2018

Simulation Outside the Silo: Allied Health Interprofessional Education Day to Improve Patient Outcomes

Eva Huneycutt Whitley

Simulation Outside the Silo: Allied Health Interprofessional Education Day to Improve Patient Outcomes

by

Blair Whitley

A capstone project submitted to the faculty of
Gardner-Webb University Hunt School of Nursing
In partial fulfillment of the requirements for the degree of
Doctor of Nursing Practice

Boiling Springs, North Carolina

2018

Approved by:

Submitted by:

_____	_____
Blair Whitley, MSN, RN	Dr. Cindy Miller, PhD, RN
_____	_____
Date	Date

Approval Page

This DNP Project has been approved by the following committee members:

Approved by:

_____	_____
Dr. Tammy Crump, PhD Associate Vice President, Practice Partner	Date
_____	_____
Kimberly Lewis, M.Ed., CPhT Committee Member	Date
_____	_____
Kayla Huneycutt, MSN, RN Committee Member	Date
_____	_____
Amy Witschey, BSRT, RRT, RCP Committee Member	Date
_____	_____
Tina Harper, BS, RRT-RCP Committee Member	Date
_____	_____
Scott Shew, MltA, EMT-P Committee Member	Date

Angela Hamby, MSN, RN, CENC, PEN Committee Member	Date
Christa Little, RT(R)(M) Committee Member	Date
Tiffany Barbee, M.Ed., RT(R)(M)(CT) Committee Member	Date
Chassity Washburn, MSN, RN, CNE Committee Member	Date
Tou Vang, MPH Committee Member	Date
Starra Herring, MA, CMA(AAMA), AHI Committee Member	Date
Candice Rome, DNP, RN Chair, Digital Learning Programs	Date

Abstract

Since 2003, the World Health Organization (WHO) has identified working in interdisciplinary teams as a critical factor in providing patient-centered care. Simulation-enhanced interprofessional education (Sim-IPE) has shown improved knowledge, skills, attitudes, and behaviors of teamwork required to improve patient outcomes. The purpose of this project was to determine whether a simulation-based interprofessional education day would improve these factors in senior allied health students in a small community college. The NLN Jeffries Simulation Theory was used as a theoretical framework for this project. The project administrator used the Interprofessional Socialization and Valuing Scale (ISVS) 9A pre-test to examine beliefs, behaviors, and attitudes towards interprofessional collaboration. After a Sim-IPE experience where six allied health disciplines worked together to care for five patients, the students were involved at debriefing on the patient as well as their interprofessional collaboration. When the experience was completed, the students took the ISVS 9B post-test. Paired t-test was completed for the whole population and further broken down by individual programs to analyze the statistical significance in their knowledge of IPE after the intervention. A total of 42 students completed ISVS 9A and 43 students completed ISVS 9B. There was a significant difference in the scores for ISVS 9A (M=5.5, SD=0.79) and ISVS 9B (M=6.3, SD=0.41); t (83) =-4.89, p=0.000004. These results suggested that the Sim-IPE activity did significantly improve the scores between the pre-test and post-test. The students were also asked qualitative data questions for quality improvement and sustainability purposes. The Sim-IPE experience will continue to be used at this community college.

Keywords: Sim-IPE, INACSL Standards of Best Practice, nursing education, simulation

Acknowledgements

I would like to give thanks to God for opening these doors of opportunity, and the strength to accomplish this endeavor. A special thanks to my parents for your support, encouragement, and help with the girls throughout this journey. Thank you to my husband, Adam, who is my biggest cheerleader, prayed for me, and dealt with my craziness over the past two years. To my girls, Madi and Malia, you gave me the perseverance because your little eyes were always watching; I pray that my journey has shown you to follow your dreams, work hard in everything you do, never give up, and you can accomplish anything. Thank you Dr. Miller for letting me come to your office, setting afternoons aside for me, and keeping me on track. Thanks to Dr. Crump and my team for being a part of this project; I could not have done it without each one of you, and I am so blessed to work with such wonderful friends. Finally, thank you to my cohort of DNP friends- we did it!! I love you all!

TABLE OF CONTENTS

List of Tables

List of Figures

SECTION I

INTRODUCTION

Problem Background and Significance

In 2013, the World Health Organization (WHO) defined interprofessional education (IPE) as "the process by which a group of more than two profession specific students from health-related occupations with different educational backgrounds learn together during certain periods of their education with interaction as an important goal" (World Health Organization, 2013, p. 45). Since then, simulation-based experiential learning has been recognized as an effective way to promote interprofessional education and teamwork. Throughout many studies, simulation-enhanced interprofessional education (Sim-IPE) has shown improved knowledge, skills, attitudes, and behaviors of teamwork required to improve patient outcomes (Decker et al, 2015). Therefore, the use of Sim-IPE in nursing education is essential to improving patient outcomes as students enter the healthcare field.

The North Carolina Board of Nursing (NCBON)(2017) recently introduced a guideline that the Program Director is responsible for ensuring that the International Nursing Association for Clinical Simulation and Learning (INACSL)(2016) Standards of Best Practice are utilized for lead faculty and lab personnel in simulation (NCBON, 2017). INACSL Standards of Best Practice: Simulation Standard VIII: Simulation-Enhanced Interprofessional Education (Sim-IPE) (2015) addressed the complex healthcare need of healthcare professionals working as a collaborative team. The standard explained that IPE has been identified by accrediting agencies and professional organizations as essential to achieving safe, quality patient-centered care (INACSL,

2016). Currently, at a local community college, Sim-IPE and INACSL Standards of Best Practice: Simulation are not being used within the nursing curriculum as directed by the NCBON.

Also, the National League for Nursing Commission for Nursing Education Accreditation (NLN CNEA) approved this community college nursing program for pre-accreditation status. There are five standards of accreditation that must be addressed for NLN CNEA; Standard V: Culture of Learning and Diversity—Curriculum and Evaluation Processes is not being completely met. Within this standard, quality indicator V-E states "The curriculum provides students with experiential learning that supports evidence-based practice, intra- and interprofessional collaborative practice, student achievement of clinical competence, and as appropriate to the program's mission and expected curricular outcomes, expertise in a specific role or specialty" (NLN CNEA, 2016, p. 27). An interpretive guideline attached to the quality indicator is "Intra- and interprofessional collaborative student learning opportunities are provided to facilitate professional role development" (NLN CNEA, 2016, p.27). Currently, the college does not meet this standard for NLN CNEA accreditation. In order to improve patient outcomes and meet standards for the NCBON and NLN CNEA, the nursing program must implement Sim-IPE using INACSL Standards of Best Practice: Simulation.

Problem Statement

Patient outcomes could improve if the allied health students in a small community college would experience a simulation-enhanced interprofessional educational day, increasing communication, role understanding, and teamwork as required by the NCBON and NLN CNEA.

SECTION II

NEEDS ASSESSMENT

Population Identification

A small community college in the southeastern United States was the setting for the project. The allied health campus offers Associate of Applied Science Degree programs in Nursing (Registered Nurse and Licensed Practical Nurse-Registered Nurse), Respiratory Therapy, Radiography, Medical Assisting, Pharmacy Technology, and Emergency Medical Services (EMS). There have been conversations in allied health meetings concerning IPE, but there are no policies that require IPE within the disciplines.

Gap Analysis

The Registered Nurses' Association of Ontario (RNAO) (2013) developed clinical practice guidelines to address IPE in the educational setting. These recommendations were used to perform a gap analysis within the Allied Health programs (Table 1).

Table 1

RNAO Clinical Practice Guidelines Gap Analysis

Selected Guideline Recommendations	Existing Policy? Yes/No	Policy being followed? Yes/No
3.2. a. Academic organizations prepare students to work in interprofessional teams by instilling values, skills and professional role socialization that will support interprofessional care;	NO	n/a
3.2. b. Developing, implementing, and evaluating education models that foster interprofessional values and skills; and	NO	n/a
3.2. c. Academic organizations prepare students to work in interprofessional teams by enhancing educational and clinical opportunities for health professions to study and learn together (RNAO, 2013, p.31).	NO	n/a

Sim-IPE Needs Assessment Survey

In order to quantify the need for the project, a Survey Monkey survey titled "Sim-IPE Needs Assessment" was distributed to the faculty of each program. This assessment was derived from the underlying principles from the RNAO Clinical Practice Guidelines (RNAO, 2013). Nine out of 12 faculty that received the survey responded (Table 2).

Table 2

Sim-IPE Needs Assessment

Sim-IPE Needs Assessment Question	Mean Value
I think interprofessional education is important for allied health students.	4.67
We currently teach interprofessional education in our curriculum.	3.56
My accrediting body suggests that we use interprofessional education within our curriculum.	4.25
I believe the use of simulation technology with allied health students together would improve interprofessional education.	4.33
I am interested in participating in a simulation experience to incorporate interprofessional education.	4.67
I believe that the knowledge gained in this experience will improve patient outcomes in the future.	4.44

Note. Scale: 1-Strongly disagree, 2-Disagree, 3-Neutral, 4-Agree, 5-Strongly agree

Overall, the faculty survey concluded that they agree-strongly agree that IPE is important to their program and their accrediting bodies, and that Sim-IPE could lead to improved patient outcomes. Interestingly, "We currently teach interprofessional education in our curriculum" was scored between neutral and agree (3.56). This survey showed the gap between what is current practice and the need to implement Sim-IPE within the allied health programs.

Project Sponsor and Key Stakeholders

IPE is becoming a global effort to ensure safety, effectiveness, and sustainability, but support for IPE has been problematic, especially in curriculum changes (Moran, Steketee, Forman, & Dunston, 2015). Internal stakeholders include the students, which is the primary focus. The allied health programs and instructors are stakeholders as curriculums adjustments occur. The college is a stakeholder because this project is accomplishing organizational goals, and could help with receiving grants from external stakeholders by utilizing the Simulation Hospital. External stakeholders will include the facilities where these students work in clinicals as well as upon graduation. Other external stakeholders include contributors to grants for the Simulation Hospital, prospective students, and the community. IPE is becoming an expectation of accrediting bodies, which makes these organizations stakeholders (Schreiber & Goreczny, 2013). The main stakeholders are the future patients because when collaboration of disciplines takes place, high quality, safe and efficient care results (Harris & Ward-Presson, 2016).

Organizational Assessment

Mission and Values

The mission of the college is "offers a learner centered environment that encourages student access, success, and completion. The college values partnerships, life-long learning, and actively strives to enhance the economic, social, and cultural life of the community" (Stanley Community College, [SCC], 2016). According to the community college values (SCC, 2016), the organization is student-centered, holistic, technological, and offers excellence, creativity, and flexibility in instructional delivery. Sim-IPE lines up directly with the mission and values of the organization. The Associate Vice

President of Health and Public Services was also the Project Practice Partner, and fully supported the project and use of the facility for this project. The college also supports the guidelines set forth by accrediting bodies, giving full approval to meet the standards of the NCBON and NLN CNAE.

Assessment of Available Resources

The practice site was the college's Simulation Hospital. It was equipped with an ambulance bay, an emergency room bay with a high-fidelity mannequin, two medical surgical beds with high-fidelity mannequins, a simulation birthing mother and infant, a pediatric high fidelity mannequin, and two intensive care unit beds with high-fidelity mannequins. The Simulation Hospital also has a medication administration system, code carts, supply cabinets, monitors, pagers, a control room, and multiple pieces of respiratory equipment. There was a simulated doctor's office, laboratory, and pharmacy upstairs outside of the Simulation Hospital. EMS has a working ambulance for transport of the patient from the doctor's office to the Simulation Hospital. All of the equipment was readily available to use for this project.

Every implementation plan requires resources. Fiscal resources can be a large barrier, but that was not true in this instance. The college applies for grants for new equipment based on the ability to use IPE in the simulation area. A local foundation has been very generous over the past five years with donations to promote this type of education. There is a fee that all allied health students pay each semester to maintain the fiscal resources available for supplies and upkeep of the mannequins. Each department also has a supply budget for supplies. Fiscal resources are readily available as needed.

For this project, physical resources were the largest barrier. There was a Simulation Hospital Coordinator hired several weeks before implementation, which was very helpful. Faculty commitment to IPE could have been a large barrier, and the most important intervention was creating excitement and buy-in within each department. Lawlis, Anson, and Greenfield (2014) explained that faculty may perceive that it may not be worth the workload necessary to implement IPE into their courses and may not fully understand the concept of IPE and its effect in health care. It was important to show stakeholders (faculty) the importance of letting go of something old, so to embrace a fresh new look of what the evidence is supporting when trying to embrace a change (Zaccagnini & White, 2017). The faculty members formed a committee to discuss objectives, plans, and responsibilities in the activities. A timeline was created to meet certain objectives and allow time for each department to get involved. Also, course schedules are normally made several months in advance, so timing was important to get IPE days scheduled to meet every department's needs. This barrier was overcome by planning months in advance and following a strict timeline.

Strengths, Weaknesses, Opportunities, and Threats Analysis

The strength of the college was that it has a state-of-the-art Simulation Hospital that includes an ambulance bay, five high-fidelity adult mannequins, a pediatric high-fidelity mannequin, a birthing mother with an infant, portable x-ray machines, a medication dispensing system, and supplies with a control area placed in the middle for viewing all patient areas. There was also an ambulance, simulated doctor's office, medical laboratory, and pharmacy outside of the Simulation Hospital that can be used in conjunction with it. With the use of communication devices, students can communicate

from anywhere in the building. Students pay a simulation fee each semester to pay for supplies while large grants pay for the mannequins. The support and involvement from the Associate Vice President of Health and Public Services was helpful, and she corresponded with the Executive Leadership Team of the college. The ability and willingness of the faculty to work together on this project was a very important strength.

One weakness for the project was the lack of a Simulation Director for the Simulation Hospital until the project was close to being implemented. Management of such a large area is very important when trying to meet INACSL Standards of Best Practice: Simulation. Audio is a weakness in the Simulation Hospital because of the wireless interference between mannequins, walkie-talkies, phones, and baby monitors being used for hearing the students. Due to the various frequencies from different wireless equipment, there are sound issues throughout the simulation. In addition, there was no ceiling over the sound room, so it gets loud when multiple people are trying to conduct scenarios at the same time.

This project provided an opportunity for Sim-IPE development, which will help the students learn about IPE and the importance of working together to provide safe patient care. Using Sim-IPE appropriately could provide opportunities for grants, funding, and partnerships. With additional funding, the mannequins could be updated and high-tech audio-visual equipment installed. The Simulation Hospital could be used for virtual care training, and partnerships in this market could occur. The marketing department could use this project as a tool for outreach for the allied health programs.

