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The Effect of Integration of TeamSTEPPS® Strategies Within an Orientation Program on New Graduate Nurse Team Attitudes

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The Effect of Integration of TeamSTEPPS® Strategies Within an Orientation Program on New Graduate Nurse Team Attitudes

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Dedication

To my husband, Eric, my protector, my nurturer, my biggest supporter and always having my back. To my granddaughter, Kayley for always "helping" and understanding when I had to write instead of watching cartoons with you. To my mom, Myrtis for instilling the DNA of tenacity and work ethic. You are my idol. To my dad, Frank for investing in me without question, even when I struggled. To my sister, Katrina for being my ear, rock and my pillar of strength. To my brother, Frank, Jr., the quiet storm and my defender. To my son, Suave' for teaching me to juggle while keeping my wits about me. To my King's Children church family, my Jeanerette inner circle and the 34 D.O.D. for their love, support and encouragement. Because of you, I was able to pursue my goals and ambitions.

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The Effect of Integration of TeamSTEPPS® Strategies Within an Orientation Program on New Graduate Nurse Teamwork Attitudes

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Abstract

The *problem* this research addressed was identification of potential relationships between a TeamSTEPPS® based orientation program and NGN Teamwork Attitudes. The *purpose* of this study was to determine if integration of TeamSTEPPS® into the NGN orientation program increased measurements of Teamwork Attitudes (TA). *Specific Aim 1*: In the NGN, determine TA pre-TeamSTEPPS® training, as measured by the TeamSTEPPS® Teamwork Attitude Questionnaire (T-TAQ). *Specific Aim 2*: In the NGN, determine TA post-TeamSTEPPS® training, as measured by the T-TAQ. Specific Aim 3: In the NGN, compare TA pre/post-TeamSTEPPS® training, as measured by the T-TAQ. The *theoretical framework* guiding the study was Gibson's Theory of Affordances. The *methodology* for this study was a quasi-experimental pre/post-test study design. The *significance* of the study was knowledge about TeamSTEPPS® increased measured teamwork attitudes and facilitated integration of NGNs into the interprofessional team.

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List of Abbreviations

NGN	New Graduate Nurse
TA	Teamwork Attitude(s)
T-TAQ	Teamwork Attitudes Questionnaire
TeamSTEPPS	Team Strategies to Enhance Performance and Patient Safety
AHRQ	Agency for Healthcare Research and Quality
DoD	Department of Defense
IOM	Institutes of Medicine
TJC	The Joint Commission
GNRS	Graduate Nursing
GSBS	Graduate School of Biomedical Sciences
IRB	Institutional Review Board
PI	Principal Investigator
UTMB	University of Texas Medical Branch
CBL	Computer Based Learning
CUS	Concerned, Uncomfortable, Safety Issue
ID	Identification
IP	Internet Provider
CITI	Collaborative Institutional Training Initiative
IBM SPSS	International Business Machines Statistical Package for Social Sciences

SON	School of Nursing
SHP	School of Health Professions
SBAR	Situation, Background, Assessment and Recommendation

CHAPTER 1: INTRODUCTION

Introduction

Chapter One introduces this quantitative study utilizing a quasi-experimental pre/post-test design, which explored the effect of the implementation of TeamSTEPPS strategies into a New Graduate Nurse (NGN) orientation plan on Teamwork Attitude scores. Chapter One begins with a statement of the study problem. The chapter then provides the background and significance of the problem, statement of purpose and goals, research questions and aims, theoretical framework, study variables, and definition of terms. Finally, Chapter One offers an overview of research methodology, data collection and analysis, and a brief overview of study findings.

Statement of the Problem

The Problem

The *problem* this proposal addressed was identification of potential relationships between a TeamSTEPPS® based orientation program and NGN Teamwork Attitudes. This proposal addressed a critical gap in knowledge. Little is known about the effect of intentional integration of TeamSTEPPS strategies into the orientation of NGNs on teamwork attitudes. Likewise, teamwork is necessary for success in professional

socialization, retention, and collaborative skill development of NGNs. While many studies on teamwork and associated topics have been conducted, there remains a paucity in the literature on this phenomenon. One study included NGNs but focused on the leadership domain. A second study consisted of registered nurses, practical nurses and nursing assistants with a limited number of newly hired participants (Luger & Ford, 2019, Vertino, 2014).

The Purpose

The *purpose* of this study was to determine if integration of TeamSTEPPS® into the NGN orientation program would increase measurements of teamwork attitudes (TA). Due to the NGN's inexperience, orientation is a stressful time of anxiety, transition shock, and integration into new team roles, all affected by TA (Arrowsmith et al., 2015; Beecroft et al., 2007; Casey et al., 2011; Clark & Springer, 2012; Gill et al., 2010; Ortiz, 2016; Parker et al., 2012). TA effects NGN turnover rates and costs, i.e., costs in 2005 were $22,000-$77,200, with up to 75% attrition within year one (Welding, 2011). Contemporary trends have not improved. The transition to practice period for NGNs is a vulnerable time during which organizations should seize opportunities for retention of these new graduates (Arrowsmith et al., 2015; Clark & Springer, 2012; Fallatah et al., 2017, Gill, et al., 2010, Liang et al., 2018). Increasing TA scores could better prepare

NGNs to handle stressors of transition to practice and create healthier work environments. TeamSTEPPS® strategies have been utilized to increase measurements of TA across many disciplines and practice areas (AHRQ, n.d.; Maneval et al., 2020; Vertino, 2014).

Background and Significance of the Problem

The Background

NGNs report feelings of anxiety, inadequacy, poor communication skills, and lack of preparation to perform as a registered nurse (Casey et al., 2011; Gill et al., 2010). These factors may influence turnover intention as well as retention (Beecroft, et al., 2007). Duffield et al. (2014) reported the United States had the 2nd highest turnover rate (26.8%) among its counterparts New Zealand (44.3%), Canada (19.9%) and Australia (15.1%). As previously stated, NGNs comprise the bulk of most organizations' workforce as approximately 60-70% of new hires. The direct and indirect costs associated with the NGN attrition can range from $10,000 to $88,000 based on the cost calculation method (Duffield et al., 2014). Associated attrition costs cover advertising, recruitment, training and even termination. It is prudent to properly develop teamwork and communication skills to successfully integrate NGNs into the healthcare team.

TeamSTEPPS®

Developed from over 50 years of research and publicly disseminated in 2006 (King et al., 2008), Team Strategies and Tools to Enhance Performance and Patient Safety (TeamSTEPPS®) is a training strategy created and jointly funded by the Agency for Healthcare Research and Quality (AHRQ) and the Department of Defense (DOD) to improve outcomes and decrease preventable deaths resulting from teamwork and communication failures. The public domain course materials are available for download, sharing among colleagues, non-commercial or non- resale purposes (AHRQ, n.d.). Team training actually began several years before implementation of patient safety initiatives and the Institute of Medicine's (IOM) pivotal publication To Err is Human, which highlighted the shocking number of approximately 200,000 preventable deaths per year (Kohn et al., 2009). Through this publication, nursing and health care professionals became aware of the importance of participation in interdisciplinary team training.

