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Simulation Collaboration: Will Screen Capture Change Attitudes?

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Simulation Collaboration: Will screen capture change attitudes?

by

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Approval Page

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Abstract

The ongoing call for interprofessional education with healthcare providers who routinely work together has largely gone unanswered. Parallel to this call, a large number of nursing programs across the United States exist in a stand-alone setting. These programs are unattached to a school of medicine. This creates barriers including a lack of access to physicians and lack of funding to hire medical staff as embedded participants. At the same time, aging nursing faculty, increasing enrollment, and decreasing clinical facility availability create an increased need to use simulation-learning environments to continue to maintain existing capacity in nursing programs. This project used Adobe® Captivate® with video captures to create a planned algorithm that allowed for interaction between the simulation-based learning experience participants and the physician. As an embedded participant, the video-captured physician was able to offer interventions, based on assessment data and recommendations provided through a touchscreen interface. This unique and successful implementation showed that video captures are a pedagogy that adult learners are able to use to experience a positive increase in attitudes toward the physician-nurse collaborative relationship as measured on the Jefferson Scale of Attitudes Toward Physician-Nurse Collaboration©.

Keywords: DNP student, Adobe® Captivate®, Jefferson Scale of Attitudes Toward Physician-Nurse Collaboration©, simulated collaboration, associate degree nursing programs, embedded actors, video capture, interprofessional education, collaboration, multi-professional education, interprofessional education

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TABLE OF CONTENTS

List of Figures

List of Tables

CHAPTER I

Introduction

Across the United States, there are many pre-licensure associate degree nursing (ADN) programs that are not affiliated with supporting schools of medicine, pharmacology, physical or occupational therapy, social work, respiratory therapy, and many of the other treatment team members the student nurse will encounter once he or she assumes the role of professional registered nurse. In these stand-alone programs, nurse educators must impart a sense of collaboration with the requisite communications for safe and effective patient care to be a product of the educational process.

Collaboration in the practice setting addresses several domains, and thus is not defined as a single skill. Collaboration includes communication, interprofessional relationships, and the organizational culture that is present (Shaw, 2013). Students must become competent in all of these domains in order to contribute to the safety and quality of the practice environment.

Problem Statement

Medical errors in 2008 cost the United States an estimated $19.5 billion dollars (Shreve et al., 2010). The Joint Commission (TJC) 2010, pointed out communication errors during patient hand-offs and transfers accounted for 80 % of serious, preventable medical errors. The Institute of Medicine (IOM) 2000 recommended that training of healthcare professionals include interprofessional team training programs in order to increase patient safety. Given the scope of responsibilities of the TJC and the IOM, medical errors would be best described as a national problem.

Using available resources, the challenge for facilitators remains the creation of simulation-based learning experiences that include collaboration and communication skills. When applying current knowledge of communication errors that are not solely related to patient hand-offs and transfers, one begins to understand that communication can affect patient safety at every level. With these communication failures, collaboration also fails because "…effective communication is integral to the success of all the other 'systems' factors" (Nagpal et al., 2012, p.843). During the collaborative phase of healthcare team communication, failure to impart the right information to the correct member of the healthcare team, and in a timely fashion, can contribute to an adverse event. The results of such an event may be morbidity or mortality.

While nurse educators may have the opportunity to improve nursing students' collaboration skills, primarily via the teaching of communication techniques in the clinical setting, those who work in simulation face certain challenges. Out of necessity, the facilitator may act out multiple roles while in the simulation-based learning experience. For this project, the facilitator was defined as a nursing educator, with a graduate degree in nursing, who had received specialized training on the use of simulation as a teaching tool, instruction, and practice in debriefing methods.

Communication with the healthcare team is requisite for collaboration. During these learning activities, students anecdotally reported that they are distracted by the voice of the facilitator being the same as that of the patient, other team members, and family members. There may also be a degree of gender confusion between the facilitator and the simulated patient being portrayed (Childs & Sepples, 2006). As more programs

add a simulation component to the education of pre-licensure professional nurses, facilitators must consider the impact of simulation on patient outcomes.

A trend toward increased simulation utilization across the United States is another factor to consider. As clinical sites become less accessible, or as programs increase enrollment, there are fewer available clinical slots to meet the students' needs (Robb & Gerwick, 2013; Byrd, Garza, & Nieswiadomy, 1999; Schoening, Sittner, & Todd, 2006). The National League for Nursing (NLN) is conducting studies to evaluate many areas of simulation in nursing education, including how much time pre-licensure nursing students should spend in simulated-based learning experiences (Hayden, Jeffries, & Kardong-Edgren, 2012).

Nursing education is not unique in this need for collaborative interprofessional education. The detailing of the educational requirements for such communication and collaboration is well-documented in the literature by educators (Meszaros, Lopes, Goldsmith, & Knapp, 2011). Again, as the consequences of collaborative errors can be substantial, this gives the call to transform the stand-alone simulation experience into a collaborative experience through the integration of video captures.

Off-the-shelf software is available for minimal cost that allows for the integration of video and audio clips into the clinical scenario. One such product is Adobe® Captivate®, which allows for the creation of multiple pathways through which the user may navigate (Adobe Systems Incorporated, San Jose, California). These pathways or algorithms are unique to the participant's as they are dependent on the user's input. This software facilitates the participants assessing, reporting, and teaching inside the clinical scenario.

The goal of this project was to create a clinical scenario with the Adobe® Captivate® product that allowed the participant to derive an actual benefit from collaborative communications with the physician being portrayed through video clips and audio files. This was measured using a pre/post-test method.

Justification of Project

Simulation learning has become a standard in almost all healthcare educational settings. While programs may lack full scale, highly realistic, and interactive high fidelity patient simulators; task trainers, computer guided case studies, and in classroom role-play, all are simulations, each with a different level of fidelity. The rationale for devoting human and budgetary capital to such andragogy is simple; patient safety and improved outcomes are often the result of simulation-based learning experiences (Kennedy, Cannon, Warner, & Cook, 2014).

This project introduced collaboration into the stand-alone simulation setting. Using traditional simulation-based learning experiences, the project included the introduction of a touchscreen that allowed semi-planned navigation of pre-recorded video clips of a physician who offered guidance based on the participants reporting of assessment data during the clinical scenario utilizing a high fidelity manikin as the patient. The IOM (2001) states that teams that regularly interact with each other in the clinical setting should train together, as this is not a feasible situation at many schools of nursing that are not attached to schools of medicine. This project is an attempt to simulate interprofessional collaboration in the absence of a real-time embedded participant.

This project used a valid and reliable tool developed to measure the participant's attitude toward collaboration pre- and post-test. The Jefferson Scale of Attitudes Toward

Physician-Nurse Collaboration© (JSATPNC©) developed by Hojat et al. was used to measure nurse and physician attitudes about collaboration on a standardized scale (1999). The Likert type scale tool has 15 items rated from "strongly agree" to "strongly disagree". This results in a score ranging from 15 to 60, with higher scores indicative of a more positive attitude toward collaboration. The Cronbach's alpha, a measure of internal consistency, was determined to be good for medical students (.84) and for nursing students (.85) (Hojat et al., 1999). The JSATPNC© has been used in a number of recent studies and there is consistency in the factors measured by the tool in terms of the discussions related to collaboration (Bondavalli, Guberti, & Iemmi, 2012; McCaffrey et al., 2012; Onishi, Komi, & Kanda, 2013; Dougherty & Larson, 2005).

Purpose

The purpose of this project was to determine the suitability and feasibility of video capture as a means to create a positive attitude toward collaboration in the stand-alone nursing program setting as measured by an existing valid and reliable tool. The project, *Simulation Collaboration: Will screen capture change attitudes?* (SC) used pre-recorded video screen captures of a physician within a planned clinical scenario.

Project Question

Given the information presented, the clinical question offered was: Does implementation of video screen captures of physicians in a simulation-based learning scenario improve attitudes toward physician-nurse-collaboration among ADN students?

Definition of Terms

Definition of terms will use the International Nursing Association for Clinical Simulation and Learning's (INACSL) Standards of Best Practice: Standard I, as revised

in 2013. "Standard terminology enhances understanding and communications among planners, participants, and others involved in simulation-based experiences" (Meakim et al., 2013, p. S1).

- Clinical scenario is defined by INACSL as: "The plan of an expected and potential course of events for a simulated clinical experience. The clinical scenario provides the context for the simulation and can vary in length and complexity, depending on the objectives" (Meakim et al., 2013, p. S2). The clinical scenario is planned and should show evidence of pre-briefing, objectives that are known to the participants, debriefing and other elements as defined by best practices (Meakim, et al., 2013).
- Embedded participant, as defined by INACSL, is: "A role assigned in a simulation encounter to help guide the scenario. The guidance may be influential as positive, negative, or neutral or as a distracter, depending on the objective(s), the level of the participants, and the scenario. Although the embedded participant's role is part of the situation, the underlying purpose of the role may not be revealed to the participants in the scenario or simulation" (Meakim et al., 2013, p. S6).
- Facilitation is defined as: "A method and strategy that occurs throughout (before, during, and after) simulation-based learning experiences in which a person helps to bring about an outcome(s) by providing unobtrusive guidance" (Lekalakala-Mokgele & du Rand, 2005).
- Facilitator is defined as: "An individual who provides guidance, support, and structure during simulation-based learning experiences" (Meakim et

al., 2013, p.S6).

- High fidelity is defined by the NLN's Simulation Innovation Resource Center (NLN-SIRC) as: "Experiences using full scale computerized patient simulators, virtual reality, or standardized patients that are extremely realistic and provide a high level of interactivity and realism for the learner" (NLN-SIRC, 2013).
- Participant is, "One who engages in a simulation-based learning activity for the purpose of gaining or demonstrating mastery of knowledge, skills, and attitudes of professional practice" (Meakim et al., 2013, p. S7).
- Simulation-based learning experience is defined by Pilcher et al. (2012) as: "An array of structured activities that represent actual or potential situations in education and practice and allow participants to develop or enhance knowledge, skills, and attitudes or analyze and respond to realistic situations in a simulated environment or through an unfolding case study" (p.S9) .

Summary

Current trends in literature indicate a need to provide interprofessional training opportunities to increase patient safety within the clinical setting to reduce harm and expenses. Simulation, as a teaching modality, offers the participants a safe learning environment where skills can be acquired that will have a positive impact on their future practice. At the same time, the increased use of simulation will lead to better patient outcomes. Facilitators have access to new tools to introduce embedded participants via video capture; however, this approach has not been studied empirically at this time.

CHAPTER II

Research Based Evidence

In this project, *Simulation Collaboration: Will screen capture change attitudes?* (SC), the clinical scenarios included video captures of a physician as an embedded participant in a clinical scenario. Through this unique intervention, it was anticipated that the results would show an increase in the positive attitudes toward collaboration in the stand-alone academic setting. The embedded participant was an actual physician, who responded to participants' phone calls regarding assessment data and desired orders.

The course that was used for this project is typically taught with repeated clinical scenarios. As the focus of this project was the use of video captures, existing protocols were not changed. Literature supporting this model is included in the review of the literature.

Introduction

The literature review was conducted for utilizing simulation as an andragogy to teach participants skills and to reflect on collaboration. It also covered the debriefing of participants. The literature also reviewed clinical scenarios where living persons portrayed and acted within their defined professional roles during the simulation-based learning experience. A review of the use of video captures effectiveness was also completed.

Review of Literature

A scholarly literature review was conducted using the Cumulative Index to Nursing and Allied Health Literature Plus with Full Text employing search terms related to this project including; interactive tutorial, simulation, debriefing, webcast or screencast

and medical, nurse, nursing or health. Additional searches to allow review of simulation learning evaluation, debriefing and confusion as it relates to roles were also completed.

Interactive learning methods evaluated

Podcasts and video lectures alone were evaluated, but the primary focus was on simulation and screen capture technology. While the learner may be asked very valid and thought provoking questions, this is not a method that allows instant instructor feedback and results could easily be replicated in an asynchronous environment with emails, discussion boards and quizzes.

