Significance Values per Domain

Domain	**Original p value**	**Simes corrected p value** (Simes, 1986)
Assessment	0.270	0.270
Communication	0.009*	0.018*
Clinical Judgment	0.091	0.121
Patient Safety	0.002*	0.008*

*Statistically significant at $p<.05$.

Research Question 1C Findings

RQ1C asked: "*What is the impact of expert modeling videos on simulation outcomes as identified by trends within CCEI behaviors?"* Literature surrounding the use of the CCEI discuss the instrument's subscales; however, they provide little discussion about the implications of their findings (Hanson & Bratt, 2017; Kirkpatrick et al., 2019). In order to better understand student achievement within each of the four domains, mean scores from the CCEI subscales were reviewed to identify trends within and between the control and experimental groups.

A review of the literature on the use of CCEI in simulation found multiple interpretations of what constitutes high *competency* levels (Kirkpatrick et al., 2019; Victor et al., 2017). Therefore, in order to review control and experimental group outcomes, a rating scale was created. This is consistent with guidance from the CCEI authors (Todd et al., 2008) who guide faculty to delineate what constitutes a competent score based upon their expectations of the students. The scale ranged from no competency demonstrated (0) to high competency demonstrated (5), see Table 8.

Table 8

Levels and Determination of Competency

Level	Determination of Competency	%
0	None	0
1	Low	1-20
2	Low-Medium	21-40
3	Medium	41-60
4	Medium-High	61-80
5	High	81-100

Descriptive means of the 17 behaviors were used to compare the control group to the experimental group (see Table 9). The experimental group performed at least one level better in 11 of the 17 domains ranging across assessment (1), communication (3), clinical judgment (3), and patient safety (4). The experimental groups outperformed the control group by 2 levels in 4 of the 17 domains (communication = 1, clinical judgment = 1, and patient safety = 2). The control group received a level five in six of the 17 behaviors (see Tables 9, 10, & 12), whereas the experimental group achieved a level five in nine of the 17 behaviors (see Tables 9, 11, & 12). Both control and experimental groups performed the best in the domain of clinical judgment, with the control group receiving a Level 4 or Level 5 in four of the six behaviors and the experimental group receiving a Level 4 or Level 5 in five of the six behaviors (see Table 12).

Table 9

Control and Experimental Levels

Domains	#	Behavior	Control %	Control Level	Exp. %	Exp. Level
Assessment	1	Obtains pertinent data	0	0	0	0
	2	Performs follow-up assessments as needed	38.9	2	63.6	3 *
	3	Assess the environment in an orderly manner (reference 1)	100	5	100	5
Communication	4	Communicates effectively with intra/interprofessional team	0	0	13.6	1 *
	5	Communicates effectively with patient & significant other	33.3	2	81.8	5 **
	6	*Documents clearly, concisely, and accurately*	*n/a*	*n/a*	*n/a*	*n/a*
	7	Responds to abnormal findings appropriately	88.9	5	86.4	5
	8	Promotes professionalism	44.4	3	68.2	4 *
Clinical Judgment	9	Interprets vital signs	50	3	81.8	5 **
	10	*Interprets lab results*	*n/a*	*n/a*	*n/a*	*n/a*
	11	Interprets subjective / objective data	72.2	4	95.5	5 *
	12	Prioritizes appropriately	94.4	5	100	5
	13	Performs evidence-based interventions	83.3	5	86.4	5
	14	Provides evidence based rational for interventions (reference 2)	83.3	5	90.9	5
	15	Evaluates evidenced based interventions and outcomes	38.9	2	45.5	3 *
	16	*Reflects on clinical experience*	*n/a*	*n/a*	*n/a*	*n/a*
	17	*Delegates appropriately*	*n/a*	*n/a*	*n/a*	*n/a*
Patient Safety	18	Uses patient identifiers	16.7	1	54.5	3 **
	19	Utilizes standardized practices and precautions including hand washing	55.6	3	77.3	4 *
	20	Administers medications safely	5.6	1	45.5	3 **
	21	Manages technology and equipment	100	5	100	5
	22	Performs procedures correctly	0	0	13.6	1 *
	23	*Reflects on potential hazards and errors*	*n/a*	*n/a*	*n/a*	*n/a*

* Represents a change of ≥1 levels
** Represents a change of ≥2 levels

Table 10

Breakdown of Domains and Levels: Control Group

Domains	#	Behavior	Control %	Levels
Assessment	3	Assess the environment in an orderly manner	100	L5
Patient Safety	21	Manages technology and equipment	100	
Clinical Judgment	12	Prioritizes appropriately	94.4	
Communication	7	Responds to abnormal findings appropriately	88.9	
Clinical Judgment	13	Performs evidence-based interventions	83.3	L4
Clinical Judgment	14	Provides evidence based rational for interventions	83.3	
Clinical Judgment	11	Interprets subjective / objective data	72.2	
Patient Safety	19	Utilizes standardized practices and precautions including hand washing	55.6	L3
Clinical Judgment	9	Interprets vital signs	50	
Communication	8	Promotes professionalism	44.4	
Assessment	2	Performs follow-up assessments as needed	38.9	L2
Clinical Judgment	15	Evaluates evidenced based interventions and outcomes	38.9	
Communication	5	Communicates effectively with patient & significant other	33.3	
Patient Safety	18	Uses patient identifiers	16.7	L1
Patient Safety	20	Administers medications safely	5.6	
Assessment	1	Obtains pertinent data	0	L0
Communication	4	Communicates effectively with intra/interprofessional team	0	
Patient Safety	22	Performs procedures correctly	0	

Table 11

Breakdown of Domains and Levels: Experimental Group

Domains	#	Behavior	Experimental %	Levels
Assessment	3	Assess the environment in an orderly manner	100	L5
Clinical Judgment	12	Prioritizes appropriately	100	
Patient Safety	21	Manages technology and equipment	100	
Clinical Judgment	11	Interprets subjective / objective data	95.5	
Clinical Judgment	14	Provides evidence based rational for interventions	90.9	
Clinical Judgment	13	Performs evidence-based interventions	86.4	
Communication	7	Responds to abnormal findings appropriately	86.4	
Clinical Judgment	9	Interprets vital signs	81.8	
Communication	5	Communicates effectively with patient & significant other	81.8	
Patient Safety	19	Utilizes standardized practices and precautions including hand washing	77.3	L4
Communication	8	Promotes professionalism	68.2	
Assessment	2	Performs follow-up assessments as needed	63.6	
Patient Safety	18	Uses patient identifiers	54.5	L3
Clinical Judgment	15	Evaluates evidenced based interventions and outcomes	45.5	
Patient Safety	20	Administers medications safely	45.5	
Communication	4	Communicates effectively with intra/interprofessional team	13.6	L1
Patient Safety	22	Performs procedures correctly	13.6	
Assessment	1	Obtains pertinent data	0	L0

Table 12

Breakdown of Levels by Group

Level	Control	Experimental
L5	6	9
L4	1	2
L3	3	4
L2	3	0
L1	2	2
L0	3	1

Summary of Research Question One

The first overarching research question asked: *"What is the impact of expert modeling videos (EMV) on undergraduate nursing student outcomes?"* Three sub-questions were crafted to answer this question. Research question 1A asked: "*What is the impact of expert modeling videos on simulation outcomes as measured by the CCEI total score?*" Research question 1B asked: "*What is the impact of EMV on simulation outcomes as measured by the four CCEI domain scores (assessment, communication, clinical judgment, and patient safety)?*" Lastly, research question 1C asked: "*What is the impact of expert modeling videos on simulation outcomes as identified by trends within CCEI behaviors?*"

Evaluation of the data from the *Creighton Competency Evaluation Instrument* (CCEI) total scores found a significant difference between the control and experimental groups on overall outcomes. Furthermore, a significant difference was found between the control and experimental groups in the CCEI domains of communication and patient safety. Descriptive analysis of the sub-behaviors of each of the four CCEI domains found the experimental group achieving a level five, or high competency, in nine of the 17 behaviors: the control group in six of the 17 behaviors. Overall, the experimental group performed one level or greater higher in each of the four domains: assessment (1), communication (3), clinical judgment (3), and patient safety (4).

In summary, findings from research question one indicated that EMVs have a positive impact on nursing students' simulation outcomes when measured by the CCEI. Further exploration into the domains of the CCEI also found a significant impact in some domains (i.e., communication and patient safety.) Finally, descriptive analyses showed higher competency levels in some behaviors for those receiving expert modeling videos. Therefore, this study provided evidence of the positive impact that expert modeling videos had on undergraduate nursing students' simulation outcomes.

Research Question Two Findings

The second overarching research question (RQ2) sought to discover students' enjoyment of the nursing process videos. Two sub-questions were created to help answer this second major research question.

Research question 2A asked: "*How does student enjoyment of the nursing process videos compare between experimental and control groups as measured by a tool developed to evaluate students' enjoyment of a video intervention?"* The null hypothesis was that there was no statistically significant difference between control and experimental groups on enjoyment of the video intervention. Although research question one analyzed student performance within their clinical *groups*, research question two sought to understand a student's *individual* enjoyment of the videos. As such, a total of 160 students completed the video enjoyment survey (Lin et al., 2008) immediately following their simulation experience. Data from the survey was first examined using *IBM SPSS* descriptives.

An evaluation of the data found several student responses that were representative of the students selecting all of one response (e.g., all 1s or all 2s). Although a response of one represented *strongly agree*, it is also the first response option in the survey. Students selecting all 1s or all 2s may have simply selected all of these numbers in order to quickly complete the survey. Following this assumption, the data were considered false data and were removed during data cleaning. A total of 17 answers were removed, nine from control (eight all 1s and one all 2s) and eight from experimental (four all 1s and four all 2s).

After removal of the false data, some outliers remained. These outliers were on the lower end of the overall rating scores (strongly disagree or disagree) but consisted of several different responses (compared to picking the same answer for everything). This suggested the answers were purposive responses and thus were not removed. The outliers within the data led to a violation of normality as it demonstrated a high skewness at 1.311. A Mann-Whitney U test was run to compare overall survey results between the control and experimental groups. The results found no statistically significant difference between the control and experimental groups ($z = -0.740$, $p = 0.459$). Therefore, the null hypothesis failed to be rejected.

Research Question 2B Findings

RQ 2B asked: "*How does student enjoyment of the nursing process videos compare between experimental and control groups as measured by the three factors of engagement, positive affect, and fulfillment within the video enjoyment survey?*" The results from the video enjoyment survey were used to answer this question. However, this research question sought to understand any differences within the instruments three factors of engagement, positive affect, and fulfillment (Lin et al., 2008). Descriptive statistics were run to analyze normality of the data. Results showed high skewness for the control group in engagement (1.642; kurtosis 6.439), moderate skewness for positive affect (0.509; kurtosis 0.113), and high skewness for fulfillment (1.232; kurtosis 2.379). The experimental group showed high skewness in all factors: engagement (1.316; kurtosis 2.976), positive affect (1.011; kurtosis 0.413), and fulfillment (1.248; kurtosis 1.807; see Table 13).

Table 13

VES Factor Scores

	Factor	Mean	Std. Dev.	Skewness	Kurtosis
Control	Engagement	2.537	0.852	1.642	6.439
	Positive Affect	2.794	0.891	0.509	0.113
	Fulfillment	2.310	0.759	1.232	2.379
Experimental	Engagement	2.208	0.898	1.316	2.976
	Positive Affect	2.962	1.133	1.011	0.413
	Fulfillment	2.278	0.916	1.248	1.807

Due to the violation of normality, a Mann-Whitney U test was run to compare the three factors of the video enjoyment survey between the control and experimental groups. A statistically significant difference was found in engagement (z = -2.818, $p = 0.005$) between the control ($\overline{x} = 2.537$; SD = 0.852) and experimental groups ($\overline{x}$=2.208 SD=0.898).

A Simes correction was run with adjusted p values showing a significant difference in means between control and experimental on *Enjoyment* (adjusted p value of 0.020). The null hypothesis was rejected (see Table 14).

Table 14

Adjusted p Values for Video Enjoyment Survey

Factor	Original (p values)	Simes
Engagement	0.005	0.020*
Positive Affect	0.707	0.707
Fulfillment	0.396	0.533

*Statistically significant at p<.05.

Summary of Research Question Two

Research question two asked: *How does student enjoyment of the nursing process videos compare between experimental and control groups as measured by a tool developed to evaluate a student's enjoyment of a video intervention?"* To answer this, two sub-questions were created. Research question 2A asked: "*How does student enjoyment of the nursing process videos compare between experimental and control groups as measured by a tool developed to evaluate student's enjoyment of a video intervention?"* Research question 2B further explored video enjoyment by asking: "*How does student enjoyment of the nursing process videos compare between experimental and control groups as measured by the three factors of engagement, positive affect, and fulfillment within the video enjoyment survey?"*

Results showed no statistically significant difference overall between control and experimental groups in enjoyment of the video intervention. However, when looking at the individual factors of the video enjoyment survey, a significant difference was found in engagement. Therefore, the answer to research question 2 is that while there was no difference in enjoyment between the discussion nursing process video and demonstration nursing process video overall, nursing simulation students did report finding the EMV more engaging.

Other Findings

The tools used in this study helped to examine the efficacy of a video intervention in terms of student outcomes and students' enjoyment. The CCEI had already been used, validated, and tested in nursing education. This video enjoyment survey had also previously been found reliable and valid in at least two published research studies (Lin et al., 2008; Lin et al., 2012). However, to date, no other published research was found that examined the use of the *Video Enjoyment Survey* in nursing education.

The video enjoyment survey used in this study was adapted, with the author's permission, from a survey designed to measure web experiences (Lin et al., 2008). Modification of the tool for use in this study was minimal; it consisted of changing the contextual instructions for each of the three factors (i.e., engagement, positive affect, and fulfillment). For instance, the introduction to the four questions for engagement originally asked users to respond after reading: *While visiting the web pages*. The adaption for this use changed the wording to: *While viewing the nursing process video*. Table 15 contains the three changes made to the contexts of the factors

Table 15

Factor Modifications

Factor	Original	Modified
Engagement	While visiting the Web pages,	While viewing the nursing process video
Positive Affect	While visiting the Web pages, I felt	While watching the nursing process video I felt…
Fulfillment	Visiting the Web pages was	I found the nursing process video to be…

The modified *Video Enjoyment Survey* (VES) was found to be highly reliable in this study (α=0.931). High reliability was also found within each factor: *engagement* (a=0.882), positive *affect* (α=0.940), and *fulfillment* (α= 0.841), see Table 16. This high reliability approximates the original authors' findings (see Table 16).

Table 16

Reliability comparison for Video Enjoyment Scale

VES Factors	Original (Lin et al., 2008) (α values)	Current study (α values)
Engagement	0.941	0.882
Positive Affect	0.964	0.940
Fulfillment	0.966	0.841
Overall enjoyment	0.964	0.931

Summary of Findings

This chapter provided the results of the quantitative and descriptive analysis of this research study on the impact of expert modeling videos on undergraduate nursing students' simulation competency as well as their enjoyment of the video intervention. Findings from this study indicate that the use of expert modeling videos had a positive impact on nursing students' simulation outcomes in both specific domains (i.e., communication and patient safety) and behaviors. Findings also indicated that the control and experimental group did not differ in their enjoyment of the video interventions; however, nursing simulation students found the EMV more engaging. Finally, while not an original research question for this study, psychometric properties of the video enjoyment survey showed high reliability overall and for each of the three factors within the survey. The following chapter discusses the meaning of these findings and provides implications and recommendations for future research.