The Theory.

According to King et al. (2008), TeamSTEPPS® was developed based on teamwork theory which emphasizes the need for a shared set of Attitudes, Skills, and Knowledge (ASKs). Within the ASKs, there are eight (8) specific competencies, i.e., team leadership, mutual performance monitoring, backup behavior, adaptability, team/collective orientation, shared mental model, mutual trust and closed-loop

communication, operationalized through application. Research by Baker (2003) specifically tied these ASKs to healthcare, with each serving as the foundational basis of TeamSTEPPS®. The instructional teamwork framework was further refined to four (4) competencies: Leadership, Situation Monitoring, Mutual Support and Communication.

The TeamSTEPPS® Process.

The implementation of the didactic modules for TeamSTEPPS® utilizes an adapted model of John Kotter's model of organizational change (AHRQ, n.d.). Elements of Kotter's model utilized are specific to Assessment, Planning (includes Training & Implementation) and Sustaining (gains in patient safety) (Baker et al., 2008). Trained coaches or master trainers deliver the content for customizable instructional programs that vary in duration based on needs assessments. Course materials include slide decks, videos and toolkits for briefs, debriefs, huddles and Situation Background Assessment Recommendation (SBAR). In response to challenges in staffing against the backdrop of the COVID-19 pandemic, a self-paced online video toolkit version of TeamSTEPPS® was made available. The video toolkit, a collaborative effort between the American Hospital Association and the CDC Project Firstline, offers a concise, convenient delivery option.

Teamwork and Attrition Rates.

Ineffective teamwork affects attrition rates, which may result in an inexperienced pool of novice nurses and increased expenses due to the employ of supplemental or temporary staff to address workforce shortages (Liang et al., 2018). Turnover costs have been estimated at $70,000 per nurse. Moreover, precepting nurses' and NGNs' salaries must be collectively factored, as this figure is higher for those participating in lengthy orientation or residency programs (Baker, 2010). Due to multiple challenges, 26% of NGNs are primed for early departure from the profession, i.e., amid organizational concerns of medical errors and patient safety issues (Casey et al., 2011; Fallatah et al., 2017). Forty-one percent (41%) of NGNs intend to leave employment during the first three (3) years (Fallatah et al. 2017). While NGNs comprise 42% of the workforce of most organizations (Theisen & Sandau, 2013), many organizations continue to struggle with retention as evidenced by turnover costs as high as $1.4 to $2.1 million in the United States (Fallatah et al., 2006; Pitt et al., 2012; Rambur et al., 2003; Read, 2017). These excessive NGN turnover rates equate to both negative patient outcomes and patient safety issues (Hayes, 2018). However, NGNs have reported positive perceptions when feeling a part of the interdisciplinary team, i.e., perceived respect for opinions and expertise. (Fallatah et al., 2017).

Teamwork and Patient Safety.

Patient safety is a direct benefit of successful teamwork efforts (Blum & Parcelle, 2012; Makary & Daniel, 2016). Initial estimates by the IOM have suggested over 98,000 deaths are the result of preventable errors (Blum & Parcelle, 2012; Kohn et al., 1999). Makary and Daniel (2016) estimated that these figures are currently four times as high and may exceed 400,000 deaths per year (Pogue & O'Keefe, 2021). Preventable errors cost organizations over $8.8 billion from approximately 240,000 preventable deaths (Healthgrades, 2008). The Joint Commission (TJC, n.d.) reports that over 70-80% of errors result from communication issues within the team (TJC, n.d.) Teamwork is a critical skill for successful transition to practice and prevention of errors.

Teamwork and Job Satisfaction.

Effective teamwork affects job satisfaction. For example, patient safety, retention, attrition, medical errors and staff satisfaction have been attributed to successful transition of NGNs to practice (Arrowsmith et al., 2015; Casey et al., 2011; Hayes, 2018; Kaddoura, 2010). Dissatisfaction rates as high as 41% have been reported by NGNs and are related to intent to leave (Rambur et al., 2003). The relationship between satisfaction and intent to leave is strong (Rambur et al., 2003). NGNs report supportive environments, residency programs, skilled mentors and preceptors contributed to their overall work satisfaction and their desire to remain in the profession (Fallatah, Laschinger & Read,

2017; Liang et al., 2018, Rambur et al., 2003). Mentored dyads, interprofessional support, constructive communication and structured preceptorships were reported to impact retention and intent to stay (Arrowsmith et al., 2015; Clark & Springer, 2012; Gill et al., 2010). NGNs indicated that although workloads were challenging, effective teamwork and support emerged as prominent reasons to remain (Crawford et al., 2018; Gill et al., 2010; Ortiz, 2016; Theisen & Sandau, 2013).

The Gap in Knowledge

TeamSTEPPS® training has been used by multiple disciplines to improve teamwork and communication skills (AHRQ, n.d.). It has been well-studied in organizational, medical and nursing literature, however there is limited literature regarding its impact on the development of the NGN's skillset. Nursing and Medical research has shown that the program positively impacts patient safety, communication, and team attitudes (Baker et al., 2010; Clancy, 2016; Clapper, 2019; Cote, 2011; Gaston, 2016; King et al., 2008; Peters, 2018; Vertino, 2018).

The effectiveness of TeamSTEPPS® of increasing TA has never been evaluated in the NGN, except in a rural setting (Luger & Ford, 2019). The study was of a small sample, limited geographically, limiting its generalizability; thus, there is a *gap* in knowledge concerning whether TeamSTEPPS® increases TA scores within a NGN orientation program. Specifically, there is a gap in knowledge concerning the effect of

integration of TeamSTEPPS® within an NGN orientation program on Teamwork Attitudes.

The Significance

Cultivation of group teamwork environments that support NGNs are essential to staffing and patient safety. While there are numerous studies examining multiple factors i.e., team attitudes that may impact transition to practice and retention (AHRQ, n.d.), there is a paucity in the literature on the role that teamwork may play in retention and transition to practice (Baker, 2010; Friedman et al., 2013; Rambur et al., 2003). The effect of integration of TeamSTEPPS® strategies within a NGN orientation program on Team Attitudes is unknown. This problem is significant because understanding mechanisms to improve NGNs Teamwork Attitudes is significant in helping organizations better integrate NGNs.

Although fostering teamwork skills is significant in helping organizations reduce attrition rates, an additional impact is related to the wellbeing of NGNs and their colleagues. In other words, good team-based work could: 1) positively impact NGN wellbeing, 2) promote team cohesion and sustainability, 3) promote patient safety, and 4) facilitate organization wellbeing.

