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Improving Cardiopulmonary Resuscitation Education in Undergraduate Nursing Programs

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This doctoral project, directed and approved by the candidate's committee, has been accepted by the College of Graduate and Professional Studies of Abilene Christian University in partial fulfillment of the requirements for the degree

Doctor of Nursing Practice

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by

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Dedication

This DNP project is dedicated to my grandmother Rita B. Wood, who gave me my first glimpse of nursing through her stories of nursing school and her passion for teaching home nursing courses. Though I fell into nursing, it was no accident. God's plan became my destiny and blessed me with a fantastic journey. I am forever grateful nursing is one we could share.

Additionally and supremely, I dedicate this project and degree to my Lord and Savior Jesus Christ, who for placed this desire in my heart and guided me through every step.

Acknowledgments

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Additionally, I want to acknowledge my husband Kevin and our five children, their spouses, and children who inspire me daily. Thank you for your undying patience and support throughout this journey: my eternal devotion, Mimi.

Abstract

Ongoing competency validation of cardiopulmonary resuscitation (CPR) skills is not a routine practice in nursing school. Basic Life Support training and certification is obtained before or during nursing school with little opportunity for practice. Poor quality cardiopulmonary resuscitation skills can affect the confidence level of the performer and the patient outcome. The aim of this study was to explore the effect of training nursing faculty on the adoption of cardiopulmonary resuscitation technology into nursing school curriculum to provide improved cardiopulmonary resuscitation skills to nursing students. Using a pretest-posttest, this study followed the Kirkpatrick model of evaluation of continuing education, which measures reaction, knowledge gain, ability to apply learning and results noted from application. This convenience sample consisted of undergraduate nursing faculty located in the North and East Texas area who willingly attended the provided educational intervention. The researcher utilized a Wilcoxon signed-rank test to evaluate participants' reactions, knowledge gain, and perceived level of willingness to adopt an evidence-based competency validation resuscitation program. This project provides knowledge and awareness that promotes an avenue for nursing education to move from a certification-based resuscitation program to an evidence-based competency validation resuscitation program. Cardiac arrests continue to be a significant health problem both in and out of the hospital; nurses should be ready and prepared to provide prompt initiation of quality CPR, which would lead to improved patient outcomes.

Keywords: resuscitation quality improvement, cardiac arrest, cardiopulmonary resuscitation, nursing students, Rogers's diffusion of innovation and faculty, Kirkpatrick's model of evaluation

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Chapter 1: Introduction

Cardiopulmonary resuscitation (CPR) is a vital part of patient survival after cardiac arrest and must be performed immediately and correctly (American Heart Association [AHA], 2022). There are 9–10 cardiac arrests per 1000 hospital admissions (Andersen et al., 2019). Today's nurses must be prepared to respond to cardiac arrest situations. As early as 2005, Madden (2006) noted poor performance in CPR-related skills of nursing students. Her research demonstrates poor performance in the cognitive and psychomotor aspects of CPR based on the 2-year certification model. The AHA and Resuscitation Quality Improvement (2017) concur that poor quality CPR is a preventable harm in patient care.

There is a current gap in practice related to the lack of undergraduate nursing schools in North and East Texas providing quality resuscitation education programs. This project addressed this education gap by providing training for nursing faculty on a validation program for CPR skills. This training provided an opportunity to understand the function and efficacy of the Resuscitation Quality Improvement (RQI) program to improve nursing faculty and leadership stakeholders' knowledge of the adoption outcomes and promote adoption.

Undergraduate nursing clinical preparation uses multiple modalities, including skills-practice laboratories, simulation sessions, virtual reality simulations, and time spent on hospital units with experienced nurses and instructors. Henderson et al. (2018) recommended that clinical education start in semester one and build throughout the program. However, most nursing colleges require a Basic Life Support (BLS) course upon admission and spend little time ensuring the competency of these skills throughout the program.

By implementing a competency validation CPR program, nursing faculty could prepare student nurses to respond to cardiac arrest situations confidently and competently. This

confidence and competence would assist in a smoother transition to the workplace. Duchscher (2009) did extensive research and writing regarding the theory of transition shock, which emphasizes the need to bridge undergraduate curricula with the expectations the student will be tasked to perform upon entering the workforce. Henderson et al. (2018) acknowledged that whatever the nurses' experience levels, they must function effectively in novel and complex situations.

Background

Nursing Students' Poor Resuscitation Skills

In current practice, students are admitted into nursing programs having already obtained a BLS certification. Most students have only had one or two training sessions spaced 1 to 2 years apart, which means they enter nursing school with very little practice. In 2013, the AHA resuscitation guidelines indicated that high-quality CPR improves patient outcomes. Additionally, anything but high-quality CPR "should be considered a preventable harm" to the patient (AHA & RQI, 2017, p. 3). Ensuring the delivery of high-quality CPR by practicing high-quality CPR is essential to saving more lives.

Most students demonstrate poor skills retention because of a lack of practice opportunities leaving them incompetent to perform effective CPR (Oermann et al., 2014). In a press release on September 23, 2021, the National League for Nursing (NLN) and Laerdal Medical announced a partnership stating their support for the using the RQI program in nursing schools to further prepare future nursing professionals to respond to cardiac arrest events (NLN, 2021). The NLN (2021) recommends the adoption of RQI as a standard-of-care training in BLS courses as an essential aspect of nursing education.

Transition to Practice Issues

Nurses are now in greater demand, and hospitals throughout North and East Texas desperately need well-trained nurses. However, Texas ranks among the lowest in the United States, with nine nurses/per 1,000 people, while the U.S. average stands at 12 nurses per 1,000 (Grimley et al., 2021). According to Hampton et al. (2020), despite interventions implemented in nursing programs, 25% of novice nurses resign from their initial employment during their first year of practice because of unsatisfactory transition experiences. Hospital and hospital systems are continuously searching for ways to ease "transition shock" (Hoare, 2016), with several hospital systems investing in nurse residency programs or transition-to-practice programs (Hampton et al., 2020). Schools of nursing currently cannot validate students' competency in BLS. Students maintain BLS certification by taking an AHA CPR course before the start and, if needed, during the nursing program by utilizing courses outside the nursing school.

North Texas hospital systems, such as Texas Health Resources and Baylor Scott & White, offer not only nurse residency programs but also use the RQI program. Grimley et al. (2021) explained that nurse staffing plays a pivotal role in meeting national patient safety and infection control-related benchmarks. Improving student nurse confidence and competency in resuscitation skills before employment better prepares them for in-hospital cardiac arrest situations during nursing school and on hire (NLN, 2021). Adopting programs, such as the RQI program, in nursing schools would prepare nursing students and new nurses for cardiac arrest situations and ease the transition to practice upon entering the workforce (Hampton et al., 2020). Agencies such as the American Association of Colleges of Nursing (AACN) and the American Commission for Education in Nursing (ACEN) support standards for accreditation for their

respective programs and encourage collaboration between healthcare organizations and schools of nursing to ensure skill progression (Hampton et al., 2020).

Intervention-RQI Program

In 2015, the AHA and Laerdal Medical collaborated to develop and launch the RQI program. This program moves from the traditional 2-year certification for CPR education to a quarterly skill competency practice and verification, also known as "low-dose, high-frequency" (AHA & RQI, 2017, p. 7). This program provides ongoing feedback to ensure learners are performing skills needed to ensure high-quality CPR practice. This high-quality practice enables the learner to perform these skills well when needed in a cardiac arrest situation (Dudzik et al., 2019).

The RQI program is an evolution in the quality of resuscitation training. It focuses on skill competency and is not contingent on the expiration of the certification card. RQI utilizes the high-frequency, low-dose model (AHA & RQI, 2017). Learners complete coursework in smaller sections and practice skills quarterly (Dudzik et al., 2019). This program ensures competency in the cognitive and psychomotor aspects of resuscitation. The cognitive portion is an interactive online scenario using avatars controlled by the learner to simulate actions needed to provide essential life support to the simulated patient. Lectures and other content precede these scenarios to teach or refresh the learner before completing the scenario. Psychomotor skills are validated using a skills station outfitted with a specially designed manikins that students can conveniently access, allowing the quarterly practice. Based on learner skills, psychomotor training typically takes about 5–10 minutes (AHA & RQI, 2017). Each station contains an adult and infant manikin and a laptop with internet connectivity.

Learners are coached with audio and visual feedback while performing simulated CPR. Learner performance data remain in a learning management system that records compressions of adequate rate and depth, full chest recoil, minimal interruption to compressions, and avoidance of excessive ventilation. These data track and document individual learner performance. The manikin station is self-service and available during the quarterly learning cycle. This training eliminates scheduling and attending BLS classes to maintain certification. Certification cards are available by logging into the platform and printing or downloading data.

Significance

Schools of nursing cannot currently validate students' competency in BLS. Students maintain BLS certification by taking an AHA CPR course before the start and, if needed, during the nursing program by utilizing courses outside the nursing school. Oermann et al. (2014) highlighted the need for continued psychomotor skills required for high-level CPR. Their research demonstrated that one training session is not optimal for skill retention. Skills retention requires practice to ensure learners refine their performance and improve (Oermann et al., 2014).

Several North and East Texas hospitals are part of large healthcare systems already utilizing the RQI program. Students who can use the RQI program in nursing school will transition to practice easier as the expectations for maintaining competency are the same. Additionally, students transitioning to healthcare systems that currently require registered nurses (RNs) to have Advanced Life Support (ALS) and Pediatric Advanced Life Support (PALS) certifications have the advantage of knowing how to utilize and navigate this platform. Familiarization with this technology may eliminate some of the stress of new RNs entering an entirely new training atmosphere. Additionally, RN students who understand the need for frequent CPR training during nursing school and that do not transition to practice at a hospital or

healthcare facility that uses an ongoing competency validation would still benefit from repetition and skill refinement. These nurses would be more prepared for a cardiopulmonary arrest situation that could take place in the early days of their employment and before graduation (Kardong-Edgren et al., 2020). Dudzik et al. (2019) stated that the RQI program provides quarterly practice sessions with real-time feedback to learners. It allows student learners and faculty administrators to monitor skill progression as learners are given a numeric score during each quarterly psychomotor skill session, making it a positive addition to the nursing school curriculum (Dudzik et al., 2019).