Simulation for Training

Simulation has been used as one pedagogy to teach teamwork and collaboration. In a randomized control trial evaluating four methods used to teach teamwork to interdisciplinary teams, Hobgood et al. (2010) evaluated the results of each training method. The researchers hoped to determine if one training method was more effective than another at increasing interdisciplinary teamwork. Hobgood et al. (2010) wanted to determine if there was a more cost-effective way to teach interdisciplinary care, citing in part a cost of $5,000 per day to train five students, utilizing high fidelity human patient simulators. In a large-scale study (n=438) of senior nursing students (n=203) and fourth-year medical students, students were randomized into one of four groups (Hobgood et al., 2010).

Using four different methods to teach interdisciplinary teamwork, they found no significant difference in any one method when compared to the others, and that all tested pedagogies created a measurable change in students' perceptions using a variety of tools tailored to each method of education. All four groups received a pre-test to complete and

all participants received lecture-based instruction (Hobgood et al., 2010). Cohort A (n=80) took part in a high fidelity simulation that included two medical students and two nursing students in each of 20 groups. Once the simulation had ended, there was an immediate debriefing (Hobgood et al., 2010). Students then received the lecture content in mass (n=438). The participants then went on to be re-randomized into new groups (n=110) of two medical students and two nursing students each. They then completed a standardized patient interaction and post-test evaluations were completed (Hobgood et al., 2010).

There were also three other groups that took part in different activities in place of the high fidelity simulation-based learning experience. Cohort B completed a low fidelity patient simulation case (n=80), cohort C completed a lecture that also incorporated an audience response system (n=140), and cohort D revived didactic lecture alone (n=138) (Hobgood et al., 2010).

Hobgood et al. (2010) found that regardless of the tested pedagogy, all students had a significant improvement in attitudes related to collaboration (p=.001) (Hobgood et al., 2010). While Hobgood et al. (2010) did recommend further study, the results from their study indicated that an integrated curriculum should produce a change in student's perceptions regardless of the pedagogy used.

A mock code simulation-based learning experience was the context that Dillon, Noble, and Kaplan explored the use of simulation as a possible way to conduct successful interdisciplinary collaborative training in the urban university setting (2009). Dillon et al. (2009) demonstrated that a collaborative approach would reduce patient harm through a better understanding of each professional's role as a member of the health-care team.

The use of the simulation setting to provide this training offered a safe environment, free of risk to patients. Additionally, it was noted that simulation is an effective method to develop communication skills required for collaboration (Dillon et al., 2009).

The participants included fourth year pre-licensure baccalaureate nursing students (n=68) and third year medical students (n=14) from a large urban university who took part in a pre-test/post-test perception evaluation utilizing the Jefferson Scale of Attitudes Toward Physician-Nurse Collaboration© (JSATPNC©) as a way to evaluate learners perceptions (Dillon et al., 2009). A convenience sample was used with significantly fewer participants (nursing students, n=31; medical students, n=9) completing the post-test. This was attributed to scheduling conflicts, a previously cited barrier to collaborative education (Dillon et al., 2009). Students also completed four open-ended items related to their perceptions of the nurse-physician relationship pre-test and post-test.

Following Institutional Review Board (IRB) approval, students, as part of their curriculum, took part in a mock code simulation utilizing a high fidelity patient simulator. They had completed the perceptions scale prior to the experience. Once the simulation had ended, a debriefing occurred that covered feeling as well as a review of the psychomotor and clinical thinking that had taken place in the progression of the scenario (Dillon et al., 2009). A total of 20 students participated in two simulation events, and these were videotaped for review by non-participating students in another room (Dillon et al., 2009).

Post simulation, the mean scores of the medical students showed a statistical difference in two areas: collaboration (p=.013) and nursing autonomy (p=.025) (Dillon et

al., 2009). However, the nursing students' qualitative responses showed that only two had had a change in perception post simulation (Dillon et al., 2009). Dillon et al. (2009) goes on to report that nursing students had high pre-test scores on the JSATPNC© , but these scores seemed at odds with the open-ended responses the students gave. The team hypothesized that this may have been because they answered the survey the way they had been taught as part of didactic lectures. However, when the students answered the open-ended items, they answered, as they perceived collaboration in actual practice.

Dillon et al. (2009) acknowledged the small sample size as a limiting factor in their study. They acknowledged using a debriefing method in their study that may have had a role in learning, but they did not publish the demographics of their student population. Without this, one is left to speculate that there might have been a significantly different population in the medical school than in the nursing school.

Kirkman (2013) attempted to determine if undergraduate nursing students were able to transfer didactic and skills content learned in both the classroom and simulation setting to the bedside, further showing that simulation learning is a potentially valuable tool for educating adult learners. As the use of simulation-based learning experiences is increasing across the United States, validation of the positive effects on student learning outcomes is necessary to affirm the increased use of simulation-based learning. Mere student perception is not enough to ensure positive outcomes.

Baccalaureate pre-licensure nursing students who were enrolled in their first semester (n=42), were evaluated three times, in a repeated measures study (Kirkman, 2013). Observers, who had demonstrated inter-rater reliability, evaluated participants with a standardized tool. Students then attended a lecture that covered the standards of

care related to respiratory assessment and then were scored again with the same tool and raters one-week post didactic intervention. The students then participated in a high fidelity simulation-based learning experience that was centered on a patient with asthma. Again, one week post intervention students were evaluated.

After assessing the mean scores, Kirkman found that "…there was a significant difference (p=0.000) [*sic*] in transfer of learning demonstrated by the participants over time" (2013, p.4). Post hoc analysis was conducted. The high fidelity simulation-based learning experience demonstrated a significant difference (p<.001) (Kirkman, 2013). The lecture also had an effect, but to a lesser degree (Kirkman, 2013).

While Kirkman concluded that high fidelity simulation was an effective pedagogical tool to teach clinical skills, it was with the warning that simulation-based learning cannot fully replace the traditional clinical experiences students encounter in the nursing program. However, the data does suggest that simulation-based learning experience is an effective setting for students to refine clinical skills (Kirkman, 2013). Faculty can produce safe and competent graduates for the healthcare setting through the use of this tool (Kirkman, 2013).

Limitations included the time interval between intervention and evaluation. The effect may have been recall based and not indicative of a higher level of synthesis. Further, Kirkman points out that the design only called for a single clinical scenario and this may change the results when replicated in future studies (2013). Thirdly, there is no mention of the debriefing methodology. This would be significant in that this is one area where learning is known to occur (Fanning & Gaba, 2007). Although there was mention of additional student-simulator interactions as students had additional time to listen to

manikin generated lung sounds (Kirkman, 2013).

Repetition in Simulation

The simulation center where this project was implemented uses a scenario, debrief, repeat scenario, and debrief model. In a literature search for other similar models, there is evidence that such model is an effective learning tool when measuring self-efficacy. In an overseas hospital using nurses, one study looked at utilizing a similar model as the one used in this project's facility (Abe, Kawahara, Yamashina, & Tsuboi, 2013). In this hospital-based research, the participants were nurses with 5 to 19 years of experience and represented a number of care areas including pediatrics and critical care (Abe et al., 2013). All participants received lecture content and training on simulation with debriefing during and after the simulation.

Rubric-based scoring was used by the nurses to self-evaluate performance and in each scenario scores showed improvement after the second debriefing (Abe et al., 2013). Surveys were also completed that showed that all participants felt that job satisfaction increased significantly ($p=.01$) as did their confidence in being a team member ($p=.004$) and their overall assessment of teamwork (Abe et al., 2013).

The limitations of Abe et al.(2013) related to this project are the nature of the debriefings as reported tended to be less faculty-led and more participant-led, as is indicative of a higher level of learner. Participants in this study were licensed professionals with a number of years of experience.

Debriefing and the effect on student learning

Fanning and Gaba (2007) made an early attempt at reviewing debriefing methods used in the field of nursing education. They reviewed both peer-reviewed material and

non-peer reviewed material from presentations and meetings of simulation professionals (Fanning & Gaba, 2007). The setting for all of the debriefing methods reviewed involved adult learners. Fanning and Gaba noted that adult professionals bring with them "… [a] complete set of previous life experiences…", they further define that adults come with "… knowledge, assumptions, feelings…" that make up frames (Fanning & Gaba, 2007, p.115). This would be comparable to King's transaction phase, and it is in this debriefing that transformation will occur. Fanning and Gaba (2007) further note that learning in the adult learner is based on a series of factors such as whether training is voluntary or involuntary.

There are a number of models used to debrief learners. All models allow several phases to occur. First, the students have a period to describe their attitude toward the experience (Fanning & Gaba, 2007). Without facilitation, students tend to stay in this phase. As the facilitator moves the conversation forward, the students then enter the analogy/analysis phase. It is during this phase that the students can look at their performance more globally, and not focus on self or creating a hot seat in the debriefing session (Fanning and Gaba, 2007). In the third and final phase, application of learning objectives is obtained. In this phase, learners apply didactic learning to the situation, and in relation to the learning objectives of the simulation-based clinical experience.

Facilitators do not lecture in the debriefing, but rather direct the conversation to discussion of what went well, and what went wrong during the clinical scenario, a reflective process (Fanning and Gaba, 2007). Both individual and team behaviors are evaluated during the debriefing. The significance of debriefing is also noted by Fanning and Gaba (2007).

Fanning and Gaba are not alone in this assertion, the INACSL standards for simulation also call for a planned debriefing of each clinical scenario (Decker et al., 2013). The standards further direct that the debriefer have experience in debriefing; including formal training, peer evaluation from an experienced debriefer, and ongoing monitoring of debriefing using validated tools (Decker et al., 2013). Further, the person debriefing the clinical scenario should be the same person that observed the simulation-based clinical experience (Decker et al., 2013).

Decker et al. (2013) further stipulated that debriefing should follow the objectives of the clinical scenario, identify the gaps between the participant's actions and the established expectations. The role of the facilitator does not end with simply bringing the participants to critically appraise their actions and identification of missteps. The facilitator also has the responsibility of making recommendations regarding the gaps in performance compared to the expected learning objectives (Decker et al., 2013).

Role confusion within the simulation learning experience

While role confusion was not the scope of study of a report of a rotational simulation-based learning experience that involved nursing students, others have noted, at least anecdotally, that students experienced some degree of confusion when faculty members played multiple roles within a clinical scenario (Childs & Sepples, 2006). Cited possibilities for student confusion were related to a difference in the gender of the high fidelity patient simulator (HFPS) in the clinical scenario as compared to the gender of the faculty member voicing the patient as student's questions are answered (Childs & Sepples, 2006). Further, students noted that the voices of the HFPS also belonged to the faculty members with whom they were familiar.

A very limited amount of data exists regarding role confusion and the potential impact on timely delivery of care to the HFPS and the resultant effect on patient outcomes. In a descriptive study of an associate degree nursing program, researchers began to try to quantify the problem of role confusion and the effects this had on patient outcomes (Carmack, Evans, Fruechting, Carmack, & Corwyn, 2013).

The convenience sample contained nursing students enrolled in the first and second year of a two-year program, who had participated in a clinical scenario associated with each didactic content area. Because students attended up to two different didactic courses during a given semester (e.g. Adult II and Mental Health or Pediatrics and Women's Health & Obstetrics), students were invited to complete the survey several times during each semester. The sample (n=164), was 73% female, and ages varied but were aggregated to specific age groups; 18 to 29 years of age (n=85), 30 to 39 years of age (n=50), and those over 40 years of age (n=17). First year students made up 68% of the sample (n=111) with second year students comprising the remainder of the sample (n=41).

In aggregate, 58% of the students agreed that different methods of role presentation (i.e. video capture or recordings) would clarify the role being portrayed. More than 25% of the sample also agreed that role confusion caused delays in the clinical scenario related to patient care.

Evaluation of this study revealed a relatively small sample, utilizing a tool that had not undergone validity and reliability testing. Typically, the halo effect is used to describe the over-estimation of a student's performance based on prior experiences with the student (Lie, Encinas, Stephens, & Prislin, 2010). The authors have concerns that the

student's responses may exhibit a similar halo effect. This may have led to favorable sample responses that are not as critical of the staff as they could be (Carmack et al., 2013). However, given the overwhelming student perceptions in this small study that methods to augment reality and eliminate the instructor as a factor in role confusion would improve learning, this work supports additional study in this area of nursing.