Statement of Purpose and Goals

The Purpose

The *purpose* of this study is to determine if integration of TeamSTEPPS® into the NGN orientation program will increase measurements of teamwork attitudes (TA).

The Goals

The *goals* of the study were to measure teamwork attitudes pre-/posttest implementation of a TeamSTEPPS® training program in a sample of NGNs.

The Research Question and Aims

Research Questions and Specific Aims explored are as follows:

- **Specific Aim 1:** In the NGN, determine Teamwork Attitudes (TA) pre-TeamSTEPPS® training, as measured by the TeamSTEPPS®-Teamwork Attitude Questionnaire (T-TAQ).

  Research Question 1: In the NGN, what is the TA pre-TeamSTEPPS® training, as measured by the T-TAQ?

  Research Hypothesis 1: In the NGN, there is no difference in TA pre-TeamSTEPPS® training compared to the mean of reference groups reported in the literature.

- **Specific Aim 2:** In the NGN, determine TA post-TeamSTEPPS® training with TeamSTEPPS® strategies integration, as measured by the T-TAQ.

  Research Question 2: In the NGN, what is the TA post-TeamSTEPPS® training with TeamSTEPPS® strategies integration, as measured by the T-TAQ?

  Research Hypothesis 2: In the NGN, there is no difference in TA post-TeamSTEPPS® training compared to the mean of reference groups reported in the literature.

- **Specific Aim 3**: In the NGN, compare TA pre-TeamSTEPPS® training and post-TeamSTEPPS® training with TeamSTEPPS® strategies integration, as measured by the T-TAQ.

  *Research Question 3: In the NGN, what is the relationship between TA pre-/post-*TeamSTEPPS® training *with TeamSTEPPS® integration, as measured by the T-TAQ?*

  Research Hypothesis 3: There is no relationship between TA pre/post-TeamSTEPPS® training with TeamSTEPPS integration, as measured by the T-TAQ.

Statement of the Theoretical Framework

Theoretical Framework: Gibson's Theory of Affordances

An important skill NGNs must develop is the integration of subjective and objective data to inform clinical decision-making and nursing interventions. Gibson's Theory of Affordances was selected as the theoretical framework (Gibson, 1979). Although affordance theories generally emphasize the relationship between abilities of animals and features of their environment, this theory is often applied to humans and could be applied to nursing to understand complex situational awareness (Clapper et al., 2018; Gibson, 1977). Clapper (2018) adapted the theory to describe situational monitoring for pediatric, medical, and emergency medicine teams. A novel application will be to apply the theory to NGNs to describe situational awareness or situation monitoring. Affordance data is likened to subjective and objective data, making it an ideal theory for situational awareness, a core competency of teamwork. The TeamSTEPPS® communication tool, SBAR relies heavily upon information ascertained from situation monitoring and assessment to formulate its components for relay to other healthcare team members. Perception and, more importantly, misperception vary according to the perceiver's location or position within or relative to the environment (Clapper et al., 2018), thereby making the Theory of Affordance an appropriate theoretical framework for the proposed study.

The Study Variables

Independent Variable

The active independent variable is the TeamSTEPPS® training strategy (video, virtual or in-person delivery).

Dependent Variable

The dependent study variable is the *Teamwork Attitudes Score (TAS)*.

Confounding Variables

Confounding or demographic variables include but are not limited to age, ability to read, write and understand English, type of nursing program attended, length of licensure, type of residency/orientation program, length of residency/orientation program, length of employment, unit of employment type and type facility of employment.

Definition of Relevant Terms

Conceptual Definitions

Attitudes are conceptually defined as beliefs, feelings or behaviors related to teamwork.

Affordances are conceptually defined as a specific combination of the properties of its substance and its surfaces taken with reference to a human being; what is offered, ascertained, perceived, valued by, or provided to a human being.

Attrition is conceptually defined as the percentage or number of employees an organization loses due to premature departure or exit; or those who fail to complete a designated period of orientation or training for a specialized program.

Introductory employment period is conceptually defined as the first 6 months of employment in the initial position of licensed registered nurse. *New Graduate Nurse (NGN)* is conceptually defined as a recent graduate or newly hired nurse employed for a period of less than 6 months. The NGN was: 1) prelicensure or currently licensed to practice as a registered nurse by a state board of nursing; and 2) employed in a traditional (4 to 6 week) or residency type (1-2 year) orientation in an acute care hospital setting, academic teaching hospital or other nursing practice area.

Orientation is conceptually defined as the period of time allotted for the introduction of newly hired employees to the hiring organization. Information is provided to familiarize new employees with expectations, policies, safety and completion of insurance and payroll documents.

Residency is conceptually defined as a formal, structured program designed to acclimate and assist newly licensed nurses with transition to practice. Residency programs may be accredited or non-accredited.

TeamSTEPPS® is conceptually defined as an evidence-based teamwork system to improve quality, safety and efficiency of healthcare and teamwork.

Teamwork is conceptually defined as the dynamic interaction between individuals toward the facilitation of a shared goal.

Operational Definitions

The TeamSTEPPS® Teamwork Attitude Questionnaire (T-TAQ) operationally defines and measures participant's *teamwork attitudes* as related to the five (5) core competencies of TeamSTEPPS®: Leadership, Communication, Situational Monitoring, Mutual Support and Team Structure (Baker et al., 2010). Measurement of teamwork may consist of two methods: 1) a total score of each of the five (5) teamwork constructs; or, 2) computation of an average score of the five (5) teamwork constructs. Measurements may be taken at three different points: stand-alone (independent or one-time measurement), assessment (pre-intervention/training), or evaluation (i.e., to measure change or effect). The proposed study measured teamwork attitudes by calculation of score averages recorded at an initial assessment and at evaluation after the intervention.

Overview of Research Methodology

Quantitative Research Methodology

The quantitative study utilized a quasi-experimental pre-/post-test design. The study incorporated a nonequivalent pre-/post-test comparison group. As described by Polit and Beck (2018), quasi-experimental designs are similar to experimental pre-/post-test designs but lack randomization. This design is commonly used to compare data

collection of two or more groups before and after a given intervention. The design is longitudinal in nature because participants will be analyzed over a period of time with assessments conducted at multiple points (i.e. Time 1, Time 2). Longitudinal designs are beneficial for detecting changes in effect over time or determining the presence and extent of causality (Polit & Beck, 2018). Quasi-experimental designs have been lauded for their convenience and practical methods (Polit & Beck, 2018). This design was most appropriate to examine the effect of integration of TeamSTEPPS® strategies on NGN Teamwork Attitudes (TA).