Threats to the Sim-IPE project included malfunctioning mannequins or equipment. If this occurs, the simulation scenarios will not work. Another threat comes

from the leadership over the Simulation Hospital. If the new coordinator position did not understand Sim-IPE, this could have been a large barrier to overcome.

Cost-Benefit Analysis

Due to the nature of the facilities, this project did not cost any more money or additional resources than would regularly be used in clinical experiences. Since these clinical hours took the place of other clinical hours, it did not cost extra money in faculty or supplies. Another possible benefit was grants or funding that may be received based on using Sim-IPE. Also, prospective student enrollments may increase due to the advancement of technology and IPE.

SECTION III

GOALS, OBJECTIVES, AND MISSION STATEMENT

Goals and objectives seem to overlap, but have different meanings. According to Zaccagnini and White (2017), goals are broad statements that identify future outcomes and point to the expected outcomes of the project. Objectives are the statements of action that will move the project toward its goals. The mission statement describes why the project is being conducted; this helps clarify the problem. The development of goals, objectives, and a mission statement guides the project to stay on course with what it is intended to achieve (Zaccagnini & White, 2017).

Goals

The Registered Nurses' Association of Ontario (RNAO)(2013) developed clinical practice guidelines entitled "Developing and Sustaining Interprofessional Health Care: Optimizing patients/clients, organizational, and system outcomes." Within this guideline, there are three recommendations proposed to implement in the practice setting to improve patient outcomes. The guidelines and goals of this project were:

- "3.2.a. Academic organizations prepare students to work in interprofessional teams by instilling values, skills and professional role socialization that will support interprofessional care;
- 3.2.b. Developing, implementing, and evaluating education models that foster interprofessional values and skills; and
- 3.2.c. Academic organizations prepare students to work in interprofessional teams by enhancing educational and clinical opportunities for health professions to study and learn together" (RNAO, 2013, p.31).

Objectives

Using the framework developed by the Interprofessional Education Collaborative Expert Panel (IPEC)(2011), there were four core competencies with IPE that were incorporated: Values and ethics, roles and responsibilities, interprofessional communication, and team and teamwork. The objectives were:

1. The student will describe the roles of interprofessional team members in a clinical setting by the end of the scenario.
2. The student will participate as a member of an interprofessional team to develop a patient-centered plan of care during the scenario.
3. The student will demonstrate interprofessional communication skills during a team-based clinical experience.
4. The student will discuss how to apply patient-centered interprofessional principles in clinical settings by the end of the scenario (NLN, 2016).

Mission Statement

The mission of this Sim-IPE project was: "Use best practices in simulation technology to teach allied health students to save lives by learning to work together."

SECTION IV

LITERATURE REVIEW

Database and Keyword Search

The first literature review identified the need for incorporating Sim-IPE into the curriculum to enhance IPE among allied health students. The literature review for best practice focused on finding solutions for this practice problem and the best way to implement best practices. A literature review searching for best practices contained literature reviews, studies, and organizational standards. A comprehensive search was completed using NCLIVE, Bulldog OneSearch, and Clinical Key for Nursing. The Medical Subject Headings (MeSH) started with "Sim-IPE" in NCLIVE ProQuest Nursing and Allied Health Database. Only three results returned and two of those were studies. "Interprofessional education AND Simulation" yielded 1,686 results, while "Interprofessional simulation" yielded 1,760 results. Of those, 1,404 are peer-reviewed. The MeSH terms "Interprofessional simulation AND nursing students" returned 1,254 results. These articles were narrowed by containing the terms within the abstract and 32 articles remained. Three of these articles were useful. The MeSH terms "Interprofessional simulation education AND INACSL" yielded 31 results. Only those with interventions or theories noted were included, and references from several articles noted for review. Within ProQuest Health Management Database, "Sim-IPE" yielded no results.

After reviewing the articles within NCLIVE databases, best practices were being defined by the International Nursing Association for Clinical Simulation and Learning (INACSL) Standards of Best Practice. The next search using Bulldog OneSearch using

the terms “INACSL and implementation” yielded seven results, but no studies. “INACSL AND nursing students” yielded 13 results, but were eliminated due to lack of usefulness in implementing best practices.

“INACSL standards of best practice” yielded 61 results, but these were mostly INACSL definitions from the Clinical Simulation in Nursing Series. While the definitions and guidelines are important, it did not introduce implementation strategy studies.

Clinical Key for nursing searching for “Sim-IPE”, 19 results were found, and six of these were pertinent studies. “INACSL AND implementation” yielded 84 results, which some are research articles and others are advice and strategies to implement Sim-IPE using INACSL standards. There were no articles excluded due to year of publication, and only articles in English were included. Articles that include implementation of best practices were reviewed as well as theoretical frameworks.

Support for Simulation Based Education (SBE)

Dunnington (2014) explained that simulation has been used primarily for teaching procedural, instrumental, or critical incident types of skills, but now simulation is being applied to training related to more dynamic, complex, and interpersonal human contexts. High fidelity human patient simulation is an instructional technique that involves a technology comprised of a life-size human mannequin, monitors, and computer-driven programming that requires design, administration, and role-play. Simulation-based learning aims to provide an interactive and immersive learning environment to replicate real world situations (Lateef, 2010). The underlying theme in simulated learning activities is the concept of practice in a “no-risk” environment, providing health

professionals an opportunity to build their confidence, apply their knowledge, and develop technical, critical thinking, and crisis management skills. This also affords educators the opportunity to verify the competence of health professionals in a safe, interactive environment, before they enter the clinical setting (Lau, Tran, & Tse, 2012). High-fidelity human patient simulation provides a realistic, authentic learning environment. According to Lejonqvist, Eriksson, and Meretoja (2016), simulation is widely implemented all over the world and there is evidence of the positive effects of simulation in nursing education.

There are many studies explaining the use of SBE and the variety of ways simulation is integrated into nursing education. In 2013, Cumin, Boyd, Webster, and Weller published a systematic review for multidisciplinary team training through simulation, which evaluated 18 articles containing technical and non-technical skills. McGaghie, Issenberg, Petrusa, and Scalese (2010) performed a critical review of simulation-based education (SBE) and gave recommendations for best practices in SBE. A systematic review published by Schmidt, Goldhaber-Fiebert, Ho, and McDonald (2013) of simulation exercises as a patient safety strategy reported on 38 studies containing outcomes after simulation interventions. Orledge, Phillips, Murray, and Lerant (2012) reviewed studies on the impact of simulation on patient outcomes and skill retention. Among the systematic and integrative reviews, there is meaningful data that supports SBE.

According to Skrable and Fitzsimons (2014), the use of simulation in nursing education is increasing in scope and popularity. Many undergraduate nursing programs have adopted high-fidelity patient simulation as an educational tool. The results of their

review identified the following themes: critical thinking, clinical skill performance, knowledge acquisition, student satisfaction, self-confidence, and anxiety (Skrable & Fitzsimons, 2014). Simulation being used as clinical time has gained approval from many organizations and is viewed as worthwhile time.

Manning, Skiff, Santiago, and Irish (2016) brought nursing and social work students together for an interprofessional education day. After a narrative analysis, the results emerged including the interprofessional setting characteristics, the value of collaborative communication between professions, student affective experience, and the student lessons learned. These results validated that simulation is a powerful experience that engages learners and can be an importance piece to teaching students about interprofessional communication and roles.

According to Dufrene (2012), interdisciplinary education fosters collaboration and teamwork among the health care team. Considering that nurses, physicians, and other healthcare professionals must work together, learning through interdisciplinary groups should enhance educational outcomes. In most institutions, students share classes only with others in their discipline, but formal examination of how the professions need to be working together is not included (Sullivan & Godfrey, 2012). Sullivan and Godfrey (2012) explained that interprofessional education is designed to enhance knowledge of the various disciplines, their roles, and overlapping areas, while incorporating reflective interaction required for experiential learning. This can be achieved using SBE to meet educational goals.

Professional Organizations

Institute of Medicine (IOM)

In 2003, the IOM identified a core competency "Work in Interdisciplinary Teams" as a critical factor in providing patient-centered care (IOM, 2015). From this, the Core Competencies for Interprofessional Collaborative Practice were developed with representatives from the American Association of Colleges of Nursing among many other health organizations (Interprofessional Education Collaborative Expert Panel, 2011). In 2015, the IOM suggested new studies focusing on how IPE affects patient, population, and health system outcomes (IOM, 2015).

National League for Nursing (NLN)

In 2012, The NLN met with healthcare stakeholders and collaborated to identify ways to integrate simulation with interprofessional education in the academic and clinical settings (NLN, 2012). Currently, the NLN recognizes simulation as "an effective vehicle to enhance interprofessional education, can help educate students from all health professions, across the educational spectrum, to work collaboratively" (NLN, 2018).

World Health Organization (WHO)

The WHO (2013) concluded that the students from various teams learn as a team and there is a cognitive and behavioral change when they learn the mind-sets of various disciplines. They added that participation in simulation with other healthcare professionals allows them to gain knowledge, skills, attitudes, and behaviors of teamwork required to promote safe, quality patient care (WHO, 2013).

North Carolina Nursing Association (NCNA)

The NCNA, based on the recommendations from the NLN and WHO, formed a position statement on Sim-IPE. It reads: "NCNA Position: NCNA strongly supports the use of simulation-based interprofessional education in both academic and practice settings and encourages researchers to study the effects of this type of training on patient outcomes" (NCNA, 2016).

American Association of Colleges of Nursing Quality and Safety Education for Nursing (AACN QSEN)

The AACN QSEN project's goal is to meet the challenge of preparing nurses with knowledge, skills, and attitudes to improve the quality and safety of healthcare systems (QSEN Institute, 2017). Using the IOM's competencies, QSEN has formulated basic nursing competencies to be developed within pre-licensure programs, with one being AACN QSEN Competency: Teamwork and Collaboration. The AACN defines teamwork and collaboration as "Function effectively within nursing and inter-professional teams, fostering open communication, mutual respect, and shared decision-making to achieve quality patient care (Cronenwett et al, 2007). The knowledge, skills, and attitudes set by QSEN are as follows:

"The knowledge related to this standard includes:

- Describe own strengths, limitations, and values in functioning as a member of a team
- Describe scopes of practice and roles of health care team members
- Describe strategies for identifying and managing overlaps in team member roles and accountabilities

- Recognize contributions of other individuals and groups in helping patient/family achieve health goals
- Describe scopes of practice and roles of health care team members
- Describe strategies for identifying and managing overlaps in team member roles and accountabilities
- Recognize contributions of other individuals and groups in helping patient/family achieve health goals
- Analyze differences in communication style preferences among patients and families, nurses and other members of the health team
- Describe impact of own communication style on others
- Discuss effective strategies for communicating and resolving conflict
- Describe examples of the impact of team functioning on safety and quality of care
- Explain how authority gradients influence teamwork and patient safety
- Identify system barriers and facilitators of effective team functioning
- Examine strategies for improving systems to support team functioning

The skills associated with teamwork and collaboration include:

- Demonstrate awareness of own strengths and limitations as a team member
- Initiate plan for self-development as a team member
- Act with integrity, consistency and respect for differing views
- Function competently within own scope of practice as a member of the health care team

- Assume role of team member or leader based on the situation
- Initiate requests for help when appropriate to situation
- Clarify roles and accountabilities under conditions of potential overlap in team member functioning
- Integrate the contributions of others who play a role in helping patient/family achieve health goals
- Communicate with team members, adapting own style of communicating the needs of the team and situation
- Demonstrate commitment to team goals
- Solicit input from other team members to improve individual, as well as team, performance
- Initiate actions to resolve conflict
- Follow communication practices that minimize risks associated with handoffs among providers and across transitions in care
- Assert own position/perspective in discussions about patient care
- Choose communication styles that diminish the risks associated with authority gradients among team members
- Participate in designing systems that support effective teamwork

The attitudes associated with teamwork and collaboration include:

- Acknowledge own potential to contribute to effective team functioning
- Appreciate importance of intra- and inter-professional collaboration
- Value the perspectives and expertise of all health team members

- Respect the centrality of the patient/family as core members of any health care team
- Respect the unique attributes that members bring to a team, including variations in professional orientations and accountabilities
- Value teamwork and the relationships upon which it is based

Value different styles of communication used by patients, families and health care providers

- Contribute to resolution of conflict and disagreement
- Appreciate the risks associated with handoffs among providers and across transitions in care
- Value the influence of system solutions in achieving effective team functioning"

(Cronenwett et al, 2007, p. 125).

Registered Nurses' Association of Ontario (RNAO)

The RNAO (2013) developed a best practice guideline that was an evidence-based document focused on developing and sustaining interprofessional health care. The clinical practice guideline was entitled "Developing and Sustaining Interprofessional Health Care: Optimizing patients/clients, organizational, and system outcomes." The guidelines under "academic organizations" are:

"3.2 Academic organizations prepare students to work in interprofessional teams by:

a. Instilling values, skills and professional role socialization that will support interprofessional care;

b. Developing, implementing and evaluating education models that foster interprofessional values and skills; and

c. Enhancing educational and clinical opportunities for health professions to study and learn together" (RNAO, 2013, p.31).

National Council of State Boards of Nursing (NCSBN)

The NCSBN has issued guidelines addressing how clinical simulations are developed, implemented, and evaluated (NCSBN, 2016). The largest and most comprehensive study examining student outcomes with simulation is NCSBN National Simulation Study (Hayden, Smiley, Alexander, Kardong-Edgren & Jeffries, 2014). This longitudinal, randomized, controlled study used 10 nursing programs from across the country. The study involved following the students through nursing school and their first six months of practice to provide evidence that there is no statistical significance found in practice if up to 50% of clinical experiences are simulation (Hayden et al, 2014). The literature provides evidence that simulation-based learning is appropriate as long as the faculty are adequately trained, appropriate resources are available, appropriately designed scenarios are being utilized, and debriefing is based on a theoretical model (NCSBN, 2016). This study in addition to the data from literature laid the basis for practice guideline development.

International Nursing Association for Clinical Simulation and Learning (INACSL).

An expert panel from International Nursing Association for Clinical Simulation and Learning (INACSL), American Association for Colleges of Nursing (AACN), National League for Nursing (NLN), Society for Simulation in Healthcare (SSH), Boards of Nursing and NCSBN developed the guidelines based on the NCSBN Simulation

Study, the literature, and the INACSL "Standards of Best Practice: Simulation" (NCSBN, 2016). The purpose of these guidelines is to guide Boards of Nursing in evaluating readiness of nursing programs to use simulation and guide nursing programs to develop evidence-based simulation programs (NCSBN, 2016).