The Use of Screen Capture, Virtual Patients, and Video Capture in Other Disciplines

In an effort to assess students' attitudes and perceptions of screen capturing as an effective tool for distribution of didactic continuing medical education materials, Razik, Mammo, Gill, and Lam (2011) used screen-casting technology to create an online media presentation. Their screencasting was a capture of a lecturer's voice and traditional presentation software's video output. The intent was to mirror what was presented during a Grand Rounds presentation. The file was created using Camtasia®, a screen capturing application similar to Captivate® (1 for All Software, Zug, Switzerland).

A video link was sent to 236 ophthalmologists and 20 ophthalmology residents in Canada that practiced in the rural and urban setting in 2009. The participants had access to the video for eight weeks, and could view it at their leisure (Razik et al., 2011). The presentation covered a topic in neuro-ophthalmology and was 42 minutes in length (Razik et al., 2011).

The survey had a 31% participation rate (n=80). Of those 80 responses, 60 were practicing physicians with the remaining responses being contributed by the residents (n=20) (Razik et al., 2011). The majority of the responses came from those practitioners in the urban area, with a limited number from the rural areas (Razik et al., 2011). A

number of participants watched less than 50% of the presentation and responded that the reason this occurred was a lack of time (8% of the urban ophthalmologists, and 35% of the residents), also citing internet speed as a factor (Razik et al., 2011).

Over 152 of the 256 invited guests logged into the site and an overall score of 9.2 on a 10 point scale was reported regarding utilization, convenience, quality and usefulness (Razik et al., 2011). Further, most of the free text comments collected from the survey, suggested that the practitioners felt it was an alternative to live continuing education offerings that they would be interested in (Razik et al., 2011).

Barriers cited included the internet speed as previously stated. However, others felt that there was a lack of interactivity (27.1% of ophthalmologists and 25% of residents) (Razik et al., 2011). Additional barriers cited included the inability of the participants to retain an interest and stay engaged in the activity, indicating a possible lack of interest in the topics presented (Razik et al., 2011).

Limitations of the study included a lack of interactivity. The authors in this project used the screen capture technology in a way that any asynchronous technology could have been used. They did not include interactive quizzes or other learning tools as part of the learning experience, and could have accomplished much the same results with a video recording of the presentation and further by supplying the participants' handouts of the slides used. Secondly, the content conveyed was continuing education material. It was not disclosed if the material presented was new, remediation content or a change in practice, so application to understanding is limited.

Medical students' perception of interaction with virtual patients was explored in a qualitative study. This knowledge is necessary not only for future design decisions but

also in the evaluation of an institution's current learning resource holdings (Botezatu, Hult, & Fors, 2010). Programs such as the one evaluated in this study by Botezatu et al., are becoming more commonplace in all education, including healthcare (2010). Botezatu et al. (2010) argues that a successful integration into curriculum is based not only on the expectations of faculty, but also on those of students.

Internal medicine students in Spain, who had interacted with a virtual patient simulator, were placed into two focus groups of eight undergraduates each. The interviews, conducted in Spanish, were later coded and translated into English (Botezatu et al., 2010). This coding allowed for identification of themes by the researchers. During the interview process, students were interviewed with facilitators, but students often brought up concerns that were not originally identified by the researchers.

There were 18 themes identified as a result of this coding of the facilitated interviews. Certain of these themes are applicable to this project. Students felt that virtual patients allowed the student to reinforce clinical reasoning skills (Botezatu et al., 2010). Students also felt that the design of the virtual patient simulator lead to increased stepwise problem solving, this would make sense given that this project design followed a stepwise design, allowing students to potentially see the solution coming.

Students also cited transferability for the simulation-learning environment to the bedside as an advantage (Botezatu et al., 2010). In the case of the program evaluated in this study, the cases were developed based on real patient cases, and included pictures, labs, exams, and tests for and with the actual patient (Botezatu et al., 2010). Students also felt safe making a mistake in the simulation-based learning environment. When a student made a mistake in the simulation, they reported feeling less stress, and felt confident they

would be less likely to repeat the error in the clinical setting in the future (Botezatu et al., 2010).

Botezatu et al. (2010) offers many conclusions regarding the virtual patient simulations perception of usefulness. Clearly, the simulator offers the ability to practice communication skills, reinforcement of clinical thinking, and a safe place to learn.

The virtual patients that this study evaluated were of the highest fidelity. They were constructed from patients that entered a Spanish hospital, in a culture that has a different set of privacy regulations than those in place in the United States. Charts, exams, lab work, and tests were all from actual patients captured for the training of physicians. This is simply not easily created in the United States. The study also lacked correlation to students' overall classroom or clinical performance.

Drumheller and Lawler (2011) pointed out the usefulness of screen capture beyond simply capturing slide presentations with instructor voice-over of didactic content. Screen capture programs such as Captivate® and Camtasia® offer the ability to teach complex skills such as how to operate new software, using screen captures of the instructor's computer desktop (Drumheller & Lawler, 2011). Further it is the opinion of Drumheller and Lawler (2011) that such programs can be used to replace some of the face-to-face interactions.

A library in the Chicago area gives an anecdotal account of how they used screen captures to educate medical students on the use of complex library searches involving resources like PubMed and other databases. The librarians used screen capture to teach medical students asynchronously using the Camtasia® application (Kerns, 2008).

Kerns felt that by adding the screen capture technology to the existing library

guides that all learners, regardless of learning style, would find the screen captures useful in learning how to establish search terms and further, how they could limit and select data that would meet their specific requirements (Kerns, 2008). Participants that interacted with the screen capture saw the content on screen, heard the instructor, and could see written notes as they appeared in the screen capture.

Kerns offered no formal evaluation in the description of a unique way to educate students using available technology. However, the article does point out that such approaches are inexpensive, flexible and easy to learn and integrate (Kerns, 2008).

Gaps in Literature

Simulation-based learning has been shown to be an effective pedagogy to deliver a variety of learning objectives to healthcare students. While there are many methods to teach collaboration and teamwork, simulation has been tested to be an effective method for adult learners. Lessons learned in the simulation setting are transferable to the bedside and can improve patient outcomes, while reducing errors and harm (Kennedy et al., 2014). If errors occur in the simulation environment, there is no actual harm to a patient and it is considered a less stressful and safe learning experience (Robinson-Smith, Bradley, & Meakim, 2009; Knudson, 2013). Current methods of creating a collaborative environment by having facilitators play multiple roles can cause confusion and may lead to delays in patient care within the simulation-based learning experience. There is also evidence that the debriefing phase of the simulation-based learning experience can change the student's perception and lead to change the student's behavior when delivering care.

This project expects to fill the gap of what is not known. A determination of

whether a positive attitude toward the nurse-physician collaboration can be influenced by participant's interaction with physicians using video captures in the clinical scenario. Nursing programs without direct access to other health professional programs must entertain methods for increasing interprofessional teamwork and collaboration without face-to-face interactions.

Theoretical Framework

In this capstone project, King's Conceptual Theory of Goal Attainment was used to support curriculum changes within the simulation setting. Presently there are many stand-alone nursing programs, those without direct ties to a medical school or other healthcare training programs, that desire to create a simulated learning environment that includes interprofessional collaboration. One clear driver in this process is the recent transition of nursing programs to the Quality and Safety Education for Nurses framework funded through the Robert Wood Johnson Foundation. One of the main components in this framework is the competency of collaboration mentioned in the QSEN framework (Quality & Safety Education for Nurses [QSEN], 2009).

King's Theory of Goal Attainment has three concepts: personal systems, interpersonal systems, and social systems. This project tested the concepts of interpersonal systems. King's theory, in part, states that when transaction occurs, the participants will attain their goals. There are other components: interaction, communication, transaction, roles, and stress are all concepts that build toward changes to the interpersonal system and thus goal attainment (Parker, 2006).

The first system is the personal system, which looks primarily at what would be considered the patient or person (Butts & Rick, 2011). King describes that a person can

be well or sick, and that each person has perceptions of self that form person. This perception of person includes many factors like growth, development, self-image, and others (Butts & Rick, 2011). Further, the reader is told that the person is an open system, with perceptions subject to change and evolve based on many factors including time, life experiences, and feelings (Chinn & Kramer, 2008).

The interpersonal system is the area where goal attainment is present. One can see goal attainment occur based on six concepts. The six concepts: communication, interaction, roles, stress, coping, and transaction must be present for goal attainment occur (Butts & Rick, 2011). Within this system King offers the premise that when a goal is attained, the learner experiences satisfaction and continued growth; however, this only occurs when there is an understanding of why the new skills must be mastered (Butts & Rick, 2011). Furthermore, King hypothesizes that goal attainment will decrease the natural stress and anxiety experienced by the nurse in the normal course of providing care due to the lack of role conflict on the part of the nurse (Butts & Rick, 2011).

In King's interpersonal systems concept, communication and roles are key (Sieloff, Frey, & King, 2007). One may ask where problem solving or the act of thinking like a nurse will come into play. In this theory, problem solving is embedded in the transaction. Through the act critical thinking and negotiating, the student learns and thus is able to experience goal attainment (Sieloffet al., 2007).

The social system is where the organization is defined, where these interactions occur. This system is defined by several boundaries and can include not only organizations but also professions (Butts & Rick, 2011). The social system encompasses "…authority, decision making, organization, power and status" (Butts & Rick, 2011,

p.425). In the simulation setting, this will include the facilitator, nurse educator, the video capture of the physician, and the hierarchy perceived by the student.

Application

The student's personal system is already defined, but is not fixed. Students can be described as persons with a common core background of education, who are enrolled in a complex care adult nursing course. This does not imply a completely homogenous population, as all students have varying experiences and unique talents that make each different.

Likewise, the social system is defined by "…social roles, behaviors and practices developed to maintain values and the mechanisms to regulate the practices and rules" (Butts & Rick, 2011, p.425). The clinical scenario takes place in a defined area known as the simulation hospital. In this area, the roles are defined, as is the power and authority. Decisions regarding what content is presented, student learning outcomes and which students will be in the clinical simulation are also clearly defined and not able to be influenced by the student. There are also pre-defined evaluations that are known to the student in this setting.

King's interpersonal system concepts were applied in this video capture project. The students were given a clinical scenario with a patient who needed assessment, interventions and evaluation of the care they provided. This patient was portrayed by a high fidelity human patient simulator (HFPS) marketed under the name SimMan® Classic (Laerdal Medical Corporation, 2007). The change was in the way students interacted with other professionals while in the clinical scenario. Previously, students interacted with a single facilitator while in the clinical scenario. In this project, students

interacted with a 19" touchscreen that delivered video captures based on the student's and/or facilitator's input.

Communication was directed to an unknown member of the teaching team, by way of video capture. While the students previously knew each facilitator, the video-captured physician was a new and unknown person to the students. As a result, students had to hone their communication skills to relay their concerns to the physician while using standardized communications tools. This interaction allowed the embedded participant to be open to suggestions and feedback regarding the plan of care for the HFPS and allowed the student to realize the value and role he or she was fulfilling as a member of the healthcare team.

Communication also occurred between the HFPS and the student. The HFPS was capable of voicing approximately 25 pre-recorded voice clips, including simple yes and no responses, vomiting, basic needs, and feelings. In addition to this verbal communication, the HFPS was capable of communicating blood pressure, respiratory rate, heart rate, lung sounds, pulses, and bowel sounds when proper assessment techniques are used. However, the student must have interacted with the HFPS to obtain some of the physiological data, while other data were viewable on the patient monitor.

The student was also able to see the role of the physician in a new light. In the past curriculum, the facilitator was present; however, with the introduction of video capture, delays in reaching the physician could be programmed into the clinical scenario. This would more closely resemble real life, thus increasing the overall fidelity of the clinical scenario.

With the facilitator no longer in the role of physician, and physician in the video capture being an unknown person to the students, certain stresses were introduced into the clinical scenario. This factor increased the overall fidelity of the experience. With this stress, the students had to determine how to cope. Pre-recorded video captures had a pre-planned pathway that involved questions that the physician asked of the clinical scenario participants. The video captures were based on expected assessment findings identified by the participants. This required interaction with the video captures of the physician, aided in drawing the participants out of their comfort zone and required student input to affect the plan of care for the HFPS, thus increasing collaboration.

Stress was not only the result of an event, but was also created by the environment. Stress also occurred as a result of growth and development and the interaction with others in a setting (Alligood, 2013). It was also important to note that this state of stress was dynamic, so that physical assessment data could have added or subtracted from the stress as the HFPS improved or deteriorated.