The Setting

COVID-19 presented unique challenges to several study aspects due to imposed limits on in-person gathering. Therefore, the *setting,* and sites selected for data collection of the proposed study, were online platforms such as SurveyMonkey®, computer-based learning (CBL) platforms, social media and special interest group websites and designated class/conference rooms. An atmosphere that allowed privacy and confidentiality for respondents was also required. Ease of access to convenient locations for data collection was provided to garner the highest participation, i.e., organization's computer-based learning program (CBL).

The Population

The *population* of this study was the New Graduate Nurse (NGN). NGNs were prelicensure, recent or imminent graduates who were employed in temporary positions, such as a Nurse Technician or Registered Nurse Applicants awaiting examination or results from their respective boards of nursing. NGNs had completed requirements for an associate, diploma, or baccalaureate level nursing program. NGNs may have also successfully passed their national board exam and were newly licensed by their respective state board of nursing but were employed in a traditional or residency type orientation and had not been employed in this position greater than six months.

The Sample

The *sample* consisted of newly hired NGNs. NGN participants were employed on Medical-Surgical, Telemetry, Emergency, Neonatal Intensive Care, Surgery or Operating Room, Oncology, Neurological, and Critical Care units or other nursing care areas with the exception of home health and school nursing. Because the NGN and nursing student is often a member of a cohort or part of a group of individuals with similar experience levels in similar orientation plans, the proposed study used a nonprobability convenience sampling design because this method provided recruitment of the best pool of participants needed to inform the research (Creswell & Poth, 2018).

Power Analysis

The Principal Investigator (PI) used G*power developed by Faul et al. (2007) to calculate the sample size needed to detect a statistical significance between pre and post test scores. The assumptions and values entered into G*power consisted of a one-tailed paired *t*-test with a pre-test mean and standard deviation of 4.20, 0.82 and a post-test mean and standard deviation of 4.64, 0.29 based on data from a previous study (Vertino, 2014). The incorporation of previous studies serves as an important frame of reference for comparison of results. The results indicated the study has a 95% power to detect a difference with a sample size of 30. The PI aimed for 30 participants and was able to recruit six (7) at first and then in one session, thirty-three (33).

Sample Inclusion Criteria

Study participants had to have met the following *inclusion criteria* for pre-test and participation in the study:

- Eighteen (18) years of age or older,
- Speak, read, write, and understand English,
- Recent or imminent graduate of an accredited nursing program (diploma, certificate, or baccalaureate) ***or:***
- Currently licensed to practice as a registered nurse applicant or registered nurse by their respective state board of nursing,

- Currently employed in a traditional (4 to 6 week) or residency type (1-2 year) orientation,
- Employed less than 6 months but has not completed 50% of their employment orientation plan,
- Employed in an acute care hospital setting or academic teaching hospital,
- Employed in Medical-Surgical, Telemetry, Emergency, and Critical Care units or other nursing care areas except for home health and school nursing.

Sample Exclusion Criteria

Participants were *excluded* if they did not meet any of the inclusion criteria listed above. The nurses were also excluded if they were employed in school nurse or home health settings. In these settings, nurses practice more autonomously, independently, and interdisciplinary interactions and involvement may be severely limited, thus limiting potential research data. Home health and school settings allow independent function of nurses. As such, due to low frequency of interdisciplinary (healthcare team) interactions within these practice settings, these NGNs were excluded. Failure to complete and submit any component that was construed as consent, or research component, was considered cause for exclusion from the study.

Recruitment

Participants were recruited from a pool of newly hired NGNs at large, academic teaching facilities in Louisiana and Texas. The proposed study was submitted for Institutional Review Board (IRB, Appendix E) approval through University of Texas Medical Branch (UTMB). The PI was not required to complete dual IRB applications to recruit participants from the academic healthcare facility per the Office of Research of the organization serving as the recruitment site. A feasibility review was completed by the Office of Research of the external recruitment site to obtain an endorsement letter necessary for permission to recruit and conduct research. Once IRB approval was obtained, the PI began recruitment via the Study Recruitment Flyer (Appendix G) distributed to potential participants by posting in conspicuous departmental and commons area breakrooms or shared with potential participants during their department meetings. The flyer outlined the purpose, inclusion criteria and provided contact information of the PI. If interested, the potential NGN participants contacted the PI by phone or email as instructed in the recruitment flyer.

Overview of Design: Data Collection and Data Analysis

Data Collection

The Data Type

The data type included quantitative and descriptive data obtained from demographic surveys and the T-TAQ instrument.

Methodology

The initial twelve-week data collection period (Appendix I: Research Timeline) began after consent was obtained but was extended due to enrollment lag related to access to participants due to the COVID-19 pandemic. A study recruitment flyer containing general study information, PI contact information and an invitation to NGNs to participate was distributed via orientation and residency program contacts or in-person where approved. Interested participants notified the PI via phone, email or verbally of their intent to participate. The PI contacted participants via phone or in-person to confirm participation and answer any questions. Participants were then sent an email containing a link to the information concerning the study goals and purpose, consent form, the Demographic Data Sheet and the initial T-TAQ assessment. In-person recruitment, consisted of enrollment into the study, providing consent and distribution of information about the study goals and purpose. These participants were provided electronic access to the online Demographic Data Sheet and the initial T-TAQ. Completion of the

Demographic Data Sheet and T-TAQs was construed as consent to participate in the study. Privacy safeguards were utilized (See Appendix H). Demographic data was collected by the PI and included data such as age range, gender, number of months/days employed, type of educational preparation, date of licensure and unit of employment, etc. (See Appendix F). Collection occurred via SurveyMonkey®, an online platform.

The Instrument: TeamSTEPPS®-Teamwork Attitude Questionnaire (T-TAQ)

The Instrument.

The TeamSTEPPS®-Teamwork Attitude Questionnaire (T-TAQ) is a 30-item instrument, eliciting responses on a 5-point Likert scale. The T-TAQ was developed from a pool of 110 items to measure critical domains of team performance and attitudes related to the core principles of teamwork. Its developers found few instruments designed for healthcare and none associated with the core elements of teamwork (i.e. Cockpit Management Questionnaire is aviation-focused). It is important to note that the Safety Attitudes Questionnaire, the Safety Climate Survey and the Hospital Survey on Patient Safety (HSOPS) were healthcare-related instruments reviewed in the literature. Although measures of safety culture, teamwork and safety attitudes and perceptions were measurable by the aforementioned instruments, none operationalized the TeamSTEPPS-specific subscales individually by domain. For example, the HSOPS does not measure or address the specific competencies of teamwork, namely Team Structure, Leadership,

Situation Monitoring, Mutual Support and Communication. Its 12 areas of are related to patient safety culture and two dimensions are teamwork-focused (Baker, et al., 2008). It is one of the few instruments specifically designed to measure each of the five (5) key principles of teamwork: Team Structure, Leadership, Situation Monitoring, Mutual Support and Communication (Baker et al., 2008). Each construct was measured by six (6) items. The instrument has been evaluated to ensure content and construct validity (Baker, et al., 2008).