The literature reviewed as well as the obligations set forth by the NCBON, NLN CNEA, NCNA, AACN QSEN standards, INACSL standards, and the RNAO confirm the need for interprofessional education in the pre-licensure nursing program. Clinical guidelines from the RNAO further support the need for Sim-IPE and the positive effect on patient outcomes when students are trained in this manner. The literature shows best practice for Sim-IPE is following INACSL Standards of Best Practice: Simulation. The remainder of the literature review focuses on these best practices.

Incorporating INACSL Standards of Best Practice: Simulation

The history of the INACSL Standards of Best Practice: Simulation (SM) began in 2009 with a discussion among INACSL members identifying a need to standardize best practice in simulation. The first seven standards were introduced in 2010, and feedback was given including more literature reviews in 2011, 2012, and 2013. In 2014, 20 healthcare organizations joined to provide feedback, literature, and best practices. In 2015, Simulation Enhanced Interprofessional Education (Sim-IPE) and Simulation Design were added to the standards (INACSL, 2015). The latest standards were released in 2017. INACSL Standards of Best Practice: Simulation are the evidence-based guidelines that nursing programs must abide by in order to use simulation for clinical hours. The standards are "designed to advance the science of simulation, share best

practices, and provide evidence based guidelines for implementation and training" (INACSL, 2018).

According to INACSL (2018), the "Adoption of the INACSL Standards of Best Practice: Simulation demonstrates a commitment of quality and implementation of rigorous evidence-based practices in healthcare education to improve patient care by complying with practice standards in the following areas:

- Simulation design
- Outcomes and objectives
- Facilitation
- Debriefing
- Participant evaluation
- Professional integrity
- Simulation-enhanced interprofessional education (Sim-IPE)
- Simulation glossary" (INACSL, 2018)

Simulation-enhanced IPE is a standard added in 2015; it enables students from different professions to achieve shared objectives and outcomes through simulation (INACSL, 2016). Benefits to Sim-IPE include teamwork, collaboration, and improved patient outcomes, while consequences of not following the standard include impaired learning opportunities, professional mistrust, and lack of role clarity among other issues (INACSL, 2016). There are four criteria necessary to meet this standard:

1. Conduct Sim-IPE based on a theoretical or a conceptual framework.
2. Utilize best practices in the design and development of Sim-IPE.
3. Recognize and address potential barriers to Sim-IPE.

4. Devise an appropriate evaluation plan for Sim-IPE (INACSL, 2016).

In relation to the problem identified, the remainder of this literature review will focus on Sim-IPE. Each criterion addressed by the INASCL standard will be discussed with recent studies and data regarding the implementation of Sim-IPE.

Conduct Sim-IPE Based on a Theoretical or a Conceptual Framework

The required elements within this criterion include adult learning theories, frameworks, standards, and competencies to structure the development of simulation, conduct curricular mapping, and integrate the theoretical and philosophical models of each healthcare profession in the Sim-IPE (INACSL, 2015). According to Lancaster, Anderson, Jambunathan, Elertson, and Schmitt (2015), implementing INACSL Standards of Best Practice: Simulation is required for regulatory and accrediting bodies, and using an underlying framework such as Jeffries Simulation Framework is very important. The National League for Nursing Jeffries Simulation Framework is a mid-range theory for simulation, and will hopefully facilitate more theoretical-based research in simulation (Rutherford-Hemming, Lioce, Kardong-Edgren, Jeffries, & Sittner, 2016). Adamson (2015) conducted a systematic review of the literature related to Jeffries Simulation Framework and found empirical support for its use. The review included 153 studies; the review concluded that contributions of participants are much greater than program, level, and age, and other variables such as readiness to learn, goals, preparedness, learning style, cognitive load, and level of anxiety could make a difference (Adamson, 2015). However, this information is a tool for further development of the theory. Jones and Potter (2017) used Jeffries Simulation Framework to implement scenarios in a critical care response team training. Simulation specialists noted that using the standards helped

provide a safe learning environment required to support the training (Jones & Potter, 2017).

Thomas et al. (2015) recognized a gap in simulation educator development and the organization of resources. A tool was created for the educators to complete a self-assessment of ability level, and resources were provided in a theory-based toolkit using Benner's Novice to Expert Theory. This project later became the Simulation Education Toolkit available on the National League for Nursing Simulation Innovation Resource Center website (Thomas et al., 2015). Benner's Novice to Expert Theory provided a framework for educators to become prepared to teach Sim-IPE.

Utilize Best Practices in the Design and Development of Sim-IPE

Utilizing best practices for Sim-IPE according to INACSL (2015) included considering multiple experiences to achieve an outcome, incorporating scenarios developed and reviewed by the professions, developing mutual goals, basing activities on objectives, ensuring a safe learning environment, and providing appropriate debriefing and feedback. One article used the Jeffries S.T.E.P. Educator Preparation Plan to coordinate and implement simulation activities in order to report to the proper agencies (Lancaster et al., 2015). Liaw, Zhou, Lau, Siau, and Chan (2014) conducted a program based on safe care for a deteriorating patient with medical and nursing students using Team Strategies and Tools to Enhance Performance and Patient Safety (TeamSTEPPS). Pre- and post-test were used to assess the students' self-confidence in interprofessional communication and perception in interprofessional learning. Findings showed a significant increase in both, signifying that the program works well using TeamSTEPPS (Liaw et al., 2014).

A recent interprofessional simulation with the purpose of enhancing communication, developing mutual respect, and identifying role clarity through team learning utilized the National League for Nursing unfolding case studies and simulation with nursing, pharmacy, and medical students (New et al., 2015). Using NLN's evaluation survey, the experience was shown to be effective through reflective notes following the Sim-IPE. Reactions from students included a sense of empowerment, value of giving accurate data, and work in teams to increase patient outcomes (New et al., 2015). In a study of a Sim-IPE activity, nursing students completed questionnaires and key themes identified were role recognition and differentiation, adaptation to the team environment, and professional solidarity (Leonard, Shuhaiber, & Chen, 2010). While the questionnaire was not proven to be reliable, it is notable that key themes recurred among 48 students concerning their perception of Sim-IPE.

McDermott, Sarasnick, and Timcheck (2017) conducted a pilot study with 143 students to implement the INACSL Simulation Design Standard (SDS) to create a novice simulation experience. The SDS provided a clear format to design the simulation and this article demonstrates a systematic method for creating a simulation based on the SDS (McDermott et al., 2017). Using this framework could assist in implementing Sim-IPE using best practices.

Recognize and Address Potential Barriers to Sim-IPE

Recognizing potential barriers is important to Sim-IPE and requires a needs assessment on the program, organization and stakeholders, leadership commitment, sustainability, utilization of Sim-IPE champions, resources, faculty development, curricula, support, and INACSL standards: Simulation Design and Professional Integrity

(INACSL, 2015). In response to questions regarding schools following the INACSL Standards of Best Practice, the NCSBN conducted a descriptive mixed-method study through structured interviews designed to determine if nursing programs were following the INACSL Standards of Best Practice: Simulation. Results overwhelmingly confirmed that programs needed trained simulation educators, faculty education, and development of simulations, evaluations, and debriefing (Beroz, 2017). Beroz (2017) discussed barriers to simulation-based education, which include faculty development, time, space, equipment, faculty buy-in, staffing, and scheduling. Being aware of these barriers could help the implementation of a simulation program. Although this study was conducted in Maryland, it is considered generalizable across the country (Beroz, 2017). The NCSBN used this study to promote adherence to the standards set for simulation.

The National League for Nursing (NLN) (2016) developed an *Interprofessional Toolkit to Guide IPE within Nursing Education*. In Section V: Interprofessional Education Sustainability, the NLN recognizes the challenges of developing and sustaining IPE within educational settings (NLN, 2016). The critical factors identified as barriers are IPE infrastructure, commitment of time and effort from individuals, financial model and reliable funding sources to cover costs, program revision process with reliable evaluation tools, faculty development so faculty can effectively design and deliver IPE programming, centralized group for the coordination of IPE programming, diverse array of authentic IPE programs that respond to local environmental needs, and ongoing coaching for participants after being trained (NLN, 2016).

Zorek, Blaszczyk, Haase, and Raehl (2014) conducted a study to assess the structural and procedural readiness by using a Practice Site Readiness for

Interprofessional Education (PRIPE) instrument. Sometimes there are resources, but the faculty are not ready to implement changes. Sullivan and Godfrey (2012) noted that faculty attitudes about interprofessional education will strongly affect their behavior. Also, there will be an increased workload up front in the planning and development stages, which could be a barrier to those that do not value IPE. There must be interventions to get faculty involved in IPE with the students. Kehrwald and McCallum (2015) conducted a study concerning the increased workload associated with flexible delivery methods, and educators identified different pedagogical practices, increasing workload, and needs for additional staff as barriers to overcome. In a study by Teo, Pick, Newton, Yeung, and Chang (2013), the Transactional Model of Stress-Coping was used as a theoretical framework to help explain the negative impact and stressors nurses experience during organizational change. This study confirmed that although involving nurses as active participants in the decision-making and planning processes had a positive impact on the change process, it did not reduce perceived stress of their usual nursing role or day-to-day work. The barriers of lack of time and commitment to the project could be a downfall. Attention to developing a timeline and expectations early in the process is of utmost importance.

Devise an Appropriate Evaluation Plan for Sim-IPE

INACSL Standards of Best Practice: Simulation, Sim-IPE (2015) requires the use of reliable evaluation tools, if available, to measure competencies, learner outcomes, patient outcomes, and culture change. While this is not possible in every simulation, it is important to use reliable tools when available. Gannon et al. (2017) developed a simulation to measure IPE and simulation on students' perceived learning needs in end of

life care compared to a non-IPE approach using end of life competencies. A 19-item questionnaire called the Readiness for Interprofessional Learning Scale (RIPLS) was used to measure changes in the health care students' attitudes toward readiness for Interprofessional teamwork and education following an intervention. This study showed no changes in pre- and post-test scores after the simulation (Gannon et al., 2017). Reliability and validity of this tool could be a concern since the literature shows evidence of the benefits of Sim-IPE.

An article by McDermott et al. (2017) using the SDS format to develop the simulation utilized the Creighton Clinical Evaluation Instrument (C-CEI) to provide feedback to students. This tool was revised by the NCSBN Simulation Study to be used in simulation and found the tool demonstrated a Cronbach's alpha > 0.90. The Simulation Perspective Survey (Cronbach's alpha 0.83) given to the students after the simulation determined that 80% of students found that the simulations were a valuable learning experience (McDermott et al., 2017).

The Interprofessional Socialization and Valuing Scale (ISVS) is useful to evaluate beliefs, behaviors, and attitudes about interprofessional practice. This tool was initially validated with 124 Canadian health profession students. A study by De Vries, Woods, Fulton, and Jewell (2015) evaluated the validity and reliability of this tool while identifying attitudes and behaviors in students. The Office of Interprofessional Health Education and Research (2012) noted the reliability of the instrument was established using Cronbach's alpha which ranged from 0.79 to 0.89 for the three scales and the coefficient alpha for the scale as a whole was 0.90. Construct validity was established using principal components analysis (Office of Interprofessional Health Education and

Research, 2012). King, Orchard, Khalili, and Avery (2016) conducted a study to revise the original ISVS to use two shorter equivalent forms to be used in pre-post studies. The student score agreement for the two item sets had an intraclass correlation coefficient = 0.970, 95% CI 0.963-0.976 (King et al., 2016). According to this study, the equivalent versions can be used to assess change in interprofessional socialization as a result of IPE.

SECTION V

THEORETICAL FRAMEWORK

NLN Jeffries Nursing Education Simulation Framework

Mary E. Mancini (2016) explained that Dr. Pamela Jeffries worked with the National League for Nursing to produce a simulation framework called "A Framework for Designing, Implementing, and Evaluating Simulations as Teaching Strategies in Nursing". Mancini notes that conceptual frameworks are a way of showing how relevant concepts relate to each other, and theories are specific, explain evidence-based practice, and use concepts that can be tested, and therefore, provide a basis for informed practice (Mancini, 2016). Since then, Jeffries and her team have evolved this framework into the NLN Jeffries Simulation Theory. The NLN Jeffries Simulation Theory has become a mid-range theory, which is less abstract than grand theories and addresses specific concepts that reflect practice (Jeffries, 2016). According to Meleis (2012), theory is important in clinical simulation because it is a phenomenon that nursing theory must explain the relationships among concepts, predict consequences, and provide action from the activities. Jeffries (2016) believed that developing the mid-range theory starts the process of exploring best practices, outcomes and systems change, and this will lead to new knowledge and practices being discovered.

Dr. Jeffries led the endeavor to transform her framework into a theory, but she had a large team and organizations helping her. In 2011, INACSL consulted with Dr. Jeffries to work on the Nursing Education Simulation Framework. There were four reiterations by 2012 completed by five teams of researchers, one for each concept, and the fourth reiteration was presented at the 2012 INACSL conference (Rizzolo, Durham,

Ravert & Jeffries, 2016). A picture of the Jeffries' Nursing Education Simulation Framework is shown below (Figure 1).

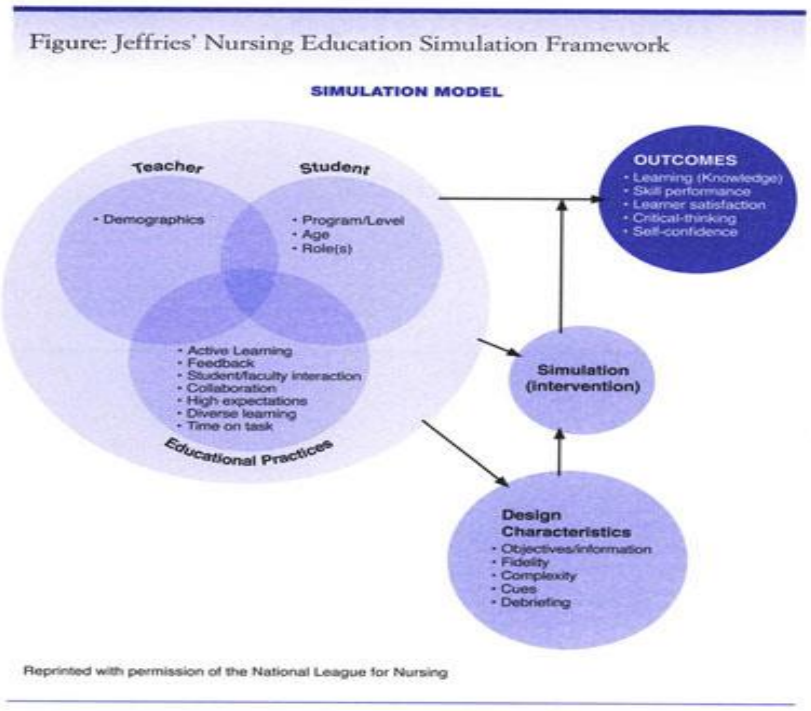

Figure 1. Jeffries' Nursing Education Simulation Framework

Following the presentation, Laerdal provided grants to start literature reviews that would help transform the framework into a theory (Rizzolo et al., 2016). To accomplish this, each concept needed to be explored further in the literature and generalized in order to apply the theory to practice. This research identified recurring themes, gaps, and key issues in the framework (Adamson, 2015).