Nature of the Project

In this quality improvement project I utilized the Faculty Attitudes and Adoption of Simulation (FAAS) survey created by Min and O'Rourke (2017) in a pretest-posttest nonexperimental design to collect participant ratings regarding the effectiveness of the training to improve knowledge and perceived adoption of the RQI program (Appendix A). The educational intervention evaluation for this study followed the Kirkpatrick model of evaluation of continuing education, which measures reaction, knowledge gain, and self-efficacy (Kirkpatrick & Kirkpatrick, 2016). The convenience sample consisted of North and East Texas undergraduate nursing faculty who willingly attended the provided educational intervention. I chose this design and a nonrandomized sample because of the participants' availability and the project's time constraints.

The participants filled out an informed consent form (Appendix D) and chose a unique identifier to use on the pretest-posttests. The pretest-posttest utilizes the Kirkpatrick model for the valuation of the continuing education format (Kirkpatrick & Kirkpatrick, 2016). Bhatia et al. (2021) and Reio et al. (2017) demonstrated the use of the Kirkpatrick model in the successful

evaluation of continuing education programs like this educational intervention. The pretest-posttest tool is a paper-based questionnaire with Likert scale questions. I matched the pretest-posttest results using these data for statistical analysis.

Statement of the Problem

Despite the evidence regarding the efficacy of the RQI program, healthcare education in North and East Texas has yet to show even moderate utilization (NLN, 2021). A solution is evaluating the impact of training on improving the nursing faculty's awareness and knowledge of the need to incorporate CPR technology programs such as RQI into nursing school curricula. Oermann et al. (2014) revealed that cardiac arrests continue to be a significant health problem both in and out of the hospital; nurses should be ready and prepared to provide prompt initiation of quality CPR, which leads to improved patient outcomes.

Purpose of the Study

In this project I aimed to evaluate whether training provides nursing faculty with improved knowledge and adoption of a CPR technology program in nursing schools in North and East Texas.

Research Questions

RQ: Will CPR technology training increase undergraduate nursing faculty attitudes on the knowledge of and perceived willingness to adopt CPR technology into the undergraduate nursing curriculum?

The PICOT question: Will undergraduate nursing faculty who receive training on a CPR technology program show improved knowledge of and perceived willingness to adopt CPR adoption of CPR technology after completing a classroom and hands-on training session?

The research hypothesis is the following: In an undergraduate nursing faculty, CPR technology training improved participants' knowledge, attitudes toward knowledge gain, and perceived willingness to adopt CPR technology into the undergraduate curriculum.

The null hypothesis is the following: In undergraduate nursing faculty, CPR technology training did not improve participants' knowledge, attitudes toward knowledge gain, and perceived willingness to adopt CPR technology into the undergraduate curriculum.

Definition of Key Terms

Cardiac or cardiopulmonary arrest. an often-fatal sudden loss of heart function requiring immediate intervention such as high-quality CPR (AHA, 2021).

Cardiopulmonary resuscitation (CPR). a critical and lifesaving procedure performed immediately and correctly to ensure blood and oxygen flow during a cardiac arrest (AHA, 2022).

Nursing faculty. Registered nurses who teach the nursing practice in nursing education programs (Law Insider, 2022). This term includes full-time, part-time, and adjunct staff teaching at the undergraduate level.

Scope and Limitations

Scope

This study explored the effect of training on nursing faculty's attitudes toward adopting CPR technology into the nursing school curriculum to ensure the competency-validated CPR skills of nursing students. This project's inclusion criteria were all full-time, part-time, and adjunct nursing school faculty from the North and East Texas area willing to participate in the CPR technology training program. Evaluation included an assessment of knowledge gained and participants' perceived willingness to adopt CPR technology into the curriculum.

Limitations

Limitations of this study included ethical, economic, and organizational culture considerations. Klacman and Marshall (2016) found hospitals show significant savings and improved skill performance using the RQI program over the traditional BLS training model. However, nursing students are responsible for ensuring their own BLS certification before attending nursing school. Based on a Google search, a traditional 2-year certification class ranges from $35–$50 in the North and East Texas area. Kimberly Flatland, the impact manager of strategic enterprise solutions at RQI Partners, LLC, stated there are two options for payment when using the RQI program at a college or university. In Option 1, the school incurs approximately $64 per student per year. In Option 2, the student chooses to utilize the RQI program, and there is a once-a-year charge of $70. Despite the improved competency associated with the using the RQI program, the additional cost may have been a factor related to the participants' willingness to adopt.

The organizational cultures of the undergraduate nursing schools used in this study can play a role in the ability and willingness to adopt the new curriculum. Cheema (2021) reminds us that when adopting new technologies, understanding the challenges faculty face regarding change is paramount. Berg-Poppe et al. (2022) explored the changes in knowledge and attitudes related to the commitment of a practice change after providing a specific trauma education program to healthcare providers. According to Berg-Poppe et al. (2022), providing expert knowledge-based training and organizational commitment to change drove the affective commitment needed to promote the behavior change.

Additional limitations of this study included faculty availability and willingness to attend training, causing a limited study sample and limiting generalizability. The increased cost of

student training using the RQI program could alter faculty's perception of adoption feasibility, thus limiting their attitudes toward adoption. I addressed these known limitations during the training intervention.

Summary

This chapter highlights the need to improve resuscitation education in undergraduate nursing programs. In addition to improving patient outcomes, improved resuscitation skills can aid new nurses and nursing students in the transition to practice. Nursing faculty must understand the importance of providing improved competency validation and training of CPR skills to move toward the adoption of CPR technologies into the undergraduate nursing curriculum.

Chapter 2: Literature Review

Nursing students and newly graduated nurses may be needed to perform CPR during school clinical rotations or in the workplace shortly after graduation. Nursing students complete BLS before entering the nursing program without planned opportunities for practice or competency validation. According to Kardon-Edgren et al. (2020), this current practice leads to undergraduate nursing students' poor CPR skill mastery and retention.

There is a current gap in practice related to the lack of undergraduate nursing schools in North and East Texas that exceed the current requirement of resuscitation education programs. This chapter addresses this gap by providing research that supports training to adopt an ongoing competency-based resuscitation program, Rogers's diffusion of information theory for adopting CPR technology, and literature supporting the use of the Kirkpatrick model to evaluate the training.

Literature Search Methods

I searched several databases including CINAH, EBSCO, Science Direct, and Onesearch for Abilene Christian University's library database. The following terms were used in the literature search: *resuscitation quality improvement*, *cardiopulmonary resuscitation and nursing students, Rogers's diffusion of innovation and faculty*, and *Kirkpatrick's evaluation model.* Initial searches of *resuscitation quality improvement* revealed 110,697 results. Refining the search using *and nursing students* and narrowing the date range to 2015–2022 revealed 44 results. Initial searches of *Rogers's diffusion of innovation and faculty* revealed 204 results, and searching *Kirkpatrick model and faculty* revealed 526 results, then narrowed by using *nursing faculty*. All literature searches used dates from 2015–2022. The review included studies from the United States and internationally and included research on the need for improved CPR training,

the implementation of new or changed curriculum, and the evaluation of faculty acceptance of a new or changed curriculum.

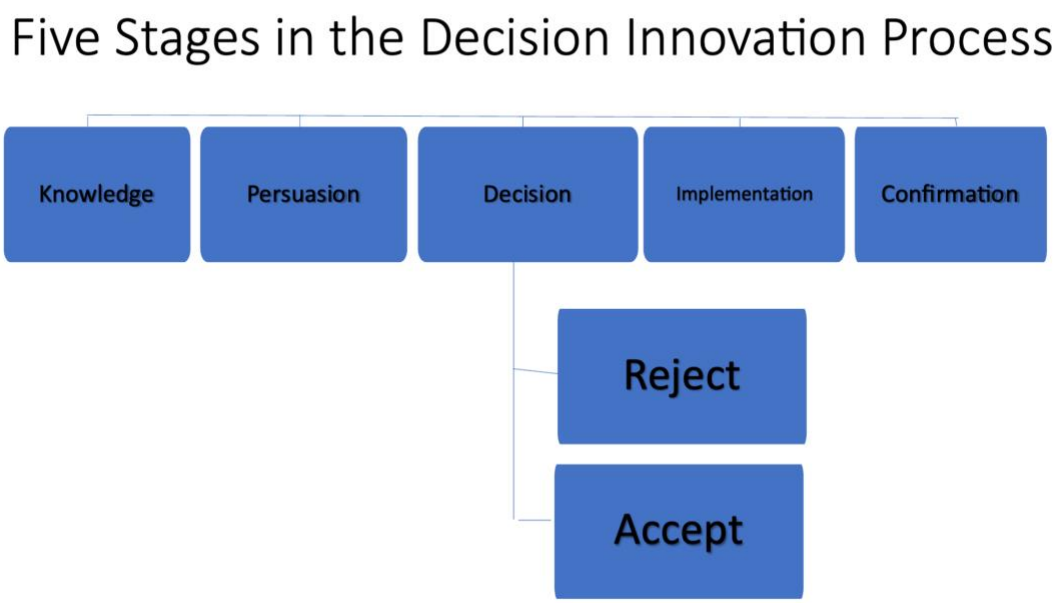
Theoretical Framework

Rogers's Diffusion of Innovation Theory

Rogers's 1962 diffusion of innovation theory guided this project's implementation. The theory has been used when adopting processes related to nursing informatics; however, it is also applicable to innovation in nursing schools. Rogers's five-step diffusion theory utilizes communication channels to share knowledge and persuade the audience to adopt innovation. Rogers's process stages are awareness, persuasion, decision, implementation, and continuation. A visualization of this process is presented in Figure 1 (Rogers, 2003). Though this innovation is not new, it is new to healthcare education. In the awareness phase of Rogers's process, faculty have the opportunity to receive education on this innovation—the RQI program. Using multiple avenues of communication and networking, I generated awareness of the training intervention. Reaching out to classmates, fellow educators, and current and past coworkers, I generated a contact list for area nursing schools. I worked with school contacts via email to meet the availability needs of willing faculty participants. Additionally, I created an IRB-approved informational flier and disseminated it by email and on nurse educator networking platforms.

Figure 1

Rogers's Diffusion of Innovation Theory Process



The persuasion phase is the second stage of Rogers's theory. During this phase, faculty participants attended the educational training, providing knowledge and understanding of the RQI program. According to Rogers (2003), the subjective experience of others may be more impressionable than the objective experience of the evaluator. As an experienced RQI user, I shared with participants the positive personal experiences that I encountered in the adoption of the RQI program at two large healthcare organizations. An experienced RQI representative was available to provide information on equipment and technical support provided by RQI partners. I shared with participants feedback from nursing schools already using the RQI program, literature resources supporting the use of the RQI program in undergraduate nursing schools, and information regarding payment options available for nursing schools. The assessment at the end of the training will evaluate the perceived willingness (decision) to adopt.