CHAPTER V

DISCUSSION, INTERPRETATIONS, IMPLICATIONS

Research has provided evidence that new graduate nursing students lack essential clinical competencies (Kavanagh & Szweda, 2017). This has been referred to as the *academic-practice gap;* the gap between theoretical knowledge and the ability to demonstrate that knowledge in practice (Huston et al., 2018). Nursing programs have attempted to reduce this gap by implementing simulated learning experiences in undergraduate nursing education.

However, while the use of simulation has proven beneficial to attaining clinical competency, research continues to provide evidence that students are missing key competencies (Scalise, 2019). One innovative strategy that has been explored in an effort to improve students' clinical competency in the simulated environment is expert modeling videos (EMVs). EMVs are videos that allow students to watch an exemplar performance (i.e., patient care; Song et al., 2005). While literature on the use of EMVs within simulation has provided evidence towards their positive impact on nursing outcomes, significant research gaps exist. These gaps include a dearth of literature discussing their use within the prebriefing period of simulation, a lack of research on the use of EMVs in prebriefing within different care contexts, and a lack of methodological rigor in existing studies. Therefore, the purpose of this quasi-experimental research study was to address these gaps by determining the impact of expert modeling videos on undergraduate nursing students' simulation competencies.

A total of 160 students participated and were divided by clinical group into either a control group (n=22) or an experimental group (n=22). Both groups were shown a nursing process video in the prebriefing stage; the control group viewed an expert discussion video, while the experimental group viewed an expert modeling video. Simulation performance was measured for both the control and experimental groups using the *Creighton Competency Evaluation Instrument* (CCEI; Todd et al., 2008). In the debriefing stage, all students (*n*=160) completed a *Video Enjoyment Survey* (VES; Lin et al., 2008). Data was analyzed using IBM *SPSS Statistics 28*.

The purpose of this chapter is to discuss implications of the findings on whether EMVs impacted nursing simulation outcomes as measured by the CCEI overall, how EMVs impacted students' outcomes within specific CCEI domains and behaviors, and students' enjoyment of the video intervention. A discussion on theoretical implications and limitations of the research is also included. Finally, this chapter will discuss guidance for future research and practice on the use of expert modeling videos in undergraduate nursing education.

The research questions (and associated hypotheses where appropriate) that guide this chapter are:

RQ1: What is the impact of expert modeling videos (EMVs) on undergraduate nursing student outcomes?

RQ1A: What is the impact of an EMV on simulation outcomes as measured by the CCEI total score?

H_o: There will be no statistically significant differences between control and experimental groups as measured by the CCEI total scores.

H_1: There will be statistically significant differences between control and experimental groups as measured by the CCEI total scores.

RQ1B: What is the impact of EMV on simulation outcomes as measured by the four CCEI domain scores (assessment, communication, clinical judgment, and patient safety)?

RQ1C: What is the impact of EMV on simulation outcomes as identified by trends within CCEI behaviors?

RQ2: How does student enjoyment of the nursing process videos compare between experimental and control groups as measured by a tool developed to evaluate students' enjoyment of a video intervention?

RQ2A: How does student enjoyment of the nursing process videos compare between experimental and control groups as measured by the overall video enjoyment survey?

H_o: There will be no statistically significant differences between control and experimental groups as measured by the overall video enjoyment survey.

H_1: There will be statistically significant differences between control and experimental groups as measured by the overall video enjoyment survey.

RQ2B: How does student enjoyment of the nursing process videos compare between experimental and control groups as measured by the three factors of engagement, positive affect, and fulfillment within the video enjoyment survey?

Discussion and Implications of RQ1

Research question one sought to discover the impact of expert modeling videos (EMVs) on undergraduate nursing students' simulation outcomes. To answer this question three sub-questions were crafted.

Research Question 1A

Research question 1A asked: "*What is the impact of an EMV on simulation outcomes as measured by the CCEI total score?*" Research has shown a gap between students' theoretical knowledge and the ability to demonstrate clinical skills (Osuji et al., 2019; Vaismoradi et al., 2014). The use of simulation has been identified as an essential building block for clinical competency and an optimal method for the reduction of this gap (AACN, 2008). In fact, the NCSBSN advocates for the use of simulation as one way to evaluate students' clinical competency (Hayden et al., 2014). Therefore, the need to build and evaluate simulation competency is paramount to improving students' overall clinical preparation.

The findings of RQ1A suggest that the use of EMVs may improve students' overall simulation competencies. Evaluation of the CCEI data found a statistically significant difference in overall CCEI scores (p=0.001) between the control group ($\overline{x}$=.503; SD=.163) and the experimental group ($\overline{x}$=0.679; SD = 0.160). These findings are similar to work completed by Brennan (2022) who used expert modeling videos in the prebriefing phase to determine their impact on simulation competency. In the study, both the control and experimental groups received standard prebriefing (guided by the INACSL); however, the experimental group received an additional intervention of an expert modeling video (Brennan, 2022). Brennan (2022) found that the experimental group performed significantly better on overall simulation competency as evaluated by the CCEI. While these findings are foundational for the impact of EMVs, the additional intervention allotted to the experimental group may account for the statistical findings. The present study differs in that both the control and experimental group were provided with a nursing process video intervention (the experimental group received an expert modeling video, and the control received an expert discussion video). The provision of an additional learning opportunity for both groups in this study enabled evaluation of the impact of an expert modeling video over simply a video intervention.

This present study and the study completed by Brennan (2022) further validate the use of EMV as a viable educational strategy for the development of simulation competency. One area in need of further exploration is the use of EMVs for the care of the acutely ill patient in different care contexts. These types of simulations are imperative as research has shown that students lack exposure to the care of acutely ill patients during hospital-based clinical practice (J.E. Brown, 2019). The present study provided students with an opportunity to practice care of an acutely ill patient experiencing an exacerbation of a chronic disease (i.e., congestive heart failure) in a simulated setting. Future research on EMVs should look at the care of the acutely ill patient in other care content areas such as obstetrics, pediatrics, and critical care.

Furthermore, Albert Bandura's *Social Learning Theory* provides insight and guidance for the findings of RQ1A. Social Learning Theory (Bandura, 1977) posits that individuals learn both by their own experiences and through the observation of the experiences of others. The viewing of an expert modeling video allowed students to observe the exemplar care of a patient with an acute exacerbation of congestive heart failure and subsequently provide care for a similar simulated patient. *Social Learning Theory* discusses observational learning occurring through three processes: vicarious, symbolic, and self-regulatory (Bandura, 1986). These three processes can be seen in students who viewed an EMV. They were provided with the opportunity to learn vicariously through the performance of the expert model, consciously reflect on the expert model's actions through comparison of previous knowledge and care experiences, and determine which actions of the expert model were deemed useful in their understanding of patient care. These processes are evident in the behavioral trends identified in this study and further validated by previous research on students' simulation competency. For example, research has found that nursing students struggle to therapeutically communicate with patients (Abdolrahimi et al., 2017; MacDonald-Wicks & Levett-Jones, 2012). However, this study demonstrated that students in the expert modeling group not only performed significantly better than the control group in communication, but descriptive statistics also showed that the experimental group performed three levels higher in communication with the patient and significant other, and one level higher in communication with a licensed provider.

In addition, results of RQ1A demonstrated what Albert Bandura defined as *delayed modeling*. Delayed modeling occurs by recalling previous observational experiences and using the stored knowledge to perform that behavior at a later time (Bandura, 1977). Students in the experimental group were able to recall, from memory, the performance viewed in the EMV and employ similar care during their own simulation experience. This provides an excellent guide for future research as nursing education is attempting to answer how simulated competency translates to clinical competency (Qua, 2012). Future research on the use of EMVs should investigate the relationship between students' simulation competency and their ability to translate this competency into the care of a patient in the clinical environment.

Research Question 1B

Research question 1B further investigated the CCEI scores by asking: "*What is the impact of EMV on simulation outcomes as measured by the four CCEI domain scores (assessment, communication, clinical judgment, and patient safety)?"* Evaluation of the CCEI data found a statistically significant difference between the control and experimental groups in the domains of *Communication* (z=-2.622; p=0.009) and *Patient Safety* (z=-3.171; p=0.002).

These findings suggest that EMVs may be beneficial in the development of competency in communication and patient safety measures.

Quality and Safety Education in Nursing prioritizes the need for nursing educators to develop six competencies in order to promote safe and competent clinical practice; two of those competencies include communication (through patient-centered care) and patient safety (QSEN, 2020). Additionally, the Joint Commission Sentinel Event Database has identified communication as one of the leading causes of sentinel events in the United States. These findings call for nursing programs to find strategies to build competency in this area (The Joint Commission, 2016). Teaching strategies which reinforce patient safety measures through both theoretical and practice models is essential to decreasing this number and promoting patient safety.

Communication

Nursing education has attempted to address the competency of communication through simulated experiences. One example is research by Bussard & Lawrence (2019), who sought to discover the impact of EMV on students' therapeutic communication. Bussard and Lawrence (2019) brought an expert modeling the care of a simulated patient into the nursing classroom by using live-streamed technology. While Bussard and Lawrence (2019) lacked an experimental / control group, their findings help to confirm the ability of expert modeling videos to help nursing students understand effective communication. However, this research contradicts Aronson et al. (2013) who found that despite the use of an EMV, both the control and experimental groups had low achievement in the ability to meet national patients' safety standards. Evaluation of Aronson et al.'s findings indicate a significant time lapse between exposure to an EMV and the simulated experience, averaging 35-99 days (2013). In the present study, students were provided with an

EMV during the prebriefing period, which, in literature, is identified as an optimal time to maximize learning and preparedness (Leigh & Steuben, 2018). The ability to view an EMV in prebriefing and then immediately demonstrate competency may account for the differences between this study and Aronson et al.'s findings (2013). Future research should examine the impact of time on EMVs. An example may be the viewing of an EMV in the presimulation period (control) and the prebriefing phase (experimental) and evaluating their simulation outcomes.

Patient Safety

In addition to improved communication, findings of RQ1B suggest that the use of EMVs in simulation preparation may be able to significantly improve students' understanding of the importance of safety measures within patient care. These findings are valuable as research has revealed that students continue to struggle with patient safety considerations in the simulated environment (Scalise, 2019). Research by Franklin et al. (2014), using the CCEI to determine simulation competencies, provided further evidence of students' lack of competency in patient safety measures. In this study, three groups were provided with different presimulation preparatory activities: an EMV, a voice over PowerPoint, and additional reading assignments. While Franklin et al. did not find a statistically significant difference in overall simulation competency, a strong relationship was found between safety checks and the viewing of and the viewing of an EMV (2020). Future research should expand on these findings by comparing different simulation preparation methods to determine if EMVs continue to provide improved competency in specific behaviors such as patient safety.

The results of RQ1B found no significant difference between control and experimental in the domains of *Assessment* and *Clinical Judgment*. Reviewing the competency levels within these two domains showed that both groups attained a level two or higher in eight of the nine assessed behaviors. Furthermore, both groups attained a level five in four of the nine assessed behaviors. One explanation could be the specific criterion used to measure competency within the behaviors of the domain. The CCEI tool allows nursing educators to develop criteria needed to determine competencies within each behavior under each domain (Todd et al., 2008). It may be that the criterion developed for the assessment and clinical judgment domains was too easily attainable based on the students' level of knowledge and clinical exposure whereas other domains (i.e., communication and patient safety) had criterion exceeded students' level of knowledge and experience. Future research on EMVs evaluated with the CCEI should critically analyze the appropriateness of each criterion in determining competency within each domain. Thus, further exploration is needed to: (a) determine if students are better prepared through lecture and clinical experiences in the domains of clinical judgment and assessment, (b) determine if the nursing process video intervention (whether demonstration or discussion) provided the guidance needed to achieve competency in these domains, and (c) provide guidance for selecting specific criterion within the CCEI behaviors

Research Question 1C

Research question 1C asked: "*What is the impact of EMV on simulation outcomes as identified by trends within the CCEI behaviors?*" The behaviors listed in the CCEI have been identified as critical elements necessary to achieve an overall domain (Hayden et al., 2014). However, research often neglects to offer a discussion on the individual CCEI behaviors, often providing statements of findings as opposed to exploring their meaning (Hansen & Bratt, 2017; Page-Cutrara & Turk, 2017). This is problematic as recent research has identified a gap in understanding the impact that simulation-based learning experiences have on students' behaviors

(Norman, 2012; Weaver, 2011). Furthermore, a lack of understanding of students' behavioral strengths and weaknesses within simulation may lead to confounding curricular objectives (Lee et al., 2019). Because of the dearth of literature expanding on the CCEI behaviors, this section will describe what an assessment of the behavioral findings might look like. Practice, research, and policy implications are listed in the discussion of each behavior, as applicable.

Although the findings for RQ1C were unable to be statistically analyzed due to the small sample size, behavioral trends did exist. Caution should be taken due to the lack of statistical analyses; however, there were trends that are worth further discussion and exploration. As demonstrated in chapter 4, levels were created in order to organize the findings of RQ1C. These levels ranged from no competency (Level 0) to high competency (Level 5). Each section below first lists the overall behavior and then provides the criterion for meeting each behavior (there are up to three criteria per behavior). Further discussion is provided in consideration of the individual criterion needed to achieve competency in each behavior. A discussion on the trend for each behavior, its importance to nursing education and research, and additional implications derived will be provided.

The following section will first discuss the two domains and associated behaviors which showed statistical significance (*Communication* and *Patient Safety*). This will then be followed with a discussion on the two domains where statistical significance between control and experimental groups was not reached (*Assessment* and *Clinical Judgment*).

EMV and the Communication Domain

The behaviors assessed within the Communication Domain consisted of *the ability to communicate within an intra/interprofessional team* (CCEI #4), *communicates effectively with patient and significant other* (CCEI #5), *responds to abnormal findings* (CCEI #7), and *promotes* *professionalism* (CCEI #8). CCEI behavior six (*documents clearly, concisely, and accurately)* was not used because it was unobservable in the students' recorded simulation experiences. The overarching behaviors and the identified trends are provided first, followed with a brief discussion. Next, the criteria needed to establish competency within each behavior is provided and discussed as a sub-heading within the respective behavior.

Behavior #4: Intraprofessional and Interprofessional Communication Skills

This behavior measured students' ability to communicate effectively with an intra/interprofessional team. In order to achieve *clinical competency* within this behavior, students must have (a) demonstrated proper SBAR format when calling the physician and (b) read back the verbal orders given by the physician. Descriptive statistics found that both groups did poorly in this area; however, the experimental group performed one level higher in this behavior compared to the control group (control = Level 0; experimental = Level 1).