Content and Construct Validity.

The instrument was created with assurances of content and construct validity. *Content validity* indicates an instrument measure is what it is purported to measure. *Construct validity* and reliability were also examined and Pearson correlation co-efficient ranged from 0.36 to 0.63 indicating variance with some overlap and positive relationships of pairs (Baker et al., 2008; Polit & Beck, 2018). Correlation co-efficient of 0.36 to 0.63 indicates fair to moderate relationships (Portney & Watkins, 2015). Finally, Cronbach's alpha for each of the five (5) constructs ranged from 0.70 to 0.83, indicating the internal consistency of multi-scale items for measuring the same construct (Polit & Beck, 2018).

Historical Research.

The T-TAQ has been used in previous studies on laboratory technicians, undergraduate nursing students, medical students, nurses, nurse anesthetists, physicians,

physician assistants, dentists and other health professionals for team training and translational purposes in a variety of settings. In a scoping review by Chen et al. (2019), only two (2) studies utilized the T-TAQ instrument created for TeamSTEPPS® although all utilized the TeamSTEPPS® program. Thirteen out of the twenty-three programs used externally validated instruments and some used multiple instruments. However, the review noted the only 4 of the 23 programs used tools from the TeamSTEPPS® course. Results from teamwork perception questionnaires indicated slight to moderate increases in team perceptions regarding their attitudes about teamwork. Significant results were found to vary across domains and from study to study. For example, the Leadership domain was not significant in the Brock study, but the remaining domains were significant (Chen et al., 2019). There was also a decrease in instrument equivalency with translation, with the exception of one study utilizing a modified version of the T-TAQ (Ballangrud et al., 2020; Maguire et al., 2015; Watanabe et al., 2019). Surprisingly, a single study using the T-TAQ and including a sample of five (5) new graduate nurses indicated a team structure change of an increase by 1.5% and a situation monitoring change of a decrease by 3.5% at the conclusion. The study also indicated overall teamwork attitudes changed by a decrease of 1.5% in total score (Luger & Ford, 2019).

Research Protocol

The research protocol required specification based on if the recruitment occurred in-person or online.

For online recruitment, a recruitment flyer inviting NGNs to participate in the study was distributed to orientation and residency program coordinators. NGNs opting to participate contacted the PI via phone or email, and subsequently received an email and/or phone call outlining the goals of the study and what their participation entailed. Each contact method was guided by an email or phone script. NGNs opting to participate were emailed links to the fast facts study document. After participant review of the information concerning the study goals and purposes, once admitted to the study, an email and embedded email script was provided that contained a link to the consent form, the Demographic Data Sheet and the initial T-TAQ assessment. Participants were asked to complete the Demographic data sheet, pre-/posttest surveys were provided that contained a link to the consent form, the Demographic Data Sheet and the initial T-TAQ assessment. Completion of the demographic data and T-TAQs was construed as consent to participate in the study (See Appendix C). Completion of the demographic data and T-TAQs was construed as consent to participate in the study (See Appendix C).

For in-person recruitment, the PI made advanced arrangement through the residency program coordinators and directors of professional practice to approach the

NGNs. The PI was invited to speak to NGNs about the research project during breaks in the orientation curriculum. Potential NGN participants had the option to participate or be excused if they chose not to participate. NGNs opting to take part in the study were consented via an oral consent narrative read according to an IRB-approved script. Participants completing any component of the study gave their consented by virtue of completing any study component as stipulated per the study protocol. Participants were given a copy of the recruitment flyer and study fast facts sheet outlining human subjects and data protections for their review. After participant review of the information concerning the study goals and purposes, once admitted to the study, the PI obtained signed minimal risk consent forms and asked if participants had any lingering questions. Hearing none, the PI proceeded to conduct the study after the enrollment of all interested NGNs. Once admitted to the study, a QR code that provided a link to the Demographic data sheet and initial T-TAQ 1 survey was displayed on the projected screen. NGNs were able to utilize personal mobile devices or a weblink on their laptops to access the study online demographic. The PI-guided overview of the TeamSTEPPS® video tool kit was provided.

Should the online or in-person participant have *declined to participate*, the PI would have thanked the prospective subject, concluded all interactions, and terminated communication without further contact. Should the participants (online or in-person)

agree to participate, the subjects provided the PI with a working email address, i.e., provided valid contact information for follow up, and began the demographic data sheet and the first T-TAQ assessment. During the scheduled calls or meetings, the narrative for obtaining consent was read to the participant, and all questions regarding the study were answered.

Institutional Review Board (IRB) Approval

All procedures in the proposed study were approved by the Institutional Review Board (IRB, Appendix E) of The University of Texas Medical Branch at Galveston prior to study initiation. Additionally, a feasibility review was completed by the Office of Research of the recruitment site to obtain an endorsement letter necessary for permission to recruit and conduct research. The risks of participating in the study are loss of confidentiality, emotional distress, and fatigue. Informed consent was obtained prior to data collection and participants were reminded that they had the right to revoke their consent and withdraw at any time from the study.

Undue Influence.

Undue influence was avoided as the participants had no supervisory or reporting structure to the PI. Safe, quiet spaces conducive for data collection were provided. Voluntary, informed consent was obtained prior to data collection. Participants were sent an email containing a link to the information concerning the study goals and purpose,

consent form, the Demographic Data Sheet and the initial T-TAQ assessment. For in-person participants, this information was hand-delivered and given as stipulated per the research protocol. Completion of the Demographic Data Sheet, T-TAQs and any study component was construed as consent to participate in the study. Participants reserved the right to revoke their consent and withdraw at any time from the study. Participants were given a $5 Starbucks® gift card as compensation for their time in the study.

Data Collection Procedures

Preparation for Initial Consent.

The PI phoned or contacted the participant at the identified time, date, and venue; then discussed study goals, confidentiality safeguards, proper ethical conduct, and answered any additional questions (See Appendix A, B, & C).

Informed Consent.

Once the participant's questions were answered, the PI confirmed the participant's intent to participate in the study. An email link containing the consent form (Appendix D), the Demographic Data Sheet (Appendix F) and initial T-TAQ assessment (Appendix H) was sent or distributed in-person to participants. Completion of the Demographic Data Sheet, T-TAQs or any study component was construed as consent to participate in the study.

Confidentiality.

The participant identity was masked by providing a unique identification number. The unique identifier was randomly generated by the PI and assigned to the participants. Each ID was associated with a participant's name and was kept in a separate locked file, away from actual assessment data. Participants were required to use their unique identification number consistently throughout the study as it was used to complete and match assessments. Participants who forgot or misplaced their unique ID were advised to contact the PI for retrieval.