With all the concepts interacting in a positive manner, goal attainment may be evident in the transaction and a change in attitudes was noted. This was demonstrated by a positive increase in the participant's attitude regarding collaboration in the healthcare team determined by use of a valid and reliable tool. This transaction is observable in the interaction with not only the HFPS, but also with fellow team members and the environment or context where the clinical scenario occurred.

The interaction of the concepts related to interpersonal systems (Figure 1), shows the nature of the relationships between each concept. Of note, the interaction between each is two way and fluid. All concepts lead to transaction and with this step, goal

attainment can be observed and evaluated.

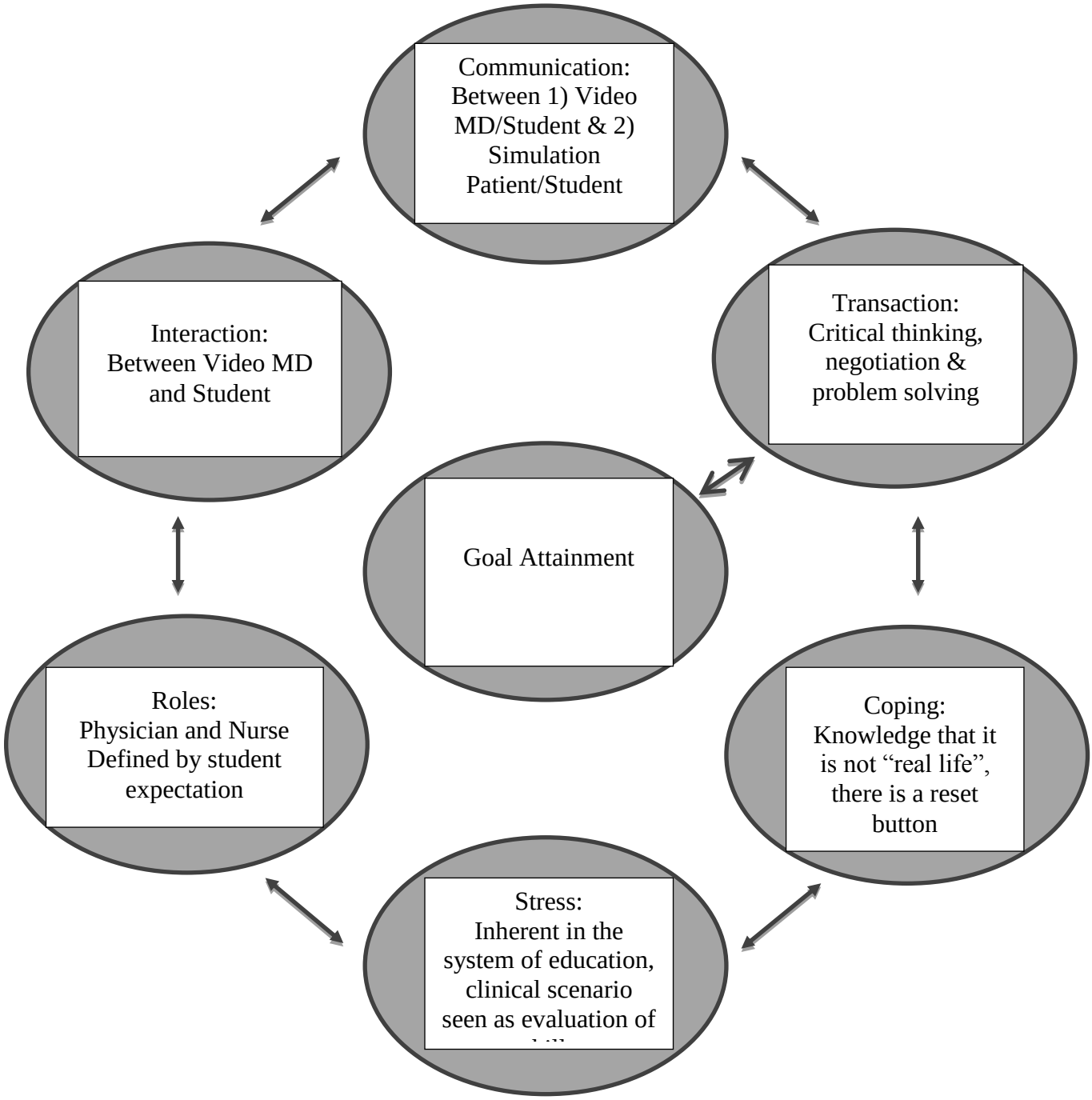

Figure 1. Diagram showing the six concepts as they relate to goal attainment. Linkages between each concept are two-way, and with transaction, goal attainment is achieved.

Summary

The current evidence indicates that simulation is an effective andragogy for goal attainment. While that simulation-based learning experience may take several different formats, from a single experience to a repeated experience, changes in behaviors can still be observed. However, attention to the design of the pre- and post- debriefing experience should not be neglected as part of the overall experience. It is important to understand that each participant in the clinical simulation contributes to the collaborative simulation-based learning experience (Taylor-Powell, Rossing, & Geran, 1998). There are also valid arguments for repetition of the simulation-based learning experience. Current methods of simulation that include a facilitator playing multiple roles during the simulation-based learning experience can cause confusion in the learning experience of the participants.

CHAPTER III

Project Description

Collaboration and teamwork are two of the major driving components in many areas of nursing; ranging from pre-licensure education to medication error reduction and beyond. How healthcare team members communicate with each other in today's healthcare settings is under intense scrutiny. The project plan, *Simulation Collaboration: Will screen capture change attitudes?* (SC), introduced a video capture platform that allowed students to interact with an embedded participant who was a physician.

Creating a collaborative environment in the simulation-learning environment is difficult for stand-alone nursing programs that do not have access to schools of medicine or related health disciplines. Facilitators and nurse educators can train embedded participants to play the role of physician to attempt to create a collaborative setting, but using lay people in these embedded roles neglects the other realities such as a complex understanding of roles, behaviors, language, and the culture of that profession. Collaboration includes communication and other domains that are necessary for safe patient care (Nagpal et al., 2012). By utilizing a video capture of an actual physician, the project sought to enhance the fidelity of the simulation-based learning experience that used high fidelity patient simulators.

Project Implementation

The clinical scenario took place in the complex care setting of the simulation environment, as part of a last semester simulated-based learning experience. The complex care setting was a four-bed critical care unit. One bed in the unit was a high fidelity bed with two cameras, a microphone and a speaker to allow bi-directional

conversation with the facilitator. The audio-visual system also contained the needed components to record and archive video and audio from both cameras; the microphone and a third data stream that records continuous physiologic data that the participants also see at bedside. This physiological data was produced by the simulation manikin software and displayed on the bedside touchscreen monitor. This monitor relayed patient data from the HFPS to the participants in a visual format and included: pulse oximetry, EKG/ECG, arterial pressure, respiratory rate, and other data. These data were generated by the SimMan software (Laerdal, 2007).

There were many components required for success of this project. The department installed a 19" touchscreen and laptop computer with remote access, which allowed participants to answer the questions asked by the embedded participant via the video capture. These three components: interface (touchscreen), network cabling, and laptop, interacted with each other allowing for delivery of the video capture in sequence with the both facilitator and participant selected menu options. This project also called for a software platform. Adobe® Captivate® was used as the authoring and rendering software to create a web application (Adobe Systems Incorporated, San Jose, California).

In a broader sense, this project's goal was to increase the student's positive perceptions of teamwork and collaboration. After completion of this project, the student's attitudes were more positive, and the department can work to increase the number of simulations that integrate video capture to represent not only medical staff, but also any member of the healthcare team.

Setting

The project *Simulation Collaboration: Will screen capture change attitudes?* (SC) took place in an associate of applied science nursing program at a metropolitan university. The simulation environment was part of a larger building dedicated to the education of nurses. The entire lower level of the structure was a simulation hospital. This 22-bed concierge model facility served the learning needs of the department of nursing and included complex care, general medical/surgical, mental health, obstetric, and pediatric units. The project took place in the four-bed complex care unit.

The complex care unit was designed as an open patient care area divided by drapes. The participants interacted with a Laerdal® HFPS sold and marketed under the name SimMan® Classic. The clinical scenario used was an NLN standard case for patient with a bowel obstruction that had been modified and validated (Laerdal, 2007).

Sample

A quasi-experimental comparison project using a pre- and post-test implementation, without a control arm, was conducted using a convenience sample of participants enrolled in a two-year pre-licensure nursing program. Final semester complex care nursing students took pre- and post-test surveys using a valid and reliable tool. Additionally, data were collected and analyzed from a single open-ended item that asked for additional comments.

Demographic data on students was limited to age and their self-declared gender due to the small sample size. These data were further aggregated to assure anonymity. The project included the first approximately 40 students (n=40) who were scheduled randomly to take part in a simulation-based learning experience that all students in the

final semester completed. This population was a traditional cohort that will graduate within four months of this project's data collection period. The students' responses were analyzed using IBM® SPSS® in aggregate (Armonk, New York).

Project Design

This capstone project, SC, was approved through the Institutional Review Boards (IRBs) of the universities. The survey was conducted online and students were not identifiable. Students created a unique identification number by using data that are not collected by the Department of Nursing. If a reasonable match could be made between the pre- and post-test survey via the student generated ID number, the data were analyzed. Participants consented to participate in the survey after reading an approved informed consent approved by both IRBs.

Instruments

This project used a valid and reliable tool developed to measure nurse and physician perceptions of collaboration pre and post project. The Jefferson Scale of Attitudes Toward Physician-Nurse Collaboration© (JSATPNC©) developed by Hojat et al. (1999) was used to measure nurse attitude toward collaboration on a standardized scale (Appendix A). Permission to use the JSATPNC© was obtained (Appendix B), as well as permission to modify (Appendix C) the scale was obtained from Dr. Hojat. The Likert-type scale tool has 15 items rated from "strongly agree" to "strongly disagree". This scale results in a score between 15-60, with higher scores indicative of a more positive attitude toward collaboration. The Cronbach's alpha was determined to be good (>.8); as was construct validity and reliability of the tool (Hojat et al., 1999).

Data Collection

Data collection occurred in two phases. The pre-test survey was sent the night prior to the clinical scenario. Students read and consented (Appendix D) to inclusion in the project. If the student consented, he or she completed the JSATPNC©. The JSATPNC© takes approximately five minutes to complete.

Students were randomized to attend the simulation-based learning experience. Students participated in the clinical scenario in groups of four. The clinical scenario ran for approximately 30 minutes, followed by a 60 minute facilitator-led debriefing. The day of the clinical scenario, students followed this simulation center's standard template for a simulation-based learning experience. The participants sat in on a pre-briefing, which covered rules of the simulation center, safety, and a brief introduction related to the topic of the upcoming clinical scenario.

Once the clinical scenario was completed, the participants moved from the simulation unit into an adjoining debriefing room. The facilitator debriefed the students using the Promoting Excellence and Reflective Learning in Simulation (PEARLS) model. The project used a valid and reliable tool developed to measure nurse and physician perceptions of collaboration pre and post project. The Jefferson Scale of Attitudes Toward Physician-Nurse Collaboration© (JSATPNC©) developed by Hojat et al. (1999) was used to measure nurse attitude toward collaboration on a standardized scale. Permission to use the JSATPNC© was obtained, as well as permission to modify the scale was obtained from Dr. Hojat. The Likert-type scale tool has 15 items rated from "strongly agree" to "strongly disagree". This scale results in a score between 15-60, with higher scores indicative of a more positive attitude toward collaboration. The Cronbach's

alpha was determined to be good (>.8); as was construct validity and reliability of the tool (Hojat et al., 1999).

The facilitator used the video recording of the simulation from two points of view and the physiologic monitor at the time of debriefing to assist with the debriefing. Once the debriefing concluded, students repeated the simulation and debriefing a second time, following the same protocol. Once the second debriefing was concluded, students were sent to the learning resource center and complete the JSATPNC© as the post-test measure.

Data Analysis

The student's responses were analyzed using IBM® SPSS® in aggregate. Each consenting participant was assessed pre and post-clinical scenario. A difference score was calculated for each participant. Means, standard deviations, and descriptive statistics were calculated. A paired t-test was employed to test for a non-zero difference in the difference score. Data were tested at the 5% level of significance. Using Hojat et al., (1999) sample statistics the project had at least 80% power to detect an approximate 0.6 unit difference in the change of the score mean.