The implementation and continuation phases are beyond the scope of this study.

The Kirkpatrick Evaluation Model

Donald Kirkpatrick's theoretical framework has stood the test of time. Introduced it in the 1950s, it has now been utilized for 60 years. According to Kirkpatrick, evaluation ensures that learning occurs at the highest level. Evaluations provide evidence of the degree of understanding and the need for program changes to improve knowledge (Kirkpatrick & Kirkpatrick, 2016). Kirkpatrick uses a four-step model of evaluation to evaluate training programs. Level one focuses on the learner's reaction to the program, which is deemed highly important regarding the learner's participation in future programs. Level two focuses on the learner's perceived learning from the training program. Level three measures the degree to which the learner can apply the training to the current occupational role, and level four looks at organizational results related to learners' training outcomes.

Literature Review

Skill Decay

Kardon-Edgren et al. (2020) examined the adequacy of CPR-related skills with one skill refresher session utilizing the RQI program in nursing students previously trained in BLS. While the study demonstrated statistically significant results showing poor skill performance prior to refresher and improved skill mastery with refresher utilizing the RQI program, additional studies are needed to compare CPR skills between those trained initially by instructors and those prepared by the RQI system. Multiple studies authored by a variation of this author group provide expertise in this topic. The sample of 467 nursing students was not randomized and the researchers chose participants from 10 schools of nursing, which were in all regions of the United States.

Kardong-Edgren et al. (2020) utilized parametric statistics *t* tests to determine the difference between pretest and posttest results. The results showed an overall increase in compression scores from pretest *M* (*SD*) = 42.76 (36.23) to posttest *M* (*SD*) = 77.87 (26.26) with a $p = .0001$ and an overall increase in ventilation scores from pretest *M* (*SD*) = 19.06 (21.68) to posttest *M* (*SD*) = 70.61 (33.29). Several variations of compressions and ventilations were analyzed and presented in tables showing pretest/posttest scores by mean, standard deviation, and *p*-value. Participants showed a skill level not meeting AHA guidelines despite completing a CPR course before performing CPR-related skills. Skill level improved after receiving an additional training session.

Demirtas et al. (2021) examined the effectiveness of a simulation-based CPR training program on nursing students' knowledge, satisfaction, and self-confidence. Their literature review included high-fidelity and low-fidelity manikins and simulations to improve the CPR skills of medical and nursing students from 2011–2019. The researchers utilized a mixed-method design of quantitative and qualitative data found using a convenience sample of 89 fourth-year nursing students participating in an emergency department internship. Of note, this sample received CPR education in year two of their nursing education. All 89 participants agreed to the quantitative portion of the study, and 24 also participated in the qualitative part (Demirtas et al., 2021).

The instruments used in this study included demographic data, a CPR knowledge questionnaire, a CPR skills observation checklist, a students' satisfaction and self-confidence scale (SSSC), and a semistructured interview form. A pretest, intervention session including didactic and psychomotor training, and posttest three weeks after the intervention were used as quantitative data. Descriptive statistics (mean, standard deviation, frequency, and percentage)

were used to analyze the qualitative data. A paired sample *t* test was used to compare pretest and posttest mean scores. A *p*-value of less than .05 was considered statistically significant. Qualitative data were collected using a focus group interview. Four groups of six students were interviewed and recorded to collect the qualitative data. Two researchers performed the content analysis of the quantitative data. The data was blinded by assigning students a code number allowing statements to be recorded separately by the researchers. Themes were revealed—Initialization, Construction, Rectification, and Finalization (Demirtas et al., 2021).

The results indicated that the average age of participants was 20–23 years old. The didactic portions of the pretest and posttest were scored 0–10. The participants scored a mean of 5.66 before and 8.38 after, showing a significant improvement. There was also a notable improvement in skill performance from a mean of 22.29 pretest and a mean of 32.51 posttest. The maximum range was not given for this but listed both statistics with *p*-value less than .001. The qualitative data suggested increased confidence and satisfaction related to the training with student participants, suggesting that all nursing students would benefit from this training.

Demirtas et al. (2021) stated that a limitation of their study was that it was conducted in one nursing school and, therefore, results could not be generalized. The literature search and sample size used for this study showed the need for improved CPR training in nursing schools. This study reinforces the need for improved resuscitation education in undergraduate nursing programs.

CPR Practice With Feedback Device

Dick-Smith et al. (2020) investigated the use of CPR feedback devices to improve nursing students' CPR performance. The sample of 64 participants included nursing students who had taken a traditional CPR course about three weeks before the study. Results indicated

that using feedback devices in training improved skill performance. Nursing students appear to be a convenient sample, but any group that could undergo BLS certification could have been utilized. Each participant was tested on the three devices, first without feedback and then with feedback. The sample size appears adequate for this study.

The researchers utilized nonparametric tests, as data demonstrated nonnormal distributions (Shapiro-Wilk test; $n < 2000$). Median and interquartile ranges were reported. The Friedman test determined differences between the baseline (no feedback) and the three feedback devices. For multiple comparisons, the researchers calculated pairwise comparisons with a Bonferroni correction ($p < .0125$). A Wilcoxon signed-rank test determined which device performed better ($p < .05$). *P*-values < .05 were considered significant (Dick-Smith et al., 2020). A standardized method was used to capture data by the devices providing confidence in the data collected and adding validity to the results.

Arrogante et al. (2021) studied the acquisition and retention of CPR skills. Their study utilized a feedback device to explore if physical characteristics, deliberate practice, and feedback-device use during training affected the quality of CPR-related skills such as compressions and ventilations. An extensive literature review that explored the use of high-quality CPR for patient outcomes, feedback devices in the practice of CPR skills, and frequent practice of CPR skills preceded this study. The literature review revealed a lack of data on rescuers' physical characteristics in performing high-quality CPR.

The study design was a two-group parallel randomized clinical trial that utilized 60 undergraduate second-year nursing students who received CPR training during the first year of nursing school (Arrogante et al., 2021). They recruited this convenience sample based on willingness to participate in the study. The sample group was randomized into a control group (*n*

= 28) and an experimental group (n = 31). The study was blinded for personnel recording outcomes and the statisticians involved. The researchers measured students for weight, height, respiratory volume, handgrip strength, and CPR position strength. All participants completed two minutes of CPR on a manikin with measurement capabilities. A two-hour CPR course (30 minutes didactic, 90 minutes of hands-on training with a feedback device) was the intervention provided to the experimental group. Repeat testing of both groups was performed on the same day and then at the three-month mark.

The data analysis of the overall quality of compressions and ventilations showed the training (experimental) group and the control group to be very close with mean and standard deviation values of M = 50.3, SD = 23.7 and M = 53.5, SD = 26.0, respectively, before the intervention. After the intervention training, results indicated values of M = 93.7, SD = 4.7 and M = 53.5, SD = 30.7, respectively. At the three-month follow-up, values for the experimental and control groups were measured at M = 88.3, SD = 5.3 and M = 52.0, SD = 26.5, respectively, revealing a significant difference between the groups, with the experimental group showing marked improvement. The level of confidence was set at 95% with $p < .05$. Although muscle strength has been positively associated with quality chest compressions, there was no evidence suggesting physical characteristics impacted the quality of CPR in this study. However, this finding might be hindered by the participants only doing 2 minutes of CPR instead of a long time, which might be more telling. Despite muscle strength possibly being an asset, the rescuer must utilize what is available in time of need; therefore, learning to perform high-quality CPR is essential.

According to (Arrogante et al., 2021), this study showed CPR skill improvement using feedback devices during practice and attending the 2-hour practice session. The study

intervention was a two-hour practice session including 90 minutes of CPR training with a feedback device. This study indicates that practice is needed beyond initial training for nursing students to perform CPR at a level recommended by the AHA. It also implies that practice with a feedback device improves CPR skills by promoting real-time correction of poor-quality compressions and ventilations.

The RQI program promotes frequent (quarterly) psychomotor skill practice and utilization of real-time feedback modalities. Evidence supports improved psychomotor skill competency when using the RQI program compared to traditional CPR training. Feedback devices assist the learner in correcting their errors in real-time promoting competent skill practice. The evidence listed supports themes of improved performance using real-time feedback modalities and psychomotor skills related to CPR.

Implementation of New or Changed Curriculum

I used Rogers's diffusion of innovation theory to operationalize the PICO in implementing this project. Rogers's five-step diffusion theory utilizes communication channels to share knowledge and persuade the audience to adopt innovation. Rogers's process stages are awareness, persuasion, decision, implementation, and continuation (Parker, 2021). Though this innovation is not new, it is new to healthcare education.

Blumberg (2016) conducted a study based on Rogers's process to explore the prevalence of learning-centered teaching practices. A convenience sample of 58 full-time faculty members were chosen based on the university's strategic plan to move to learning-centered teaching. The faculty were from the College of Art and Science and Health Professions. Blumberg (2016) explained how she used the five factors or intrinsic characteristics to influence this adoption of learning-centered teaching by defining and capitalizing on these factors or characteristics,

including relative advantage, compatibility, complexity or simplicity, trial ability, and observability, Blumberg was able to customize learning opportunities using these factors and characteristics to meet the needs of her implementation.

Blumberg (2016) conducted an interview study after her implementation and compared the results to a study by Blumberg and Pontiggia (2011). The data collection tool, a semistructured questionnaire, was utilized for both studies. The questionnaire used a rubric similar to a Likert scale with four values. Higher values indicated increased intention or actual use of learning-centered instruction by faculty. Additional faculty members were trained on the rubrics and independently rated transcribed interviews to provide inter-rater reliability.

Blumberg's (2016) results showed improvement from 2009-2010 (M = 2.07, SD = 0.36) to 2012–2013 (M = 2.51, SD = 0.97). Of note, faculty implemented learning-centered teaching differently, and faculty could be grouped into one of three categories: mostly employing, partially employing, and not employing. Per Rogers's theory (2003), the middle category is typically the largest, which held for Blumberg's study (Blumberg, 2016). Blumberg lists limitations due to using self-reported data instead of direct observation. Overall, this research contained valuable insight on project implementation that could ultimately improve the utilization of RQI by nursing faculty.

Cheema (2021) explored a curriculum change and recommended the importance of recognizing individual and collective faculty concerns during the change process. She used a mixed method of data collection using quantitative survey data pre-intervention and qualitative interviews postintervention. She found that most faculty (97%) favor curriculum integration. However, 56% of those faculty members noted concerns about the lack of coaching for adapting

teaching methods associated with the change. She contends that adoption include proper training and a plan to monitor faculty concerns during implementation (Cheema, 2021).