Recording Devices.

No recording devices were utilized in this study.

Administration of the T-TAQ.

The T-TAQ was administered via an online survey at the first assessment and at a second assessment after completion of the selected TeamSTEPPS® training method.

TeamSTEPPS® Video Toolkit

Virtual Venue.

The intervention will consist of a 3-minute pre-test, a less than 45-minute video toolkit delivery of TeamSTEPPS®, a 3-minute post-test after virtual or PI-led/guided delivery of the TeamSTEPPS® Training Course by the researcher, who is a certified master trainer, i.e., trainer or coach. Virtual delivery of the course will take place through

the organization's computer-based learning program (CBL), Healthstream® or self-accessed via employee email or website. Computer-based training was the delivery method for the training program due to the outbreak of COVID-19 virus to limit exposure. As restrictions were reduced, in-person delivery was offered upon approval.

The Content.

The course consists of didactic materials including slides, videos, and interactive activities and tools. Content for the full TeamSTEPPS® course is available via the ARHQ website at https://www.ahrq.gov/. For the purposes of this study, the PI utilized the abbreviated TeamSTEPPS® video toolkit available as a collaborative project between the American Hospital Association and the CDC Project Firstline website at https://www.aha.org/center/project-firstline/teamstepps-video-toolkit. Permission to use the toolkit was requested and obtained via the link available on the website. Content included the TeamSTEPPS® framework, five (5) key principles and competencies for teamwork knowledge, skills and attitudes as well as tools to improve teamwork such as SBAR, Callouts, briefs and huddles. The PI delivered the TeamSTEPPS® tools related to the SC^3 content (SBAR, Checkbacks, Callouts, and CUS words), which represented commonly used tools.

The Timeframe.

TeamSTEPPS® was administered to 100% of the total number of participants. For in-person participants, the researcher presented the TeamSTEPPS® video toolkit course to the participants immediately after T-TAQ score was obtained. The second assessment to evaluate the T-TAQ was then re-administered immediately after completion of the training program. For online participants, after the completion of the first series of assessments, and completion of the video toolkit, the PI emailed participants a link to the second online T-TAQ Questionnaire. Reminder emails were provided at day thirty-five (35), and forty (40), but not required.

Data Management

Data Confidentiality

The PI provided a nondisclosure agreement for SurveyMonkey® outlining their refusal to sell or distribute confidential information as well as measures to protect the security and confidentiality of content (See Appendices J & K). The current SurveyMonkey® privacy and security statements are also available via the website at https://www.surveymonkey.com/mp/legal/privacy/ and https://www.surveymonkey.com/mp/legal/security/ respectively.

The Code Book.

A code book was created and stored on a hard drive with the de-identified demographic, assessment, and other data, as well as all related study materials. A separate hard drive was used to store the master record of participants, their unique ID assignment and any identified data and was kept independently of the hard drive containing de-identified information.

Confidentiality.

Subject data confidentiality was strictly maintained, and the protection of data integrity ensured, by keeping all study materials under lock in the primary investigator's office. A dedicated research laptop was utilized for all study data collection and analysis. The laptop, external drive and all thumb drives were password protected. Online surveys via SurveyMonkey® were structured so that IP addresses remained anonymous. The PI maintained valid CITI research training certificates, current curriculum vitae and conflict of interest forms completed for protection of human subjects.

Confidentiality was further maintained by the de-identification or masking of all forms with a unique ID number. The PI assigned a unique ID number to participants for use throughout the study. Participants who forgot their unique ID were advised to contact the Principal Investigator for retrieval. All data and materials will be destroyed within one year of conclusion and dissemination of results.

Data Analysis

Statistical analysis of data was conducted by using paired *t*-tests to examine the difference between two dependent means (Portney & Watkins, 2015). IBM SPSS Statistics Grad Pack 27.0 Premium Version was used for the data management and compilation of demographic variables, bivariate statistics, or other descriptive data (SPSS Statistics Grad Pack 27.0 Standard Version, n.d.; Morse & Richards, 2002).

If the participant were to withdraw from the study prior to completion, then that participant's data was eliminated. There were no participant withdrawals.

Additional Data Analysis

Gibson's Theory of Affordances

Gibson's Theory of Affordances was the theoretical framework guiding the research and data analysis (Clapper et al., 2018; Gibson, 1979). The Theory of Affordances was also be utilized to organize the data and test the three (3) null hypotheses from an interpretive viewpoint.

Data Rigor

Design.

According to Polit and Beck (2018), rigor in quantitative research is a reflection of reliability and validity. Efforts to ensure a strong design were implemented. Also, according to Polit & Beck (2018), features such as presence of an intervention (namely,

the TeamSTEPPS® training program), comparisons, control of confounding variables, longitudinal time frame, and location help to facilitate a strong design and are present in this proposed study. The repeated measures (pre-/posttest) design with matched pairs enhances control over variables that are extraneous in nature. The paired *t*-test was selected for analysis for the research design due to its ability to reduce error variance due to these variables (Portney & Watkins, 2015).

Randomization.

There was no randomization in this study.

Sampling.

Measurements were conducted at two points, assessment and evaluation using a one group pre-/posttest design. Monitoring for participant attrition within the study was performed because it is a common threat to pre/post-test studies and may have affect generalization and introduced bias.

The Training Program

Training fidelity was ensured via delivery of a standard course by the TeamSTEPPS® certified researcher utilizing standard course material available online via the AHRQ website at https://www.ahrq.gov/ and the CDC Project Firstline website at https://www.aha.org/center/project-firstline/teamstepps-video-toolkit.

Statistical Controls

Finally, available statistical controls during analysis were utilized to introduce a final layer of regulation and to limit threats to internal and external validity and reliability.

- Power analysis was conducted to ensure the study sample size was sufficient for detection of statistical significance, should one exist.
- The study used a valid and reliable instrument, the T-TAQ for measurement of teamwork attitudes.
- The study will be replicable, as the researcher provided an accurate and detailed research protocol for future testing.
- Control Variables and Covariates. The study controls for demographic differences such as age, ability to read, write and understand English. In addition, the study adjusts for covariates related to nursing education and experience; specifically, the type of nursing program attended, length of licensure, type of residency/orientation program, length of residency/orientation program, length of employment, unit of employment type and type facility of employment.

It is by these gold standards that the quality of a quasi-experimental research inquiry was assessed (Polit & Beck, 2018, Portney & Watkins, 2015).