Timeline

The timeframe for completion of this project was approximately six months see Table 1.

Table 1

Timeline

Month	Task
November 18, 2013	Submit project proposal to chairperson
November 23, 2013	Submit project proposal to chairperson and committee
November 29, 2103	Recruit physician and finalize video algorithms
December 6, 2013	Submit project proposal to UALR IRB
December 16, 2013	Videotaping for algorithms
January 2, 2014	Submit project proposal to Gardner-Webb IRB for review
January 21, 2014	Data collection continues through March 3, 2014 (~40 participants)
March 4, 2014	Begin data analysis.
March 31, 2014	Finalize project report for defense.

Budget

The majority of the expenses in this project were related to infrastructure. The only hardware requirement that was unique to this project is the touchscreen. This could be bypassed, given that the output file created by the Captivate® product could be run on any PC or laptop with a mouse. Adobe® Captivate® was the selected authoring software for this project. The cost of this software package was approximately $165 through a state contract price. One could reproduce this project setting with existing hardware quickly and affordably (Kerns, 2008).

The physician was paid a small stipend for rights to the video content, upon

completion of a release agreement. Similarly, other non-physician embedded participant s appearing in the video captures as extras were also paid a stipend in exchange for release agreements. Video production staff were retained and compensated for audiovisual recoding assistance and related post-production editing at a flat rate of $100.

Limitations

There were environmental limitations of this project that were inherently part of the facility that cannot be changed. The mounting of the video touchscreens placed the monitors in a superior position, about five feet eight inches from the floor. However, the facility overall had a very high level of environmental fidelity, from built-in medical gas to hospital grade drug delivery systems in place and much effort and expense were evident in the structure that housed the simulation hospital that hosted the project.

Sample limitations also existed, given that all students have similar backgrounds educationally, they had a certain level of homogeneity. However, as a metropolitan university, there were also second career and non-traditional students as well as first time freshmen enrolled in the program.

Summary

This project took place during the final semester of an associate of applied science of nursing program, using pre-licensure nursing students. The simulation-based learning experience was not an additional requirement, but rather an integrated part of the nursing curriculum.

Participants completed The Jefferson Scale of Attitudes Toward Physician-Nurse Collaboration© (JSATPNC©) prior to the simulation-based learning experience. The participants then received a pre-briefing, which included an introduction to the simulation

center, safety orientations, and didactic content.

Participants in the simulation-based learning experience interacted with the video captures of the physician and then completed debriefing. Participants then repeated the simulation-based learning experience, again interacting with the video captures of the physician and completed a second debriefing.

Once the second debriefing was completed, participants completed the post-simulation survey.

CHAPTER IV

Results

Collaboration in the training of healthcare providers is imperative, and while any failure in the collaborative relationship can be costly, communication errors have shown to be among the most costly (IOM, 2000; IOM, 2001, Van Den Bos et al., 2011; Shreve et al., 2010; TJC, 2010). However, many ADN nursing programs are not a part of a larger medical system and therefore may be considered stand-alone. Without access to medical staff to include in interprofessional simulation-based learning experiences, this can an expensive if not impossible goal to achieve.

This project used video captures, short-recorded video clips, arranged and delivered in a logical and sequential order, based on participant input via a touchscreen interface. This occurred as participants were providing care to a high fidelity patient simulator (HFPS). The purpose of this project was to determine the feasibility of using video captures as a means of fostering positive attitudes toward collaboration in a stand-alone ADN program.

This project titled *Simulation Collaboration: Will screen capture change attitudes?* (SC), evaluated participants attitudes toward the collaborative relationship by using a pre- and post- test. This was done using The Jefferson Scale of Attitudes Toward Physician-Nurse Collaboration© (JSATPNC©) developed by Hojat et al. (1999). The JSATPNC© was demonstrated to be a valid and reliable tool (Hojat et al., 1999; Bondavalli et at., 2012; McCaffrey et al., 2012; Onishi et al., 2013; Dougherty & Larson, 2005).

Sample Characteristics

The SC project was a quasi-experimental comparison project using a pre- and post-test implementation, without a control arm and included second year pre-licensure nursing students in their final semester of an ADN program. Of the 60 survey sets collected, the final complete, matched sets that were analyzed totaled 46 (n=46). Several participants were eliminated as non-matched including three that left more than five questions blank, as this violated the rules of the JSATPNC© tool.

There were also 11 sets that could not be validated as a matched set due to the student-created random identification code errors. Some of these included near match codes, and these were reviewed by an independent outside party. Near match codes where the gender and dates collected were correct, but the age was off by more than one year, were also excluded. There were no withdrawals to report.

Of the total matched sets of pre- and post-test survey data sets (n=46), females (n=35) outnumbered males (n=11). The overall sample ranged in age from 20 to 45 years of age (M = 29.52, SD = 7.086).

Major Findings

Students completed the JSATPNC© pre- and post- simulation-based learning experience. The hypothesis states that there would be a significant difference between pre-test and post-test scores and the preferred test of the null hypothesis is the related sample *t*-test. Although the related sample *t*-test is considered robust when the assumption is not met, the test assumes that the difference score is normally distributed. Table 2 shows means, standard deviations, skewness and kurtosis of study measures and a histogram of the difference scores (i.e. the difference between post-test and pre-test

scores) is displayed in Figure 2. Both Table 2 and Figure 2 indicate that the difference scores are not highly skewed or highly kurtotic. Because the difference scores are not highly skewed or highly kurtotic, and because the related sample *t*-test is robust in the face of the normality assumption (Howell, 2007), the related sample *t*-test was used in this study.

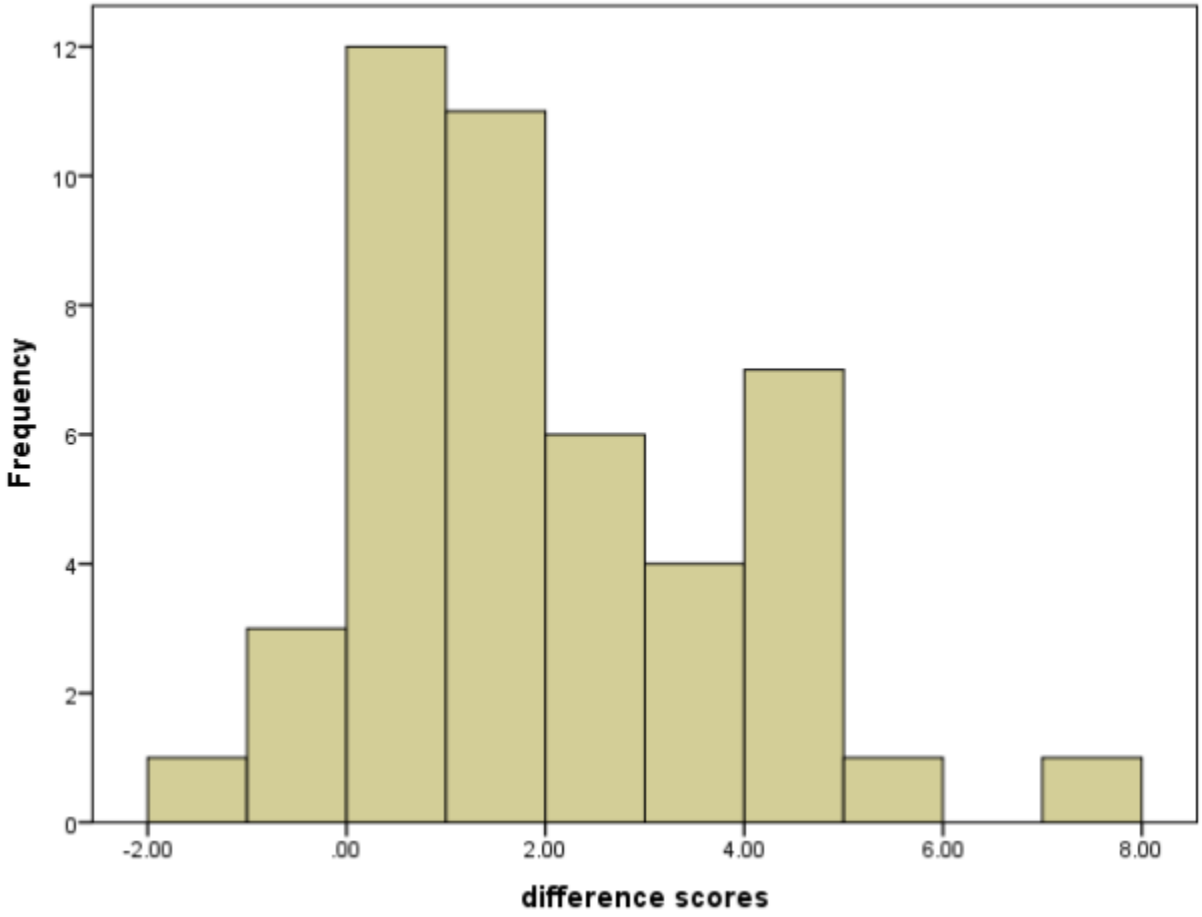

Figure 2. Histogram of Difference Scores

The null hypothesis for the related sample *t*-test was that there would be no difference between the pre-test scores and post-test scores (i.e. H_0: $\mu_1 - \mu_2 = 0$). The mean pre-test score was 52.65 (3.60) and the mean post-test score was 54.22 (3.385), resulting in a mean gain of 1.57 (1.85). Using a related samples *t*-test, the difference was

statistically significant at the specified .05 level of significance, $t(45) = 5.76$, $p < .001$, 95% CI [1.02, 2.12]. The formula for the confidence limits on the difference between two related means is;

$(Mean\ posttest - Mean\ pretest) \pm\ t\ critical\ value(standard\ error)$. Calculated in this way, one can say that the probability is .95 that the interval, from 1.02 to 2.12, encloses the true difference in the population. Considering that the standard deviation of the differences was 1.846, the interval is less than one standard deviation of the differences, which is not large. The relatively narrow confidence interval gives us some confidence in the difference that was found in this study. Alternatively, a wide confidence interval would have suggested that there is considerable uncertainty about how large a difference there is in the population.

The Cohen's *d*, effect size estimate was calculated using the formula, $d = \frac{t}{\sqrt{\mathrm{N}}}$, resulting in $d = \frac{5.76}{6.78}$ = .849. This means that the video capture physician resulted in a .849 pooled standard deviation increase in attitudes toward physician-nurse collaboration. Although this is the first study to investigate the influence video captures on attitudes toward physician-nurse collaboration, making it difficult to know what constitutes a large effect size in this area of research, Cohen operationally defined a large effect sizes as .80 or above (Cohen, 1992).

During the planning stage of the project, the sample size needed in order to obtain a power of .80 was calculated using the formula, $n = \frac{delta\ squared}{\text{Effect size squared}}$ (i.e. δ^2/d^2). The numerator is 2.80^2 because a δ of 2.80 is associated with a power of .80 at the .05 level of significance (Howell, 2007).

Table 2

Distributional Characteristics of Pretest, Posttest and Difference Scores

	M (SD)	Skewness (SE)	Kurtosis (SE)
Pretest	52.65	-.65 (.35)	-.013 (.69)
Posttest	54.22	-.99 (.35)	.79 (.69)
Difference	1.85	.66 (.35)	.33 (.69)

Note. SD = standard deviation; SE = standard error

Therefore, an effect size of .50 would require a sample size of 32 ($n = \frac{7.84}{.25} = 31.36$) in order to achieve a power of .80 at the .05 level of significance. Fortunately, complete data were available for 46 project participants and the effect size of the project was .849. Because the sample size and the effect size, the two factors that determine the power of a completed project, were higher than the a priori estimate, the power of the project was higher than .80. Using the formula, $\delta = d\sqrt{n}$, for the power of a related sample *t*-test, resulted in a delta of 5.76. The table of power as a function of δ and significance level indicates that this project had a power of 1.00 (the same level of power was obtained with PS® software (McCrum-Gardner, 2010)). This is a very high level of power, indicating that the probability is 1.00 that the study was able to detect a true difference that exists in the population.