Evaluation of Faculty Acceptance

Reio et al. (2017) examined fifteen studies utilizing the Kirkpatrick model. Two of the fifteen employed the Kirkpatrick model similarly to evaluate training effectiveness, with both studies using a survey method for data collection. Reio et al. (2017) posited that the continued use of the Kirkpatrick model is related to its ease of use in evaluating training.

Berg-Poppe et al. (2022) explored the changes in knowledge, beliefs, self-efficacy, and commitment to practice change after providing a specific trauma education program to healthcare providers. According to Berg-Poppe et al. (2022), providing expert knowledge-based training and organizational commitment to change drove the effective commitment needed to promote self-efficacy. They recognized that when providers hold positive attitudes toward their ability to implement change, the implementation of new programs becomes more successful. In agreement with Rogers (2003), they recognize that self-efficacy can be influenced by personal successes, verbal persuasion, and motivation from others (Berg-Poppe et al., 2022). Berg-Poppe et al. (2022) also utilized a pretest-posttest design to evaluate the effectiveness of this implemented curriculum change.

Bhatia et al. (2021) used the new world Kirkpatrick model (NWKM) in their study to evaluate a neonatal simulation program by using a posttraining, survey-based response. They highlighted the importance and methods of delivering neonatal resuscitation training, but they did not focus on the efficacy of the Kirkpatrick model. Additional research by Reio et al. (2017) provided an in-depth review of studies using the Kirkpatrick model, like Bhati et al. (2021).

Bhati et al. (2021) found the NWKM is effective in assessing program effectiveness by qualitatively utilizing a postintervention survey. They also examined patient outcomes quantitatively by comparing a pre-intervention time (2007–2011) with a postintervention time (2012–2018). Four hundred and forty-five participants that attended the training made up the sample population. The sample was consistent in the number of physicians and nursing professionals who received training. Seventy-one percent completed the postevaluation questionnaires.

Bhati et al. (2021) collected the data feedback surveys after every training session for more than 7 years using a paper-based evaluation form. The evaluation form included nine questions; five were measured using a Likert scale, and four were open-ended response questions, including one for general comments. Likert scale responses were analyzed statistically, and the free-text responses were sorted into themes or categories. The Likert scale responses were averaged by year and question, and an overall total was listed by question. None of the averages for the questions in the overall column were below 4.50/5. This result showed that the training scored well according to the Kirkpatrick model. The open-ended questions provided insight into current and future activities.

The outcome (quantitative) data were extracted from the hospital's database. Data from 2007–2018 were assessed on all newborn babies that required resuscitation at birth. Statistical analysis included using categorical or continuous numerical data. Outcomes were compiled on a yearly and all years combined level. Bhati et al. (2021) conducted ANOVA to compare the outcomes between the years. Pre- and postdata were analyzed using *t* tests for continuous data and chi-square tests for categorical data. The *p*-value was less than .05. The study revealed improved outcomes posttraining that might be linked to the training. Neonatal deaths decreased

from 0.8% to 0.6% after the training intervention. The authors recommended continuing training sessions (Bhati et al., 2017). Based on the use by Bhati et al. (2021) and information provided by Reio et al. (2017), the Kirkpatrick model would assist in the evaluation of this project.

Summary

According to the AHA, poor-quality CPR is preventable harm. Currently, nursing students lack the skills to perform high-quality CPR during clinical rotations and immediately upon graduation. By providing practice opportunities, students can improve and maintain CPR skills (Demirtas et al., 2021; Kardon-Edgren et al., 2020). In addition to deliberate practice, using real-time feedback devices during CPR improves skill performance (Arrogante et al., 2021; Dick-Smith et al., 2020). According to research by Demirtas et al. (2021) and Bhatia et al. (2021), the ability to practice in a simulated environment also improved participants' confidence in their ability to perform skills when needed. The RQI program provides quarterly practice sessions with real-time feedback to learners, making it a positive addition to the nursing school curriculum.

This literature review includes articles related to the implementation and evaluation of this study. Blumberg (2016) offers insight into using Rogers's diffusion of innovation theory for faculty adoption of an innovation. Kirkpatrick and Kirkpatrick (2016) recognized the need to evaluate education programs and ensure high-level learning. Articles by Bhatia et al. (2021) and Reio et al. (2017) explore the use of the Kirkpatrick model in the successful evaluation of continuing education programs, which highlight its use for this study.

Chapter 3: Research Method

There is a current gap in nursing education practice regarding the lack of undergraduate nursing schools in North and East Texas providing quality resuscitation education programs. Oermann et al. (2014) revealed that cardiac arrests continue to be a significant health problem both in and out of the hospital; nurses should be skilled and prepared to provide prompt initiation of CPR, which leads to improved patient outcomes. Currently, students receive their CPR or BLS certification more than 6 months before graduation, with no opportunity to practice, leaving them without the skill retention needed to perform effective CPR (Oermann et al., 2014).

Despite the evidence regarding the efficacy of the RQI program, healthcare education has yet to use this program (NLN, 2021). This project aims to determine the impact of an educational intervention on undergraduate nursing faculty's knowledge and perceived willingness to adopt the RQI program in the undergraduate nursing curriculum. This project also highlights the need to increase faculty awareness of the RQI program to improve the resuscitation skills of undergraduate nursing students caring for patients in the clinical setting both before and after graduation.

Project Design

I recruited undergraduate nursing faculty from North and East Texas. Recruitment methods included reaching out to current or past coworkers and classmates and the nursing school leadership identified on the school website via email. This convenience sample agreed to participate by attending the educational intervention and completing the pretest and posttest surveys. The educational intervention was an in-person training due to the hands-on equipment portion—however, virtual training modalities were also used. I traveled to provide training on selected campuses.

A pretest-posttest was given before and after the educational intervention. Terry (2017) states that the pretest-posttest design allows the researcher to look at the outcome of interest before and after the application of an intervention. This study used the Faculty Attitudes and Adoption of Simulation (FAAS) instrument, created by Min and O'Rourke (2017), in a pretest-posttest non-experimental design to collect participant ratings regarding the effectiveness of the training to improve knowledge and perceived willingness to adopt the RQI program. The FAAS instrument uses a Likert-type scale to measure attitudes and two subscales, one measuring perceived knowledge and one measuring level of adoption. As can be seen in Appendix A, the faculty with higher self-ratings reported increased knowledge and intent to adopt (Min & O'Rourke, 2017).

Intervention

Participants attended a one-time, in-person training session that I developed. The training took approximately 40 minutes, but the equipment and I remained available after the training. The training took place on campuses that agreed to participate in the study and at the times convenient for faculty participants. I provided literature-based, in-person training highlighting the current state of CPR skill quality in nursing education and offered insight on the need to adopt the RQI program in undergraduate nursing education. Literature discussion included CPR skill decay, CPR practice with a feedback device, transition to practice issues, the need for CPR skill competency validation, and RQI as an intervention. As an experienced RQI adopter, I offered personal insights and experiences using the RQI program in a hospital-based setting. A trained RQI program representative provided feedback on current undergraduate nursing program use and equipment for demonstration and hands-on use.

Instruments and Measurement Tools

In their quest to measure the faculty's perceived knowledge and intent to adopt after training, Min and O'Rourke (2017) created the FAAS evaluation tool. They used theoretical concepts from Ajzen's theory of planned behavior, Benner's novice to expert theory, and Roger's diffusion of innovation theory to guide their efforts (Min and O'Rourke, 2017).

Using the FAAS evaluation survey, this study followed the Kirkpatrick model of evaluation of continuing education (Kirkpatrick & Kirkpatrick, 2016). The FAAS survey evaluated Level 1 (reaction), Level 2 (knowledge gain), and Level 3 (potential behavior change) of the Kirkpatrick model. The survey asked participants to rate their knowledge of the RQI program on a novice-to-expert scale. This rating addresses Level 1—the reaction to the training. According to the NLN (2021), despite the evidence regarding the efficacy of the RQI program, healthcare education in North and East Texas has yet to show even moderate utilization. The FAAS survey measured the perceptions of the RQI program using a Likert-type scale with 1–5 values to assess Level 2—the knowledge gain associated with the training. The FAAS survey assessed the Level 3—perceived behavior change—by asking participants to rate their level of adoption of the RQI program. There were five categories, each outlining a level of adoption, from awareness to leading the process (Min & O'Rourke, 2017).

Bolarinwa (2015) explains that construct validity is how an instrument such as a questionnaire measures the theoretical construct it is intended to measure. Content or face validity can be ensured by conducting a thorough literature search to determine if the variables are relevant, including the variables in a measurement instrument, and having the instrument viewed by a panel of experts (Bolarinwa, 2015; Heavey, 2018). Validity and reliability of the FAAS survey were achieved using a panel of experts and used in pilot testing (Min & O'Rourke,

2017). Bolarinwa (2015) describes construct validity as a valuable and meaningful measurement of validity. Convergent construct validity ensures similar results with different measuring tools. Min and O'Rourke (2017) showed that the convergent construct validity of the FAAS survey was 0.91. The external validity of this instrument was maintained by using a real-life situation instead of a laboratory setting (Sefidkar & Madadizedeh, 2022).

Data Collection, Management, and Analysis Plan

Data Collection

The study took place over 3 months. Each participant attended one training session. The training intervention occurred in prearranged faculty meeting rooms on the participants' home campus. I provided the forms for informed consent and the FAAS survey. These were collected before the training intervention. The quantitative instrument, the FAAS survey (Appendix A), was used with permission from the author Jenny O'Rourke (Appendix C), who approved using the FAAS survey to evaluate CPR technology in nursing education in the manner it has been used to assess simulation in teaching. Each faculty member agreeing to participate chose their unique six-digit (letter and or number) identifier, which was used to match presurvey and postsurvey results. I administered the FAAS survey immediately after the training intervention.

Data Management

The informed consent form informed participants that the collected data will remain anonymous, only identified by the unique identifier and only used for this DNP project. I organized raw data was by matching presurveys and postsurveys by the unique identifier. Then unidentifiable results were stored in a secured university drive with a protected passcode for participant privacy. I uploaded all data to the university canvas course NURS 755 in the de-identified state. Data will be stored for 3 years and then destroyed.