Overview of Study Findings

This study explored the effect of the implementation of TeamSTEPPS strategies on teamwork attitude scores in an NGN orientation plan. The total teamwork attitudes score was computed as an average of five teamwork subscales comprising leadership, team structure, mutual support, situation monitoring and communication. Scoring consisted of computation of the total score or individual averages of each of the 5 domain subscales. Study findings revealed increases in TA total scores after the TeamSTEPPS® training was implemented (TA Pre-test M1=21.19, Post-test M2=21.57, +0.38). An examination of individual subscales indicated increases present in some domains and decreases in others. In addition, communication was a domain of interest with moderate increases in pre- to posttest scores (p=.057, two-tailed paired samples *t*-test). These findings underscore the importance of communication as a prominent component of teamwork attitudes thereby warranting further analysis.

Summary of Chapter One

Chapter One introduced this quantitative study utilizing a quasi-experimental pre/posttest design, which explored the effect of the implementation of TeamSTEPPS strategies on teamwork attitude scores in an NGN orientation plan. Chapter One began with a statement of the study problem. The chapter then provided the background and significance of the problem, statement of purpose and goals, research questions and aims,

theoretical framework, study variables, and definition of terms. Finally, Chapter One offered an overview of research methodology, data collection and analysis, and a brief overview of study findings.

Plan for Remaining Chapters

Chapter Two provides a detailed review of the literature on TeamSTEPPS® and its impact on TA. Chapter Three discusses the application of the quantitative quasi-experimental methodology, with pre/post-test research design. Chapter Four presents the study findings. Chapter Five presents the conclusions, discussion, and recommendations relative to the study findings.

CHAPTER 2: REVIEW OF LITERATURE

Introduction

Chapter Two provides a review of literature related to what is known about the integration of TeamSTEPPS strategies within an orientation program on NGN Team attitudes. The theoretical and historical overview of literature regarding the application of TeamSTEPPS strategies across multidisciplinary practice areas was also summarized. The literature review further explored related variables, e.g., prevalence, demographics, and risk factors. Finally, the Chapter defined variables, identifies gaps in the literature, and discusses the rationale for the study.

Theoretical and Historical Literature Review

Theoretical Literature Review

TeamSTEPPS

TeamSTEPPS was launched in 2006 as a joint effort by the Department of Defense and AHRQ (AHRQ, 2006). It is a patient safety strategy that has been utilized across multiple disciplines and with several populations (Maneval, et al., 2020; Vertino, 2014).

Impact of TeamSTEPPS.

TeamSTEPPS has positively impacted patient safety, improved communication, and Team Attitudes (Baker, D.P., et al., 2010; Clancy, 2016; Clapper, 2019; Gaston,

2016; King, et al., 2008; Peters, H., 2018; Vertino, B, 2018). Advancements in communication and improved patient safety was realized across various disciplines and practice areas. Studies supporting positive outcomes were conducted in Obstetrics, Ambulatory care, Rapid Response Team Performance, and Emergency care (AHRQ, n.d.). Research has shown that TeamSTEPPS increases teamwork attitudes (Maguire, et al., 2015; Vertino, 2014), job satisfaction (Kalisch, et al., 2010), and improves patient safety (Jones, et al., 2013; Kohn, et al., 1999; Weaver, et al., 2010).

In 1999, in response to an unprecedented number of deaths and preventable iatrogenic injuries described in the *To Err Is Human* report by the IOM (Kohn, et al., 1999), multiple agencies joined forces to address the source, teamwork performance (King, et al., 2008). A broad patient safety initiative to study and find solutions was launched by President Clinton as a result of the growing number of deaths presented in the IOM report. The safety initiative resulted in several successful initiatives such as the One Hundred-Thousand Lives campaign. Since its 2006 release, TeamSTEPPS has been utilized among nurses, physicians, pharmacists, and administrative staff to bridge the communication gaps that impair the delivery of safe and competent care. The development of team skills helps to nurture a willingness and desire to function as a highly efficient team and reduce errors.

TeamSTEPPS® in Surgery.

The TeamSTEPPS® training program has effectively improved communication gaps in the surgical theater when implemented in medical training programs (Awad, et al., 2005). Diverse platforms for delivery have made it beneficial in-person or via pre=recorded video lessons. Observational studies have demonstrated its usefulness in developing situational awareness in surgical teams in the orthopedic department as well (Bleakely, et al., 2013). TeamSTEPPS® has shown positive effects when utilized among experienced providers, novices, and students regardless of the time of exposure within the medical career. By providing participants with a foundation to interprofessional teamwork, human factor, performance, and communication are enhanced for pre-operative, perioperative and postoperative interactions (Awad, et al., 2005; Bognar, et al., 2008; Greenberg, et al., 2007; Paige, et al., 2013; Puall, et al, 2013; Weaver, et al., 2010).

TeamSTEPPS® in Medical Education.

The TeamSTEPPS® training strategy has been utilized extensively in medical education. It is closely related to Crew Resource Management (CRM) utilized by anesthesiologists and emergency medicine residency programs (Awad, et al., 2005; Dedy, et al., 2013). Embedded into the curriculum of several medical education programs, these organizations have chosen to prepare their program participants with a unique skillset that

capitalizes on reduction of error, improved communication, and team dynamics (Awad, et al., 2005; Meier, et al., 2012).

TeamSTEPPS® in Simulation.

Simulation is an educational methodology that gained exposure amid the COVID-19 pandemic. Simulation is the creation of a simulated or mock clinical encounter or scenario using a human patient simulator designed to replicate clinical pathologies in a controlled educational environment. As restrictions resulted in the lockout of many healthcare learners from important hands-on clinical experiences, many educators turned to simulation as an alternative. Simulation offered an opportunity to improve communication and a way to experience unique patient cases. The methodology allows participants to experience low-frequency, high-risk patient conditions, learn in a simulated clinical environment without causing harm to actual patients. TeamSTEPPS has been embedded into the simulation scenarios objectives and post-simulation debriefing framework with positive results. Improvements have been realized in intensive care unit teamwork, patient safety, in situ teamwork, obstetrics and code management (Daniels, et al., 2008; Figueroa, et al., 2013; Gaba, et al., 2001; Garbee, et, al., 2013; Paige, et al., 2013; Powers, K, et al., 2008; Riley, et al., 2011; Salas, et al., 2005; Shear, et al., 2013). According to Davis and others (2008), the use of simulation in teamwork

training can be multifaceted approaches, however the overarching purposes are to reduce harm and patient injury and to improve communication and teamwork.

TeamSTEPPS® in Interprofessional Education.