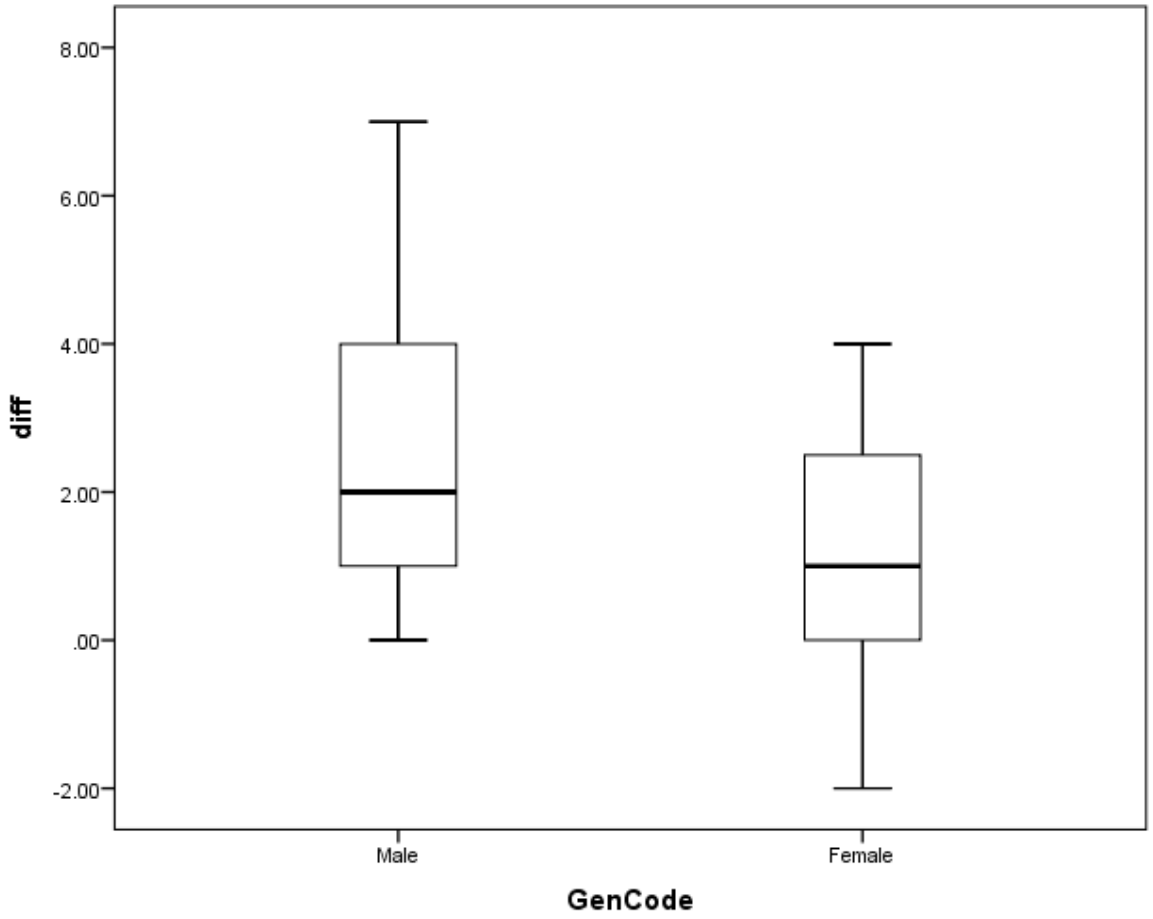

Figure 3. Difference in Attitude Scores by Self-Reported Gender.

During coding of the data for analysis, it was anecdotally noted that scores for males increased more than females. The difference between post-test scores and pre-test scores was computed and the mean difference score for males was compared with the mean difference score for females. It was confirmed that males did in fact have a greater average increase in attitude scores (M = 2.48, SD = 2.22) than females (M = 1.28, SD = 1.65), as displayed in Figure 3.

Summary

With a homogeneous sample population, having completed similar pre-requisite course work, this project demonstrated a positive change in attitudes related to physician-nurse collaboration. The data that were collected through the use of the JSATPNC© was normally distributed, not highly skewed or highly kurtotic. The attitude change was statistically significant ($p < .001$). Data indicated that significant power was present to indicate a high probability that the use of video captures within the simulation-based learning experience created a positive change in the attitudes of participants regarding physician-nurse collaboration.

CHAPTER V

Discussion

This chapter summarizes the findings of this project. There will also be a discussion of the linkages to King's Conceptual Theory of Goal Attainment as it was used to test this project. A review of the limitations will also be presented and concluding comments on the project will follow the nursing implications and recommendations.

This project, *Simulation Collaboration: Will screen capture change attitudes?* (SC), evaluated participants attitudes toward the collaborative relationship by using a pre- and post- test. The SC project was a quasi-experimental comparison project using a pre- and post- test implementation, without a control arm that looked at the attitudes of second year pre-licensure nursing students enrolled in their final semester of a nursing program.

A simulation-based learning experience was designed using video captures, short video clips, of a physician delivered to the participants based on data input and interaction with an algorithm to control the flow of patient care via a touchscreen. As the participants delivered care to a high fidelity patient simulator, they interacted with a physician to report assessment data, obtain orders or seek general advice.

Implication of Findings

The findings indicated that video capture was an acceptable andragogy for creating a collaborative experience in the simulation-based environment without access to live physicians. This allowed for recruitment of physicians for video captures to be recorded at times when it was convenient to the provider. This also allowed for the cost of the physician's time to be realized once for the recording and production time and then

spread out over a number of simulation days or possible even years, making the investment more affordable in the long term.

These findings were applicable to any stand-alone schools of nursing that lack access to physicians. The video capture could be a physician from any area of specialized practice, essentially allowing expert consultation to any simulation-based learning experience.

The findings of this project were consistent with what was noted in the literature with live physicians, and confirmed that simulation-learning environments can be used to impart collaboration skills with any number of teaching methodologies (Hobgood et al., 2010). At the same time, this technology allows greater translation of best practices to the educational setting of any program willing to invest in the audiovisual equipment, software and infrastructure to complete the experience.

Application to Theoretical Framework

The theoretical framework used for this project was King's Conceptual Theory of Goal Attainment. The goal of the project was to determine if the use of video captures of a physician that required participant interaction with said physician, would have a positive influence on student's attitudes toward the physician-nurse collaborative relationship. The students, or participants as they are defined while in the clinical scenario came to the simulation-based learning experience with their personal system defined based on life experience and education according to King's theory. Each participant, because of pre-requisite nursing courses, had a similar educational background and all are in the same course with an anticipated graduation date of May, 2014. However, each participant had a unique life experience that also influenced his or

her personal system. Likewise, each participant had experienced a different set of patients in the clinical setting, although the goals of the clinical setting, as evidenced by the student learning outcomes for each clinical rotation, are the same. This personal system is not fixed, and, as defined by King, would also be comparable to a frame as defined by Fanning and Gaba, always changing based on new experiences (2007).

The simulation-based learning experience took place in what King would see as a very rigidly defined social system, defined as the simulation hospital to the participants. The facilitator was well known to the participants and was an example of a person in a social role. The facilitator had the power and authority bestowed on any member of the faculty in a nursing program, and offers evaluation and grading of student performance as well as mentoring the behaviors of the professional nurse. A new stressor was introduced in the simulation-based learning experience: a previously unknown physician, via video captures, was displayed on a touchscreen interactive monitor. The physician's power was further solidified in that it was her name on all the orders given to the participants in the scenario pre-briefing. This left little room to question the authority of the physician's role.

The physician appeared to display the social cues expected of a physician: a neat, clean, pressed appearance, stethoscope, ID tag, and cell phone all in place. Additionally, when the physician gave orders, she did so with a direct tone and without giving any appearance of uncertainty. When the participants provided data that was not appropriate for the patient, the physician would challenge the participants directly on the data and question them a second time regarding their assessments. In one video capture she asks them "No, really, are the IV fluids in the patient? Is the bag empty? ", creating

communication challenges for the participants.

As the participants interacted with the touchscreen, they were able to communicate their concerns and needs to the physician and obtain additional orders for treatment, convey assessment data, and determine when contact with the physician was not appropriate. With the facilitator's ability to navigate the video captures based on algorithms, the participants would receive the same orders if the physician were given the same assessment data or provided the same recommendations via student input into the video capture interface. The advantage of using the video capturing software is simple, regardless of how data was entered into the system; the pathway a student will follow will be a reliable experience. Based on input, the algorithm will follow the same pathway each time, significantly reducing variability.

After the clinical scenario ended, the participants then took part in debriefing with the facilitator and the student learning objectives were addressed. The debriefing is probably the first place that student had a chance to have any real time for problem solving or critical thinking, what King would call the transaction phase. It is also in this debriefing period where the participants can decompress, and know that they were in a safe learning environment with little to no risk of harming a living patient, thus allowing for adequate coping.

Limitations

Utilizing video captures created limitations. Only anticipated requests were covered in the pre-recorded videos and the corresponding algorithms that created the pathways the participants followed. Given the challenges of scheduling the physician's time, video recording/production staff and the fact that simulations continued to occur

several times a day over several days per week, addressing and adding the new material to the video capture is not feasible in the middle of the simulation cycle. This limitation means that only clinical scenarios that are well known to facilitators are candidates for video capture collaboration.

In this project, one group of participants asked for an intervention from the physician that was not anticipated, and as a result there was not a video capture or algorithm to address the participant's concerns. Although the video physician was unable to respond and collaborate with the group, the facilitator improvised a response. This may have had an impact on the participant's attitude toward collaboration. In simulation-based learning experiences where live physicians are present, this might not be a limiting factor.

Additional limitations related to the video captures were noted. In the recording of the video clips, the physician initially tended to be very polite regardless of the reason for initiating contact on the part of the nurse, or in this case the pre-licensure student. The physician was prepared in some cases prior to the recording and told that the participant contact was not appropriate. This created a more realistic response. Anecdotally in debriefing, participants reported feeling that they had irritated the physician or that the physician was mad. While this may have been a realistic response on the part of the physician, it may have led to a change in the post-survey scores as well, and was not possible to quantify.

It is also possible that there could be a degree of carry over effect. The night before the simulation-based learning experience students received a link to the pre-test survey. The questions on the survey clearly address the physician-nurse relationship and

collaboration in practice. Once the simulation debriefing had ended, participants again completed the same survey, possibly conditioning students to look for collaboration learning outcomes within the simulation-based learning experience. Secondly, the simulations occured physically on the first floor, participants then transitioned to the second floor computer lab to complete the post-test survey. During this time, there could also have been a change in attitudes based on peer feedback in the form of unstructured debriefing of the clinical scenario.

Implications for Nursing Education

The findings of this project were consistent with the findings of others and indicated that teaching using many pedagogical methods will create a change in students' attitudes toward collaboration (Hobgood et al., 2010). Moreover, video captures using a pre-planned algorithm for student interaction will increase positive attitudes toward physician-nurse collaboration without the need for live physicians in the simulation-based learning experience. Agreeing with Kerns (2008) this project was found to be affordable, with Adobe® Captivate® software being relatively easy to learn.

Recommendations

An understanding of the effect of traditional nursing driven simulation-based learning experiences on the attitudes of collaboration would be beneficial in determining the cost-effective nature of this project. Although there are not effective measures of costs for running a simulation-based learning experience with only nursing facilitators, this could be completed to determine if the difference in effect size is large enough to warrant the investment in the audio-visual systems, production staff, and nursing faculty time that go into the video capture creation and maintenance. That being offered, the

video captures do reduce variability in facilitator responses to requests from participants, ensuring that each receives the same orders in the same situation, every time.

At the same time, nurse educators and simulation facilitators must consider methods to consistently deliver the roles of other providers in the simulation-based learning experience. If the current trend of increasing nursing program enrollments continues, the competition for clinical learning locations will become more intense (Bantz, Dancer, Hodson-Carlton, & Van Hove, 2007). With this transition from clinical-based learning to simulation-based learning, there will be a desire to create a graded simulation-based learning experience. With this will approach the same rigor as with any other pre-licensure nursing evaluation including: proper instructions, objectives and criteria for evaluation (Sando et al., 2013). Nevertheless, as the stakes rise, so will the requirements of the evaluation; facilitators will be forced to address factors standardizing formatting, pilot testing, and fidelity both environmental and construct (Sando et al.). Video captures can ensure that each participant at least receives the same cues, in the same format and at the same time in each clinical scenario, thereby addressing some of the evaluation concerns.