Data Analysis

I used the FAAS tool as the pretest and posttest instrument. The participants provided answers based on a scale of 1 = *strongly disagree*, 2 = *disagree*, 3 = *neutral*, 4 = *agree*, and 5 = *strongly agree* (Min & O'Rourke, 2017). I statistically analyzed the quantitative data from the matched pretest-posttests and analyzed each question using the Intellectus Statistics program using descriptive statistics, including the parametric paired samples *t* test or the nonparametric Wilcoxon signed-rank test. According to Intellectus Statistics (2022), a paired sample *t* test identifies the mean differences between dependent variables, and it is used when the dependent variable data is scale in nature. The Wilcoxon signed-rank test identifies the median differences between dependent variables. The Wilcoxon test is a nonparametric statistic used to assess differences between matched pair designs or repeated measures such as the pretest-posttest design (Intellectus Statistics, 2022). I would have used the paired *t* test if a larger sample was obtained. However, I used the Wilcoxon signed-rank test based on sample size.

Methodology Appropriateness

This project's comparative non-experimental research design compared pretest-posttest scores from the same participants. Terry (2017) stated there must be randomization and the use of a control or comparison group for a study to be deemed experimental. The pretest-posttest design does not utilize randomization or a control group but, based on the review of literature, appears to be the best method for assessing the impact of the educational intervention (Berg-Poppe et al., 2022; Bhati et al., 2021; Cheema, 2021; Terry, 2017). I administered the FAAS survey in person before the intervention and again upon completion. The same participants' results were examined to determine if the intervention produced some change.

Feasibility and Appropriateness

The educational intervention occurred at two different nursing schools in North and East Texas based on faculty availability and leadership approval (Appendix E). I performed and maintained direct oversight in all aspects of project implementation, such as explaining and obtaining the informed consent, administering the pretest and posttest surveys, providing the educational training intervention, and obtaining resources for data analysis. I used assistance from my contacts at RQI partners for the use of RQI program equipment for demonstration purposes. In addition, I absorbed any costs associated with the development and deployment of this project.

IRB Approval and Process

This study posed minimal risks. The intervention for this project provided training to improve nursing faculty knowledge and self-efficacy in implementing the RQI program. I used a pretest-posttest design in the evaluation of this intervention. This design looks at the outcome of interest before and after applying an intervention (Terry, 2017). Using this design, participants chose a unique identifier to match the pretest and posttests, but all data were kept confidential and blinded for reporting. I secured the surveys in a locked file cabinet in a locked office until I scanned them into a secure electronic file. Paper files were then shredded after the data transfer was complete.

I recruited participants from area nursing schools through professional connections, and participation was voluntary. I obtained informed consent before the study by providing a paper consent form to all participants just prior to the educational intervention. According to the Belmont Report (National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research, 1979), quality improvement projects that are not program evaluations,

program audits, or fiscal audits are not considered research and do not need IRB approval. Defining what constitutes research with human subjects states that the researcher uses information obtained through intervention or interaction or receives, uses, studies, analyzes, or generates identifiable private information (National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research, 1979).

I conducted this evidence-based practice (EBP) quality improvement (QI) project in the academic setting and I used no identifiable data for surveys. EBP and QI projects typically do not qualify for IRB review (Terry, 2017). Brewer and Alexandrov (2014) recommend gaining IRB approval before initiating EBP programs. The IRB of Abilene Christian University approved the study (see Appendix F), as did one of the nursing schools from which I recruited participants.

Interprofessional Collaboration

Interprofessional collaboration occurred at various intervals throughout this project. I am a faculty member at one of the schools of nursing from which participants were recruited and a past RQI implementor while working as a hospital professional development specialist during two extensive hospital system RQI rollouts. Nursing leadership and faculty of two schools of nursing participated in the education intervention. At ACU, the collaboration consisted of the DNP project chair, committee members, the DNP program director, ACU instructors, and the IRB committee.

Practice Setting

I conducted the educational at the two schools of nursing. The ability and willingness of participants determined location. Targeted campuses agreed to provide a room or skills lab to accommodate the number of participants in attendance.

Target Population

Based on the nature of this project and geographical location, the target population consisted of full-time, part-time, and adjunct undergraduate nursing faculty members at two nursing schools in North and East Texas. The sample size was evaluated using the G* Power calculator and determined that the ideal sample size was 111 using a paired *t* test and 47 using the Wilcoxon signed-rank test to be considered statistically relevant (Faul et al., 2007). Based on the time constraints of this project, sample size was a limitation.

Risks and Benefits

There were minimal preconceived risks; however, the lack of available faculty and the spread of infectious diseases could have disrupted the in-person training session. I was prepared and did deliver virtual Zoom sessions in attempts to meet sampling requirements. Benefits included increased faculty knowledge of the RQI program and its use within nursing schools to ensure student resuscitation skill competency. Improving student nurse confidence and competency in resuscitation skills before employment would better prepare them for in-hospital cardiac arrest situations during nursing school and on hire (NLN, 2021). Adopting programs such as the RQI platform in nursing schools would prepare current and new nursing students for cardiac arrest situations and ease the transition to practice upon entering the workforce (Hampton et al., 2020).

Timeline

The project's development and implementation timeline (Appendix B) took place over 9 months. Starting in January 2023, the initial recruitment of faculty participants began. The pre-implementation planning began in January to secure dates, locations, and equipment. In January and April, the project's training intervention took place. Posttest data were collected immediately

after the intervention. Data analysis took place in June. The project was completed in September 2023.

Chapter Summary

Nursing faculty must improve CPR training during nursing school to improve the resuscitation skill quality of student nurses and newly graduated nurses. This project intended to show that educational training on the RQI program can impact faculty attitudes and knowledge gain, which would increase perceived willingness to adopt the RQI program.

The project intervention included literature-based in-person training that highlighted the current state of CPR skill quality in nursing education and offered insight into the need to adopt the RQI program in undergraduate nursing education. The project intervention assessment used the Min and O'Rourke (2017) FAAS instrument in a non-experimental pretest-posttest design. It measured faculty attitudes toward knowledge and perceived willingness to adopt the RQI program and has shown high reliability and validity for use in the evaluation of faculty training.

Unique identifiers blinded me to identifiable faculty information. I analyzed pretest-posttest surveys using the paired *t* test or the Wilcoxon signed-rank test. According to ACU protocol, data management and approval to conduct this process improvement initiative were obtained following guidelines from the ACU Office of Research & Sponsored Programs.

Chapter 4: Results

Identifying the gaps in nursing education related to cardiopulmonary resuscitation was a goal of this study. Improving the knowledge of and perceived willingness to adopt the RQI program was the motivation. In addition, my goal was to examine the current perception of cardiopulmonary resuscitation education and ensure awareness of the improved standards of care of the RQI program in use by several area hospital systems.

Data Collection

The population targeted for this study was undergraduate nursing faculty in North and East Texas. There were 24 participants from two local community colleges and two universities in Texas, 23 full-time faculty members, and one master of nursing education student completing his final semester practicum. I recruited participants via emails to leadership contacts at various universities, delivered two educational interventions in-person, and presented one via Zoom. One nursing school provided 14 participants for the live presentations; the other provided eight. The Zoom presentation invitation was sent to multiple institutions but only yielded two participants. All participants signed the provided consent form before participation and self-assigned a six-digit unique identifier used to match the pretest-posttest surveys.

Data Analysis

Perceptions of the RQI Program

I provided each participant with two copies of the FAAS survey (Appendix A) and instructed them to add a unique identifier in the space provided. Before beginning the educational presentation, I asked them to check *presurvey* at the bottom. Participants completed an additional FAAS survey after the educational intervention and marked *postsurvey* at the bottom.

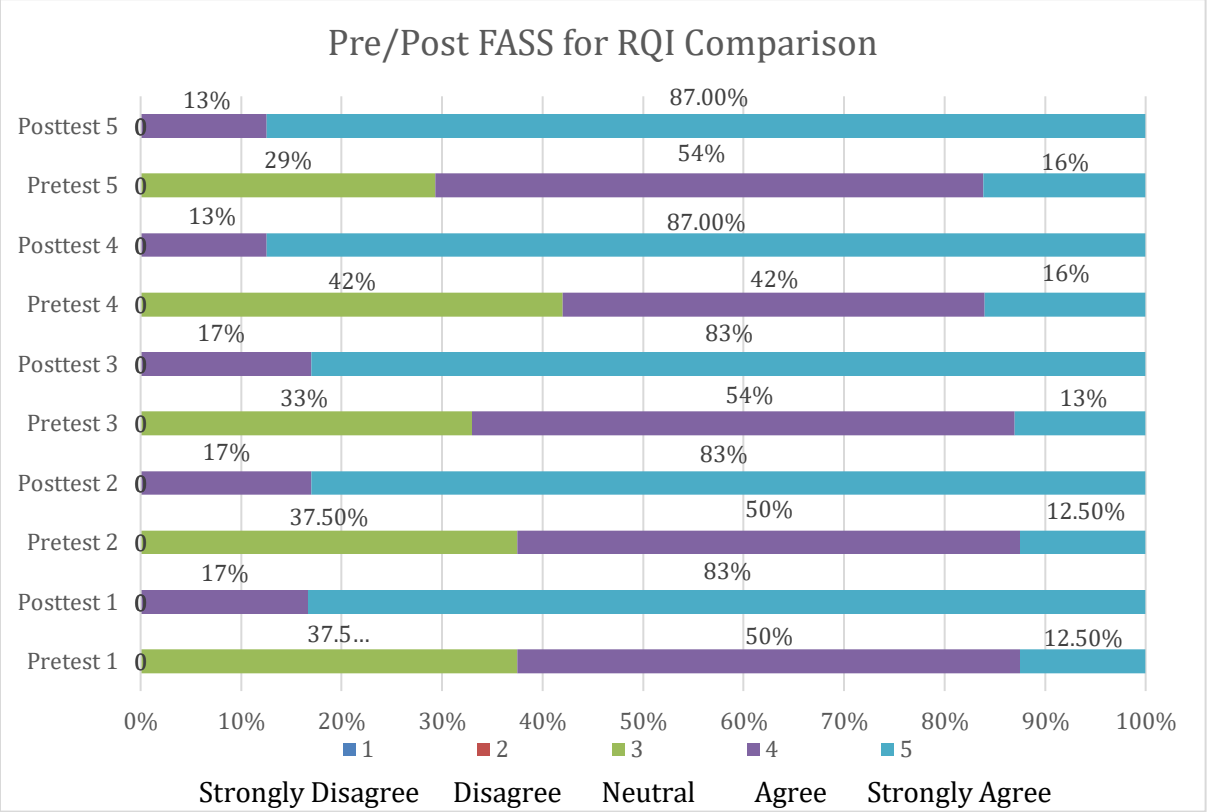
The first portion of the FAAS survey is a set of five statements based on a Likert scale rating about the individuals' perceptions of the RQI program. The participants responded based on the following scale: 1 = *strongly disagree*, 2 = *disagree*, 3 = *neutral*, 4 = *agree*, and 5 = *strongly agree*.