Behavior #4, Criterion #1: SBAR. Situation, background, assessment, and recommendation (SBAR) communication is a way for healthcare workers to streamline and organize pertinent information (Haig et al., 2006; Leonard et al., 2004; Whittingham & Oldroyd, 2013). Competent SBAR communication is an expectation of new graduate nurses (Gore et al., 2015). SBAR communication is used both from nurse-to-nurse and nurse-to-physician or other healthcare provider (e.g., surgeon, physical therapy). The Joint Commission reported that 60–70% of healthcare sentinel events from 2003 to 2013 were related to a breakdown in communication (Narayan, 2013). This breakdown is most often attributed to the omission of critical patient information (Steelman et al., 2019). However, the implementation of SBAR communication has been found to promote collaboration between healthcare employees and to improve overall patient care outcomes (Narayan, 2013). A review of the literature surrounding the effects of SBAR communication training found reports of perceived improvement in interprofessional communication (DeMeester et al., 2013; Fay-Hillier et al., 2012; Kesten, 2011; Sears et al., 2010; & Randmaa et al., 2013), an increase in communication knowledge (Kesten, 2011 & Wang et al., 2015), and a decrease in negative outcomes due to communication errors (Randmaa et al., 2013).

Within undergraduate nursing education, simulation is often used to help develop SBAR communication skills (Foronda et al., 2018; Norman, 2012). Simulation provides an optimal opportunity to practice SBAR communication through multiple simulated experiences and with multiple patient scenarios (Durham & Alden, 2008). Research conducted by Franklin et al. (2020) found that EMVs improved students' ability to communicate in SBAR format. However, these trends conflict with EMV research by Lanz & Wood (2018). Those authors stated that although students were able to recognize a patient problem, the ability to provide accurate, concise communication was challenging. The conflicting research findings may be due to individual expectations for SBAR. For example, Lanz & Wood (2018) specifically focused on students' ability to communicate with ISBARR. This modified SBAR includes an "I" to cue the student to identify self and an additional "R" to cue the student to read back verbal orders (Lanz & Wood, 2018). Moreover, within this study, the authors also provided the control group with an opportunity to role-play SBAR with feedback in the classroom setting. This extra practice related to expert modeling may have impacted the study's results.

Data trends from this study showed that students who watched an EMV performed one level higher when communicating with SBAR. Yet, while the EMV group trended better than the control group, both groups scored low in relation to SBAR, specifically in the areas of "B" (background) and "A" (assessment). The SBAR videos used in this study demonstrated nurse-to-nurse handoff (control and experimental groups) and nurse to physician SBAR (experimental group). While both forms of communication are essential, nurse-to-nurse communication is often lengthier due to the provision of objective data, detailed account of patient status throughout the shift, and social support issues (Achrekar et al., 2016). Moreover, nursing students get adequate practice with nurse-to-nurse communication, but often lack experience and opportunity to engage in nurse-to-physician SBAR. As such, future research and development on EMVs should be cognizant of the different types of SBAR communication and should focus on improving nurse-to-physician SBAR.

Behavior #4, Criterion #2: RBVO. Read back verbal order (RBVO) is an informal communication tool which allows for confirmation of orders prior to implementation (Moghaddasi & Farabakhsh, 2017). Verbal orders are provided throughout healthcare fields and can include laboratory tests, discontinuation or addition of medications, diagnostic evaluations, and therapeutic interventions (Wakefield et al., 2012). It is estimated that medical orders provided verbally account for more than 20% of orders placed; the dual signature of these orders when implemented become legally binding (Moghaddasi & Farabakhsh, 2017). Furthermore, the regulation of RBVO has been listed on the Joint Commissions National Patient Safety Goals (Joint Commission, 2007) due to finding 2.3% of medical errors being attributed to inaccurate RBVO (Cho et al., 2014).

Research on the use of RBVO in simulation has found students struggling in their ability to complete this skill (Cummings, 2014). This may be in part due to the lack of opportunity to obtain orders from a physician during hospital-based clinical experiences (Jamshidi et al., 2016). A review of the literature on EMVs for improving RBVO found no articles which included a demonstration of or discussion on the purposeful inclusion of RBVO. The EMV used in this study provided students with two expert examples of RBVO.

Descriptive statistics found the experimental group performing one level higher than the control group, however, the low-level accomplishment for each group demonstrates room for growth in RBVO. However, two cascading issues were identified which may have impacted these findings. First, while clinical faculty assisting in the simulation were told to provide verbal orders to students, several faculty members simply stated, "I will send over the orders." This forced students to use the monitor to retrieve the orders and eliminated the ability of students to read back the orders and achieve competency in CCEI behavior #4 overall. Second, the literature reports a lack of opportunity to practice RBVO during hospital-based clinical experiences (Jamshidi et al., 2016), therefore removing the opportunity to practice this skill during simulation eliminates any exposure students have in the development of this skill.

While the findings of this study are encouraging for the use of EMVs in building students' recognition of the need to RBVO, more research is needed. Simulation facilitators need to ensure consistency in the delivery of the simulation scenario. This may involve additional faculty training, scripting, and mentorship. Additionally, simulation coordinators should ensure that all simulation scenarios include an opportunity to RBVO to promote competency in this area.

Behavior #5: Effective Communication with Patient and Significant Other

This behavior measured students' ability to communicate effectively with the patient and their significant other. The simulation scenario used in this study did not include the opportunity to speak with a significant other, therefore, competency was determined based upon students' communication with the patient. To achieve *clinical competency* within this behavior, students needed to (1) display therapeutic communication by listening to the patient and (2) provide education on interventions and/or medications prior to administration. Descriptive statistics found a difference of three levels when comparing the control and experimental groups (control = Level 2; experimental = Level 5).

Behavior #5, Criterion #1: Therapeutic Communication. Therapeutic communication is defined as “a face-to-face interaction that focuses on improving the emotional and physical welfare of the patient” (Laffan, 2011, para 2). Nurses use therapeutic communication in both verbal and nonverbal ways such as through affirming statements, giving recognition and encouragement, offering of time, observing silence, allowing for broad openings, and active listening (Sherko et al., 2013). In healthcare, the use of therapeutic communication has been found to improve patient care, prevent mistakes, and to promote relationship building (Neese, 2015). On the other hand, a breakdown in therapeutic communication has been found to have both direct and indirect effects on a patient’s health (Campbell & Daley, 2018). Research in undergraduate nursing education has found that the inability to therapeutically communicate with patients can lead to a reduction in the quality of nursing care and results in poor patient satisfaction and attitudes (Abdolrahimi et al., 2017; MacDonald-Wicks & Levett-Jones, 2012). Furthermore, poor nurse-to-patient interactions have been found to increase student levels of expressed anxiety /depression and decrease levels of student self-esteem and overall success (Szpak & Jameg, 2013).

In undergraduate nursing education, therapeutic communication is most heavily discussed in the setting of mental health (Martin & Chandra, 2016). The use of simulation to improve therapeutic communication within this population has been found to improve empathy and reduce prejudice towards those suffering from mental illness (Choi et al., 2019; Lehr & Kaplan, 2013; Park & Kweon, 2012). Literature surrounding therapeutic communication and simulation has shown promising results for the overall improvement of therapeutic communication through simulated practice (Blake & Blake, 2019). The use of EMVs in therapeutic communication simulations is building on these positive findings. Research on the use of an expert model demonstrating therapeutic communication found that students reported an increased ability to identify both effective and ineffective therapeutic communication (Bussard & Lawrence, 2019). Additionally, students expressed that the expert modeling intervention allowed for a visual understanding of the impact that good and poor communication have on the patient, as well as reported improved understanding of the concepts of therapeutic communication (Bussard & Lawrence, 2019).

The criterion for behavior number five was crafted according to the *Hospital Consumer Assessment of Healthcare Providers and Systems* survey (HCAHPS), which is a standardized survey that seeks patients' perspectives of their most recent hospital stay (CMS, 2021). HCHAPS surveys are heavily relied upon as markers of healthcare excellence and are evaluated by The Centers for Medicare and Medicaid in determination of reimbursements of care (Merlino et al., 2014). In the survey, the overarching question concerning therapeutic communication asks: "D*uring this hospital stay, how often did nurses explain things in a way you could understand?"* Research has found that therapeutic communication heavily influences these patient satisfaction scores (Bussard & Lawrence, 2019).

The trends identified in this study found that students exposed to an expert modeling video performed at the highest level of competency in this behavior. This provided strong evidence towards the effectiveness of EMVs in the development of therapeutic communication. Future research on EMV should continue to employ therapeutic communication techniques in order to help students practice developing relationships with their patients. This includes providing examples of numerous variations of therapeutic communication such as silence, encouragement, and active listening.

Future research should also examine unprofessional student behaviors when therapeutic communication is not achieved. During the review of videos for CCEI scoring in this study, researchers observed behaviors, such as giggling at the bedside, providing short responses to the simulated patient, and often ignoring the simulated patient's questions. While one explanation may be the level of anxiety students were facing due to this being their first simulation experience (Nakayam et al., 2021), further attention to this is warranted. Research surrounding therapeutic communication in simulation has found reduction in anxiety-provoked behaviors and improved learning when standardized patients (SPs) have been used (Alexander & Dearsley, 2013; Williams et al., 2017). The allowance of students to actively communicate with a live patient increased students' self confidence in therapeutic communication and helped students to stay in the role of professional nurse (Donovan & Mullen, 2019). Research comparing the use of EMV in both high-fidelity simulation and simulation with standardized patients may help determine which method is best for developing therapeutic communication in undergraduate nursing students.

An additional consideration for future research is the identification of criteria to meet behaviors. The CCEI tool allows nursing educators to specify criteria needed to determine competencies within each behavior, under each domain (Todd et al., 2008). Despite guidance by the tool's authors, determination of desired behaviors to achieve competency proved to be challenging due to the potential replication of criteria across behaviors. For example, to meet CCEI behavior #5, one of the two criteria was that the students were able to therapeutically communicate the medication ordered for the patient in a way that they can understand. This criterion was guided by the inpatient HCAHPS survey which asks clients specifically about medication administration through the questions, "*Before giving you any new medication, how often did hospital staff tell you what the medicine was for?*" and "*Before giving you any new medicine, how often did hospital staff describe possible side effects in a way you could understand?*" However, this criterion may be better served to meet CCEI behavior #20 in the domain of patient safety as part of the competency for "*administers medications safely*." Future research should analyze each criterion for relevancy within the specific behavior and determine when and if duplication is warranted.

Behavior #7: Responds to Abnormal Findings Appropriately

This behavior measured students' ability to recognize abnormal findings. There were two separate qualifications to meet competency between groups. For group A to achieve *clinical competency* within this behavior, students needed to (1) assess the patient, obtain vital signs, and call the doctor in response to the change in patient condition. For group B to achieve *clinical competency* within this domain, students needed to (1) recognize that the patient's chest pain was not relieved with nitroglycerin, (2) recognize the patient's oxygen saturation was not responding to the maxed out nasal cannula, and (3) contact the doctor in response to the findings. Descriptive statistics found no difference between the control and experimental groups with both achieving the highest level in this category (control = Level 5; experimental = Level 5).

The ability to detect changes in patient condition is an essential skill for new graduate nurses and often one in which they fail (Kavanagh & Szweda, 2017). While simulated experiences have been shown as an engaging way to develop critical thinking and decision-making skills (Brown, 2015), new graduate nurses continue to lack the ability to identify patients' critical needs (Kavanagh & Szweda, 2017). Research on the lived experiences of new graduate nurses found that while nurses felt prepared to complete nursing tasks, they described their first experience as a nurse as "overwhelming, knowledge overload, difficult, challenging, and intimidating" (Brown, 2019, p. 4). Other students commented that while they felt competent caring for a stable patient due to the abundance of exposure to these types of patients during their clinical education, they found it difficult to care for acutely ill and unstable patients (Brown, 2019).

An argument can be made that the issue does not lie in a lack of theoretical preparation, as the national average for the passage of the NCLEX licensure examination in 2021 was 86.96% (NCSBN, 2021). In Brown's (2019) report, students commented that they knew there was an issue present, due to their theoretical preparation, but found it difficult to identify priority interventions. This was further expressed by Gardiner & Sheen (2016) who found an incongruence between the theoretical knowledge learned in the classroom and the ability to apply this knowledge in the care of a patient in practice. Emphasis on the application of theoretical concepts within practice environments is, therefore, necessary to building this essential skill.

Trends identified in this study suggested that a video intervention may improve students' ability to identify patient deterioration and the need for immediate intervention. The video interventions for both the control and experimental groups followed the nursing process of *assessment, diagnosis, planning, intervention,* and *evaluation* (Toney-Butler & Thayer, 2021). Guiding students through each step of the care of the patient acutely ill with an exacerbation of heart failure, either by way of discussion or demonstration by an expert nurse, may have provided the guidance needed to improve understanding and action within this domain. In line with Brown's (2019) findings, students were able to identify a change in the patient condition and the need to call the doctor in response to these changes.

However, while this study found both groups performing at the highest levels of competency, issues were identified with students' ability to process the situation. The difficulty identified in this study, similar to Brown (2019), was in the gathering of critical assessment data and the identification of the priority intervention in order build a proper SBAR for the licensed provider (a criteria evaluated for CCEI behavior #4, criterion #1: SBAR). Steelman et al. (2019) asserted that the omission of critical patient information needed to properly diagnose and prescribe interventions is a primary reason for communication breakdown. While it is important that students were able to recognize abnormal findings, it is essential that students know what the next steps are once these critical findings are identified. This guides future EMV developers to model proper identification of each critical issue within SBAR communication with the licensed provider. Furthermore, the findings in this behavior indicate the potential positive impact that nursing process scaffolding has on EMV. Future research should continue to explore the use of the nursing process in the development of EMVs.

Behavior #8: Promotes Professionalism

This behavior measured students' professional behaviors. To achieve *clinical competency* within this behavior students needed to (1) introduce themselves and their role as the RN, (2) treat the patient professionally, and (3) perform professionally as a group. Descriptive statistics found a difference of one level when comparing the control and experimental groups (control = Level 3; experimental = Level 4).

Behavior #8, Criterion #1: Professional Behaviors. Professionalism is paramount to the development of the nurse-patient relationship (Martin & Chandra, 2016). Professional behaviors promote nurse to patient communication and allow patients to feel comfortable discussing their health concerns and feelings (Rosenberg & Gallo-Silver, 2011). An evaluation of factors contributing to professionalism found this behavior directly correlated to the number of years as an RN as well as the RN's educational accomplishments and organization memberships (Wynd, 2003). Furthermore, research reports that nursing professionalism is influenced by the observation of a role model's attitudes and behaviors (Castledine, 1998). Nursing educators play a pivotal role in the demonstration of these professional behaviors (Bussard & Lawrence, 2019).

In nursing education, professionalism is built through didactic lecture, clinical experiences, and simulation (Beaird et al., 2017; Witt et al., 2018). Simulated experiences provide an appropriate medium to build professional behaviors through deliberate practice (Kiernan, 2018). This is further validated through research by Bussard and Lawrence (2019) who provided all students with an expert model of the care of a simulated patient via livestream into the student class. Their findings indicated that students were able to differentiate between professional behaviors (i.e., knowledge, advocacy) and unprofessional behaviors (i.e., placing blame, inappropriate body language, use of cell phone, chewing gum, and poor appearances) through this active teaching strategy (Bussard & Lawrence, 2019). While Bussard & Lawrence's (2019) study was nonexperimental, it provides further evidence as to the impact that EMVs may have on the development of students' professional behaviors.