Educators must also work to understand the link between the attitudes and learning. The JSATPNC© is a valid and reliable tool for measuring the change in attitudes. The link between attitudes and learning are unclear, but borrowing theory from other modalities would suggest that there is a correlation. Work in psychology suggests that attitude changes correlate with learning; however this change is not immediately measurable (Petty, Wheeler, & Tormala, n.d.). This is related to the fact that while in the simulation-based learning experience, participants must process a large number of

stimuli, return multiple pieces of data to team members including the video physician and the facilitator during a 30-minute scenario. This experience was followed by an intense debriefing period where additional pieces of data were discovered, encoded, and decoded by the participant. There is simply not sufficient running neural capacity for the participant to make sense of the experience in that moment beyond the attitude change (Betsch, Plessner, Schwieren, & Gutig, 2001). This would indicate a need for longitudinal evaluation and follow-up to determine if learning goals were being met outside of the attitude changes.

Further study and data collection is also warranted to determine if the difference in the increase in the attitude scores experienced by males versus females is statistically significant. This could be a byproduct of the small numbers of males in sample.

Conclusion

This project demonstrated that video screen captures could be an effective tool to augment the simulation-based learning experience in order to effect a change in the participants attitudes related to collaboration within the nurse-physician relationship. Post-test surveys showed that participants had a statistically significant change in attitudes post-test regardless of gender. This project demonstrated that live physicians are not necessarily required in the simulation-learning environment for this change to be measurable and that for schools with limited resources, this could be one viable option for consideration. The project demonstrated that collaboration could be simulated with a minimal investment in technology. The benefits of owning video captures could include a lower long-term cost than a simulation center might incur by hiring physicians as embedded participants. However, if frequent updates are needed to the video captures,

the cost will increase.

Based on the current understanding of the correlation between attitude and learning, the change in attitude as measure by the JSATPNC© would indicate that learning had occurred. However, given that collaboration includes knowing how to communicate, whom to communicate with, and the ability to negotiate or problem solve through the use of critical thinking skills, participants achieved goal attainment as a part of this simulation-based learning experience.

References

Abe, Y., Kawahara, C., Yamashina, A., & Tsuboi, R. (2013). Repeated scenario simulation to improve competency in critical care: A new approach for nursing education. *American Journal of Critical Care*, *22*(1), 33-40. dx.doi.org/10.4037/A]ajcc2013229

Alligood, M. R. (2013). *Nursing Theory: Utilization & Application* (5th ed.). St. Louis, MO: Evolve.

Bantz, D., Dancer, M., Hodson-Carlton, K., & Van Hove, S. (2007). A daylong clinical laboratory: from gaming to high-fidelity simulators. *Nurse Educator*, *32*(6), 274-277.

Betsch, T., Plessner, H., Schwieren, C., & Gutig, R. (2001). I like it but I don't know why: A value-account approach to implicit attitude formation. *Personality and Social Psychology Bulletin*, *27*(2), 242-253. Retrieved from http://commonsenseatheism.com/wp-content/uploads/2011/05/Betsch-et-al-I-like-it-but-I-don%E2%80%99t-know-why-A-value-account-approach-to-implicit-attitude-formation.pdf

Bondavalli, P., Guberti, M., & Iemmi, M. (2012). Collaboration between nurses and auxiliary staff: cognitive study on behavior in a hospital environment] [Italian]. *Professioni Infermieristiche*, *65*(4), 224-233.

Botezatu, M., Hult, H., & Fors, U. G. (2010). Virtual patient simulation, what do students make of it?: A focus group study. *BMC Medical Education*, *10*(91), 1-8. doi:10.1186/1472-6920-10-91

Butts, J., & Rick, K. (2011). *Philosophies and theories for advanced nursing practice*. Sudbury, MA: Jones & Bartlett Learning.

Byrd, G., Garza, C., & Nieswiadomy, R. (1999). Predictors of successful completion of a baccalaureate nursing program. *Nurse Educator*, *24*(6), 33-37.

Carmack, J. K., Evans, J. D., Fruechting, S. K., Carmack, M. V., & Corwyn, R. F. (2013). *Simulation learning and role confusion*. Poster presentation at the meeting of the QSEN Institute, Atlanta GA.

Childs, J., & Sepples, S. (2006). Clinical teaching by simulation: lessons learned from a complex patient care scenario. *Nursing Education Perspectives*, *27*(3), 154-158.

Chinn, P., & Kramer, M. (2008). *Integrating theory and knowledge development in nursing* (7th ed.). St. Louis, MO: Evolve.

Cohen, J. (1992). A power primer. *Psychological Bulletin,* 112, 155-159.

Decker, S., Fey, M., Sideras, S., Caballero, S., Rockstraw, L., Boese, T., & Borum, J. C. (2013). Standards of best practice: Simulation standard VI: The debriefing process. *Clinical Simulation in Nursing*, *9*(6S), S27-S29. doi:10.1016/j.ecns.2013.04.008

Dillon, P. M., Noble, K. A., & Kaplan, L. (2009). Simulation as a means to foster collaborative interdisciplinary education. *Nursing Education Research*, *30*(2), 87-90.

Dougherty, M., & Larson, E. (2005). A review of instruments measuring nurse-physician collaboration. *Journal of Nursing Administration*, *35*(5), 244-253.

Drumheller, K., & Lawler, G. (2011). Capture their attention: Capturing lessons using screen capture software. *College Teaching, 59*(93). doi:10.1080/87567550903252793

Fanning, R. M., & Gaba, D. M. (2007). The role of debriefing in simulation-based learning. *Simulation in Healthcare, 2*(2), 115-125. Retrieved from http://www.med.wisc.edu/files/smph/docs/clinical_simulation_program/The_Role_of_Debriefing_in_Simulation_Based.71.pdf

Hayden, J., Jeffries, P., & Kardong-Edgren, S. (2012). The NCSBN National Simulation Study. *Clinical Simulation in Nursing, 8*(8), e407. doi:10.1016/j.ecns.2012.07.070

Hobgood, C., Sherwood, G., Frush, K., Hollar, D., Maynard, L., Foster, B., & Taekman, ... (2010). Teamwork training with nursing and medical students: does the method matter? Results of an interinstitutional, interdisciplinary collaboration. *Quality & Safety in Health Care, 19*(6), e25. doi:10.1136/qshc.2008.031732

Hojat, M., Fields, S., Veloski, J., Griffiths, M., Cohen, M., & Plumb, J. (1999). Psychometric properties of an attitude scale measuring physician-nurse collaboration. *Evaluation & the Health Professions, 22*(2), 208-220. Retrieved from http://libproxy.uams.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=1999060258&site=ehost-live&scope=site

Howell, D. (2007). *Statistical methods for psychology* (6th edition). Belmont, California: Thomas Wadsworth.

Institute of Medicine [IOM]. (2000). In L. T. Kohn, J. M. Corrigan, & M. S. Donaldson (Series Eds.), *To err is human: Building a safer health system*: *D.C: National*

Academy Press,. Washington, D.C.: Institute of Medicine. Retrieved from http://www.nap.edu/openbook.php?isbn=0309068371

Institute of Medicine [IOM]. (2001). *Crossing the quality chasm: A new health system for the 21st century*. Washington, DC: National Academy Press. Institute of Medicine.

Joint Commission, The [TJC]. (2010). *Joint Commission Center for Transforming Healthcare tackles miscommunication among caregivers*. Retrieved from http://www.centerfortransforminghealthcare.org/news/detail.aspx?ArticleId=293994

Kennedy, C., Cannon, E., Warner, D., & Cook, D. (2014). Advanced airway management simulation training in medical education: a systematic review and meta-analysis. *Critical Care Medicine*, *42*(1), 169-178. doi:10.1097/CCM.0b013e31829a721f

Kerns, S. C. (2008). Technological tools for library user education. *Medical Reference Services Quarterly*, *26*(3), 105-114. dx/doi.org/10.1300/J115v26n03_08

Kirkman, T. R. (2013). High fidelity simulation effectiveness in nursing students' transfer of learning. *International Journal of Nursing Education Scholarship*, *10*(1), 1-6. doi:10.1515/ijnes-2012-009

Knudson, L. (2013). Integrating simulation into student learning experiences. *Connections*, *97*(4), 5-4. doi:10.1016/S0001-2092(13)00283-4

Laerdal Medical Corporation [Laerdal]. (2007). *Simulation in nursing education scenarios for SimMan* [Curriculum binder, software, CD and text]. Wappingers Falls, NY: Laerdal Medical Corporation.

Lekalakala-Mokgele, E.,& du Rand, P.P. (2005). *A model for facilitation in nursing education*. Curationis. 28:22–29

Lie, D, Encinas, J., Stephens, F., & Prislin, M. (2010). Do faculty show the 'halo effect' in rating students compared with standardized patients during a clinical examination? *Internet Journal of Family Practice*, *8*(2).

McCaffrey, R., Hayes, R., Cassell, A., Miller-Reyes, S., Donaldson, A., & Ferrell, C. (2012). The effect of an educational programme on attitudes of nurses and medical residents towards the benefits of positive communication and collaboration. *Journal of Advanced Nursing*, *68*(2), 293-301. doi:10.1111/j.1365-2648.2011.05736.x

Meakim, C., Boese, T., Decker, S., Franklin, A. F., Gloe, D., Lioce, L., & Borum, J. C. (2013). Standards of best practice: Simulations standard I: Terminology. *Clinical Simulation in Nursing*, *9*, S3-S11. doi:10.106/j.ecns.2013.04.001

McCrum-Gardner, E. (2010). Sample size and power calculations made simple. *International Journal of Therapy and Rehabilitation*, *17*(1), 10-14. Retrieved from http://www.uv.es/uvetica/files/McCrum_Gardner2010.pdf

Meszaros, K., Lopes, I., Goldsmith, P., & Knapp, K. (2011). Interprofessional education: Cooperation among osteopathic medicine, pharmacy, and physician assistant students to recognize medical errors. *Journal of the American Osteopathic Association*, *111*(4), 213-218. Retrieved from http://www.jaoa.org/content/111/4/213.full.pdf+html

Nagpal, K., Arora, S., Vats, A., Wong, H., Sevdalis, N., Vincent, C., & Moorthy, K. (2012). Failures in communication and information transfer across the surgical care pathway: interview study. *BMJ Quality & Safety, 21*(10), 843-849.

National League for Nursing Simulation Innovation Resource Center (NLN-SIRC). (2013). SIRC glossary. Retrieved June 30, 2013, from: http://sirc.nln.org/mod/glossary/view.php?id=183

Onishi, M., Komi, K. & Kanda, K. (2013). *Physicians' perceptions of physician-nurse collaboration in Japan: Effects of collaborative experience*. Journal Of Interprofessional Care, *27(3)*, doi:10.3109/13561820.2012.736095.

Parker, M. (2006). *Nursing theories and nursing practice.* (2nd ed.). Philadelphia, PA: F.A. Davis.

Petty, R. E., Wheeler, S. C., & Tormala, Z. L. (n.d.). Persuasion and attitude change. In T. Millon & M. J. Lerner (Eds.), *Comprehensive handbook of psychology* (2nd ed.). New York: Manuscript in preparation.

Pilcher, J., Goodall, H., Jensen, C., Huwe, V., Jewell, C., Reynolds, R., & Karlsen, K. (2012). *Special focus on simulation: Educational strategies in the NICU: Simulation-based learning: It's not just for NRP*. Neonatal Network, 31(5), 281-287. doi:10.1891/0730-0832.31.5.281

Quality and Safety Education for Nurses. (2009). *Competency KSAs*. Retrieved from http://www.qsen.org/ksas_prelicensure.php

Razik, R., Mammo, Z., Gill, H., & Lam, W. (2011). Academic screencasting: internet-based dissemination of ophthalmology grand rounds. *Canadian Journal of*

Ophthalmology. *Journal Canadien D'ophtalmologie*, *46*(1), 72-76. doi:10.3129/i10-093

Robb, M., & Gerwick, M. (2013). Team teaching: a resource guide for nurse educators. *Teaching & Learning in Nursing*, *8*(3), 78-82. doi:10.1016/j.teln.2013.04.005

Robinson-Smith, G., Bradley, P. K., & Meakim, C. (2009). Evaluating the use of standardized patients in undergraduate psychiatric nursing experiences. *Clinical Simulation in Nursing*, *5*(6), e203-e211. doi:10.1016/j.ecns.2009.07.001

Sando, C. R., Coggins, R. M., Meakim, C., Franklin, A. E., Gloe, D., Boese, T., & Borum, J. C. (2013). Standards of best practice: Simulation standard VII: Participant assessment and evaluation. *Clinical Simulation in Nursing, 9*(6S), S30-s32. dx.doi.org/10.1016/j.ecns.2013.04.007

Schoening, A., Sittner, B., & Todd, M. (2006). Simulated clinical experience: Nursing students' perceptions and the educators' role. *Nurse Educator, 31*(6), 253-258. Retrieved from http://graphics.tx.ovid.com.libproxy.uams.edu/ovftpdfs/FPDDNCJCAHDNBE00/fs046/ovft/live/gv023/00006223/00006223-200611000-00008.pdf

Shaw, B. (2013). Collaborative working within community maternity services--is this the chink in the armour? *British Journal of Midwifery*, *21*(4), 285-291.