The first three statements of the FASS survey asked the participants if they believed that using the RQI program in nursing education could have a positive effect on student CPR skill retention, if they believed that using the RQI program in nursing education could have a positive effect on student competency, and if they believed could have a positive effect on student confidence related to resuscitation skills. The presurvey results indicated that 12.5% of participants strongly agreed with each of the three statements, and the postsurvey results showed that 83.3% strongly agreed.

The final two statements asked participants if they believed that using the RQI program in nursing education could positively affect student ability to perform resuscitation in the clinical setting postgraduation, and that using the RQI program in nursing education could positively affect student transition to practice. The presurvey results (Figure 2) indicated that 16.7% of participants strongly agreed with each statement, and the postsurvey results indicated that 87.5% strongly agreed with these statements.

Figure 2

Pre- and Postsurvey FAAS for RQI Comparison



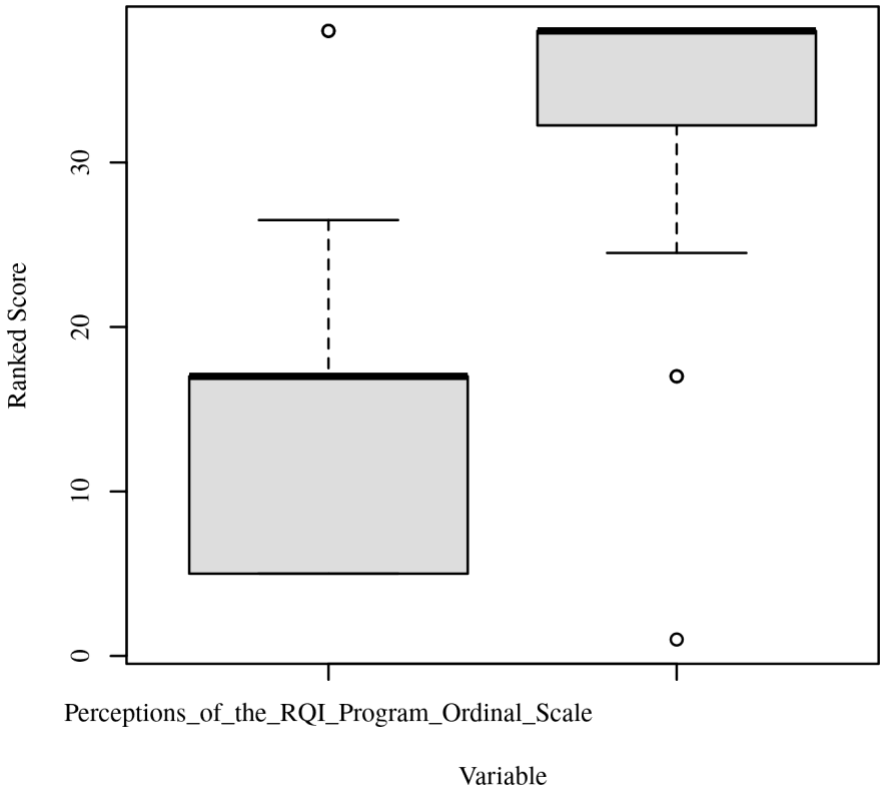
Note. 1 = *strongly disagree*, 2 = *disagree*, 3 = *neutral*, 4 = *agree*, 5 = *strongly disagree*.

Due to the limited sample size, the two-tailed Wilcoxon signed-rank test examined whether there was a significant difference between presurvey and postsurvey perceptions of the RQI program. The two-tailed Wilcoxon signed-rank test is a nonparametric alternative to the paired samples *t* test and does not share its distributional assumptions (Conover & Iman, 1981).

Figure 3 shows that the results of the two-tailed Wilcoxon signed-rank test were significant based on an alpha value of .05, $V = 6.50$, $z = -3.57$, $p < .001$. This result indicates that the differences between presurvey and postsurvey perceptions of the RQI program are not likely due to random variation. The median of the presurvey ($Mdn = 4.00$) was significantly lower than that of the postsurvey ($Mdn = 5.00$).

Figure 3

Ranked Values of Presurvey and Postsurvey

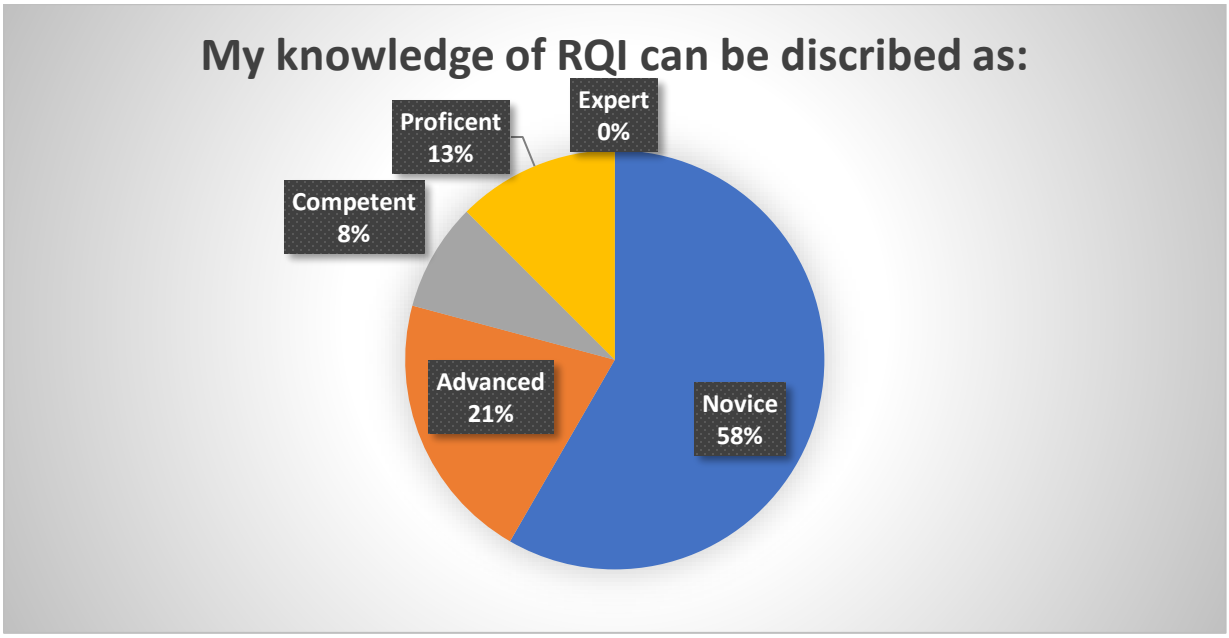


Perceived Knowledge of the RQI Program

Figure 4 shows the next section of the FAAS survey measured the participant's current knowledge of the RQI program. The pre-intervention knowledge results showed that 58.3% of the participants self-rated as Novice (having little or no knowledge of the RQI program), 20.8% self-rated as Advanced Beginner (having basic knowledge of the RQI program), 8.3% self-rated as Competent (having an average understanding of the RQI program), 12.5% self-rated as Proficient (having a solid understanding of the RQI program principles), and none of the participants self-rated as Expert (having a deep understanding of the RQI program principles).

Figure 4

FAAS Presurvey Level of Knowledge

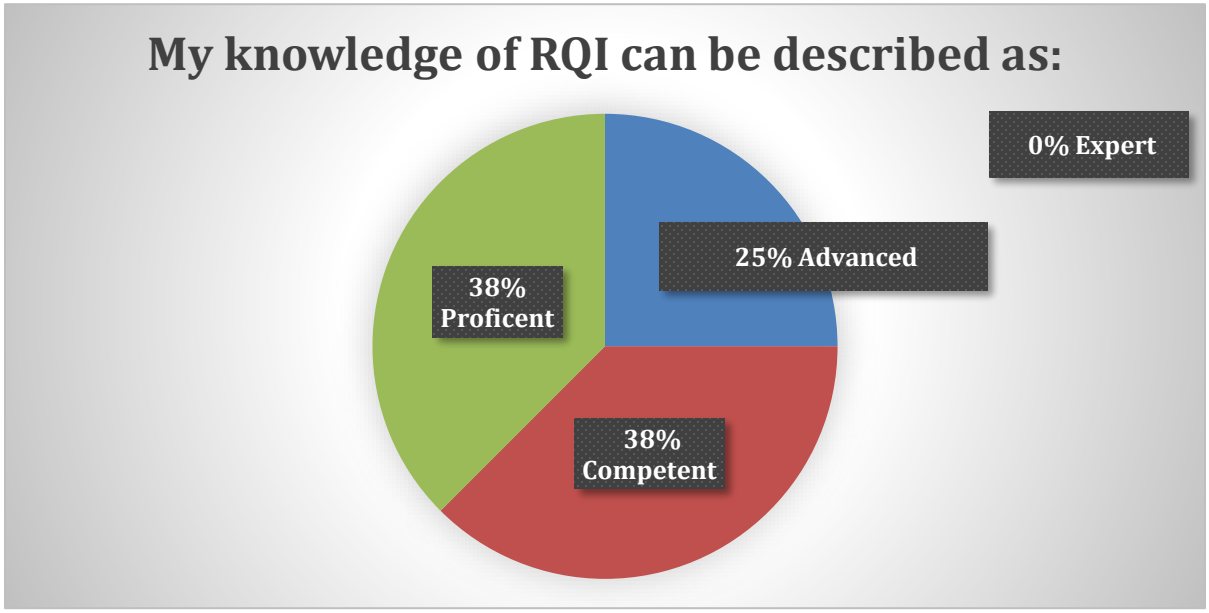


Note. n = 24; Exact percentages: Novice 58.35%; Advanced Beginner 20.8%; Competent 8.3%; Proficient 12.5%; Expert 0.0%.

Figure 5 shows the postsurvey results after receiving the educational intervention and indicates that 25% of the participants self-rated as now having basic knowledge (Advanced Beginner) of the RQI program, 37.5% self-rated as having an average understanding (Competent) of the RQI program, and 37.5% self-rated as having a solid understanding (Proficient) of the RQI program principles. There were still no self-ratings of deep understanding of the RQI program.

Figure 5

FAAS Postsurvey Level of Knowledge



Note. n = 24; Exact percentages: Novice 0.0%; Advanced Beginner 25%; Competent 37.5%; Proficient 37.5%; Expert 0.0%.