NLN Jeffries Simulation Theory

In 2015, the NLN Jeffries Simulation Theory was introduced (Adamson & Rodgers, 2016). In order to understand the theory, the concepts of context, background, design, simulation experience, facilitator and educational strategies, participant, and

outcomes must be explored (Jeffries, Rodgers, & Adamson, 2016). Each of these concepts plays a vital role in having a successful simulation experience.

Context

The context of a simulation includes the place and the purpose of the simulation. The place can refer to academic, practice, or lab. The purpose is an overarching purpose such as evaluation or instructional purposes. The circumstances and settings play a large impact on each aspect of the simulation (Jeffries et al., 2016).

Background

The background includes the goals, expectations, objectives, and benchmarks that influence the design of the simulation. The design and implementation must correlate with the curriculum, and the course and program outcomes. The background also includes resources, time, equipment, and resource allocation (Jeffries et al., 2016).

Design

The design includes the learning objectives that guide the development of the scenario pertaining to content and problem-solving complexity. Elements including equipment, moulage, facilitator responses, roles, progression, briefing and debriefing must be part of the design (Jeffries et al., 2016).

Simulation Experience

The simulation experience is the environment in which it is experiential, interactive, collaborative, and learner-centered. This requires trust, realism, and fidelity within the simulation (Jeffries et al., 2016).

Facilitator and Educational Strategies

This interaction between the facilitator and the participant has to include attributes of skill, educational techniques, and preparation. The facilitator must also alter responses during simulation as needed and provide appropriate feedback and debriefing of the experience (Jeffries et al., 2016).

Participant

The participant brings factors of age, gender, level of anxiety, self-confidence, and preparedness to the simulation. Simulation design can affect the participant and impact their learning experience (Jeffries et al., 2016).

Outcomes

There are three areas of outcomes: participant, patient, and systems outcomes. Participant outcomes include reaction, learning, and behavior. Patient outcomes are affected by the interventions, and systems outcomes are found in the literature including studies related to cost-effectiveness and changes of practice (Jeffries et al., 2016). Below is a diagram of NLN Jeffries' Simulation Theory. (Figure 2)

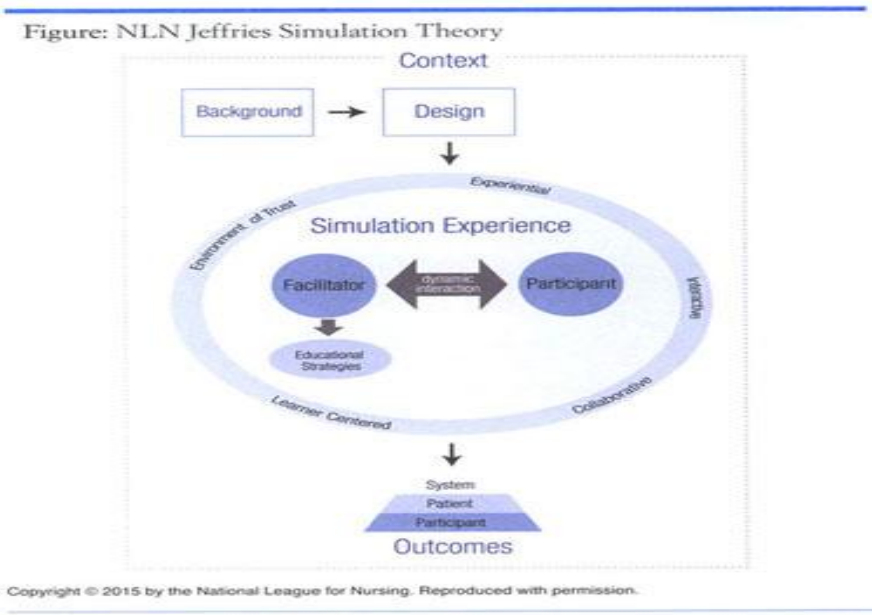

Figure 2. NLN Jeffries' Simulation Theory

Conceptual, Theoretical, Empirical (CTE) Diagram

The theoretical concepts of the NLN Jeffries' Simulation Theory support the interventions of INACSL Standards of Best Practice: Simulation and Sim-IPE. The INACSL Standards of Best Practice: Simulation and Sim-IPE are equally related as well. The empirical indicators or outcome measures are directly related to those interventions. This CTE summarizes the concepts, project variables, and outcomes measures of the project. (Figure 3)

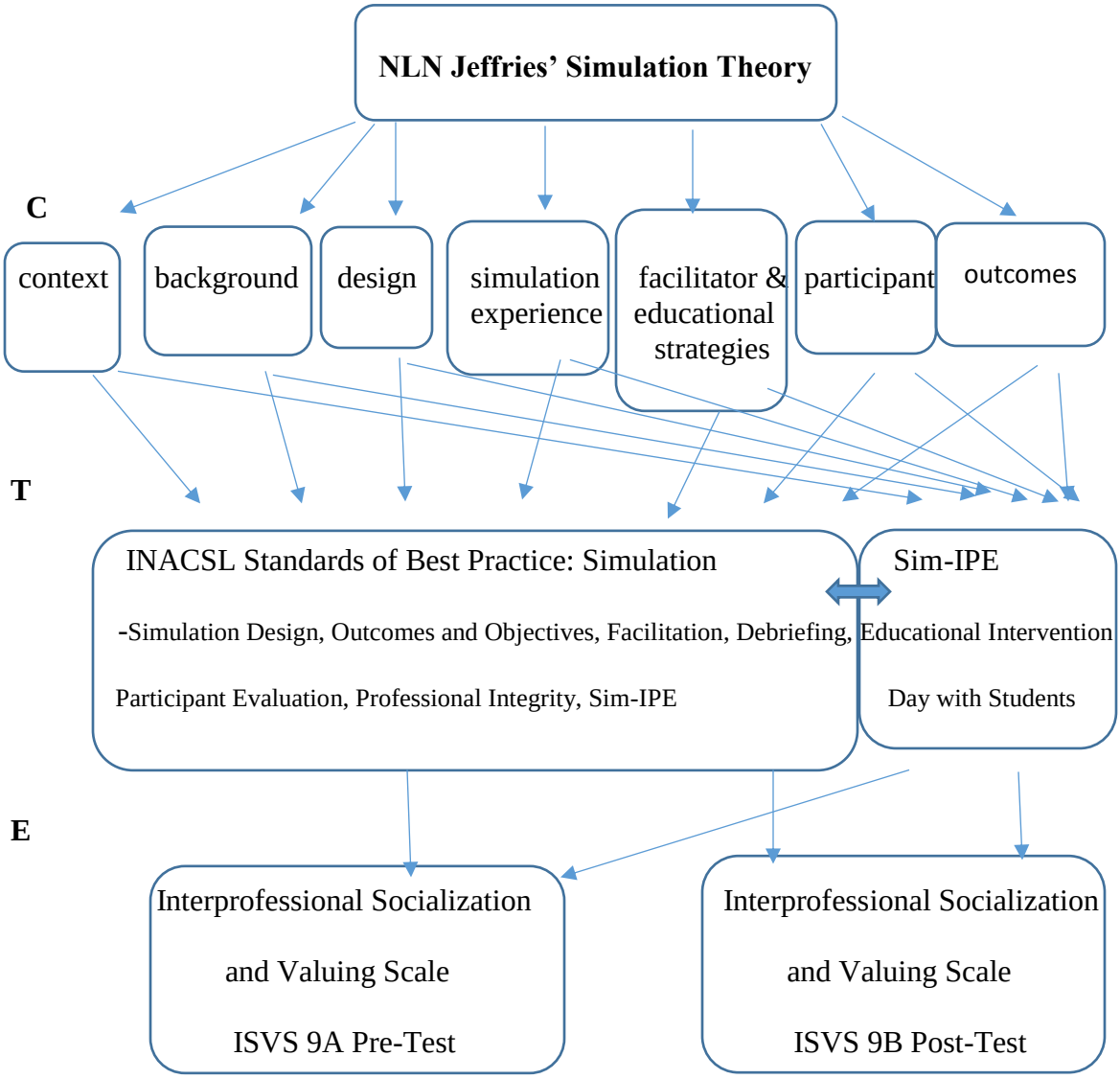

Figure 3. NLN Jeffries' Simulation Theory, CTE

Strengths and Weaknesses of Literature

The strengths of the literature included that SBE is very beneficial to student learning, can be used for clinical time, and helps students learn in a no-risk atmosphere. The literature also supports the need for Sim-IPE, and the importance of using simulation to teach IPE to improve patient outcomes. The most important part of the literature is the

INACSL Standards of Best Practice: Simulation, which is an evidence-based approach to conducting Sim-IPE.

Weaknesses in the literature are planning Sim-IPE, and the long-term effects of those interventions. Since Sim-IPE is new, the research in long-term data is not yet available. More research also needs to be done on evaluation tools and expanding the theoretical frameworks that could be used with Sim-IPE.

Summary of Literature Review

Using the literature as a basis for developing Sim-IPE, INACSL Standards of Best Practice: Simulation was used for implementing best practices. The theoretical framework developed by Jeffries in conjunction with best practices and resources provided by INACSL Standards of Best Practice guided the implementation process. Recognizing the barriers and addressing those ahead of time helped move the project forward as well. The ISVS 9A pre-test and 9B post-test has shown to be a valuable evaluation tool to measure the outcomes of the Sim-IPE.

SECTION VI

METHODOLOGY

Purpose

The purpose of this Doctor of Nursing Practice (DNP) project was to evaluate if a simulation interprofessional education (Sim-IPE) experience involving allied health students in a community college setting, as required by the NCBON and NLN CNEA, would affect communication, role understanding, and teamwork that could lead to improved patient outcomes.

Project Design

This project used a pre- and post-test descriptive design to evaluate an intervention. This type of design was used so that all students participated in the same Sim-IPE intervention with a pre-and post-test to evaluate their response to the intervention. There were no incentives used or risks to the students for participating.

Setting

This project was conducted in a small community college in Southeastern United States. The project was on the Allied Health Campus in the Simulation Hospital, simulated doctor's office, and multiple classrooms, which were reserved for the day. All activities used existing equipment and supplies, and current faculty were involved in the planning and implementation of the Sim-IPE experience. Senior Allied Health students were the participants in the project.

Team Selection

In order to gather information to plan the project, an assessment of the population affected by the problem was completed. Tools used in this needs assessment started with reviewing internal organizational data and governing organizations such as the North Carolina Board of Nursing and National League for Nursing, and led to consultations with program directors and faculty at the college. A meeting to introduce the need for Sim-IPE and gauge the interest in the allied health programs had a very positive response to incorporating this project into spring courses. All programs including Nursing, Respiratory Therapy, Pharmacy Technician, Radiography, Medical Assisting, and EMS agreed to participate in the project.

The team that became the Interprofessional Collaboration Committee (IPCC) consisted of members involved with the planning and implementation of the practice change. The Directors of each program and Clinical Coordinators from each discipline within the Allied Health division were included, as well as the Associate Vice President (AVP) of the School of Health and Public Services. The AVP made sure each discipline was involved and gave advice from an organizational level. The faculty gave suggestions, helped with scheduling, and completed a needs assessment to ensure the objectives of each program were met. The project administrator was in charge of the IPCC and ensured that all disciplines gave input on their accreditation needs and concerns. The Simulation Hospital Coordinator joined the team when the position was filled.

Project Participants

The inclusion criterion was all senior allied health students in the community college. There were no exclusion criteria. For recruitment purposes, the IPCC ensured that all senior students were scheduled to participate in Sim-IPE, and it was on clinical schedules for each student. The estimated sample size was:

- LPN-RN nursing-11
- Respiratory Therapy- 12
- Pharmacy Technician-5
- Radiography Technician- 10
- Medical Office Assisting-7
- Emergency Medical Services- 3

Ethical Approvals

IRB approval was granted through an exempt review request since the project was conducted in an accepted educational setting with normal education practices. There were minimal risks to the subjects, no grades given, and no risk more than the daily activity in simulation lab. Consent forms were given prior to the pre-test that explained that the pre- and post-test were voluntary, there was no retribution for not participating, and all responses would be anonymous. There were also no identifiers on the surveys to trace the surveys back to the students.

Project Implementation Process

This project started the planning phase nine months prior to implementation, which was June. The first meeting in June with all Allied Health Program Directors and Clinical Coordinators was to discuss the current use of IPE throughout each curriculum. A timeline was created within the committee; the first step was to turn in committee member agreement forms and complete a needs assessment by July. The first meeting also generated an overview of fall monthly meetings, and possible intervention in the spring. The next step was creating a needs assessment that was taken by nine out of 12 committee members that showed a need for the Sim-IPE experience. A literature review was completed for best practices, and an organizational assessment was completed.

All IPCC members came to monthly meetings as much as possible. If they were not present, the administrator met with them separately. In the planning phase, the administrator also met individually with each program representative to gather objectives and goals that they wanted to include for their curriculum standards, and information needed to make sure individual program accreditation standards were met.

At the first fall meeting, the goals, objectives, and mission statement were discussed. A general timeline was given to the IPCC:

August: Approval from college, meet with university chairperson

September: Set date, brainstorm scenarios, complete theoretical framework, turn I in IRB

October: Complete INACSL Standards of Best Practice Notebook, work planning, project proposal

November: Develop scenarios based on INACSL standards, evaluation planning, ensure project is approved and IRB complete

December- wrap up fall semester

January: Create charts, logistical planning for Sim-IPE day.

February: Sim-IPE day, gather data

March- interpretation of data, utilization and reporting of results

By October, an INACSL Standards of Best Practice: Simulation notebook was created for the college. Each standard was described and explained how the college planned to meet those standards. A scenario template was created using INACSL Standards of Best Practice: Simulation and distributed to the team. This was used to create scenarios to incorporate best practices in Sim-IPE.