Trends in this behavior indicated that the control group performed at a Level 3 while the experimental group performed at a Level 4. This suggests that EMVs may be helpful towards the improvement of nursing students' professional behaviors. However, while descriptive statistics in this study indicated that students reached either the highest (experimental) or second highest (control) level, areas of needed improvement were identified. Specifically, students exhibited unprofessional behaviors such as giggling and ignoring the patients' comments and questions. These behaviors may be attributed to simulation anxiety, which has been found to be connected to students who perform in front of peers and teaching faculty (Najjar et al., 2015). While anxiety may be one explanation for these behaviors, another consideration is the student's inability to suspend disbelief and accept the experience as caring for a live patient. The INACSL guidelines for simulated practice lists suspension of disbelief as a primary factor in the successful implementation of simulation experiences (INACSL Standards, 2016). Although researchers have identified the importance of suspension of disbelief in the ability to both develop and retain knowledge (Wilson & Wittmann-Price, 2015), a review of the simulation literature found little discussion and examination of this concept (Muckler, 2017). Existing research on the suspension of disbelief in simulation has found that peers play a large role in the ability to stay on task and take the encounter seriously (Muckler, 2017). Research by Muckler et al. identified the following student perception: "If everybody works toward making it more of a realistic experience, then your group is really going to have that attitude going in and it is definitely going to change what you can get out of the experience" (2019, p. 28). These findings were further validated through research conducted by Reed & Ferdig (2021) who found that students struggle with what they define as "pretend professionalism," reporting that professionalism is hard to maintain in simulated practice (p. 302).

Future research on EMV should explore the phenomena of anxiety and suspension of disbelief to determine the impact which EMV may have on improving these behaviors. Specifically, research should explore how the use of EMVs may improve nursing students' professionalism during simulated experiences. Furthermore, research should investigate how EMVs may reduce students' simulation anxiety. Another area of potential future research is exploring the benefit of a brief introduction by the expert model, prior to demonstration of care, on the importance of the suspension of disbelief. Bandura's *Social Learning Theory* posits that students are more likely to adopt behaviors if they feel those behaviors will benefit them (Bandura, 1977). An understanding of students' perceptions of the interaction (professionalism and realism) of the expert model and the patient may provide a further understanding of how EMVs impact students' professional behaviors.

EMV and the Patient Safety Domain

The behaviors assessed within the *Patient Safety* domain consisted of (a) *uses patient identifiers* (CCEI #18), (b) *utilizes standard practices* (CCEI #19), (c) *administers medications safely* (CCEI #20), (d) *manages technology and equipment* (CCEI #21), and (e) *performs procedures correctly* CCEI (#22). The criteria to establish competency within each behavior as well as the identified trends will be discussed below.

Behavior #18: Uses Patient Identifiers

This behavior measured students' competency in the use of patient identifiers. To achieve *clinical competency* within this behavior, students needed to check the patient's name and date of birth prior to medication administration. Descriptive statistics found a difference of two levels between the control and experimental group in this category (control = Level 1; experimental = Level 3).

Medication administration requires diligence by the nurse following the five rights: the right patient, the right drug, the right time, the right dose, and the right route (Grissinger, 2010). Errors with medication administration are often multi-factorial and result in increased patient morbidity and mortality (Keers et al., 2013). In fact, Makary (2016) reports that medical errors are one of the leading causes of death in the United States. One of the primary issues in medication administration is the failure to identify the patient (The Joint Commission, 2016). Research has found that proper patient identification reduces the occurrence of medication errors by up to 56% (Westbrook et al., 2011). Furthermore, the Joint Commission includes the use of two patient identifiers (e.g., name, date of birth) in their National Patient Safety Goals (Joint Commission, 2016). Due to these findings, the Institute of Medicine has published a call to action for nursing programs to build competency in medication administration (Bosworth et al., 2011).

Simulation research has shown that simulated experiences can improve students' competency in patient identification as part of safe medication administration (Jarvill et al., 2020; Sears et al., 2010; Zahara-Such, 2013). Research on the use of a *Medication Safety-Enhanced* (MSE) simulation program found that those enrolled in the MSE achieved a statistically significant difference in a *Medication Safety Knowledge Assessment*, *Medication Safety Critical Element Competency Checklists* and a *Healthcare Professional Patient Safety Assessment* when compared to the control group (Mariani et al., 2017). The findings are conflicting on the use of EMV in simulation to promote safe medication administration. For instance, research by Lee et al. (2017) on the use of EMVs to build students' basic care competencies found that only 46.2% of students properly identified patients with the use of two identifiers prior to nursing interventions. However, research completed by Franklin et al. (2020) found that those who watched an EMV prior to entering simulation had improved safe medication administration. When evaluating the sample population of both studies, Lee et al. (2017) used sophomore level students with no previous simulation experiences. On the other hand, the study completed by Franklin et al. (2020) had a sample comprised of senior level students in their capstone course who had multiple exposures to simulation. The difference between the experience among the sample population, sophomores with limited clinical exposure (Lee et al. (2017) and seniors with moderate clinical experience (Franklin et al., 2020), may be the influencing factor of their findings.

Descriptive trends for behavior #18 in this study found that students exposed to an EMV performed two levels higher than the control group. This suggests that EMV may help students develop patient safety practices which include the use of patient identifiers. The improvement in this behavior, through the use of EMVs, is important as new graduate nurses, despite citing preparedness for medication administration upon graduation, have profound stress surrounding medication administration and maintaining patient safety (Jarvill, 2021). Although the experimental group performed at a level 3 (medium competency), there is room for improvement.

A factor which may have impacted the attainment of competency is the educational / experience level of the students. At this large mid-western university, junior-level students have had only one previous clinical experience in which medication administration was permitted, approximately halfway through their 15-week clinical. The simulation designed for students at this level required the students to administer two medications, with the administration of a third medication if the simulation unfolded properly.

Future research using EMVs should continue to focus on safe medication practices which include the use of patient identifiers. Additionally, future research should examine the difference, if any, on the impact of EMV on safe medication administration practice, such as the use of patient identifiers, between sophomore, junior, and senior levels students. When creating EMVs, expert models should be cognizant to ask and verify two patient identifiers at each medication administration opportunity.

Another area for future exploration is the use of EMV to guide students in proper verification of the two patient identifiers. In this present study, it was found that although the expert model demonstrated the proper sequence of asking for the identifiers and verifying it against the patients arm band, students did not always verify the patient's information against the arm band. Verification of name and date of birth are essential to *right patient* as part of safe medication administration (Grissinger, 2010). However, in order to verify this information is correct, nurses must refer to the arm band of the patient. The incidence of patient misidentification is not uncommon. An analysis of 227 root cause analysis discovered that 182 of 253 errors were directly caused by patient misidentification (Dunn & Moga, 2010). The 2016 National Patient Misidentification Report published by the Ponemon Institute indicated that patient misidentification has lost healthcare facilities an estimated $17.4 million annually of denied insurance claims (Imprivata, 2016).

Nursing educators should continue to reinforce the need for not only verbal acknowledgement of two patient identifiers, but also the need to verify this information against the arm band. This may be done through both hospital-based clinical experiences and through simulation. Future research on EMVs should continue to practice safe medication administration through both patient identifiers and the verification of that information against the patient's armband. Conversely, the idea of a wrongly identified patient may be an important learning opportunity to help students understand the gravity of correct patient identification. Future EMVs could demonstrate a patient with the wrong identification (either incorrect arm band or patient provides incorrect identifiers) to help students understand the importance of this safety marker.

Behavior #19: Utilizes Standardized Practices and Precautions Including Hand Washing

This behavior measured students' ability to utilize standard practice. To achieve *clinical competency* within this behavior, students were expected to wash their hands prior to entering the patient room. For the purposes of this study, this consisted of either demonstrating handwashing in the sink available at the bedside or by the use of hand sanitizer found on the side of the sink. Descriptive statistics found that both groups performed well, with the experimental group performing one level higher (control = Level 3; experimental = Level 4).

The first mention of hand hygiene in healthcare is attributed to Ignaz Semmelweis in 1847 who identified that infection was spread through contaminated hands (Semmelweis, 1861). The link between hand hygiene and patient health outcomes was further expanded upon by Florence Nightingale during the Crimean War who, through her handwashing advocacy, saw a dramatic reduction in deaths from infectious processes (Mitchell et al., 2017). One result of poor hand hygiene practices is the contraction of healthcare associated infections (HAIs). It is estimated that HAIs cost the U.S. Healthcare system approximately $10 billion dollars annually (Zimlichman et al., 2013). Healthcare advocacy for safe hand hygiene practices has been found as a key component in the reduction of healthcare associated infections (Magill et al., 2014).

Sadly, compliance with hand hygiene continues to be an issue in hospitals nationwide. One study reports handwashing compliance rate as low as 40% (Erasmus et al., 2010); another report from a surgical intensive care unit found a hand hygiene compliance rate of 6.5% (Rosenberg, 2011). In the hospital setting, nursing students are at a greater risk of acquiring HAIs and spreading HAIs due to deficient knowledge and experience (Çelik & Koçaşli, 2008;

Avşar et al., 2015). Because of this, infection prevention strategies, such as proper hand hygiene are one of the first skills emphasized in undergraduate nursing education during both hospital-based clinical practice and simulation experiences (Gould & Drey, 2013).

Literature on hand hygiene has reported that while traditional lecture-based instruction may help to improve handwashing behaviors, the use of active learning styles have been found to be more effective (Dolmans & Schmidt, 1996; Tiwari et al., 2006). However, simulation research has identified that nursing students continue to struggle with the demonstration or verbalization of handwashing during simulated experiences (Oermann, 2016).

Trends in this behavior found that both groups performed well in handwashing, with the experimental group achieving one level higher. Students were divided into nurse one, nurse two, medication nurse, and documentation nurse. On several occasions in this study, only nurse one and nurse two completed hand hygiene prior to entering the simulation. This may be due to the medication nurse and documentation nurse believing that they have a secondary role as opposed to direct contact with the patient. The findings of the present study are similar to findings by Jarvill et al. (2018) who found that those exposed to an EMV performed significantly better on critical action items such as hand hygiene. However, the trends identified in this study contrast work by Lee et al (2017) who found that despite viewing an EMV on correct patient identification and hand hygiene, only 59.6% met competency in this behavior. Lee et al. (2017) hypothesized that students were inattentive to these measures due to perceived irrelevance of these actions towards the overall simulation scenario (Lee et al., 2017).

Implications for future research include the need for simulation faculty to reinforce the requirement that all students, regardless of role within the simulation, demonstrate proper handwashing prior to entering the simulated patient's room. In addition, future research should continue to evaluate hand hygiene as part of the overall simulation objectives to help build the development of this critical skill. The trends found in this study also provide important guidance for the creation of EMVs. Future EMVs should ensure that demonstration of all skills by the purposeful action of handwashing rather than mimicking the motion of hand washing. The physical completion of this task by the expert model may help students build better hand hygiene habits.

Behavior #20: Administers Medications Safely

This behavior measured students' competency in medication administration. Groups A and B differed in the requirements to achieve *clinical competency* within this behavior. To achieve competency in this behavior, students in group A needed to: (a) check the patients name, date of birth, and allergies prior to medication administration and (b) administer the medication correctly (push furosemide no faster than 20mg/minute; places nitroglycerin tablet sublingual with assessment of vital signs and pain before and between doses). To achieve competency in this behavior, students in group B were required to: (a) check the patients name, date of birth, and allergies prior to medication administration and (b) administer the medication correctly (push morphine over one minute and push the second dose of 80 mg of furosemide no faster than 4 min or 20mg/minute). Descriptive statistics found the experimental group performing two levels higher in this behavior (control = level one; experimental = level three).

Behavior #20, Criterion #1: Patient Identifiers. The use of patient identifiers (including confirming the patients name and date of birth prior to medication administration) was discussed in CCEI behavior #18 (*uses patient identifiers).* This serves as another example where criterion may be used to achieve competency in different behaviors. While an argument can be made for the behavior in both or either place, the duplication of this skill may have impacted the attainment of this competency. Future research on EMV, using the CCEI, should consider this and determine when replication is warranted.

Behavior #20, Criterion #2: Administers Medications Correctly. The three medications in this study are used primarily in the treatment of cardiac illness (furosemide, nitroglycerin) and pain (morphine). Understanding both pharmacokinetic (how a drug moves and effects the body) and pharmacodynamic (physiologic effects of the drug) principles is essential to administering medication safely (Durham, 2015). In the student sample where this study took place, the students often learn these principles in Pharmacology I and II during their sophomore and junior years. At the time of this study, students had learned about furosemide, nitroglycerin, and morphine through both their pharmacology class and their didactic lecture.

Furosemide. Furosemide is a rapid acting loop diuretic which is a primarily used to remove excess fluid during episodes of fluid overload. Its onset of action is less than one hour, and its duration can last up to eight hours. Due to furosemide causing increased excretion of electrolytes, nurses need to monitor the patient's potassium levels closely prior to administering additional doses of this medication (Rankin, 2007). An additional adverse effect is the occurrence of ototoxicity which can happen when furosemide is pushed rapidly (Wigand & Heidland, 1971). The expectation for this simulation was for students to understand the need to push furosemide no greater than 20mg/minute to reduce the possibility of tinnitus and subsequent hearing damage.

Nitroglycerin. Nitroglycerin is a vasodilatory drug used most often in the treatment of chest pain (Kim et al., 2022). The most common route for nitroglycerin is sublingual which allows it to exert its effect rapidly. Nitroglycerin sublingual tablets may be given every five minutes for up to three doses due to its onset of action within 1-3 minutes (Kim et al., 2022). The vasodilatory effect of nitroglycerin is most commonly associated with a severe headache and rapid drop in blood pressure (Kim et al., 2022). Due to such, students must monitor the patient's vital signs closely and hold repeat administration if the vital signs are not stable.

Morphine. Morphine is an opioid analgesic used in the treatment of pain. While morphine can be given by various routes, it is most often given intravenously in the hospital setting (Murphy et al., 2022). Due to its potential side effect of respiratory depression, the patient's vital signs, including respirations and blood pressure, should be monitored carefully (Murphy et al., 2022). Morphine doses are typically low and are pushed slowly (over one minute) to reduce adverse effects of dizziness and sedation (Murphy et al., 2022).

Simulation research surrounding medication research has identified that simulation is an ideal platform in which to help students develop medication administration competency. Research by Jarvill et al. (2018) compared the use of individual simulation experiences and practice (intervention) to individual skills lab experiences and practice (control) to determine best methods to build medication administration competency. Jarvill et al. (2018) found that the intervention group scored significantly higher on a competency assessment covering safe medication administration.

Descriptive trends in the present study identified that the experimental group performed two levels higher in this behavior. This may be due to the purposeful 'think aloud' technique used by the expert model while preparing, administering, and educating the client on each medication. The think aloud technique allows the expert model to verbally express the reasoning behind actions and problem-solving tasks (Fonteyn et al., 1993). This includes identifying pertinent information about the medication, potential side effects, and important patient education.

Future research on the use of EMV in simulation should expand upon safe medication administration. In the current study, the expert model discussed the mechanism of action, time of administration, and potential side effects with the patient. Future EMVs should expand upon the think aloud technique to determine the impact that vocalization of action has on students' ability to practice safe medication administration. Additionally, this large mid-western university does not have the ability to simulate medication administration through accessing the MAR and scanning medications. Future research which includes this ability is necessary to determine if EMVs may promote improved competency in this behavior through a more "realistic" medication administration process.