Perceived Adoption of the RQI Program

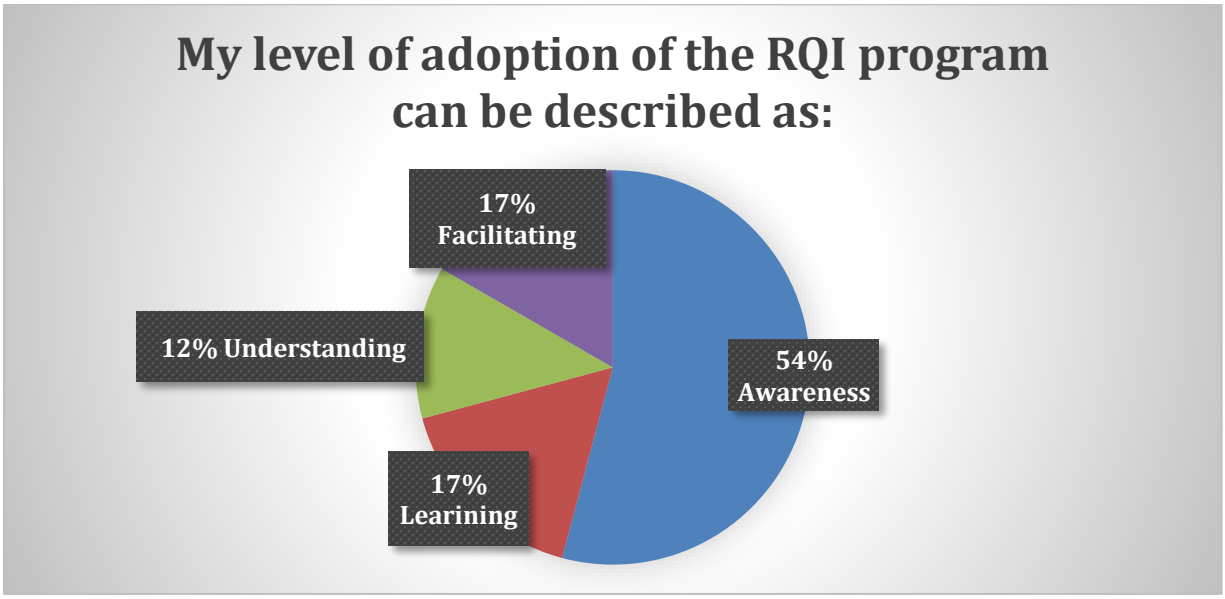
The FAAS survey's final portion measured the RQI program's adoption level. The lowest level of adoption is Awareness and describes a nursing faculty that rarely uses cardiopulmonary resuscitation (CPR) technology to teach students. The next level of adoption is Learning the Process, which represents faculty who is learning to use basic CPR technology experiences with students. Learning the Process is followed by Understanding and Applying the Process, which is described as the ability to use low and high-fidelity CPR technology to teach and evaluate students. Facilitating the Process represents one who is comfortable experimenting with various uses of CPR technology for teaching and has used CPR technology to ensure students are competent in their skills. Lastly, the highest level of adoption is Leading the Process, which

describes one eager to share their knowledge of the RQI program with colleagues and encourage student/faculty use.

Figure 6 shows the presurvey results: 54.2% of participants self-rated as Aware but rarely use CPR technology to teach students; 16.7% self-rated as Learning basic CPR technology; 12.5% self-rated as Understanding and Applying CPR technology to teach and evaluate students; and 16.7% self-rated as Facilitating various CPR-related technologies for teaching and skill evaluation.

Figure 6

FAAS Presurvey Levels of Adoption



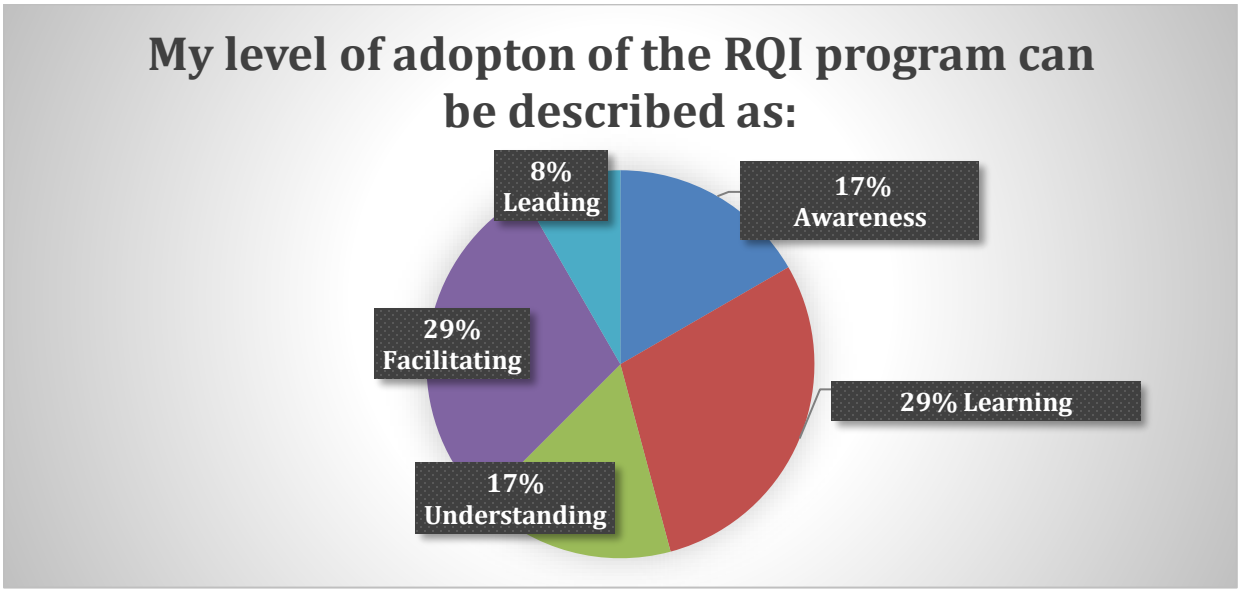
Note. n = 24; Exact percentages: Awareness 54.2%; Learning 16.7%; Understanding and Applying 12.5%; Facilitating 16.7%.

Figure 7 shows the postsurvey results: 16.7% of participants self-rated as Aware but rarely using CPR technology to teach students; 29.2% self-rated as Learning basic CPR technology; 16.7% self-rated as Understanding and Applying CPR technology to teach and evaluate students; and 29.2% self-rated as Facilitating the use of various CPR-related

technologies for teaching and skill evaluation. Additionally, 8.3% now self-rated as Leading (eager to lead) the adoption process of RQI.

Figure 7

FAAS Postsurvey Levels of Adoption



Note. n = 24; Exact percentages: Awareness 16.7%; Learning 29.2; Understanding and Applying 16.7%; Facilitating 29.2%; Leading 8.3%.

Limitations of Project

According to Faul et al. (2007), a sample size of 47 would be needed to show statistical significance using the Wilcoxon signed-rank test for this study. Based on time constraints and nursing faculty availability, a sample size of 24 was used. Due to the lack of availability of nursing faculty for on-campus presentations, one Zoom presentation yielded only two additional participants. The number of participating nursing schools also limited the project. Only three nursing schools were included in the study, leaving the majority of the North and East Texas undergraduate nursing programs unstudied.

Chapter Summary

The presurvey and postsurvey results demonstrated that the educational intervention, which provided an introduction and explanation of the RQI program, improved nursing faculty perceptions of knowledge of and perceived willingness to adopt the RQI program. The educational intervention showed no difference to the nursing faculty, whose presurveys indicated high knowledge of and perceived willingness to adopt the program. None of the participants used the ratings of *strongly disagree* or *disagree* to rate the first five survey statements. The lowest presurvey rating was *neutral*, and the lowest postsurvey rating was *agree*, with the majority of the respondents indicating *strongly agree* in response to the five postsurvey statements.

Chapter 5: Discussion, Conclusions, and Recommendations

This study highlighted the importance of educating undergraduate nursing faculty to increase knowledge of and the perceived willingness to adopt the RQI program. The results from participants showed that the educational intervention highlighting the efficacy of the RQI program was instrumental in improving faculty knowledge and awareness levels. The data revealed few faculty members were aware of the RQI program before the educational intervention, but all faculty members recognized the importance of ongoing CPR competency validation after participating in the educational intervention that highlighted the RQI program. The findings indicate that education on maintaining student CPR competency using the RQI program can improve faculty knowledge and readiness to adopt this technology into their curriculum.

The literature supported the need for nursing faculty to understand the importance of providing improved cardiopulmonary resuscitation programs using a competency validation method to ensure student preparation for nursing school clinical rotations and postgraduation experiences with cardiopulmonary arrest situations. Students' improved CPR performance increases perceived confidence and aids in the transition to practice (NLN, 2021; Hampton et al., 2020).

Discussion of Findings

The FAAS survey indicated that several faculty participants rated themselves *neutral* in their perceptions of the RQI program. None of the faculty chose *disagree* or *strongly disagree* on the pre- or post-FAAS survey. After the educational intervention, all the faculty indicated increasingly positive perceptions, with a few indicating *agree* and the majority indicating *strongly agree*. All faculty indicated improved knowledge of the RQI program after the

educational intervention, except faculty who self-rated at the highest level on the presurvey. Additionally, there were improvements in the level of willingness to adopt the RQI program from pre- to postsurvey, except those indicating needing the opportunity to use technology to teach students.

The results indicated that the faculty participants increased their awareness of the RQI program by attending the educational intervention. CPR technology training would very likely increase undergraduate nursing faculty attitudes toward the knowledge of and perceived willingness to adopt CPR technology into the undergraduate nursing curriculum. Regarding the knowledge and perceived willingness to adopt, the results suggest that educating faculty produced an increased awareness of CPR technology, such as the RQI program. This competency-based technology can improve cardiopulmonary resuscitation education in undergraduate nursing programs.

EBP Findings and Relationship to DNP Essentials

The AACN (2021) recently released the latest version of core competencies for professional nursing education. The Essentials highlight ten domains of professional practice needed to advance the practice of nursing. Additionally, it promotes the need to ensure mastery of critical nursing competencies. Therefore, nurse educators must improve their ability to ensure competency validation for CPR skills.

Domain 4: Scholarship for the Nursing Discipline

Implementing the RQI program into the undergraduate nursing curriculum is an example of advancing nursing scholarship. By adopting the RQI program, undergraduate nursing schools are integrating this EBP initiative into teaching nursing students, as it ensures quality

improvement of CPR skills in the hospital setting, where it has improved nursing confidence and competency and promotes improved patient outcomes (Dudzik et al., 2019).