In November, the scenarios that the IPCC developed were transformed into the INACSL template, and distributed to the committee for approval. Changes were made based on program needs as necessary. Training occurred at each meeting so that all members understood INACSL Standards of Best Practice: Simulation and the importance of using these guidelines for Sim-IPE day. Faculty chose which scenario they would be conducting, and gave input on the scenarios.

In January, the project administrator met with each program separately several times before the January meeting to review charts and logistics of setting up the scenarios. At the January meeting, the administrator described the process for the Sim-IPE day from start to finish, communication processes, locations of each program, and overview of each scenario. The next week, a mock Sim-IPE day was conducted to verify that everyone knew their roles and everything worked out logistically.

All students had Sim-IPE day on their clinical schedules and were instructed where to arrive at the appropriate time. Each student received a schedule to arrive at 0900, 1200, or 1500. This divided the students randomly into three groups with each group having an equal combination of students from each discipline.

On Sim-IPE day, the same process occurred three times with a new group of students. First, a prebriefing occurred in the classroom explaining a DNP project was being conducted to measure the effectiveness of Sim-IPE for increasing communication, role understanding and teamwork among students. The objectives of the Sim-IPE were explained and an introduction to the experience was given. The project administrator also explained that the experience is mandatory, but being a part of the DNP project and completing the surveys was optional without retribution or ability to identify students that chose not to participate.

A committee member passed out two sheets of paper stapled together. The top paper was the consent form to participate in the study and the second sheet was the pre-test: Interprofessional Socialization and Valuing Scale (ISVS) 9A. The only identifier was the program the student was enrolled in, and they wrote their program name at the top of the ISVS 9A. A committee member walked around the room and gathered all papers face down in a box so that it was unknown if a person decided to participate or not. Another committee member separated the consents from the ISVS 9A forms face down so that anonymity remained.

Using best practice guidelines by INACSL Standards of Best Practice: Simulation, there were five scenarios that started at the same time with a prebriefing, scenario, and debriefing on each scenario at the bedside. The scenarios included four

critical care patients that required the care of all disciplines. One scenario began in the medical office and the patient was transported to the Simulation Hospital via EMS and admitted to the Emergency Room. The students had a time limit of 30 minutes to complete the five simultaneous scenarios. Multiple students from each discipline worked together to provide care on all five patients. The debriefing at the bedside focused on the care of the specific patient scenario that each student was providing care.

Following the Sim-IPE scenarios, the students returned to the classroom to have a debriefing led by the project administrator based on interprofessional roles, communication, care of patients, and the effect on patient outcomes. Then, the post-test ISVS 9B was given. Again, the only identifier was the program for statistical analysis purposes. Every student received a post-test and a committee member collected papers face down in a box to maintain anonymity of identification and who participated in the post-test. The students left and the IPCC set the scenarios back up. This cycle was completed two more times so that all students had an opportunity to participate.

The project administrator ended the day with the IPCC discussing the Sim-IPE experience. Qualitative data was gathered from the faculty through open-ended questions about how the day went, and what changes needed to be made for next time. They were also asked to think about sustainability issues and a wish list for making improvements to the Sim-IPE experience.

Data Collection

The Sim-IPE experience was mandatory to participate in the simulation for clinical hours for each program, but it was voluntary to answer pre- and post-test surveys (ISVS 9A and ISVS 9B) for this project. Following the Sim-IPE day, brief interviews

with each program gave qualitative data about how the day went and what could be improved.

Instruments

Quantitative. The students took a pre-test and post-test to measure the effect of the SIM-IPE activity on their overall understanding of interprofessional care. The Interprofessional Socialization and Valuing Scale (ISVS) 9A was the pre-test and ISVS 9B was the post-test; these were used with permission. The copyright statement and permission via email was received. Based on interprofessional socialization and teamwork literature, the ISVS was constructed to reflect beliefs, attitudes, and behaviors in interprofessional teams. The reliability and validity of the ISVS was established by De Vries et al. (2015) through a study with 124 Canadian health profession students. According to King et al. (2016), the ISVS 24 was refined to make the ISVS 21; the ISVS 9A/9B is a condensed form to assess change in interprofessional socialization as a result of IPE. When comparing the existing reliable and valid ISVS 21, the score agreement for the two items sets was excellent: correlation coefficient = 0.970, 95% CI 0.963-0.976. Therefore, this tool is a reliable and valid tool to measure the change following Sim-IPE.

Qualitative. A time was scheduled for the project administrator to meet with each program separately and ask a series of questions:

1. What went well?
2. What could be improved?
3. Is there anything you would add or take out?
4. Should there be more IPE throughout each curriculum?
5. Do you think this should be sustained?

How Data Analysis was Conducted

Quantitative. The ISVS 9A (pre-test) and 9B (post-test) are 9-question tests based on a Likert scale 0-7. 0=n/a, 1=not at all, 2= to a very small extent, 3= to a small extent, 4= to a moderate extent, 5= to a fairly great extent, 6= to a great extent, and 7= to a very great extent. Scoring instructions are: add the rating scores (0-7) on the nine questions to get a sum score. Then, a mean score is calculated for each test. The same process is used for the nine-question ISVS 9B post-test.

Once all scores were calculated for the pre-tests and post-tests, a dependent (paired) t-test was conducted to compare the means to determine whether there was a statistically significant difference between the pre- and post-test means. The pre- and post-tests were also separated by program and conducted a dependent t-test for each program to further evaluate the difference.

Qualitative. The responses from the qualitative questions were written verbatim, and divided by faculty responses and student responses. Each program was addressed separately in a group discussion to gather the student responses.

SECTION VII

RESULTS

This chapter presents the results of the data analysis; quantitative and qualitative results are included. The quantitative data was gathered as part of Sim-IPE day. The ISVS 9A pre-test was completed prior to the intervention, and the ISVS 9B post-test was completed following the intervention. Qualitative data was gathered from students and faculty following the Sim-IPE day in small meetings within each discipline.

Response Rate

There were 43 students that participated in Sim-IPE Day. Forty-two students completed the pre-test and 43 students completed the post-test. Table 3 describes the sample size and response rate. There were no demographics taken.

Table 3

ISVS 9A and ISVS 9B Response Rate per Program

Program	ISVS 9A pre-test completed	ISVS 9B post-test completed
Radiography	11	12
Pharmacy Technology	2	2
Medical Assisting	4	4
Respiratory Therapy	13	13
LPN-RN Nursing	10	10
Emergency Medical Services	2	2

Findings

Quantitative

The ISVS 9A pre-test and ISVS 9B post-test were measured with a 7-point Likert Scale questionnaire with a range of 0=n/a, 1=not at all, 2=to a very small extent, 3= to a small extent, 4=to a moderate extent, 5= to a fairly great extent, 6=to a great extent, and 7=to a very great extent. Results were analyzed by adding the ratings for the nine questions and dividing the sum by nine to get a mean score (King, Orchard, & Khalili, 2016). Paired t-test were completed for the whole population and further broken down by individual programs to analyze the statistical significance in their knowledge of IPE after the intervention.

Allied health programs. A total of 42 students completed ISVS 9A and 43 students completed ISVS 9B. There was a significant difference in the scores for ISVS 9A (M=5.5, SD=0.79) and ISVS 9B (M=6.3, SD=0.41); t(83)=-4.89, p=0.000004. These results suggested that the Sim-IPE activity did significantly improve the scores between the pre-test and post-test (Table 4).

Table 4

Allied Health Programs Changes in Mean Values

Program	ISVS 9A Mean	ISVS 9B Mean
Radiography	5.75	6.125
Pharmacy Technician	4.9	6.35
Medical Assisting	5.5	6.6
Respiratory Therapy	5.82	6.57
Nursing	4.93	6.04
EMS	5.15	6.55

Due to small sample sizes, it is important to note that all programs had an increase in mean scores between the pre-tests and post-tests. (Figure 4, Table 5)

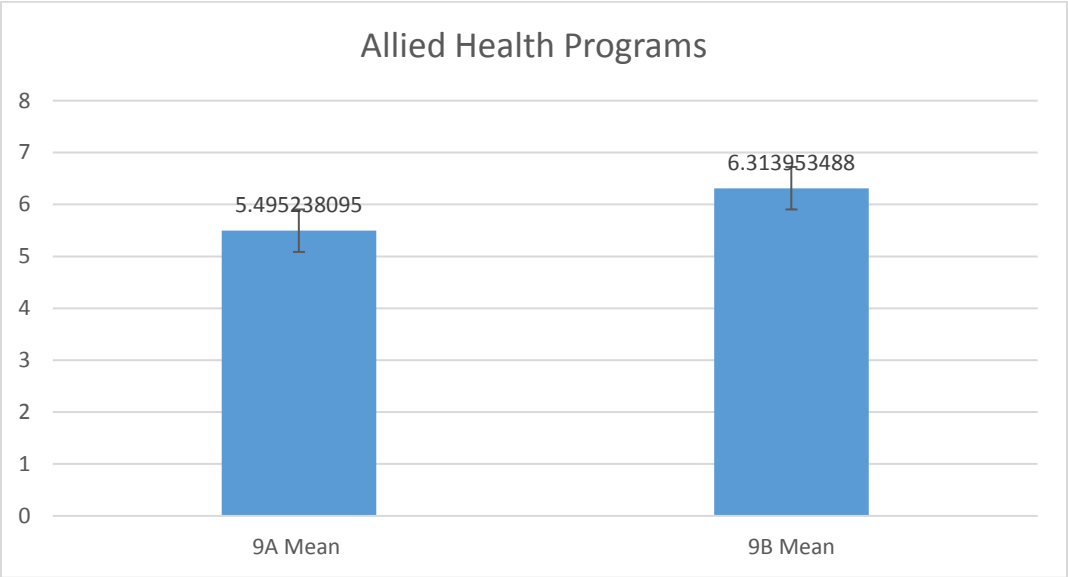

Figure 4. Overall Allied Health Results

Table 5

Overall Allied Health Paired T-test Results

t-Test: Two-Sample Assuming Equal Variances	9A Mean	9B Mean
Mean	5.495238	6.313953
Variance	0.788269	0.406944
Observations	42	43
Pooled Variance	0.595309	
Hypothesized Mean Difference	0	
df	83	
t Stat	-4.89115	
P(T<=t) one-tail	2.42E-06	
t Critical one-tail	1.66342	
P(T<=t) two-tail	4.84E-06	
t Critical two-tail	1.98896	

Radiography. A total of 11 students completed ISVS 9A and 12 students completed ISVS 9B. There was not a significant difference in the scores for ISVS 9A (M=5.75, SD=0.55) and ISVS 9B (M=6.13, SD=0.5); t(21)=-1.25, p=0.22. These results suggested that the Sim-IPE activity did not significantly improve the scores between the pre-test and post-test. (Figure 5, Table 6)

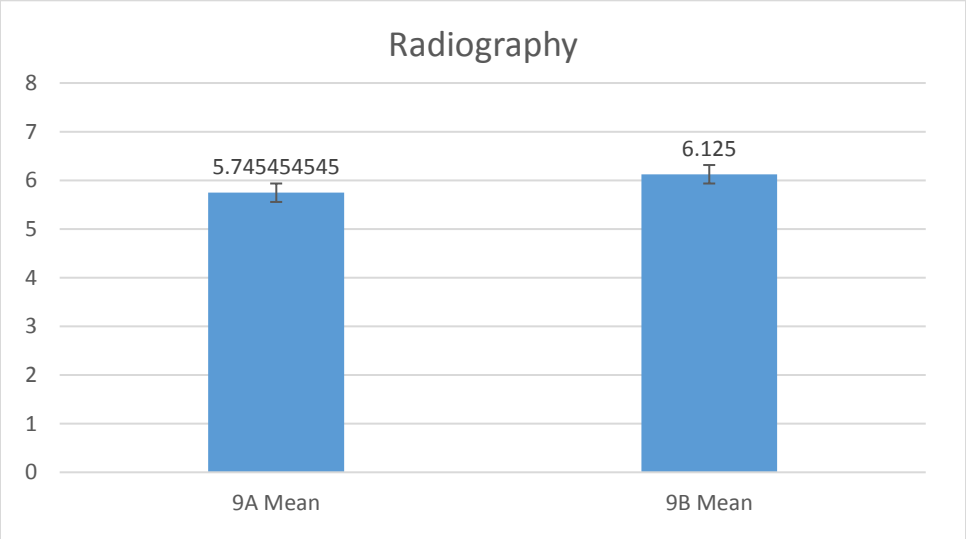

Figure 5. Radiography Results

Table 6

Radiography Paired T-test Results

t-Test: Two-Sample Assuming Equal Variances	9A Mean	9B Mean
Mean	5.745455	6.125
Variance	0.552727	0.500227
Observations	11	12
Pooled Variance	0.525227	
Hypothesized Mean Difference	0	
df	21	
t Stat	-1.25462	
P(T<=t) one-tail	0.1117	
t Critical one-tail	1.720743	
P(T<=t) two-tail	0.2234	
t Critical two-tail	2.079614	

Pharmacy technology. A total of two students completed ISVS 9A and two students completed ISVS 9B. There was not a significant difference in the scores for ISVS 9A (M=4.9, SD=0) and ISVS 9B (M=6.35, SD=0.845); t(2)=-2.23, p=0.15 for two-tailed test, and p=.07 for one-tailed test. These results suggested that the Sim-IPE activity did not significantly improve the scores between the pre-test and post-test (Figure 6, Table 7).