Behavior #21: Manages Technology and Equipment

This behavior measured students' ability to manage the technology and equipment within the simulation room. To achieve competency in this behavior students needed to have accurately used the monitor to obtain vital signs and checked for new orders. Descriptive trends in this behavior found both groups achieving the highest level of competency (i.e., Level 5).

In addition to the video interventions viewed in each respective group, students viewed a short video on how to use the monitor in the simulated environment to assess vital signs and locate information such as doctors' orders and patients' medication history. Upon entering the simulation room, this information was reiterated by the simulation coordinator. The ability of students to view proper usage coupled with the reinforcement immediately prior to the simulation start may have enabled the students to successfully navigate the simulation equipment. Future research should explore the impact that EMVs have on students' technology competency. This may include having an experimental group exposed to only an EMV and a control group exposed to standard prebriefing practices which include an orientation to the equipment (INACSL Standard Committee, 2016) to determine the impact that EMVs have on students' outcomes. Furthermore, descriptive trends in this behavior suggest that students navigate technology well with guidance. Future EMVs should include the use of additional technologies, such as the use of electronic charting and navigating the patient chart to determine how an EMV may impact other areas of competency attainment in the behavior of managing technology.

Behavior #22: Performs Procedures Correctly

This behavior measured students' ability to complete a focused assessment. To achieve competency in this behavior, students must have completed a focused assessment by listening to both anterior and posterior lungs, perform a neurovascular assessment on the patient's lower extremities, and assess the indwelling catheter. Descriptive statistics found both experimental and control groups performing poorly in this behavior, with the experimental group performing only one level higher (control = Level 0; experimental = Level 1).

The trends in this behavior provide further validation towards students' inability to perform complete and accurate assessments. Kavanagh and Szweda (2017) found that merely 23% of new graduate nurses were able to achieve the "acceptable" range in their competency in patient assessment. Data from 2016-2020 found a decline in this percentage at 14%. Even more concerning is that current data for the year ending 2020 found that only 9% of new graduate registered nurses can perform in the *acceptable* range in competent patient assessment (Kavanagh & Sharpnack, 2021). Research seems to suggest that new graduate nurses' competency in patient assessment is declining at an alarming rate.

Patient assessment is an integral part of the nursing process and is necessary to have a complete understanding of the patient's condition (Munroe et al., 2013). Bedside clinical practice places a large responsibility on nurses to complete both a thorough patient history and physical examination (Fennessey & Wittman-Price, 2011). A literature review on the effects of missed nursing care on patient outcomes found that missed care (i.e., an inadequate assessment) has led to poor clinical outcomes including bloodstream infections, pneumonia, nosocomial infections, patient falls, and pressure ulcers (Recio-Saucedo et al., 2018). Fenwick et al. (2011) reported that a key function for competent practice includes the ability of students to both *learn* their practice and *perform* their practice within context.

Simulation has been found as a safe place to build confidence in students' ability to perform a complete patient assessment (Durham & Alden, 2008). An example of this can be found in a study completed by Guhde (2010) who used EMVs to demonstrate the importance of a complete assessment. The first video demonstrated an incomplete assessment, which was followed by the patient condition deteriorating into a critical event. A second video was then viewed of the expert model demonstrating an exemplar assessment. Student feedback from the viewing of both a complete and incomplete assessment found three themes: (a) an awareness of the importance of an early assessment; (b) awareness that the outcome of a client is linked to nursing assessment; and (c) statements on how this will change students' approach to patients (Guhde, 2010, p. 389).

Trends in this behavior showed that both groups did poorly in this behavior with the control group failing to accomplish competency (level 0) and the experimental group only performing one level higher (level 1). In the present study, students missed several key behaviors which are part of a focused assessment. This includes proper assessment of lung sounds, a complete neurovascular assessment, and assessment of an indwelling catheter. A discussion on each is warranted to determine factors which may have contributed to this finding.

Respiratory Assessment. A focused respiratory assessment includes listening to both anterior and posterior (A&P) lung sounds, which is a basic skill taught both in the skills lab and didactic lecture. However, students would often only listen to anterior lungs sounds, omitting the process of raising the simulated patient and assessing posterior lung sounds. One factor that may have impaired students' ability to listen to A&P lung sounds was the weight of the manikin. Laerdal (n.d.) reported that the male version of the manikin weighs 54 pounds. This may have proved problematic for some students due to the strength needed to lift the manikin. Future research on EMVs should continue to demonstrate proper lung sounds assessment through the auscultation of both A&P lung sounds. However, simulation coordinators should encourage students to vocalize listening to A&P lung sounds as opposed to lifting the manikin due to the challenges of mobilizing the equipment.

Neurovascular Assessment. The requirement of a complete neurovascular assessment may have been too ambitious of a request. This was due to students receiving instruction on a neurovascular assessment within the skills labs but having little opportunity and guidance during hospital-based clinical for continued practice (Meyer et al., 2011). A neurovascular assessment includes monitoring the six P's: pain, pallor, pulselessness, parathesis, paralysis, and poikilothermia (Pechar & Lyons, 2016). This study found that while many students would palpate the simulated patient's legs and comment on the edema, they did not verbalize the presence or absence of pulses, assess sensation / pain, or assess skin condition (color, presences of open areas, discoloration). The lack of vocalization of assessment findings lead to a mark of zero (i.e., not competent). This leads to an interesting question of whether students were able to understand their findings and what assessments were completed, but were not noticed by the researcher, due to a lack of vocalization.

This lack of vocalization has been identified in other simulation studies. For example, when looking at how students work in an interprofessional team, Anderson & Bennett (2020) found that students' lack of vocalization led to confusion within the team, further leading to a disconnect among team members. However, L. Phillips (2014) asserts that care should be taken when determining competency in the area of assessment, as the omission of vocalization of findings does not necessary reflect an absence of student noticing. One explanation could be the lack of critical reflection causing difficulty in students' ability to verbalize cognitive processes (Ravik, 2019). Solheim et al. (2017) described that one way to improve assessments in the simulation environment is by encouraging these actions, finding that both verbalizing and cognitively reflecting showed an improvement in students' overall clinical reasoning. Reflection-in-action allows simulation facilitators to prompt students to verbalize and reflect; this method has been suggested as a better approach to understanding and improving students' learning within simulation (Zhang et al., 2020). This approach would allow for the reflective process to occur during the simulation, thus promoting critical reasoning, which most closely mimics nursing care (Mulli et al., 2021).

Future research should examine this phenomenon more closely, discovering reasons which students struggle to vocalize findings in the simulated setting. Creation of EMVs for simulation should ensure that all assessments are demonstrated properly, and findings vocalized to guide students in the development of this behavior. Lastly, the use of reflection-in-action in an EMV and during students' simulated experiences should be explored to determine the usefulness of this reflective strategy in improving students' vocalization of assessment findings.

Another factor that may have played a role in the students' inability to perform focused assessments is due to the nature of a high-fidelity manikin. In this study the patients' legs were wrapped with kerlix (loose cotton dressing) and coban (compression dressing) to mimic peripheral edema. However, an assessment of sensation and skin is not possible without the students speaking with the patient and the patient being able to accurately respond to the student's assessment questions (i.e., "can you feel me touching your leg" and "does this hurt when I press"). Previous research found that students felt uncomfortable performing assessments on a manikin, specifically assessments that were difficult to complete on a manikin such as neurovascular and neurological assessments (Sanford, 2010). Future creation of EMVs should model how to interact with a simulated patient while completing an assessment that requires subjective feedback. As well, nursing educators should offer presimulation activities which review proper assessments, medications, and care considerations specific to the upcoming simulation. Continued practice with patient assessments in the simulated environment is important as research has shown that students are limited in their ability to perform assessments on acutely ill patients during hospital-based clinical practice.

Indwelling Catheter. Lastly, the assessment of the indwelling catheter was a challenge for all students in this study. The use of indwelling catheters is rapidly declining due to the incidence of preventable urinary tract infections (Meddings et al., 2014). They are being replaced with non-invasive external catheter collection systems attached to suction to absorb urinary output (Newman & Wein, 2018). Because of this, the opportunity for students to assess indwelling catheters during their hospital-based clinical may be limited. A proper catheter assessment in this study included the assessment of urinary flow, absence of kinks in the tubing, and assessment of urinary output. However, this present study found that few students did this, with many simply stating that the patient had an indwelling Foley catheter in place. Research has confirmed that multiple evidence-based guidelines exist to guide clinicians towards consideration of external collection devices and move away from indwelling catheters (Gray et al., 2016). However, the lack of research and resources concerning outcomes of external collection devices may contribute to clinician reluctance in the use of this alternative device (Gray et al., 2016). Thus, while students lack exposure to indwelling catheters during hospital-based patient care, the likelihood of encountering an indwelling catheter in practice is still probable. Due to such, nursing educators within the skills lab and didactic lecture should provide education on both external and indwelling urinary collection devices. In simulation, scenarios should continue to include indwelling catheters as well as external catheters. Future EMV research should continue to include an expert modeling the proper assessment of a Foley catheter to expose students to the care needs of a patient with an indwelling urinary collection.

EMV and the Assessment Domain

This begins a discussion on the two domains where no statistically significant difference was found between groups, *Assessment* and *Clinical Judgment*. The behaviors within the *Assessment* domain includes (a) *obtains pertinent data* (CCEI #1) and (b) *performs follow-up assessments as needed* (CCEI #2). Group A had the inclusion of an additional behavior: (c) *assesses the environment in an orderly manner* (CCEI #3). The criteria to establish competency within each behavior as well as the identified trends will be discussed below.

Behavior #1: Obtains Pertinent Data

This behavior measured students' competency in the ability to obtain pertinent data. To achieve *clinical competency* within this behavior students needed to (a) *assess the patient's vital signs (BP, HR, respirations, oxygen saturation)*, (b) *complete a focused assessment (Lungs A&P, heart, bilateral legs),* and (c) *assess the IV site (clean / dry / intact) and indwelling catheter.*

Descriptive statistics found both the control and experimental groups incompetent in this area, both receiving a Level 0.

The criteria for this behavior were largely addressed and discussed in the *Patient Safety* and *Communication* domain. The exception being the assessment of the intravenous site. It is estimated that 150 million patients, equating to 0.5 per 1000 intravenous catheters per day, acquire an infection related to IV therapy (Maki et al., 2006). The most common manifestations of infection or inflammation to the site are pain, tenderness, erythema, warmth, swelling, and inability to flush the site (Rickard et al., 2010). For this reason, it is essential for nurses and nursing students to assess the patient's IV site to ensure it is clean, dry and intact, flushes easily, and is without erythema, warmth, or tenderness.

While research on the use of simulation to teach IV catheter insertion is prominent in the literature (Foronda et al., 2018), the use of simulation to teach assessment of an existing IV site is scant. The findings of the present study identify areas of needed research. Nursing educators should continue to develop simulations that allow students an opportunity to practice IV site assessment. Providing an opportunity for students to recognize both an intact IV site and an infiltrated site would provide a beneficial and necessary learning experience. Future EMVs should place focus on proper IV site assessment as part of either the head-to-toe assessment or focused assessment.

Behavior #2: Performs Follow-Up Assessments as Needed

This behavior measured students' competency in the ability to perform follow up assessment as needed. To achieve *clinical competency* within this behavior, students were required to (1) *assess the patient after the nitro dose and in-between each dose (vital signs / pain).* In addition, group A had the added competency of (2) *re-evaluate after oxygen therapy* *(nasal cannula up to 6L / nonrebreather)*. Group B had the added competency of (2) re-*evaluate the patient's pain after morphine.* Descriptive statistics found the experimental groups performing one level higher (control = Level 2; experimental = Level 3).

The criterion from this behavior was largely addressed in the *Patient Safety* domain under the behavior *administers medications safely.* The exception being the understanding of the need to advance oxygen therapy when the patient does not respond to the nasal cannula. Low blood oxygen is known as hypoxia and this state can vary from mild to severe (Keuski, 2018). Hypoxic conditions have profound effects on patients including tissue, muscle, and organ damage leading up to an altered level of consciousness, coma, and eventual death (Bhutta et al., 2021).

Simulation research has had similar findings to the present study. Wall et al. (2014) reporting stopping a simulated activity as students responded with a modest increase in nasal cannula oxygen flow when the patient's oxygen saturation rapidly deteriorated. Additionally, Jacobs et al. (2019) conducted research on a simulation experience in the care of a patient with chronic obstructive pulmonary disease (COPD). When reviewing the simulation performance, Jacobs et al. found that while positioning was a priority to help promote oxygenation, students were more focused on this as an intervention than oxygenation measures (2019). Jacobs et al. (2019) findings are also in line with research by Shinnick and Woo who report that while students can collect data, they often lack the ability to initiate a nursing action in response to their findings (2018).

Trends in this criterion found that students understand the need to monitor oxygenation closely, however, they may have a knowledge deficit as to the ceiling of oxygen delivery through a nasal cannula and when to switch to a higher oxygen delivery system. Future research on EMV should consider the use of multiple oxygen delivery systems with the identification of the criteria for use of each one. While the expert model in this study discussed switching the patient to a higher oxygen delivery system, the model did not expand on the reason for this clinical judgment. When creating EMVs future researchers should consider providing think aloud techniques and patient education for each intervention to help build student understanding.

Behavior #3: Assesses the Environment in an Orderly Manner

This behavior measured students' competency in the *assessment of the environment*. This competency applied only to group A as this simulated experience was continuous with group B picking up where group A left off. In other words, the criterion for this behavior, once achieved, cannot be replicated by another group. To achieve *clinical competency* within this behavior students in group A needed to (a) *notice the patient's bed is in high position and lower the bed*, (b) *notice the patient's head of bed in low fowlers and correct to high fowlers*. Descriptive statistics found both the control and experimental groups achieved the highest level of competency in this area, both achieving a Level 5.

This is an important finding as the need to identify factors that may impact patient safety (e.g., patient's bed in high position) and patient's comfort (e.g., head of bed low) and apply an intervention is imperative to building clinical judgment (Swift, 2021). While not statistically analyzed, all students were able to achieve this competency through a video intervention. Future research on EMV should provide additional opportunities for students to recognize patient safety issues. This may include the side rails being down, which is a risk for the patient falling from bed, and all four side rails being up, which is seen as a patient restraint and a safety hazard. Additionally, future EMVs should be developed which encourage students to identify implied safety hazards, such as patient confusion, use of ambulatory aids, and polypharmacy.

EMV and the Clinical Judgment Domain

The clinical judgment domain consists of behaviors numbered 9-17. The behaviors within the *Clinical Judgment* behavior include *interprets vital signs* (CCEI #9), *interprets subjective / objective data* (CCEI #11)*, prioritizes appropriately* (CCEI #12)*, performs evidence-based interventions* (CCEI #13)*,* and *provides evidence-based rational for interventions* (CCEI #14). Group B had the inclusion of a behavior, *evaluates evidence-based interventions and outcomes* (CCEI #15). Behaviors 10, 16, and 17 were not used in this study. The criteria to establish competency within each behavior as well as the identified trends will be discussed below.

A very interesting finding in the clinical judgment domain is that both groups performed at high levels of competency. Descriptive statistics identified that both groups achieved a Level 5 in three of the six behaviors. That is, both groups performed at the highest level of competency in 50% of the required behaviors in the *Clinical Judgment* domain.