Shreve, J., Van Den Bos, J., Gray, T., Halford, M., Rustagi, K., & Ziemkiewicz, E. (2010). The economic measurement of medical errors. *Society of Actuaries' Health Section*. Retrieved from http://www.soa.org/files/research/projects/research-econ-measurement.pdf

Sieloff, C., Frey, M., & King, I. (2007). *Middle range theory development: Using King's conceptual system*. New York, NY: Springer Publishing Company.

Taylor-Powell, E., Rossing, B. E., & Geran, J. (1998). Evaluating collaboratives. *University of Wisconsin-Extension, Cooperative Extension.* learningstore.uwex.edu/assets/pdfs/G3658-8.PDF

Van Den Bos, Rustagi, K., Gray, T., Halford, M., Ziemkiewicz, E., & Shreve, J. (2011). The $17.1 billion problem: The annual cost of measurable medical errors. *Health Affairs, 30*(4), 596-603. Abstract retrieved from doi:10.1377/hlthaff.2011.0084

Appendix A

The Jefferson Scale of Attitudes Toward Physician-Nurse Collaboration© (Hojat et al., 1999)

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JEFFERSON SCALE OF ATTITUDES TOWARD PHYSICIAN-NURSE COLLABORATION

INSTRUCTIONS: Please indicate the extent of your ***agreement*** or ***disagreement*** with each of the following statements by circling the appropriate number. For the purposes of this survey, a nurse is defined as "a registered nurse (RN) who is engaged in providing or directly supervising the care of hospitalized patients."

Gender: [1] Male. [2] Female. **Age** (in years): ____

You are a: [1] **Nurse** (Please specify your degree: _____Your specialization: _____).
[2] **Physician** (Please specify your primary specialty: _____).

		Strongly Agree	Tend to Agree	Tend to Disagree	Strongly Disagree
1.	A nurse should be viewed as a collaborator and colleague with a physician rather than his/her assistant….	4	3	2	1
2.	Nurses are qualified to assess and respond to psychological aspects of patients' needs……	4	3	2	1
3.	During their education, medical and nursing students should be involved in teamwork in order to understand their respective roles……	4	3	2	1
4.	Nurses should be involved in making policy decisions affecting their working conditions……	4	3	2	1
5.	Nurses should be accountable to patients for the nursing care they provide……	4	3	2	1
6.	There are many overlapping areas of responsibility between physicians and nurses……	4	3	2	1
7.	Nurses have special expertise in patient education and psychological counseling……	4	3	2	1
8.	Doctors should be the dominant authority in all health care matters……	4	3	2	1
9.	Physicians and nurses should contribute to decisions regarding the hospital discharge of patients……	4	3	2	1
10.	The primary function of the nurse is to carry out the physician's orders……	4	3	2	1
11.	Nurses should be involved in making policy decisions concerning the hospital support services upon which their work depends……	4	3	2	1
12.	Nurses should also have responsibility for monitoring the effects of medical treatment……	4	3	2	1
13.	Nurses should clarify a physician's order when they feel that it might have the potential for detrimental effects on the patient……	4	3	2	1
14.	Physicians should be educated to establish collaborative relationships with nurses……	4	3	2	1
15.	Interprofessional relationships between physicians and nurses should be included in their educational programs……	4	3	2	1

Appendix B

Permission to Use Tool.

UALR

Jeffrey Carmack <jkcarmack@ualr.edu>

Jefferson Scale of Attitudes Toward Physician-Nurse Collaboration

Jeffrey Carmack <jkcarmack@ualr.edu> Sun, Jul 15, 2012 at 8:06 PM
To: Mohammadreza.Hojat@jefferson.edu

Dear Dr. Hojat,

I am writing to request permission to use the Jefferson Survey of Attitudes Toward Physician-Nurse Collaboration I am currently enrolled in the DNP program at Gardner-Webb University and would like to use the survey as part of my DNP project. I am a nursing instructor at the University of Arkansas at Little Rock, which is stand-alone and not part of a school of medicine. Our nursing department is looking at ways to increase collaboration during our student's simulation experiences. I am planning on a quasi-experimental project on the use of standardized patient trained to act as physicians during a simulation learning experience for one group (n=50). With the second group (n=50), I want to use video portrayal of the physicians via a software program. Measuring the pre and post intervention scores, I hope to see if video portrayal is as effective at increasing the students' perception of collaboration.

I believe this will add to the body of knowledge of nursing science and potentially give other stand-alone nursing programs a way to bring in collaboration during simulation learning. At the present time, I am proposing the use of King's Theory of Interpersonal Systems as my framework with your tool being my empirical evidence.

I look forward to your response and thank you in advance for your time and consideration of my proposal. If you need further information or have any questions, please do not hesitate to contact me.

–
Jeff Carmack, MSN, RN | Assistant Professor | Simulation Director
University of Arkansas at Little Rock | Department of Nursing
Office 501.569.8294 | jkcarmack@ualr.edu | ualr.edu

Fax 501.371.7546 | Cell 501.920.4332

Jeffrey Carmack <jkcarmack@ualr.edu>

Jefferson Scale of Attitudes Toward Physician-Nurse Collaboration

Mohammadreza Hojat <Mohammadreza.Hojat@jefferson.edu> Mon, Jul 16, 2012 at 1:18 PM
To: Jeffrey Carmack <jkcarmack@ualr.edu>

Dear Jeff:

In response to your request, I am sending you a copy of the scale, and its scoring instructions. You have my permission to use the sale in your not-for-profit research given that the Jefferson copyright sign will appear in any copy you will be using in your project, and proper credit is given to the original source(s).

Good luck with your project and inform me of your progress!

(-:

Hojat

From: Jeffrey Carmack [mailto:jkcarmack@ualr.edu]
Sent: Sunday, July 15, 2012 9:07 PM
To: Mohammadreza Hojat
Subject: Jefferson Scale of Attitudes Toward Physician-Nurse Collaboration

[Quoted text hidden]

4 attachments

- ScoringAlgorithm_Physician-NurseCollaboration.pdf 220K
- Jefferson Scale of Attitudes Toward Physician-Nurse Collaboration.doc 103K
- Cross Cultural Study_IJNS.pdf 143K
- JSAPNC_JIC (2).pdf 139K

Appendix C

Permission to Modify Tool.

Jeffrey Carmack <jkcarmack@ualr.edu>

Requesting permission to modify Jefferson Scale of Attitudes Toward Physician-Nurse Collaboration

Jeffrey Carmack <jkcarmack@ualr.edu> Tue, May 28, 2013 at 9:32 PM
To: Mohammadreza.Hojat@jefferson.edu

Dear Dr. Hojat,

I am originally requested, and received, permission to use the Jefferson Survey of Attitudes Toward Physician-Nurse Collaboration on July 16, 2012. I remain enrolled in the DNP program at Gardner-Webb University and continue in the planning phase of my project.

As a reminder about my project, and to update you on my progress… I am a nursing instructor at the University of Arkansas at Little Rock, which is stand-alone and not part of a school of medicine. Our nursing department is looking at ways to increase collaboration during our student's simulation experiences. I am planning on a quasi-experimental project on the use of video captures of a physician during a simulation learning experience. This video capture allows for student input to questions posed by the physician via a software program. Measuring the pre and post intervention scores, I hope to see if video portrayal is effective at increasing the students' perception of collaboration.

I believe this will add to the body of knowledge of nursing science and potentially give other stand-alone nursing programs a way to bring in collaboration during simulation learning. At the present time, I am proposing the use of King's Theory of Interpersonal Systems as my framework with your tool being my empirical evidence.

An issues raised by both my IRB and project chair is my small sample size (n=36) and the ability to determine who a respondent is based on sex and age. We have very few males (n<4) enrolled in the sample group, and there are extreme variability in the ages within the group. I have no doubt that if raw data was to be accessed, someone would be able to determine each males responses and assign their scores to that person. While I feel there is little real harm in this possibility, my chair has suggested requesting permission to modify the tool. I would remove the age and sex data collection points for this small group.

I look forward to your response and thank you in advance for your time and consideration of my proposal. If you need further information or have any questions, please do not hesitate to contact me.

–
Jeff Carmack, MSN, RN | Assistant Professor | Simulation Director
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Jeffrey Carmack <jkcarmack@ualr.edu>

Requesting permission to modify Jefferson Scale of Attitudes Toward Physician-Nurse Collaboration

Mohammadreza Hojat <Mohammadreza.Hojat@jefferson.edu> Wed, May 29, 2013 at 8:27 AM
To: Jeffrey Carmack <jkcarmack@ualr.edu>

Dear Jeff:

Happy to learn that your research is going well. Yes, you can remove the questions on age and sex from the survey.

Good luck with your project and please inform me of your progress.

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Hojat

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To be understood is a basic human need that can be fulfilled when an empathic relationship is formed.

Information about the book "*Empathy in Patient Care*" and experts' comments are posted at : www.springer.com/0-387-33607-9 (publisher) and www.tju.edu/jmc/crmehc/medu/patientempathy.cfm (Jefferson Medical College).

Appendix D

Consent to Participate.

Thank you for considering participating in this research study. Your opinions about the clinical simulation lab are very important to us. We need your feedback to continue to improve the effectiveness of teaching and learning in the simulation lab. We understand your time is valuable, and appreciate you sharing your opinions with us.

This study is being conducted by Jeffrey K. Carmack, MSN, RN, a graduate student at Gardner-Webb University, and assistant professor of the Department of Nursing at the University of Arkansas at Little Rock. It is designed to help nursing educators better understand students' attitudes related to collaboration in the simulation-learning environment.

Participation is voluntary. If you do decide to participate, you will be asked to complete this anonymous survey twice; once (the pre-test) before your simulation learning experience (SLE) and one time after (the post-test). The first time, you will complete the survey the night before your SLE, on any computer you wish. The second time you complete the survey, you will do it immediately after your SLE in the computer lab, when your SLE is fresh in your mind. Both times, access and submission are anonymous. The survey takes less than 10 minutes to complete.

The survey consists of 15 Likert-type questions about your attitudes related to collaborating with a physician on patient care. Two demographic questions ask for your age and gender. However, you do not have to answer these (or any other question) if you are concerned it might make your survey identifiable. There is also one open-ended question for comments.

We ask you to complete a pre- and post-test so that we may compare responses and evaluate the effect of the simulation learning experience. Therefore, you will be asked to create a unique number at the start of the survey both times. This number will not identify you, but will allow us to match up the pre- and post-test and still preserve your anonymity.

We do not expect you will feel uncomfortable completing the survey, but you do not have to answer any question that you feel uncomfortable answering. You may also exit the survey at any time, and none of your answers will be saved or reported to us.

There is no compensation for completing the survey and you will not be penalized if you do not do a survey. None of us will know who participates or who does not. Additionally, none of the faculty that teach in the mental health nursing course, classroom or clinical, will see the data before final grades are submitted for the course.

However, if you do participate, you may experience a sense of satisfaction from participating in a research study and offering your opinions. In the bigger picture, we hope this study will add to the body of knowledge and understanding of the simulation learning environment.

Remember that you do not have to participate in this study, but we sincerely hope that you will. It is important to the validity of the study that we have a substantial number of participants and we need you to achieve that. Without you, we just would not be able to conduct the study.