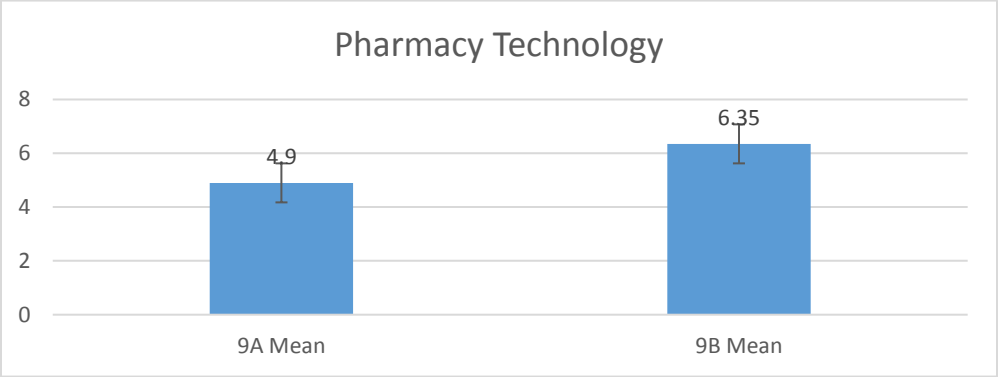

Figure 6. Pharmacy Results

Table 7

Pharmacy Technology Paired T-test Results

t-Test: Two-Sample Assuming Equal Variances	9A Mean	9B Mean
Mean	4.9	6.35
Variance	0	0.845
Observations	2	2
Pooled Variance	0.4225	
Hypothesized Mean Difference	0	
df	2	
t Stat	-2.23077	
P(T<=t) one-tail	0.07771	
t Critical one-tail	2.919986	
P(T<=t) two-tail	0.155419	
t Critical two-tail	4.302653	

Medical assisting. A total of four students completed ISVS 9A and four students completed ISVS 9B. There was not a significant difference in the scores for ISVS 9A (M=5.5, SD=1.05) and ISVS 9B (M=6.6, SD=0.25); t (6) = -1.93, p=0.10 for two-tailed test, and p=.05 for one-tailed test. These results suggest that the Sim-IPE activity did significantly improve the scores between the pre-test and post-test. (Figure 7, Table 8)

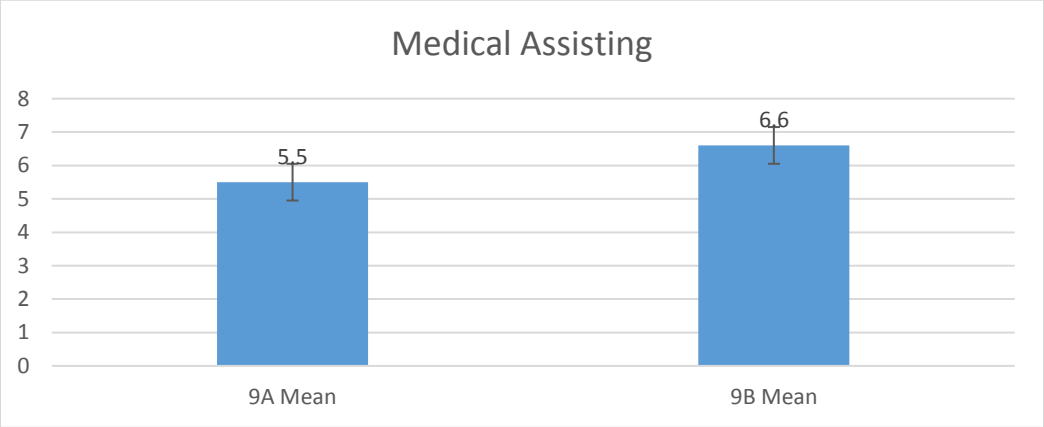

Figure 7. Medical Assisting Results

Table 8

Medical Assisting Paired T-test Results

t-Test: Two-Sample Assuming Equal Variances	9A Mean	9B Mean
Mean	5.5	6.6
Variance	1.046667	0.246667
Observations	4	4
Pooled Variance	0.646667	
Hypothesized Mean Difference	0	
df	6	
t Stat	-1.93449	
P(T<=t) one-tail	0.050606	
t Critical one-tail	1.94318	
P(T<=t) two-tail	0.101212	
t Critical two-tail	2.446912	

Respiratory therapy. A total of 13 students completed ISVS 9A and 13 students completed ISVS 9B. There was a significant difference in the scores for ISVS 9A (M=5.82, SD=0.69) and ISVS 9B (M=6.57, SD=0.27); t (24)= -2.74, p=0.01. These results suggested that the Sim-IPE activity did significantly improve the scores between the pre-test and post-test. (Figure 8, Table 9)

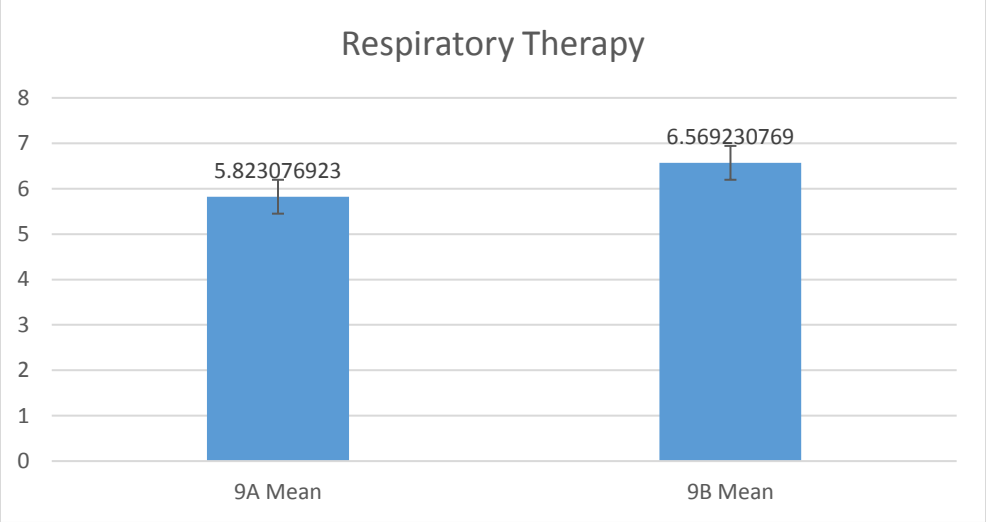

Figure 8. Respiratory Therapy Results

Table 9

Respiratory Therapy Paired T-test Results

t-Test: Two-Sample Assuming Equal Variances	9A Mean	9B Mean
Mean	5.823077	6.569231
Variance	0.690256	0.272308
Observations	13	13
Pooled Variance	0.481282	
Hypothesized Mean Difference	0	
df	24	
t Stat	-2.74211	
P(T<=t) one-tail	0.005676	
t Critical one-tail	1.710882	
P(T<=t) two-tail	0.011353	
t Critical two-tail	2.063899	

LPN-RN nursing. A total of 10 students completed ISVS 9A and 10 students completed ISVS 9B. There was a significant difference in the scores for ISVS 9A (M=4.93, SD=0.81) and ISVS 9B (M=6.04, SD=0.45); t (18) = -3.13, p=0.005. These results suggested that the Sim-IPE activity did significantly improve the scores between the pre-test and post-test. (Figure 9, Table 10)

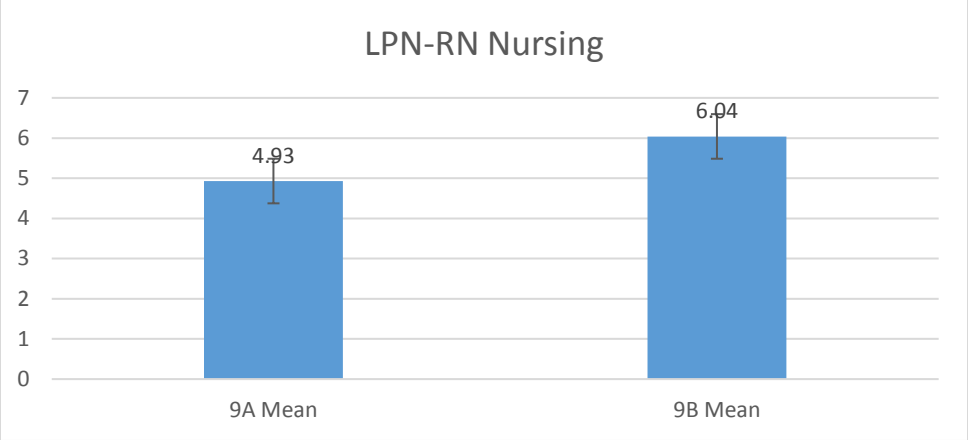

Figure 9. LPN-RN Results

Table 10

LPN-RN Paired T-test Results

t-Test: Two-Sample Assuming Equal Variances	9A Mean	9B Mean
Mean	4.93	6.04
Variance	0.809	0.447111
Observations	10	10
Pooled Variance	0.628056	
Hypothesized Mean Difference	0	
df	18	
t Stat	-3.13191	
P(T<=t) one-tail	0.002881	
t Critical one-tail	1.734064	
P(T<=t) two-tail	0.005762	
t Critical two-tail	2.100922	

Emergency medical services. A total of two students completed ISVS 9A and two students completed ISVS 9B. There was a significant difference in the scores for ISVS 9A (M=5.15, SD=2.21) and ISVS 9B (M=6.55, SD=0.25); t (2)= -1.26, p=0.33 for two-tailed test, and p=0.17 for one-tailed test. These results suggest that the Sim-IPE activity did not significantly improve the scores between the pre-test and post-test. (Figure 10, Table 11)

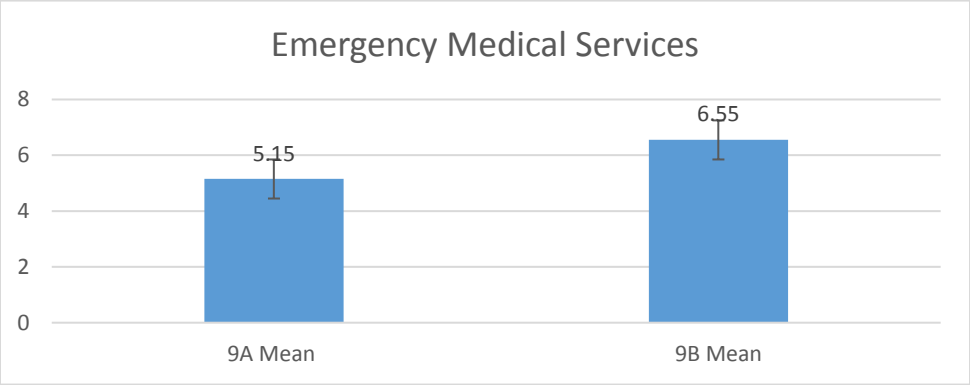

Figure 10. EMS Results

Table 11

EMS Paired T-test Results

t-Test: Two-Sample Assuming Equal Variances	9A Mean	9B Mean
Mean	5.15	6.55
Variance	2.205	0.245
Observations	2	2
Pooled Variance	1.225	
Hypothesized Mean Difference	0	
df	2	
t Stat	-1.264911064	
P(T<=t) one-tail	0.166666667	
t Critical one-tail	2.91998558	
P(T<=t) two-tail	0.333333333	
t Critical two-tail	4.30265273	

Qualitative

Faculty and students were asked the same set of questions after the Sim-IPE experience. Faculty were asked the questions immediately after the experience and the next week again to collect any information that may have been missed that day. The project administrator visited each program during class time and collected responses from all students at one time, and wrote exact phrases down.

Faculty responses.

1. What went well? Organized, scripts were well written and helped the flow of scenarios, knowing exactly what to do, hand-off between students, how everything worked together, teamwork among faculty, the students' ability to work together, faculty roles went smoothly, students were prepared for scenarios based on curriculum design.
2. What could be improved? There was a lot of waiting for the pharmacy students, medications could be ordered in advance, a phone for every room, increase number of students so that all of the scenarios can be completed, increase scenario time to 45 minutes if needed, increase nursing students for that amount of patients.
3. Is there anything you would add or take out? Use pyxis for medication dispensing, use the real ambulance when it is working so that EMS has a larger role, more scenarios in medical office for medical assisting students.
4. Should there be more IPE throughout each curriculum? Yes, being encouraged by accreditation standards that require a certain amount of

hours in simulation, smaller scenarios throughout the curriculum, cross-teaching, and many ways to incorporate IPE throughout curriculums.

5. Do you think this should be sustained? Yes, accreditation encourages hours in IPE, Tou (new simulation coordinator) become in charge of Sim-IPE, wish list for sustainability includes broadcasting system, live video feed for pharmacy, medical assisting and radiography, electronic health records, improved audio and communication devices.

Student responses.

Radiography

1. What went well? Organized, real life experiences, ran smoothly, everyone was involved, communication between disciplines, shared prioritization in a disaster, separate area like real life
2. What could be improved? Too much trauma, tell expectations ahead of time
3. Is there anything you would add or take out? no
4. Should there be more IPE throughout each curriculum? yes
5. Do you think this should be sustained? yes

Pharmacy Technology

1. What went well? Speed of getting meds to hospital, took a while to get orders
2. What could be improved? How we got orders, be in the Simulation Hospital
3. Is there anything you would add or take out? no

4. Should there be more IPE throughout each curriculum? Yes, hands on practice
5. Do you think this should be sustained? Yes

Medical Assisting

1. What went well? Involvement with other disciplines, group effort and teamwork among disciplines, learned more about college and new faces, overcome fears, confidence booster, different pace than usual
2. What could be improved? Hand-off to EMS, knowing boundaries and scope of practice
3. Is there anything you would add or take out? Add being in a real ambulance, more patients in the MD office scenario to work on HIPAA rules.
4. Should there be more IPE throughout each curriculum? Do scenarios earlier, students teach each other and cross-train?
5. Do you think this should be sustained? Yes

Respiratory Therapy

1. What went well? Communication within disciplines, got to talk to other disciplines, sharing ideas to provide care
2. What could be improved? Know where things are, orientation to the area, walkie-talkies work better, couldn't hear code blue being paged
3. Is there anything you would add or take out? Tactful comments between disciplines, trauma or disaster scene, burn patient, do it later in semester

4. Should there be more IPE throughout each curriculum? Yes, prioritization between disciplines
5. Do you think this should be sustained? Yes, more scenarios and include a care plans project

LPN-RN Nursing

1. What went well? Applying class to real life, working with other students, communication, organized
2. What could be improved? More orientation and knowledge of the Simulation Hospital, knowing all the functions of the mannequins, more nurses per group
3. Is there anything you would add or take out? No
4. Should there be more IPE throughout each curriculum? Yes
5. Do you think this should be sustained? Yes, we want to do it again

Emergency Medical Services

1. What went well? The way everybody worked together, went smoothly, helped to understand roles and departments
2. What could be improved? Feedback about performance, know objectives, orientation
3. Is there anything you would add or take out? Real ambulance
4. Should there be more IPE throughout each curriculum? Yes, more hands on and experience
5. Do you think this should be sustained? Yes

SECTION VIII

DISCUSSION

Review of the Literature

Simulation-based education has proven to be a powerful experience that engages learners and an important piece to teaching students about interprofessional communication and roles (Manning et al., 2016). This project, using qualitative and quantitative methods, sought to measure the change in interprofessional socialization as a result of the Sim-IPE experience. According to multiple nursing organizations, following INACSL Standards of Best Practice: Simulation is an effective way to ensure that simulation is conducted appropriately (IOM, 2015; NLN, 2012; WHO, 2013; NCNA, 2016; QSEN Institute, 2017; RNAO, 2013; NCSBN, 2016; INACSL, 2015). Utilizing best practices, the Sim-IPE day was completed with all senior allied health students at a small community college. The pre-test and post-test were analyzed by total participants and each program, followed by a questionnaire to get feedback from the faculty and students. The findings support a positive impact of the Sim-IPE experience on the students.