Behavior #9: Interprets Vital Signs

This behavior measured students' competency in the ability to interpret vital signs. To achieve *clinical competency* within this behavior, students needed to (a) *recognize patient's low oxygen saturation* and (b) *evaluates patient's pain and location*. Descriptive statistics found the experimental group performing two levels higher in this behavior when compared to the control, at the highest level of clinical competency (control = Level 3; experimental = Level 5).

While students displayed a solid understanding of the importance of oxygenation and the need to intervene (see Clinical Judgment, CCEI #12 *prioritizes appropriately)*, students were less successful in understanding the simulated patient's pain. Pain was established as the fifth vital sign after Dr. James Campbell recognized practitioners' undermanagement of pain (Campbell, 1996). The difference between pain and a traditional vital sign is that pain is subjective. While a numerical rating scale may provide a quick assessment of the level of pain it does not help us to determine the characteristics of the pain (Morone & Weiner, 2013).

Research on the use of simulation experiences to provide proper pain assessments found that students struggle in the assessment of this vital sign (Al-Khawaldeh et al. (2013). Assessing students via the revised *Knowledge and Attitudes Survey Regarding Pain* (KASRP) found students achieving a 34.1% (Al-Khawaldeh et al., 2013). Similarly, Al-Khalaileh and Al-Qadire (2013) found that senior-level nursing students who completed the *Knowledge and Attitudes Survey* on pain assessment averaged 16 correct answers out of 40 total answers: an achievement of 40%.

The trends for this behavior found the experimental group performing at the highest level of competency. This suggests that the demonstration of a proper pain assessment through the use of an EMV may improve students understanding of how to assess this vital sign. The EMV used in this study provided an expert model demonstrating a proper assessment of pain by asking the patient's pain level on the numerical scale, asking the patient to describe the pain, and asking the patient about radiation of pain. An interesting finding, however, was that while students were proficient in the use of the numerical scale and asking for the pain location, they were less proficient in asking investigative questions concerning the pain. While level of pain and location are essential information, assessing characteristics of pain (i.e., burning, stabbing, radiating, aching) provides additional guidance towards an overall diagnosis. Future research on the use of EMVs should expand the assessment of pain with the inclusion of additional pain assessment tools. This would include EMVs aimed at detecting pain in the adult patient as well as the pediatric and neonate. The use of scales such as the Wong-Baker faces scale (wongbakerfaces.org) for the pediatric population and the Face, Legs, Activity, Cry, Consolability (FLACC) scale (Merkel et al., 1997) for the neonatal population should also be included.

Behavior #11: Interprets Subjective / Objective Data

This behavior measured students' competency in the ability to interpret both subjective and objective data. Both groups A and B had different criterion for which they were evaluated. To achieve *clinical competency* within this behavior students in group A needed to (a) *recognize the patient's nasal cannula was not on,* (b) *question the patient about chest pain with initial complaint,* and (c) *respond with oxygen administration when patient reports shortness of breath (concurrent with low pulse oxygen saturation).* To achieve *clinical competency* within this behavior students in group B needed to (a) *question the patient about pain level after nitroglycerin administration* and *recognize the patient's chest pain was not controlled with nitroglycerin* and (b) *recognize the need for additional pain relief measures.* Descriptive statistics found both the control and experimental groups performing at the highest levels of competency, with the experimental group performing one level higher than the control and at the highest level (control = Level 4; experimental = Level 5).

Clinical judgment may be defined as "interpretation and reaching a conclusion about a patient's situation and the decision by the nurse to intervene" (Yuan et al., 2014, p. 7). The ability to develop clinical judgment comes from the student's interpretation of the patient condition through both objective and subjective data (Tanner, 2006). Simulation has been found as an optimal educational tool for developing nursing students' clinical judgment (Yang et al., 2019). The use of EMV in simulation has found promising results. Work by Weaver (2015) found a statistically significant difference in clinical judgment between the control and experimental groups as measured by the *Lasater Clinical Judgment Rubric*, a tool specifically designed to evaluate clinical judgment. Another interesting finding from Weaver's work is that the EMV group started with lower overall clinical judgment scores than the control group only to exceed the control group after viewing an EMV (2015).

Future research on EMVs should continue to demonstrate the use of clinical judgment. This would include the expert model identifying and assessing the patient for each objective finding and subjective statement. The expert model should then provide a rationale for each intervention based on the objective and subjective findings. While not used in this study, future studies should utilize each of the nine behaviors in the *Clinical Judgment* domain. This might include the expert model first introducing themselves and then reviewing the lab findings. It may be that the expert model then focuses on the camera to discuss the relevance with each finding and how they will proceed with patient care prior to resuming the simulation. In addition, as this section requires rationales for actions, future EMVs should ensure that the expert model vocalizes rationales for each intervention to help students develop the ability to critically analyze all findings and determine appropriate interventions for the simulated patient.

Behavior #12: Prioritizes Appropriately

This behavior measured students' competency in the ability to prioritize appropriately. Both groups A and B had different criterion for which they were evaluated. To achieve clinical competency within this behavior students in group A needed to (a) *address the patient's oxygen first (low oxygen saturation); apply oxygen* and (b) *contacts the physician when the patient not responding to oxygen administration and the patient reports chest pain.* To achieve clinical competency within this behavior students in group B needed to (a) *contact the physician when the patient was not responding to nasal cannula for oxygen administration; not responding to nitro for chest pain.* Descriptive statistics found both the control and experimental groups performing at the highest level of competency; level five (control = Level 5; experimental = Level 5).

Traditional clinical experiences seldom provide students with the ability to prioritize care (Kaplan & Ura, 2010). This is problematic as new graduate nurses are expected to possess this skill; therefore, the use of simulated experiences has been heavily leaned upon to help develop students' prioritization skills (Hayden et al., 2014). In a simulation developed to assess students' priority setting and delegation skills, Kaplan & Ura found that 68% strongly agreed or agreed that the simulation exercise increased their understanding of prioritization and 55% strongly agreed or agreed that the simulation helped them to gain confidence in prioritizing care (2010).

Trends in this study found that both the control and experimental groups performed at the highest level of competency in this behavior. This suggests that video interventions are overall impactful on students' ability to notice and respond to patient needs. In this study, students were able to identify patient deterioration through both subjective and objective data and use their clinical judgment to determine best interventions. Students were also able to recognize when they needed additional guidance and resources. This guides future researchers to continue to develop EMVs which demonstrate exemplar prioritization. The provision of multiple distracting factors (i.e., low pulse oxygen saturation with complaints of new onset chest pain), allowed the EMV to demonstrate proper prioritization and intervention. Future EMVs should also provide non-emergent distractors in order to help students identify priorities that are emergent versus urgent to further develop prioritization skills.

Behavior #13: Performs Evidence-Based Interventions

This behavior measured students' competency in the ability to perform evidence-based interventions. Both groups A and B had different criterion for which they were evaluated. To achieve clinical competency within this behavior, students in group A needed to *titrate oxygen based on patient's needs.* To achieve clinical competency within this behavior, students in group B needed to (a) *switch the patient to a nonrebreather when the patient's oxygen was not responding to nasal cannula (after doctor's orders to apply)* and (b) *provide morphine for pain relief with nitroglycerin not helping (after doctor's orders).* Descriptive statistics found both the control and experimental groups performing at the highest level of competency; Level 5.

The trends in this behavior are interesting as research has found that students struggle in the attainment of clinical judgment (Nielson et al., 2016). More specifically, research has identified that there is a lack of opportunity and support for undergraduate nursing students to learn and gain confidence in performing evidence-based interventions (Ryan, 2016). The behavioral trends identified in this study are supportive of the use of video interventions for the attainment of clinical judgment. Future research should continue to use video interventions to improve behaviors involving evidence-based practice. Moreover, continued research is needed to determine other areas in which EMVs may help improve clinical judgment. By reviewing current research and determining areas of continued deficit in clinical judgment, educators can create EMVs to target the attainment of these behaviors.

Behavior #14: Provides Evidence-Based Rational for Interventions

This behavior measured students' competency in the provision of evidence-based rational for interventions. Both groups A and B had different criterion for which they were evaluated. To achieve clinical competency within this behavior, students in group A needed to (a) *elevate the head of bed* and (b) *administer furosemide and nitro.* To achieve clinical competency within this behavior, students in group B needed to (a) *switch patient to a nonrebreather* and (b) *provide the* *patient with nitroglycerin, furosemide, and morphine.* Descriptive statistics found both the control and experimental groups performing at the highest level of competency: Level 5.

The behavioral trends in this domain provide further evidence as to the ability of video interventions to promote student understanding of the nursing process. As discussed in the previous behaviors of the *Clinical Judgment* domain, students perform very well at recognizing and prioritizing patient care. These trends are encouraging and suggest the need for continued research on the impact of nursing process videos overall, including EMVs.

Behavior #15: Evaluates Evidence-Based Interventions and Outcomes

This behavior measured students' competency in the evaluation of evidence-based interventions and outcomes. Both groups A and B had different criterion for which they were evaluated. To achieve clinical competency within this behavior, students in group A needed to *evaluate the patient's response to nitroglycerin and reevaluate chest pain.* To achieve clinical competency within this behavior, students in group B needed to (a) *evaluate the patient's response on the nonrebreather (including oxygen saturation)* and (b) *evaluate the patient's response to morphine administration.* Descriptive statistics found the experimental group performing one level higher than the control group in this behavior (control = Level 2; experimental = Level 3).

The trends in this behavior are suggestive of a continued deficiency in the nursing student's interpretation of vital signs. In this behavior it was identified that students had difficulty properly assessing the patient's pain. This study required students to both provide medication to alleviate the patient's chest pain and perform follow-up assessments to determine the efficacy of their intervention. Although the EMV group performed at Level 3, there is room for improvement. The assessment of pain has been identified as one barrier to acceptable pain management (Anderson et al., 2000). The best way to manage pain is to complete a reassessment of the patient's pain after interventions have been implemented in order to determine if the intervention was appropriate or if additional pain relief measures are warranted (Wells et al., 2008).

Future EMVs can build upon these findings by ensuring the expert model performs a complete pain assessment after each intervention. It is important for future EMV research to include the vocalization of non-pharmacologic pain measures which may be indicated as well. Another area in which EMV may be useful is to discuss appropriate timing of pain reevaluation.

Summary of RQ1C

Research question 1C provided an in-depth discussion on the behavioral trends identified in this research study. While many studies have focused on the total CCEI outcomes and / or the CCEI domains (Hansen & Bratt, 2017; Page-Cutrara & Turk, 2017), this study sought to understand the outcomes, domains, and behaviors as evaluated by the CCEI. This research study provided evidence that the CCEI may be used to provide information about student's competency levels. This may then guide nursing educators towards developing strategies to target specific behaviors identified as weaknesses for students. Additionally, although this study did not statistically analyze the behavioral findings, future research should attempt to quantify the results to provide a better understanding of the impact on EMVs on specific CCEI behaviors.

Challenges were present in the identification of appropriate criteria for each behavior. When developing the CCEI worksheet for use in student simulation evaluation, Todd et al. (2008) guide educators to select criteria based on the learner's knowledge level and experiences. While this researcher conferenced with the course faculty and took into consideration the level of learner, clinical experience, and theoretical knowledge, determining which criteria were essential to demonstrate competency within each behavior was challenging. Additionally, there were several occasions which found criteria spanning two behaviors, said differently, the same criterion was used to display competency in two different behaviors (i.e., checking patient identifiers as criteria for CCEI behavior #18 and for CCEI behavior #20). The duplication of criterion may have impacted this study's findings; if students were not able to meet the criterion in one behavior (thus earning a "0" for not competent), then the student would also earn a "0" for the second behavior—regardless of if all other criteria were met.

The knowledge gained by analyzing trends in student behaviors can guide future researchers into areas of needed focus. Understanding the bigger picture as to why students struggle in the development of any given domain is essential to building safe and competent graduate nurses. Knowledge of specific areas of weakness, as evaluated by RQ1C, provides guidance for nursing educators towards the development of future curriculum.

Summary of RQ1

Research question one sought to understand the overall impact of EMVs on students' simulation outcomes as measured by the CCEI. In addition, research question one took a closer look at the impact of EMVs on the individual CCEI domains and the behaviors within those domains. Results of this study indicated that EMVs are beneficial to student learning, finding a statistically significant difference between the control and experimental groups ($p=0.001$).

Looking into the CCEI domains found that students in the EMV group performed significantly better in the domains of Communication and Patient Safety. These findings are important as communication and patient safety are consistently top areas blamed for sentinel events in nursing (QSEN, 2016). However, while the results are impressive for the impact of EMVs on practice, future research should explore how EMVs may be used to also improve the domains of Assessment and Clinical Judgment. This might include looking at the construction of EMV and determining how the EMV targets each domain. Furthermore, a critical analysis of criterion for which to judge or grade the behavior should be analyzed prior to implementation to ensure accuracy and applicability.

The review of student behavior trends proved informative within this study. Future research on EMVs should continue to evaluate students' simulation or clinical performance in order to determine areas of strengths and weaknesses. By reviewing trends, this study was able to identify behaviors in which students excelled and areas which students struggle. For example, while students were able to identify patient issues which required an immediate intervention, students struggled with gathering information through the completion of a focused assessment and discussing these needs with the physician. Another example is medication administration. While students were able to identify the need for medication interventions, students' safe medication administration through the use of patient identifiers was found lacking. This guides future research on EMV to target these specific areas of weakness in order to help develop students overall safe practices.

The use of the CCEI tool allowed this researcher to evaluate students' clinical competency within both learning domains and specific behaviors. However, while the CCEI tool consists of 23 behaviors, only 17 were used in this study. Future research on EMV should ensure the use of all behaviors to determine competency as each behavior is important to overall practice.

Discussion and Implications of RQ2

Research question two sought to discover the overall student enjoyment of the nursing process videos compared between experimental and control groups as measured by a tool developed to evaluate students' enjoyment of a video intervention. To answer this question two sub-questions were crafted.

Research Question 2A

Research question 2A sought to answer the question: "*How does student enjoyment of the nursing process videos compare between experimental and control groups as measured by the overall video enjoyment survey?"* Evaluation of the Video Enjoyment Survey found no statistically significant difference between the control and experimental for overall enjoyment of the nursing process videos (z = -0.740, p = 0.459).

Although the findings of this study did not indicate a difference in overall enjoyment of an EMV over a nursing process video discussion, the findings are suggestive that students found the video interventions equally enjoyable. Research by Rieger et al. (2021) mirrors these results finding that 67.8% of students in their study preferred learning modes such as videos and demonstrations. Furthermore, Rieger et al. found that students enjoyed multimedia assignments and felt they benefited their future practice (2021). Additional research completed by Jiménez-Rodríguez and Arrogante found that the use of video consultations (in lieu of live simulation due to the COVID-19 pandemic) yielded a 97.8% satisfaction score with students reporting that they enjoyed the adaptation of the simulation model (2020).