Domain 5: Quality and Safety

This EBP project provides evidence of improved knowledge and awareness needed to support the adoption of the RQI program. Improving faculty awareness of and perceived willingness to adopt RQI allows nursing education to move from a certification-based resuscitation program to an evidence-based competency validation resuscitation program. Adopting the RQI program into the undergraduate nursing curriculum ensures improved quality of resuscitation skills and better prepares nursing students and future nurses to respond to cardiopulmonary arrest situations. Cardiac arrests continue to be a significant health problem in and out of the hospital; nurses should be ready and prepared to initiate quality CPR, leading to improved patient outcomes (Oermann et al., 2014).

Recommendations for Future Research and Clinical Practice

The pre- and postsurvey results indicated that several nursing faculty members were unaware of the RQI program and the need to ensure competency-based CPR education. The NLN also indicated this in their 2021 position statement regarding the RQI program. Future research and clinical practice should focus on processes associated with adopting and implementing the RQI program in undergraduate nursing programs. Additional recommendations include understanding student benefits, such as improved confidence and competence, and improving the gap associated with nursing faculty awareness of the RQI program.

Summary

The purpose of this educational intervention was to promote awareness and knowledge associated with the efficacy of the RQI program, thus leading to its adoption in undergraduate nursing education. This study showed that CPR technology training did increase knowledge of and perceived willingness to adopt the RQI program. Additionally, this EBP QI project promoted competency-based education recommended by the AACN and provided a vehicle to move from certification based to competency-based CPR training. Competency-based CPR training improves nurses' skills and readiness to respond to cardiac arrest situations, thus improving patient outcomes. This project promotes the integration of innovation into nursing practice by employing an established quality improvement CPR training method.

By starting competency-based CPR training in nursing education, nursing students and newly graduated RNs will be better prepared for clinical practice. Awareness of these innovations by nursing faculties is imperative for adopting and implementing new technologies. Nursing faculty must be at the forefront of identifying and role-modeling the incorporation of competency-based technology into the nursing curriculum.

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Appendix A: FAAS Survey for RQI

Faculty Attitudes and Adoption of Simulation (FAAS) for RQI

Please indicate your level of agreement with each of the following statements using the following scale: 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree

Perceptions of the RQI program	1	2	3	4	5
I believe that using the RQI program in nursing education could have a positive effect on student CPR skill retention					
I believe that using the RQI program in nursing education could have a positive effect on student competency of resuscitation skills					
I believe that using the RQI program in nursing education could have a positive effect on student confidence related to resuscitation skills					
I believe that using the RQI program in nursing education could have a positive effect on student ability to perform resuscitation in the clinical setting and post-graduation					
I believe that using the RQI program in nursing education could have a positive effect on student transition to practice					

Please circle the term that best describes your knowledge and adoption of the RQI program:

	Novice	**Advanced Beginner**	**Competent**	**Proficient**	**Expert**
My knowledge of the RQI program can best be described as:	I have little to no knowledge of the RQI programs	I have a basic knowledge of the RQI program.	I have an average understanding of the RQI program	I have a solid understanding of the RQI programs principles	I have a deep understanding of the RQI programs principles

	Awareness	**Learning the Process**	**Understanding and Applying the Process**	**Facilitating the Process**	**Leading the Process**
My level of adoption of the RQI can best be described as:	I rarely use CPR technology to teach students.	I am learning how to use basic CPR technology experiences with my students.	I use all levels of CPR technology (low to high-fidelity) in my instructional delivery, and evaluation of students.	I am comfortable experimenting with various uses of CPR technology for teaching and have used CPR technology to ensure students are competent in their resuscitation skills.	I am eager to share my knowledge of the RQI program with my colleagues and I encourage student/faculty interactions in utilizing the RQI program that are beneficial to educating student nurses.

_____ Pre-Survey _____ Post-Survey

Unique Identifier_____

Note. From "Faculty Attitudes and Adoption of Simulation: Pilot Testing of a New Instrument," by H. Min and J. O'Rourke, 2017, *Journal of Nursing Education*, *56*(6), pp. 356–369. (https://doi.org/10.3928/01484834- 20170518-07). Copyright 2017 by O'Rourke. Reprinted with permission.

Appendix B: Project Timeline and Task List

January 2023	Recruit faculty, start pre-implementation planning for educational training
January - April	Implement education, gather post-implementation data
June	Analyze data
June - August	Write chapter 4 & 5
August-September	Organize and complete DNP project

Task	Jan 2023	Feb-	March-	April	May	June	July	Aug	Sept
Recruit faculty									
Pre-implementation									
Implement education									
Gather post-implementation data									
Analyze data									
Write chapter 4 & 5									
Organize and complete project									

Appendix C: Permission Letter

FAAS

External

O

Article I. **O'Rourke, Jenny** <xxxxxxxxxxxxxxxxxx> Tue, Jul 19, 2022, 1:18 PM

to me

Thanks for reaching out about the FAAS tool.

I am happy to share the tool with you for consideration. It is currently being used in several nursing projects which I hope to get more psychometric data from.

I have attached the tool. If you choose to use it I just ask that you cite the original paper.

Please let me know if you have any questions

Jenny ORourke

Jenny O'Rourke, PhD, APN-BC, CHSE
Associate Professor
xxxxxxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxx

Appendix D: Informed Consent Letter

You may be able to take part in a research study. This form provides important information about that study, including the risks and benefits to you as a potential participant. Please read this form carefully and ask the researcher any questions that you may have about the study. You can ask about research activities and any risks or benefits you may experience. You may also wish to discuss your participation with others, such as your doctor or family member. Your participation in this research is entirely voluntary. You may refuse to participate or stop your participation at any time and for any reason without any penalty or loss of benefits to which you are otherwise entitled.

PURPOSE AND DESCRIPTION: This Doctor of Nursing Practice Student's study explores the effect of training nursing faculty on adopting cardiopulmonary resuscitation technology into nursing school curricula to provide improved cardiopulmonary resuscitation skills to nursing students.

You will be asked to attend one educational training with the study staff over three months if selected for participation. The educational training is expected to take one to two hours. During this study, you will be asked to participate in the following procedures:

- Complete a paper-based pretest survey including demographic information using a unique 6-digit identifier (chosen by you).
- Provide an email address for receipt of the post-test survey.
- Attend the educational training.
- Complete a post-test survey that you will receive via email 1-2 weeks after the educational training session.
- Return the post-test survey via mail (stamped envelope provided) or email.

RISKS & BENEFITS: There are minimal risks to participating in this research study. There are potential benefits to participating in this study. Such benefits may include increased knowledge

gained from attending the educational training. The researchers cannot guarantee that you will experience any personal benefits from participating in this study.

PRIVACY & CONFIDENTIALITY: Any information you provide will be confidential to the extent allowable by law. Some identifiable data may have to be shared with individuals outside the study team, such as ACU Institutional Review Board members. Otherwise, your confidentiality will be protected by participants' use of a unique identifier. The researcher will ensure that de-identified data remains in a secure location. No individual results will be shared. All shared data will be aggregated.

CONTACTS: If you have questions about the research study, the lead researcher is Robin Roberts, MSN RN, and may be contacted at (xxx) xxx-xxxx, xxxxxxxx@acu.edu. If you cannot reach the lead researcher or wish to speak to someone other than the lead researcher, you may contact Dr. Tricia Bernecker, Ph.D. RN, xxxxxxxx@acu.edu. If you have concerns about this study, believe you may have been injured because of this study, or have general questions about your rights as a research participant, you may contact ACU's Chair of the Institutional Review Board and Executive Director of Research, Megan Roth, Ph.D. Dr. Roth may be reached at

xxxxxxxxxx
xxxxxxxxxxx@acu.edu
320 Hardin Administration Bldg, ACU Box 29103
Abilene, TX 79699

Additional Information

Voluntary undergraduate nursing faculty participants from North and East Texas will complete this study. Participants will choose a unique 6-digit identifier for matching their pre and post-tests. The study staff will collect demographic information from participants to describe the study sample.

The sample size was evaluated using the G* Power calculator and determined that the ideal sample size is 111 using the Paired t-test and 47 using the Wilcoxon Signed-Rank test to be considered statistically relevant (Faul et al., 2007). Based on the time constraints of this project, a smaller one might be used.

Consent Signature Section

Please sign this form if you voluntarily agree to participate in this study. Sign only after you have read all the information provided and your questions have been answered to your satisfaction. You should receive a copy of this signed consent form. You do not waive any legal rights by signing this form.

_____	_____	_____
Printed Name of Participant	Signature of Participant	Date

Appendix E: Intent to Participate

Ok, we intend to participate.

Sincerely,

XXXXXXXXXXXXXXX, PhD, RN
Department Chair, Nursing
Nursing and Health Sciences
xxx-xxx-xxxx

Dear Robin,

Please meet the BSN Leadership team. They would like for you to attend a BSN faculty meeting. The can allow you 45 minutes. If that works for you, please coordinate with the team re: dates / times.

Good luck to you!

Jeni
XXXXXXXXXXXXXXXXXXXXX
Associate Dean for Academic Affairs
Nursing
Mary Coulter Dowdy Distinguised Professor

July 6, 2022

Abilene Christian University 1600 Campus Ct. Abilene, TX 79601

To Whom It May Concern:

Xxxxxxxxxxxxx College would like to express support for, and interest in participating in Robin Robert's DNP project to answer the PICO question: Will undergraduate faculty who receive training in RQI program implementation perceive improved knowledge and self-efficacy in implementation of the RQI program from the onset of training until training completion. We look forward to adding to the body of knowledge in this area. We are willing to provide the faculty participants for Ms. Roberts to be able to complete her study and help her pursue her DNP from Abilene Christian University.

Ms. Roberts has the information about getting IRB approval from Xxxxxxxxxx, which she can submit at any time. I am looking forward to hearing the results of this study. If you need anything else please let me know.

Sincerely,

XXXXXXXXXXX, EdD, RN, CNE, FAADN Provost, Health Science Center

Appendix F: IRB Approval

Date: 11-10-2022

IRB #: IRB-2022-63
Title: Improving Cardiopulmonary Resuscitation Education
Creation Date: 10-13-2022
End Date:
Status: Approved
Principal Investigator: Robin Roberts
Review Board: ACU IRB
Sponsor:

Study History

Submission Type	Review Type	Decision
Initial	Exempt	Exempt