Sample Discussion

The sample was slightly smaller than expected in each department. Although students were scheduled to come, multiple students had the flu and other viruses. Students with an illness were excused from the clinical day. All students were seniors in their last semester of their prospective programs, so the baseline knowledge of patient care was adequate for the scenarios. Some disciplines incorporate IPE, and some do not, so IPE was a new term to many students.

Findings

Allied Health Programs

Overall, allied health students had a significant improvement (p=0.000004) between the pre-test and post-test. One student out of 43 did not complete the pre-test, but 43 did complete the post-test. Otherwise, the mean score improved from 5.5 to 6.3. This large sample shows that as a group, the intervention was successful.

Radiography

Statistically, radiography students did not show a significant improvement (p=0.22), but the mean did change from 5.75 to 6.125, which was a positive change. This could have been because 11 students completed the pre-test and 12 students completed the post-test. However, regarding the questions about the day, the students had very positive responses. A possible reason for the insignificant difference is that the radiography students were based in a classroom and waited for calls from the secretary to perform their diagnostics. Since there was more time away from the scenarios, and they only interacted with nursing and respiratory, they may not have been exposed to every discipline. Also, in their clinical settings, they are used to working with nursing and respiratory disciplines. It may not have been as unusual for them to be involved in these type of scenarios.

Pharmacy Technology

The sample size in pharmacy technology explains the statistical analysis. Since a two-tailed T-test was performed, the two-tailed p value=0.15, and the one-tailed p value= 0.07. The mean did increase from 4.9 to 6.35. Pharmacy technology students were in their classroom with all of their equipment to make medications, so they were not in the

Simulation Hospital unless they were bringing medications to the nurses. They missed quite a bit of interaction with all disciplines, but could observe when they delivered medications. Also, it took longer than expected to get medication orders called in, so the beginning of the scenarios were slow for these students. The students verbalized that they would like to be in the Simulation Hospital in order to see next time.

Medical Assisting

Medical assisting students were similar to pharmacy technology students because the sample was very small (n=4) and their two-tailed p value=0.10 while the one-tailed p value= 0.05, which shows significant change. However, the mean scores improved from 5.5 to 6.6. The qualitative data showed that the students really enjoyed and learned from the experience. Although they only had one patient, they enjoyed following the patient from the medical office to the hospital to see how their work started in the office played a role in the care they received in the hospital. The students wanted to do more of these scenarios and increase the number of patients that they triaged.

Respiratory Therapy

There were 13 respiratory students involved in the scenarios, so their ratio of students to patients was helpful for them. They did show a significant change in the pre-test and post-test. These students enjoyed planning care with the other disciplines and having to prioritize not only their care, but also deciding if nursing or radiography needed to do anything before they did. Respiratory therapy usually only uses two of the mannequins, so an orientation to the other mannequins would have been helpful for them.

LPN-RN Nursing

These students also showed a significant difference between the pre-test and post-test. However, with only 10 students, there really needed to be more nursing students for the number of scenarios that were used. With five scenarios going on, three nurses could not handle the load in a limited time frame. The students did learn to rely on other disciplines, but could have worked through the scenarios better if there were more nursing students. This could have had an impact on radiography and pharmacy technology students as well because the orders did not get processed quickly.

Emergency Medical Services

Although there were only two students, there was a significant change in the pre-test and post-test scores. These students have not been in clinicals much yet, so this was a very new experience for them. It helped them to understand the roles of different disciplines very well. They also requested more orientation to the different areas since they started in the medical office and ended in the Simulation Hospital.

Faculty Feedback

The faculty involved were very impressed with the outcomes of the Sim-IPE day. Everyone agreed that it was organized, flowed well, faculty ran the scenarios very well, and the students did a great job. A few weaknesses were the waiting times for the pharmacy students and radiography students, and the lack of nursing students to handle the patient load. Everyone also agreed that we should continue this project each year and incorporate more IPE throughout the curriculums.

The faculty also created a wish list of things that could improve the Sim-IPE day. This included a phone for every patient room, increase the scenario time to 45 minutes to

ensure that students completed the objectives, use the Pyxis in the Simulation Hospital, have more patients in the medical office, use a real ambulance for transport, and live feed to the classrooms where pharmacy technology and radiography students are so that they can view the scenarios happening. The Sim Lab Coordinator is now working on this list and taking over Sim-IPE for the future.

Results through Lens of Theoretical Framework

The findings clearly fall within NLN Jeffries Simulation Theory, which highlights the importance of the elements included in the simulation. It aligns directly with INACSL Standards of Best Practice: Simulation, and adds a large emphasis on the background and outcomes.

Context

The context of this simulation was a small community college that needed to meet NCBON and accreditation standards, which led to incorporating INACSL Standards of Best Practice: Simulation. Based on multiple assessments of the allied health programs, six disciplines decided to incorporate Sim-IPE day to improve patient outcomes in the future.

Background

The main goal of Sim-IPE was to integrate IPE through the use of simulation, and six disciplines worked together on scenarios. Each discipline had input on the scenario objectives, expectations, and correlating with the curriculum, course, and program outcomes. Resources, equipment, and resource allocation were analyzed prior to starting the project.

Design

An INACSL Standards of Best Practice: Simulation notebook was developed that addressed all of the elements of design. A template was made that included each element, and each scenario was created into this template. Design characteristics also included fidelity, complexity, cues, and debriefing.

Simulation Experience

The simulation experience was completed in classrooms, a mock medical office, and the Simulation Hospital. All measures were taken to ensure trust, realism, and fidelity within the simulation (Jeffries et al., 2016). The scenarios were also interactive, collaborative, and learner-centered.

Facilitator and Educational Strategies

All facilitators were trained on INACSL Standards of Best Practice: Simulation and the importance of each element. All faculty were trained to use the mannequins, follow the template for the scenario, and alter responses during simulation as needed and provide appropriate feedback and debriefing of the experience (Jeffries et al., 2016).

Participant

There were six disciplines of senior allied health students involved in Sim-IPE. Demographics were not taken, but factors of age, gender, level of anxiety, self-confidence, and preparedness to the simulation could have impacted their learning (Jeffries et al., 2016).

Outcomes

There are three areas of outcomes: participant, patient, and systems outcomes. Based on the data gathered, there were very positive outcomes from the participants.

Overall, there was a significant change in their socialization among the teams. The students verbalized an increase in knowledge, skills, confidence, teamwork, and critical thinking. Patient outcomes are affected by the interventions, and systems outcomes are found in the literature including studies related to cost-effectiveness and changes of practice (Jeffries et al., 2016). Unfortunately, we cannot directly see the effect on patients and system outcomes, but the literature points to a chain reaction that should occur with the increase in knowledge of interprofessional teams.

Figure 11 below is the theoretical framework followed, and it worked well with the Sim-IPE experience.

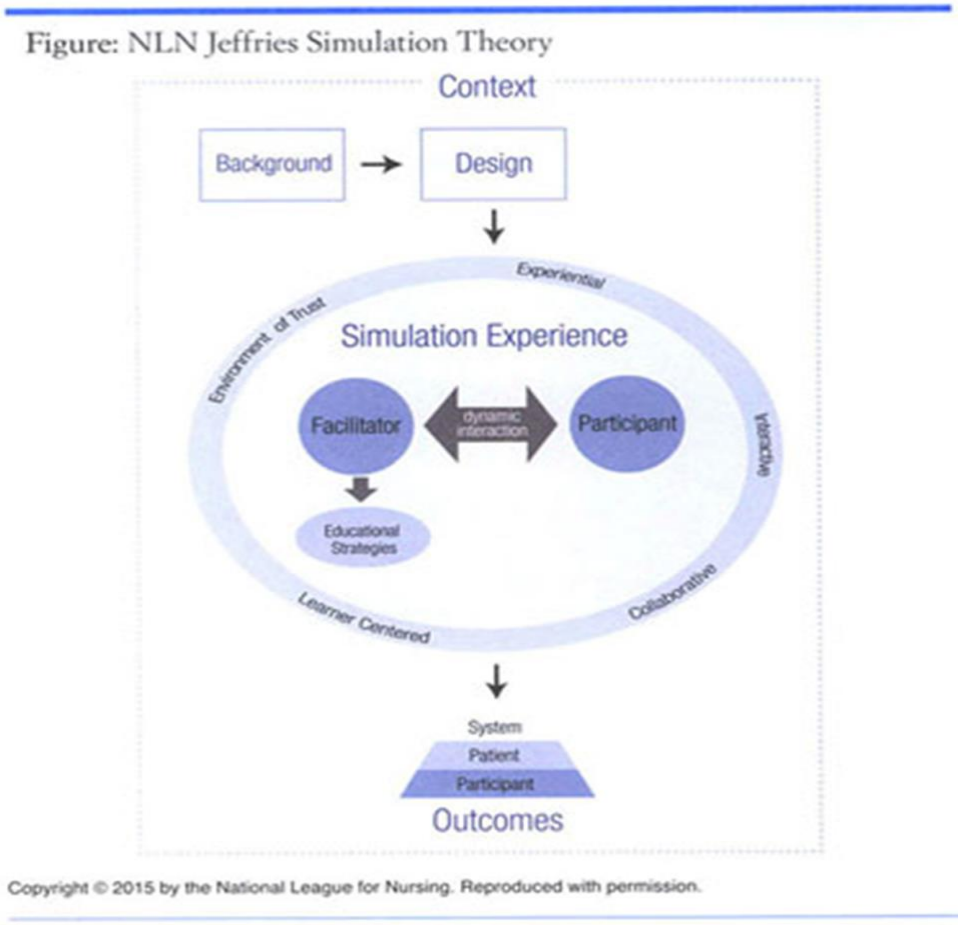

Figure 11. Theoretical Framework, NLN Jeffries Simulation Theory

Implications

Practice

Sim-IPE affords students with the opportunity to work with other disciplines to achieve objectives and outcomes together (INACSL, 2016). The benefits include teamwork, collaboration and improved patient outcomes. The evaluation tool, the ISVS 9A and ISVS 9B was constructed to reflect beliefs, attitudes, and behaviors in interprofessional teams (De Vries et al., 2015). With the significant change among students following the experience, hopefully patient outcomes will be improved by the knowledge and experience gained during Sim-IPE.

Education

There was an overwhelming response to continue the Sim-IPE day as well as integrate IPE throughout all curriculums. According to INACSL Standards of Best Practice: Simulation, there are four criteria necessary to meet this standard, and they were followed very closely:

1. *Conduct Sim-IPE based on a theoretical or a conceptual framework.* Sim-IPE was based on NLN Jeffries Simulation Theory.
2. *Utilize best practices in the design and development of Sim-IPE.* An INACSL Standards of Best Practice: Simulation notebook was developed. The notebook has each required element, the criteria to meet the element, and an explanation of how each are met.
3. *Recognize and address potential barriers to Sim-IPE.* A needs assessment, SWOT analysis, and organizational assessment was completed before starting the project.

4. *Devise an appropriate evaluation plan for Sim-IPE (INACSL, 2016).* The ISVS 9A and ISVS 9B was used to gather quantitative data and qualitative data was gathered with a brief questionnaire.

Based on the positive outcomes of the Sim-IPE day, this project will be sustained at the community college. The Simulation Hospital Coordinator will be responsible for taking over Sim-IPE and working to improve the project based on faculty and student feedback.

Policy

INACSL Standards of Best Practice: Simulation are getting integrated into simulation in each program. The Simulation Hospital Coordinator will be responsible for ensuring that simulations are conducted based on best practices, and meet IPEC (2011) competencies: values and ethics, roles and responsibilities, interprofessional communication, and team and teamwork. The goals of this project are now recommendations to implement into the practice setting:

- "3.2.a Academic organizations prepare students to work in interprofessional teams by developing, implementing and evaluating education models that foster interprofessional values and skills;
- 3.2.b. Academic organizations prepare students to work in interprofessional teams by instilling values, skills and professional role socialization that will support interprofessional care.
- 3.2.c. Academic organizations prepare students to work in interprofessional teams by enhancing educational and clinical opportunities for health professions to study and learn together" (RNAO, 2013, p.31).

Research

Future research needs to focus on how to integrate IPE throughout all curriculums. According to RNAO (2013), competencies should be built within the curriculums, with continuous instillation of values, skills, and professional role socialization, and increased opportunities for students to learn together. Best practices for integrating IPE needs to be researched and implemented. Also, research should determine how patients are affected by students that have IPE in their undergraduate programs. This would evaluate the patient and systems outcomes based on undergraduate interventions.

Limitations

There was a low risk for bias because the sample was all senior allied health students in the community college. It is a small rural community college, so the results may not be representative of other settings. The results were gathered anonymously for the pre-test and post-test, but the administrator asked the questions for the qualitative data. This could have affected the results if students did not respond honestly and openly. The other limitation noted was the lack of enough nursing students for the scenarios; this could have played a role on their scores, and those of other disciplines.

These findings should be generalized outside of the sample group and setting because it strictly adhered to a theoretical framework and INACSL Standards of Best Practice: Simulation. The template was designed based on the framework and best practices can be used for any scenario, and the process is the same. As long as the framework is followed, the outcomes should be the same.

The ISVS 9A and ISVS 9B have demonstrated reliability and validity. The questionnaire used was a set of general questions to help with feedback and sustainability issues. While it gave good information about the outcomes, it also addressed the need and value of sustainability of the Sim-IPE experience. The questionnaire may be a limitation because it did not have proven reliability measures, and was done in a class setting instead of individual responses. More information could have been gathered with a different, proven qualitative tool. However, the sustainability feedback was very important to note, and all students said Sim-IPE should continue, and IPE should be taught throughout the curriculums. There were also some great ideas for improvements in the future.

Conclusion

IPE is becoming a standard among professional organizations because it addresses teamwork and collaboration among healthcare team members, which affects patient outcomes. Undergraduate programs are being strongly encouraged to use simulation as a way to teach IPE to students before entering the workforce. INACSL Standards of Best Practice: Simulation has outlined the process to ensure Sim-IPE is developed correctly, and the NLN Jeffries Framework uses these best practices to improve student, patient, and system outcomes. The project demonstrated the importance Sim-IPE has on values and ethics, roles and responsibilities, interprofessional communication, and teamwork. This is the first step in integrating IPE throughout curriculums in order to follow the mission of this project: "Use best practices in simulation technology to teach allied health students to save lives by learning to work together."