The completion of the *Video Enjoyment Survey* (VES) took place immediately after students' simulated experience and prior to simulation debriefing. Although the experimental group performed significantly better than the control group, the lack of difference in video enjoyment may have been guided by their perceived performance in the simulation. Research shows that simulated experiences are beneficial due to their ability to allow students to learn in a safe environment, however, student perceptions indicate that performing in front of others causes embarrassment and fear of failure (Ganley & Linnard-Palmer, 2012). In this study, students performed in front of peers – both in their assigned group and the student observers from the opposite group. Additionally, students were observed by course faculty behind a one-way mirror. The debriefing phase is an opportunity for students to receive positive feedback to help tamper the stressful emotional response felt during simulation (Holland et al., 2015). Asking students to complete the survey prior to simulation debriefing and decompression may have impacted students' perceptions of the videos. Future research on EMVs should take the timing of the survey into consideration. Exploration of a survey prior to engagement in the simulation experience may better reflect students' perceptions of the video interventions and provide a better account of any differences between the two. Further exploration is also indicated in the understanding of student enjoyment through varying evaluation methods. This may provide a holistic view of how videos impact nursing students' learning, as well as any potential differences in enjoyment between video delivery methods (i.e., demonstration versus discussion). Another area of potential exploration is the impact that enjoyment has on CCEI outcomes. While CCEI outcomes and VES findings were not analyzed in this study, future research should examine any correlation that exists between enjoyment of an EMV and students' CCEI outcomes.

Additional factors which may have impacted RQ2s findings are technological factors and student difficulty in identifying feelings towards learning strategies. The *Video Enjoyment Survey* required students to answer questions about engagement, positive affect, and fulfillment. Research has identified factors influencing students' responses include that the questions are confusing, students not recognizing their feelings on the issue, and the desire to comply to social norms when answering (Clifford & Jerit, 2016). This survey asks students to describe factors such as if they were *happy, pleased, satisfied, or contented* while watching the videos. The inability to correlate the video with one's feelings may have proved problematic for the students. Future research on EMVs should employ qualitative measures such as focus groups to determine the enjoyment of this video intervention. This may provide a greater understanding of student's perceptions by eliminating the need for students to quantify their feelings.

Regarding technology, although students were instructed to bring their laptop to the simulation, the majority of the students did not, leaving them to complete the survey on their smart phone or other smart device. Thus, the formatting of the survey on students' smart devices may have impacted this study's findings. The formatting of online surveys has been associated with students' willingness to engage with and answer questions appropriately (Park et al., 2019).

Research Question 2B

Research question 2B sought to expand upon research question 2A by asking: "*How does student enjoyment of the nursing process videos compare between experimental and control groups as measured by the three factors of engagement, positive affect, and fulfillment within the video enjoyment survey??* Analysis of the Video Enjoyment Survey data between factors found a statistically significant difference in engagement (z = -2.818, p = 0.005) between the control ($\bar{x} = 2.537$; SD = 0.852) and experimental groups ($\bar{x}$=2.208 SD=0.898). These findings suggest that an EMV may be beneficial in the improvement of a student's engagement in learning.

Nursing student engagement in learning is a critical component towards their success in education (Hudson & Carrasco, 2017). Furthermore, engagement has been found to play a role in students' abilities to become independent thinkers (Hudson, 2015). A lack of engagement has been linked to dissatisfaction in learning, (Greenwood et al., 2002; Perie et al., 2005) and when present in patient care it may inhibit students' ability to achieve competency (Henderson et al., 2007).

The findings of this study suggest that EMV increased nursing students' engagement in learning. Although this study did not investigate the link between engagement and CCEI outcomes, previous research has linked student engagement to both practical competency and the ability to transfer skills into novel situations (Braxton et al., 2000). Future research should determine the link between engagement and simulation outcomes through tools such as the CCEI. In addition, engagement is multi-factorial and can be behavioral, emotional, and/or cognitive (Hudson, 2015), therefore future research on the use of EMV should seek to discover how EMVs impact student engagement under these factors.

While this study found a difference in student engagement between the control and experimental groups, no significance was found in the factors of positive affect and fulfillment. As discussed in research question 2A, this may be due to the inability of nursing students to understand their feelings towards an intervention (Clifford & Jerit, 2016). The survey used in this study was originally developed to understand students' web experiences (Lin et al., 2008). The authors identified, through extensive research, that enjoyment is comprised of three major factors: engagement, attention, and fulfillment. The authors define that engagement is the student's attention focused on an activity, positive affect is associated with feelings, and fulfillment is a need (Lin et al., 2008). The timing of this survey, after students experience simulation, may have had an impact on their emotions and fulfillment and thus may not have been appropriate questions to answer at that time. Future research should examine students' enjoyment of nursing process videos prior to emotional events such as those associated with simulation experiences.

Summary of Research Question 2

Findings from this research study have identified that a nursing process video intervention provided an enjoyable experience for undergraduate nursing students. These findings help to guide researchers to develop EMVs for use in other educational areas in nursing education. For example, how might the inclusion of EMVs in the classroom improve students' engagement in learning? The videos used in this study were provided within the context of simulation preparation. Future research should continue to develop video interventions and EMVs to help students prepare for nursing simulation in all phases: presimulation, prebriefing, and debriefing. The findings of this study also guide nursing bodies towards the support of EMVs to build engagement for course materials.

Other Findings: Creation of an EMV

The literature surrounding expert modeling videos offer suggestions for how to implement expert modeling videos as well as what these videos should include. However, a gold standard has not been created, in part due to the flexibility of the video and its intended purpose. For example, expert modeling videos have been used to demonstrate incomplete patient assessments (Guhde, 2010) and poor communication (Bussard & Lawrence, 2019). In these instances, expert modeling videos are used to help students learn through exclusion rather than through exemplar performances. On the other hand, expert modeling videos have been used to demonstrate simple skills sets such as basic patient care (transfer from wheelchair to bed, first aid management; Chau et al., 2001), a central line dressing change (Jarvill, 2018), insertion of a urinary catheter (Yeu-Hui et al., 2018), the steps in obstetrical palpation (Barka et al., 2019), and nasogastric tube insertion (Chau et al., 2001).

When used to demonstrate exemplar care, the literature provides little guidance for creating EMVs. While research often discusses the scenario, little discussion is provided on how the scenario unfolds or the expectations of the students. For example, research by Franklin et al. (2014) discussed the use of three simulated patients with presentations of (1) respiratory distress, (2) diabetic complications, and (3) cardiovascular disease. They further discussed that one of the patients required rescue interventions including emergent medications, calling the physician, and oxygen titration (Franklin et al., 2014). However, Franklin et al. (2014) did not describe the proposed evolution of the scenario to give light to potential inclusive behaviors in future EMVs.

Research has also described the use of unfolding case studies as the basis for their scenario, such as those used by Coram (2016) which were developed by the National League for Nursing Advancing Care Excellence for Seniors [ACES] (NLN, 2010). However, while the presentation of the simulated patient is provided, the expectations of care and a discussion of the expert models actions in the EMV is not described. Lastly, in a study on the use of EMVs for a patient experiencing complications of heart failure, the scenario was provided with the only guidance for the EMV being the description of patient deterioration mid-way through the scenario (Aronson et al., 2013). Interestingly, perhaps the most guidance towards the patient presentation and the patients' needs when creating an EMV came by Layton (1979). In this study, Layton sought to understand the effectiveness of EMV on teaching students' empathy and provides an in-depth discussion of the patient being interviewed (1979). However, while a descriptive background on the patient was provided, a description of the dialogue between the patient and the expert model was excluded.

An additional factor to consider during creation of EMVs is the length of the video. This study found that with the inclusion of the SBAR video, provided to both the control and experimental groups, a total of 20-25 minutes of videos preceded the student's simulation. Research surrounding EMVs found videos five to seven minutes (Coram, 205), five minutes (Weaver, 2015), twenty-two minutes (Devi et al., 2019), and two to three minutes (McConville & Lane, 2006), while others do not provide exact length of videos (Franklin et al., 2014). While previous research provides little guidance towards optimal length, observations of the characteristics of the learner might. For example, the current undergraduate nursing student population belongs to Generation Z, a generation known as both IGen and Digital Natives (Hampton et al., 2020). This generation has also been noted to have shorter attention spans than previous generations (Shatto & Erwin, 2016). This poses a challenge for educators as although the current nursing student population engages well with technology, their ability to focus on educational strategies is limited. These factors should be taken into consideration when creating EMVs. Shorter, targeted vignettes may be more beneficial. For example, brief vignettes targeted at specific domains (i.e., assessment, clinical judgment) should be explored to determine their ability to meet competencies within each domain.

A systematic review of expert modeling videos used in undergraduate nursing education was completed in order to provide guidance for the creation of the EMV used in this study and for the development of future EMVs (Dodson, 2022). This review found that research on EMVs is mostly qualitative in nature, thereby offering little guidance for future videos based on student behaviors. A major implication for nursing educators is the continued need for developing EMVs. While EMVs will undoubtedly vary based on the simulation focus and level of learner, Tables 17 and 18 provide guidance for the development of EMVs. Additionally, the development of EMVs within different care contexts and content areas is needed to expand on this outline and provide guidance for future development of EMVs.

Table 17

Guidance for the Creation of Expert Modeling Videos

	Guidance
Scenario	There are multiple variations of EMVs that may be employed such as: Simple Skills Sets • central line dressing change (Jarvill et al., 2018) • urinary catheter placement (Yeu-Hui et al., 2018) • obstetrical palpation (Devi et al., 2019) Evolving • Patient found on floor without pain, 1-week later patient who slides out of a wheelchair with pain (Weaver, 2015) • First patient: 84-year-old female admitted with dehydration, UTI, and acute delirium – evolves into near fall with confusion clearing and patient discharge in process. Second patient: 80-year-old with open wound on big toe after walking in a new pair of shoes – evolves to necrosis of toes and acute confusion with possible sepsis (Coram, 2016) • A three-video series with "Aunt Lucy" hospitalized with exacerbation of CHF. Begins with incomplete assessment, an assessment 3-hours later showing severe respiratory distress and ending with a code blue. Next video shows a complete assessment (Guhde, 2010) • Preoperative assessment, postoperative assessment, and symptom management and identification / management of delirium (Lasater et al., 2014) **Acutely Ill with Interventions Needed** • Heart failure with onset of deterioration (Aronson et al., 2013) • Respiratory distress, diabetic complications, and cardiovascular disease (Franklin et al., 2014) • Moderate respiratory distress with a history of asthma and patient with COPD in moderate to severe respiratory distress (Brown, 2008) • Patient with diabetes which experiences an episode of hypoglycemia (Gordon et al., 2018) **To Improve Behaviors** • Empathy vs lack of empathy (Layton, 1979) • Communication with SBAR (Day, 2016) • Caring vs noncaring behaviors (Nelms et al., 1993) • Effective vs ineffective communication (McConville & Lane, 2006)
Actor	• An actor with years of experience is needed to provide a rich experience • Ensure the actor is experienced in the care of the patient identified in the simulation focus

(*table continues*)

Table 17 (continued)

Guidance for the Creation of Expert Modeling Videos

	Guidance
Script	• Separate from the simulation script, the actor's script should provide guidance towards critical actions up to and including checking the patient's armband and verifying the patient's identity, educating the patient on interventions, vocalization of assessment findings, and expected SBAR • The creation of the scripts should use evidence-based practice. Use of care bundles as appropriate to ensure evidence-based practice is observed. • Guidance through the nursing process is suggested to ensure proper flow and targets as well as referencing standard operating procedures. Use of textbooks and applicable literature. • Verification of the script through content experts to ensure accuracy
Recording	• It is important to remember that this is time intensive. It may take several takes until the video is finalized. Things to look for: breaks in sterile technique, hand hygiene, use of equipment, medication administration. At times expert nurses have behaviors through experience that may be either too advanced for the stage of learner or do not follow the practice in which you want students to follow. • Another thing to keep in mind is time. Expert modeling videos average as short snippets (3-5 minutes) to demonstrations of care (10 – 30 minutes). Be mindful of your audience, shorter videos may work best.
Review	• An independent review is essential to the creation of an EMV. • Close encounters with the EMV may sometimes cloud the researcher's ability to critically analyze the expert model's actions and the simulation flow.
Dissemination	• Determine best methods for dissemination. • Online within course modules, during class lecture, during clinical practice, or within simulation.

Table 18

Lessons Learned From the Creation of Expert Modeling Videos

Identification	What happened	Guidance for future EMVs
Assessment	Expert model not consistent in their vocalization of the assessment findings	Using think-aloud techniques, the expert model should vocalize the assessment findings (i.e., assessment that Foley catheter was free flowing without kinks or obstruction)
	Expert model missed required assessments	Videos should be critically analyzed to ensure assessments are completed, even basic assessments such as ensuring the IV site is clean, dry, intact, and free from tenderness or erythema
	Expert model did not include the patient during the focused assessment	Ensure the patient is asked to participate in the assessment (as would be found in practice). For example, ask the patient to take deep breaths for lung assessment. Ask patient about pain and sensation when assessing lower extremity edema, ask the patient if they have any perineal pain or discomfort when assessing Foley catheter.

(*table continues*)

Table 18 (continued)

Lessons Learned From the Creation of Expert Modeling Videos

Identification	What happened	Guidance for future EMVs
Standards of Practice	Expert model not shown washing hands upon entering room	In the EMV, the expert model used hand sanitizer and was found rubbing his hands upon entering the room. Due to the findings of this study and the lack of student competency in handwashing, future EMV should ensure that the expert model performs proper handwashing. Additionally, expert model should demonstrate the use of hand sanitizer each time gloves are donned or doffed
Level of Learner	Expert model providing in-depth information	While this does not appear to have impaired student learning, the expert model provided information on medication mechanism of action which may have been too detailed from a pathophysiologic standpoint. Future videos should ensure that the patient education is in a way that is easy for the patient to understand, assuming a 6^{th} grade reading level
Language	Expert model used words that may be above students' level	When educating the patient on the pathophysiology of disease, ensure the education is easy to understand – assuming a 6^{th} grade reading level Be cautious of words that may not be understood by novice nurses (e.g., perseverate).
Communication	Expert model did not observe SBAR on second phone call to physician	Ensure the expert model is purposeful in the breakdown of SBAR. Ensure that SBAR is used during each encounter whether nurse-to-nurse or nurse-to-physician to help students view an exemplar model of this form of communication
Support & Encouragement	Expert model displayed professional behaviors but did not display empathetic behaviors	It is easy for experts in the field to become very task based when caring for a patient with acute needs. However, students need examples of how to integrate therapeutic communication and touch. Ensure the expert model stops to listen to the patient and asks open ended questions to build a client-patient relationship
Time	Expert modeling videos provided of SBAR, orientation to room, and video interventions	Attention spans are short, especially when students' anxiety levels are elevated due to an upcoming simulation. Video interventions should be chosen wisely; consider only using an EMV in the prebriefing period and reserving other videos for learning in the presimulation or debriefing phases.
	Length of video	Consider using short snippets, even for the care of the acutely ill. Using this study as an example (1) a 5- minute video which includes the nurse introduction and patient assessment, (2) 5-minute video addressing patients SOB with interventions and call to LIP, (3) 5-minute video addressing patient's chest pain with interventions and a call to LIP, (4) 5-minute wrap up with patient stabilizing and reassessment Consider a brief discussion between each video to engage students in understanding the actions of the expert model and build excitement for the continuation of the series.

Limitations

Similar to previously published work on nursing simulation (Aronson et al., 2013; Franklin et al., 2014), three limitations were identified during the completion of this study.

Variability Among Faculty Members

One issue common to simulation is the lack of training for simulation facilitators (Adamson, 2010; Arthur et al., 2013; Bray et al., 2009; Hayden, 2010; Nguyen et al., 2011). Many large colleges of nursing require participation from both full-time faculty and adjunct clinical instructors to successfully implement simulation (Berndt et al., 2015). However, research has shown that many simulation facilitators are inexperienced and have not been provided with the professional development needed to run a simulation properly (Anderson et al., 2012). Due to the volume of students and the expansion of simulation over five days, the need to include clinical faculty to facilitate simulation was imperative in this study.

Issues of inexperience in simulation delivery presented themselves throughout this five-day study. One common inconsistency was faculty expectations of a full assessment. When students contacted the provider, they were expected to use SBAR formatting, however, many times students struggled in this area (review Communication domain; CCEI behavior #4; criterion #1: *SBAR*). The most prominent area of struggle was in students' ability to present the provider with focused assessment. While some faculty requested the student complete the assessment and call back for orders, many accepted the poor assessment or no assessment and provided orders for medications and interventions. This reduced the student's ability to learn about the importance of patient assessment and how orders align with the patient's presentation. Another example was the lack of consistency in medication orders with one simulation finding the patient improved in both subjective and objective criteria after the initial dose of furosemide, eliminating the ability of group B to provide the second dose of furosemide and subsequently morphine due to persistent chest pain. The occurrence of inconsistencies in simulation are not new to this study. Inconsistency in simulation has been thought to contribute to student frustration and anxiety as well as leave students focusing on if they did something “right” versus “wrong” (Panian, 2020). Thus, the need to ensure that a script is followed and that all faculty have been trained to properly deliver the simulation is imperative to students learning and the accurate assessment of students’ simulation outcomes.

While a script was developed for simulation faculty with the expected progression of the scenario, many ad-libbed. For instance, on two separate occasions in the study, guidance was offered to students in order to achieve competency. Moreover, clinical faculty would provide their group with cues to guide their behavior and prompts to complete interventions or assessments. Simulation research has noted this issue, finding faculty deviated from the assigned script in an attempt to personalize the simulation based on their ideas of what students need to identify (Ray, 2017). These slight deviations and injunctions on the part of the faculty made it difficult to assess the students’ knowledge level and may have impacted the results of the CCEI findings.

Sample Size

A total of 160 students participated in the simulation who were further divided by clinical group to yield control group (n=22) and experimental group (n =22). This small sample size limits the generalizability of the findings. Larger schools experience challenges to the implementation of simulation in undergraduate nursing education. The issue presents as an inability to manage large groups of students due to a lack of laboratory space (Kardong-Edgren et al., 2008; Sole et al., 2013; Akhtar-Danesh, 2009) and staff to facilitate the simulation (Miller

& Bull, 2013; Kardong-Edgren et al., 2008; Davis et al., 2014). Due to such, large universities most often offer simulation as a group experience rather than as individual practice. However, while some may view this as a negative, there are benefits to the use of simulation as a group effort rather than individual. Simulation training in small groups allows not only for a sense of belonging within a group, but teaches how to work cohesively within a group, fostering trust within teams (Lateef, 2010). Examples of effective teams may be seen throughout healthcare during code situations, complex patient care, and surgical interventions (Lateef, 2010).

Within simulation research, the literature has consistently shown the occurrence of small samples sizes (thus, small effect sizes) which have impaired the ability to determine simulation's true effectiveness (Hayden et al., 2014). This sampling issues may be blamed on two major factors affecting simulated experiences: the inability to facilitate large class sizes (Bates et al., 2017; Murray et al., 2008), and the lack of faculty to assist in the delivery of simulation (Berndt et al., 2015). Due to such, many nursing programs complete simulated exercises in small groups; often students' clinical group, with the use of roles (e.g., active role versus observer; Hooper et al., 2015). The benefit of this approach is that it is collaborative in nature, however, this prohibits the separating of individual scores which may often be found in the research. When reviewing the issue of small sample sizes in previous simulation research, it was found that researchers will often provide a score to individual students for work completed in groups (Hayden et al., 2014). In the study by Hayden et al. individual scores were provided to nurse 1 and nurse 2 based on their group CCEI total score (2014). However, this form of scoring could misrepresent the results as it implies that each student was able to accomplish the objectives as opposed to being able to meet the objectives through mutual conversations and individual actions. Furthermore, the tool's authors instruct the CCEI tool was tested and validated within group simulation experiences (M.

Todd, personal communication, July 27, 2021). However, the CCEI authors did suggest that individual scores may be used if criteria was that the use of individual scores would have to accompany individual objectives and individual assessment within the group for each simulation (M. Todd, personal communication, July 27, 2021) Therefore, while some researchers have approached the sample size issue by providing individual scores to group performance, this researcher felt this incorrectly inflated the sample. This issue should be treated delicately in future research by reporting students accurately as groups, however, recruiting large sample groups perhaps over multiple semesters or colleges.

Suspension of Disbelief

INASCL provides guidance on how to promote simulated learning by helping the students suspend disbelief (INACSL Standards Committee, 2016). In other words, the student needs to be able to accept the sometimes unrealistic findings or patient response which may be amplified due to time constraints placed on simulation (Muckler, 2017). In this study, the patient received 40 mg of furosemide with little response. This lack of response was a cue that the patient needed additional pharmacologic support. Calling the doctor again, after the patient has little improvement, would yield an order for an additional 80 mg of furosemide. Within clinical patient care, the onset of action of furosemide intravenously is five minutes with a peak of 30 minutes (Davis Drug Guide, 2021). However, due to time limitations, the patient begins to realize the therapeutic effects of furosemide within a few minutes of medication administration (signaling to students that they correctly identified and treated the problem). There has been some concern that this may give students unrealistic expectations within clinical practice as many believe that simulation should accurately depict the clinical environment to promote effective transfer of knowledge (Bullock et al., 2015; Davis, 2014; Dieckmann et al., 2007;

Durham & Alden, 2008). For this reason, it is important to remind students of the peak, onset, and duration of specific medication used in the simulated environment when time does not allow for accurate depiction.

An additional factor which may impact students' suspicion of disbelief is the mismatch between the simulation scenario patient and the simulation facilitator's voice. In this study, male simulation manikins were used, and the patient was a male. However, all of the simulation scenarios with the exception of one (delivered by a male clinical faculty) were voiced by women. This may have impacted the realism of the simulation and the ability of students to suspend disbelief.

Conclusion

The development of undergraduate nursing student competency is paramount to the future of nursing practice. Recent studies have detailed the dire need for improved clinical preparation finding that new graduate clinical competency has fallen from 23% (Kavanagh & Szweda, 2017) to 16% (Kavanagh & Sharpnack, 2021). Simulation has been identified as not only an optimal teaching strategy but also as a way to develop and evaluate students' clinical competency (Hayden et al., 2014). Simulation research has found promising results, however, is finding that students continue to fall short of intended instructional outcomes (Page-Cutrara & Turk, 2017; Scalise, 2019). Furthermore, studies evaluating nursing students' ability to meet simulation objectives have found that students continue to struggle in the area of assessment and communication as well as patient safety, prioritizing, and safe medication administration (Page-Cutrara & Turk, 2017; Scalise, 2019). These findings have led to a call for nursing reform and the development of innovative teaching strategies to build students' clinical competency in nursing education (Kavangh & Szweda, 2017). One such strategy is that of expert modeling videos (EMV).

Expert modeling videos have proven to be a successful educational strategy to teach new behaviors and skills by the provision of an exemplar standard to be referenced for future practice (Anderson et al., 2008). The use of EMV in simulation has shown promising results for building students' behaviors (Gordon et al., 2018; McConville & Lane, 2006), skills sets (Devi et al., 2019; Jarvill et al., 2018; Yeu-Hui et al., 2018) and overall clinical competencies (Page-Cutrara & Turk, 2017; Scalise, 2019). While this innovative teaching strategy has had promising results for improving students' competencies, three gaps exist. First, available research lacks the methodological rigor with the quantitative assessment of overall simulation outcomes. Second, the use of EMVs on the care of a patient with an acute on chronic medication condition have not occurred in the prebriefing period. Lastly, there is a dearth of literature exploring the use of EMV to improve students' simulation competency.

The purpose of this study was to evaluate the impact that EMVs have on students' overall simulation outcomes as measure by the CCEI. An additional purpose was to discover students' enjoyment of a video intervention. Two overarching research questions were asked with research question one further expanded with three sub-questions, and research question two expanded upon with two sub-questions:

RQ1: What is the impact of expert modeling videos (EMVs) on undergraduate nursing student outcomes?

RQ1A: What is the impact of an EMV on simulation outcomes as measured by the CCEI total score?

H_o: There will be no statistically significant differences between control and experimental groups as measured by the CCEI total scores.

H_1: There will be statistically significant differences between control and experimental groups as measured by the CCEI total scores.

RQ1B: What is the impact of EMV on simulation outcomes as measured by the four CCEI domain scores (assessment, communication, clinical judgment, and patient safety)?

RQ1C: What is the impact of EMV on simulation outcomes as identified by trends within CCEI behaviors?

RQ2: How does student enjoyment of the nursing process videos compare between experimental and control groups as measured by a tool developed to evaluate student enjoyment of a video intervention?

RQ2A: How does student enjoyment of the nursing process videos compare between experimental and control groups as measured by the overall video enjoyment survey?

H_o: There will be no statistically significant differences between control and experimental groups as measured by the overall video enjoyment survey.

H_1: There will be statistically significant differences between control and experimental groups as measured by the overall video enjoyment survey.

RQ2B: How does student enjoyment of the nursing process videos compare between experimental and control groups as measured by the three factors of engagement, positive affect, and fulfillment within the video enjoyment survey?

Students were divided into a control group (*n* =22) and an experimental group (*n* =22), both of which were provided with a video intervention in the prebriefing period prior to their schedule simulation experience. In addition, both groups received an exemplar video SBAR nurse-to-nurse report for the simulated patient. The control group received a video discussion which followed the nursing process, describing each step in the care of a patient with an acute exacerbation of congestive heart failure. The experimental group received an EMV with an exemplar demonstration of the care of a patient experiencing an acute exacerbation of congestive heart failure.

This study supports the use of EMV in the prebriefing period of simulation for the improvement of undergraduate nursing students' overall simulation competency. Findings of this study provide evidence of the importance of evaluating students' simulation outcomes. Research data allowed analysis of students' performance within specific competency domains, finding that the experimental group performed significantly better in the domains of communication and patient safety. Furthermore, analysis of descriptive trends provided information on specific student areas of strengths and weaknesses within each domain.

Guidance for future research includes the creation of EMVs within different contexts and content areas. This study demonstrates the positive impact that EMVS have on students' simulation competency. Future research should focus on how EMVs may further develop competency through use in the classroom and possibly hospital-based clinical practice.

APPENDICES

APPENDIX A

INFORMED CONSENT

Appendix A

Informed Consent

This study involves analyzing a prebriefing intervention to determine effectiveness in improving simulation competency.

The study is being directed by Dr. Richard Ferdig and has been approved by the Kent State University Institutional Review Board. No deception is involved, and the study involves no more than minimal risk to participants (i.e., the level of risk encountered in daily life).

Participation in the study typically takes <1 minute. Your email address will be collected; however, once all data is collected, your email will be replaced with a unique identifier and your email address will be deleted—no information will be tied to you or your email address.

Additionally, your faculty member will not know who participated. Participants will be asked to provide consent for the use of their simulation data. Your simulation outcomes will also be deidentified and stored in the database.

Participation is voluntary, refusal to take part in the study involves no penalty or loss of benefits to which participants are otherwise entitled, and participants may withdraw from the study at any time without penalty or loss of benefits to which they are otherwise entitled.

You will still complete the survey and take part in the simulation; however, if you refuse to consent, your data from the simulation will not be included in the study.

If participants have further questions about this study or their rights, or if they wish to lodge a complaint or concern, they may contact the principal investigator, Dr. Richard Ferdig, at (330) 672-3317, rferdig@kent.edu; or the Kent State University Institutional Review Board, at (330) 672-2704.

If you are 18 years of age or older, understand the statements above, and freely consent to participate in the study, click on the "I Agree" button to begin. Next you will be asked to choose "yes" for inclusion of your data in the study or "no" if you do not wish your data to be used in the study.

APPENDIX B

CREIGHTON COMPETENCY EVALUATION INSTRUMENT

Appendix B

Creighton Competency Evaluation Instrument

Creighton Competency Evaluation Instrument (CCEI)

Student Name: ______________________________
Staff Nurse Instructor Name: ______________________________

0= Does not demonstrate competency
1= Demonstrates competency
NA= Not applicable

Date: ____/____/____
MM / DD / YYYY

	Circle Appropriate Score for all Applicable Criteria - If not applicable, circle NA		
ASSESSMENT			
1. Obtains Pertinent Data	0	1	NA
2. Performs Follow-Up Assessments as Needed	0	1	NA
3. Assesses the Environment in an Orderly Manner	0	1	NA
COMMUNICATION			
4. Communicates Effectively with Intra/Interprofessional Team (TeamSTEPPS, SBAR, Written Read Back Order)	0	1	NA
5. Communicates Effectively with Patient and Significant Other (verbal, nonverbal, teaching)	0	1	NA
6. Documents Clearly, Concisely, & Accurately	0	1	NA
7. Responds to Abnormal Findings Appropriately	0	1	NA
8. Promotes Professionalism	0	1	NA
CLINICAL JUDGMENT			
9. Interprets Vital Signs (T, P, R, BP, Pain)	0	1	NA
10. Interprets Lab Results	0	1	NA
11. Interprets Subjective/Objective Data (recognizes relevant from irrelevant data)	0	1	NA
12. Prioritizes Appropriately	0	1	NA
13. Performs Evidence Based Interventions	0	1	NA
14. Provides Evidence Based Rationale for Interventions	0	1	NA
15. Evaluates Evidence Based Interventions and Outcomes	0	1	NA
16. Reflects on Clinical Experience	0	1	NA
17. Delegates Appropriately	0	1	NA
PATIENT SAFETY			
18. Uses Patient Identifiers	0	1	NA
19. Utilizes Standardized Practices and Precautions Including Hand Washing	0	1	NA
20. Administers Medications Safely	0	1	NA
21. Manages Technology and Equipment	0	1	NA
22. Performs Procedures Correctly	0	1	NA
23. Reflects on Potential Hazards and Errors	0	1	NA

COMMENTS:

COMMENTS

Total: __________
Total Applicable Items: __________
Earned Score __________

Revised for DEU use 8/20/2013

APPENDIX C

STANDARDS OF CARE VIDEO ENJOYMENT SCALE

Appendix C

Standards of Care Video Enjoyment Scale

This scale was modified from Lin et al. (2008).

Please answer the following questions using this scoring system:

1. Strongly Disagree
2. Disagree
3. Somewhat Disagree
4. Neither Agree nor Disagree
5. Somewhat Agree
6. Agree
7. Strongly Agree

While viewing the standards of care video…

a. I was deeply engrossed.
b. I was absorbed intently
c. My attention was focused
d. I concentrated fully

While watching the standards of care video I felt…

e. Happy
f. Pleased
g. Satisfied
h. Contented

I found the standards of care video to be…

i. Fulfilling
j. Rewarding
k. Useful
l. Worthwhile

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