References

Adamson, K. (2015). A systematic review of the literature related to the NLN/ Jeffries simulation framework. *Nursing Education Perspectives, 36*(5), 281-291. Retrieved from http://nclive.org/cgi-bin/nclsm?url=http://search.proquest.com/docview/1713517239?accountid=14019.

Adamson, K.A., & Rodgers, B. (2016). Systematic review of the literature for the NLN Jeffries simulation framework: Discussion, summary and research findings. In P. Jeffries (Ed.), *NLN Jeffries Simulation Theory* (pp.9-28). Philadelphia, PA: Wolters Kluwer.

Beroz, S. (2017). A statewide survey of simulation practices using NCSBN simulation guidelines. *Clinical Simulation in Nursing, 13* (6), 270-277.

Cronenwett, L., Sherwood, G., Barnsteiner, J., Disch, J., Johnson, J., Mitchell, P., Sullivan, D., & Warren, J. (2007). Quality and safety education for nurses. *Nursing Outlook, 55* (3) 122-131.

Cumin, D., Boyd, M. J., Webster, C. S., & Weller, J. M. (2013). A systematic review of simulation for multidisciplinary team training in operating rooms. *Journal of the Society for Simulation in Healthcare, 8* (3), 171-179.

De Vries, D., Woods, S., Fulton, L., & Jewell, G. (2015). The validity and reliability of the interprofessional socialization and valuing scale for therapy professionals. *Work, 53* (3), 621-630.

Decker, S., Anderson, M., Boese, T., Epps, C., McCarthy, J., Motola, I., Palaganas, J., Perry, C., Puga, F., Scolaro, K., & Lioce, L. (2015). Standards of best practice: Simulation standard VIII: Simulation-enhanced interprofessional education (IPE). *Clinical Simulation in Nursing, 11* (6), 293-297.

Dufrene, C. (2012). Health care partnerships: A literature review of interdisciplinary education. *Journal of Nursing Education, 51*(4), 212-216.

Dunnington, R. M. (2014). The nature of reality represented in high fidelity human patient simulation: philosophical perspectives and implications for nursing education. *Nursing Philosophy*, *15*(1), 14. doi:10.1111/nup.12034

Gannon, J., Motycka, C., Egelund, E., Kraemer, D. F., Smith, W. T., & Solomon, K. (2017). Teaching end-of-life care using interprofessional simulation. *Journal of Nursing Education, 56*(4), 205-210. doi:http://dx.doi.org/10.3928/01484834-20170323-03

Harris, J., & Ward-Preston, K. (2016). Managing the interprofessional project team. *Project planning and management: A guide for nurses and interprofessional teams* (p.101). Burlington, MA: Jones & Bartlett.

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

Hemming, T., Lioce, L., Kardong-Edgren, S., Jeffries, P. R., & Sittner, B. (2016). Featured Article: After the National Council of State Boards of Nursing Simulation Study—Recommendations and next steps. *Clinical Simulation in Nursing*, *12*2-7. doi:10.1016/j.ecns.2015.10.010

Institute of Medicine. (2015). Measuring the impact of interprofessional education on collaborative practice and patient outcomes. Retrieved from http://www.nap.edu/21726

International Nursing Association for Clinical Simulation and Learning. (INACSL) (2015). History of the INACSL Standards of Best Practice: Simulation (SM). Retrieved from https://www.inacsl.org/i4a/pages/index.cfm?pageID=3466

International Nursing Association for Clinical Simulation and Learning. (2015). Standards of Best Practice: Simulation (SM). Retrieved from https://www.inacsl.org/i4a/pages/index.cfm?pageID=3407

International Nursing Association for Clinical Simulation and Learning. (2016). INACSL Standards of Best Practice: Simulation (SM) Simulation Enhanced Interprofessional Education (Sim-IPE). *Clinical Simulation in Nursing 12* (S), S34-S38.

International Nursing Association for Clinical Simulation and Learning. (2018). INACSL Standards of Best Practice: Simulation. Retrieved from https://www.inacsl.org/inacsl-standards-of-best-practice-simulation/

Interprofessional Education Collaborative Expert Panel. (IPEC) (2011). Core competencies for interprofessional collaborative practice: Report of an expert panel. Washington DC: Interprofessional Education Collaborative. Retrieved from http://www.aacn.nche.edu/education-resources/ipecreport.pdf

Jeffries, P, R. (2016). The NLN Jeffries simulation theory. Philadelphia, PA: Wolters Kluwer.

Jeffries, P., Rodgers, B., & Adamson, K.A. (2016). NLN Jeffries simulation theory: Brief narrative description. In P. Jeffries (Ed.), *NLN Jeffries Simulation Theory* (pp.39-42). Philadelphia, PA: Wolters Kluwer.

Jones, B., & Potter, C. (2017). Featured Article: Applying Best Practice in Simulation: Critical Care Response Team Training. *Clinical Simulation in Nursing*, *13,* 442-445. doi:10.1016/j.ecns.2017.05.009

Kehrwald, B. A., & McCallum, F. (2015). Degrees of change: Understanding academics experiences with a shift to flexible technology- enhanced learning in initial teacher education. *Australian Journal of Teacher Education*, *40*(7), 43-56.

King, G., Orchard, C., Khalili, H. Avery, L. (2016). Refinement of the interprofessional socialization and valuing scale (ISVS-21) and development of 9-item equivalent versions. *Journal of Continuing Education of Health Professionals*, *36*(3), 171-177. doi:10.1097/CEH.0000000000000082

Lancaster, R. J., Anderson, P., Jambunathan, J., Elertson, K. M., & Schmitt, C. A. (2015). Simulation STEPS ahead: Preparing to engage in systematic evaluations of simulation activities. *Nursing Education Perspectives, 36*(6), 406-407. Retrieved from http://nclive.org/cgi-bin/nclsm?url=http://search.proquest.com/docview/1747402426?accountid=14019.

Lateef, F. (2010). Simulation-based learning: Just like the real thing. *Journal of Emergencies, Trauma and Shock, 3* (4), 348-352.

Lau, A.M., Tran, M.G., & Tse, Y. (2012). The McMaster PIPER Project: A novel approach to interprofessional education through simulation-based learning. Retrieved from http://www.healthcouncilcanada.ca/n3w11n3/HIC/Lau_Tran_Tse_Health%20Canada%20Innovation%20Essay%20-%20Interprofessional%20Sim-Based%20Education%20vFINAL.pdf

Lawlis, T., Anson, J., & Greenfield, D. (2014). Barriers and enablers that influence sustainable interprofessional education: a literature review. *Journal of Interprofessional Care, 28*(4), 305-310.

Lejonqvist, G., Eriksson, K., & Meretoja, R. (2016). Evidence of clinical competence by simulation, a hermeneutical observational study. *Nurse Education Today*, *38,* 88-92. doi:10.1016/j.nedt.2015.12.011

Leonard, B., Shuhaibar, E., & Chen, R. (2010). Nursing student perceptions of intraprofessional team education using high-fidelity simulation. *Journal of Nursing Education, 49*(11), 628-631. doi: http://dx.doi.org/10.3928/01484834-20100730-06

Liaw, S. Y., Zhou, W. T., Lau, T. C., Siau, C., & Chan, S. W. (2014). An interprofessional communication training using simulation to enhance safe care for a deteriorating patient. *Nurse Education Today, 34*(2), 259. Retrieved from http://nclive.org/cgi-bin/nclsm?url=http://search.proquest.com/docview/1476435229?accountid=14019.

Mancini, M. (2016). Foreword. In P.R. Jeffries (Ed.), *The NLN Jeffries Simulation Theory* (ix). Philadelphia, PA: Wolters Kluwer.

Manning, S. J., Skiff, D. M., Santiago, L. P., & Irish, A. (2016). Nursing and social work trauma simulation: Exploring an interprofessional approach. *Clinical Simulation in Nursing*, *12*(12). 555-564. doi:10.1016/j.ecns.2016.07.004

McDermott, D. S., Sarasnick, J., & Timcheck, P. (2017). Featured Article: Using the INACSL Simulation™ Design Standard for Novice Learners. *Clinical Simulation in Nursing*, *13* (6), 249-253. doi:10.1016/j.ecns.2017.03.003

McGaghie, W. C., Issenberg, S. B., Petrusa, E. R., & Scalese, R. J. (2010). A critical review of simulation-based medical education research: 2003-2009. *Medical Education*, *44*(1), 50. doi: 10.1111/j.1365-2923.2009.03547.x

Meleis, A. I. (2012). Theoretical nursing: development and progress. Philadelphia, PA: Lippincott Williams and Wilkins.

Moran, C. M., Steketee, C., Forman, D., & Dunston, R. (2015). Using a research-informed interprofessional curriculum framework to guide reflection and future planning of interprofessional education in a multi-site context. *Journal of Research in Interprofessional Practice & Education*, *5*(1), 1-13.

National Council of State Boards of Nursing. (2016). NCSBN Simulation Guidelines for Prelicensure Nursing Education Programs. Retrieved from https://www.ncsbn.org/16_Simulation_Guidelines.pdf

National League for Nursing. (2012). A nursing perspective on simulation and interprofessional education (IPE): A report from the National League for Nursing's Think Tank on using simulation as an enabling strategy for IPE. Retrieved from http://www.nln.org/docs/default-source/professional-development-programs/a-nursing- 4 perspective-on-simulation-(ipe-nln-invitational-think-tank-report,-2011) - pdf. pdf? sfvrsn=0

National League for Nursing. (2016). Guide to effective interprofessional education experiences in nursing education. Retrieved from http://www.nln.org/docs/default-source/default-document-library/ipe-toolkit-krk-012716.pdf?sfvrsn=6

National League for Nursing. (2018). Interprofessional education (IPE). Retrieved from http://www.nln.org/professional-development-programs/teaching-resources/interprofessional-education-(ipe)

National League for Nursing Commission for Nursing Education. (NLN, CNEA) (2016). Accreditation standards for nursing education programs. Retrieved from http://www.nln.org/docs/default-source/accreditation-services/cnea-standards-final-february-201613f2bf5c78366c709642ff00005f0421.pdf?sfvrsn=10

New, S. N., Huff, D. C., Hutchison, L. C., Bilbruck, T. J., Ragsdale, P. S., Jennings, J. E., & Greenfield, T. M. (2015). Integrating collaborative interprofessional simulation into pre-licensure health care programs. *Nursing Education Perspectives, 36*(6), 396-397. Retrieved from http://nclive.org/cgi-bin/nclsm?url=http://search.proquest.com/docview/1747402474?accountid=14019.

North Carolina Board of Nursing. (2017). Simulation Guidance. Retrieved July 17, 2017 from http://www.ncbon.com/dcp/i/nursing-education-resources-for-program-directors-simulation-guidance

North Carolina Nursing Association. (NCNA) (2016). North Carolina Nurses Association position statement on simulation-based interprofessional education in academic and practice settings. Retrieved from http://pubs.ncnurses.org/pub/8a5a75e9-782b-cb6e-2763-c9fea528f946

Office of Interprofessional Health Education and Research. (2012). ISVS-interprofessional socialization & valuing scale. Retrieved from http://www.ipe.uwo.ca/Administration/isvs.html

Orledge, J., Phillips, W. J., Murray, W. B., & Lerant, A. (2012). The use of simulation in healthcare: From systems issues, to team building, to task training, to education and high stakes examinations. *Current Opinion in Critical Care, 18*(4), 326.

QSEN Institute. (2017). QSEN Competencies. Retrieved July 21, 2017 from http://qsen.org/competencies/pre-licensure-ksas/

Registered Nurses' Association of Ontario. (RNAO) (2013). Developing and sustaining interprofessional health care: Optimizing patients/clients, organizational, and system outcomes. Toronto, Canada: Registered Nurses' Association of Ontario.

Rizzolo, M., Durham, C., Ravert, P., & Jeffries, P. (2016). History and evolution of the NLN Jeffries simulation theory. In P. Jeffries (Ed.), *NLN Jeffries Simulation Theory* (pp.1-6). Philadelphia, PA: Wolters Kluwer.

Schmidt, E., Goldhaber-Fiebert, S. N., Ho, L. A., & McDonald, K. M. (2013). Simulation exercises as a patient safety strategy: A systematic review. *Annals of Internal Medicine, 158*(5 Pt 2), 426.

Schreiber, J. L., & Goreczny, A. (2013). Instructional insight into interprofessional education (IPE). *Occupational Therapy in Health Care*, *27*(2), 180-185.

Skrable, L., & Fitzsimons, V. (2014). Simulation in associate degree nursing education: A literature review. *Teaching and Learning in Nursing*, *9* (3), 120-125. doi:10.1016/j.teln.2014.03.001

Stanly Community College. (SCC)(2016). Mission and strategic direction. Retrieved from https://www.stanly.edu/college-information/mission-and-strategic-direction)

Sullivan, D.T., & Godfrey, N.S. (2012). Preparing nursing students to be effective health team partners through interprofessional education. *Creative Nursing*, *18*(2), 57-63.

Teo, S. T., Pick, D., Newton, C. J., Yeung, M. E., & Chang, E. (2013). Organizational change stressors and nursing job satisfaction: the mediating effect of coping strategies. *Journal of Nursing Management, 21*(6), 878-887.

Thomas, C. M., Sievers, L. D., Kellgren, M., Manning, S. J., Rojas, D. E., & Gamblian, V. C. (2015). Developing a theory-based simulation educator resource. *Nursing Education Perspectives, 36*(5), 340-342. Retrieved from http://nclive.org/cgi-bin/nclsm?url=http://search.proquest.com/docview/1713517207?accountid=14019.

World Health Organization. (2013). Transforming and scaling up health professionals' education and training. World Health Organization Guidelines 2013. Geneva, Switzerland: World Health Organization.

Zaccagnini, M., & White, K. (2017). *The doctor of nursing practice essentials: A new model for advanced practice nursing.* (3rd ed.). Sudbury, MA: Jones & Bartlett.

Zorek, J. A., Blaszczyk, A. T., Haase, M. R., & Raehl, C. L. (2014). Research: practice site readiness for interprofessional education (PRIPE): Instrument development and pilot study. *Currents in Pharmacy Teaching and Learning*, *6* (1), 32-40.