TeamSTEPPS has shown its adaptability in interprofessional education through its application to multiple healthcare providers (Chen, et al., 2019). Ten different professions were included in the scoping review by Chen and others (2019). Interprofessional educators have used TeamSTEPPS® in conjunction with various training methodologies such as simulation to improve communication within the team (AHRQ, n.d.; Baker & Durham, 2013; Garbee, et al., 2013; Paige, et al., 2013). Validated evaluation tools were a strength of a few of the studies described in the scoping review. The focus on teamwork training in interprofessional education highlights its importance for the most vulnerable of patients such as those in the pediatric population as well (Sands, et al., 2008; Sawyer, et al., 2013). In vulnerable or high-risk patient populations, teamwork errors can result in mortality as a result of errors in human factors. Finally, failure to rescue deteriorating patients was addressed using an interprofessional simulation among medical students and nursing students. Teamwork is an entry-level skill expectation for all healthcare practitioners regardless of discipline. The study indicated significant improvements in posttest results as compared to the pretest results

(Liaw, et al., 2014). The results of the studies underscore the need to implement interprofessional TeamSTEPPS® training programs.

Teamwork.

A major component of TeamSTEPPS® is teamwork. Teamwork serves as the foundation of purposeful communication. It encourages a cohesiveness and integrates multiple disciplines responsible for patient care. Teamwork may be a strong factor responsible for new graduate nurse perceptions about their employment environments. The perceptions of the NGN may be a key indicator of desire to remain or leave the profession.

Teamwork and Attrition Rates.

NGNs report positive perceptions when feeling a part of the interdisciplinary team (Blum & Parcells, 2012; Crawford, et al., 2018). Twenty-six percent (26%) of NGNs intend to leave the profession due to feelings of anxiety, inadequacy, workplace dissatisfaction, and frustration with initial practice and performance issues and concerns regarding medical errors and patient safety issues (Casey, et al., 2011; Fallatah, Laschinger & Read, 2017). These quantitative, qualitative and mixed-methods studies provide meaningful descriptive data especially describing participant perceptions (Blum & Parcells, 2012; Crawford, et al., 2018, Fallatah, Laschinger & Read, 2017). Additional research has demonstrated over forty-one percent (41%) of NGNs express intentions to

leave their positions during the first three (3) years (Fallatah et al., 2017). Improved teamwork may positively impact these rates.

Teamwork and Patient Safety.

A direct benefit of successful teamwork efforts is patient safety (Blum & Parcelle, 2012; Makary & Daniel, 2016). Initial estimates by The Institute of Medicine have suggested over 98,000 deaths per year are the result of preventable errors (Blum & Parcelle, 2012). Makary & Daniel (2016) estimated that these figures are currently four times as high and may exceed 400,000 deaths per year (Pogue & O'Keefe, 2021). Teamwork is a critical skill for successful transition to practice and prevention of errors. The Joint Commission, (TJC) reports that over 70-80% of errors result from communication issues within the team (TJC, n.d.). These preventable errors cost organizations over $8.8 billion from approximately 240,000 preventable deaths (Healthgrades, 2008).

Teamwork and Job Satisfaction.

Effective teamwork affects job satisfaction, can prevent patient errors and improve patient outcomes. Patient safety, retention, attrition, medical errors and staff satisfaction have also been attributed to success of NGN transition to practice (Arrowsmith et al., 2015; Casey et al., 2011; Hayes, 2018; Kaddoura, 2010). Studies utilizing surveys of over 4000 participants have indicated dissatisfaction rates as high as

41% related to intent to leave (Rambur et al., 2003). The relationship between satisfaction and intent to leave is strong (Rambur, et al., 2003). Likewise, how a hiring organization meets, exceeds or fails to meet NGN expectations can influence the NGN's perceptions and job satisfaction. These factors are presented in a small longitudinal mixed methods study examining nurse perceptions after 1, 6 and 12 months (Gill et al., 2010). NGNs report that supportive environments, residency programs and skilled mentors and preceptors contributed to their satisfaction and ultimately their desire to remain in the profession (Fallatah et al., 2017; Liang et al., 2018; Rambur et al., 2003).

Teamwork and Support Systems.

Furthermore, as evidenced in other qualitative and mixed methods studies, supportive environments, mentored dyads, interprofessional support, constructive communication and structured preceptorship programs were reported to impact retention and intent to stay (Arrowsmith et al., 2015; Clark & Springer, 2012; Gill, et al., 2010). NGNs indicated that although workloads and patient complexity were challenging, effective teamwork and support emerged as prominent reasons to remain (Crawford, et al., 2018; Gillet et al., 2010; Ortiz, 2016; Theisen & Sandau, 2013).

Historical Literature Review

TeamSTEPPS® is a culmination of over fifty (50) years of collective research in response to the appalling number of preventable deaths reported by the landmark 1999

publication by the Institute of Medicine (IOM) *To Err Is Human* (IOM, 1999; King et al., 2008). Deaths were reported as high as 200,000 but have now been re-estimated as high as 400,000 (Makary, 2016). The early emergence of the team training strategy was noted in the anesthesia field to help them efficiently address issues that arose when working with an interdisciplinary team of nurses, physicians, technicians, etc. Crisis Resource Management (CRM) was their early strategy. Developed from original research by the aviation industry, the primary goal of early team training was error reduction and prevention of patient harm (King, et al., 2008).

The TeamSTEPPS® training strategy was created through a joint effort by the AHRQ and DoD in response to the growing number of preventable deaths resulting from errors. The program was deployed across sixty-eight (68) military training facilities then later deployed into healthcare facilities and acute care hospitals. Within these facilities it is widely accepted that physicians, nurses, technicians, and other healthcare workers often work together, however they seldom train together. The earliest research by King and others (2008) noted that good teamwork required a willingness from each team member. This willingness stems from attitudes and mutual respect for the distinct roles of each team member and their respective contribution to patient care. Baker and others (2008) determined that early research of anesthesiologists provided the backbone of

teamwork competency in Attitudes, Knowledge, and Skills (AKSs). These competencies now serve as the foundation upon which TeamSTEPPS® is built.

Translation into Healthcare

Several teamwork training strategies were studied prior to the launch of TeamSTEPPS®. Dynamic Outcomes Management®, MedTeams®, and Medical Team Management®. Although each program possessed its own strengths, there was a noticeable lack in evidence-based team training development. The programs were not specific, and competencies were framed from an academic orientation rather than instructional framework that would be meaningful to the learner (i.e. the training skills were not associated with the teamwork competencies or outcomes).

Efficacy and Causal Linkage

Although TeamSTEPPS® strategies were proven effective in improving teamwork attitudes and perceptions, there remained a lack in evidence linking it to patient safety outcomes (King, et al., 2008). Participants in the TeamSTEPPS® pilot study reported positive responses and improved learning, however there are few studies supporting the evidence that TeamSTEPPS® is related to decreases in sentinel events, especially those attributable to errors due to communication (King, et al., 2008).

Studies involving New Graduate Nurses

The historical literature base on the AHRQ's TeamSTEPPS® website mentioned a study conducted at Duke University involving medical students and nursing students poised for graduation (AHRQ, n.d., King, 2008). This was one of the first studies to incorporate standardized patients, an innovative simulation technique. Early studies even included physicians, nurses, and medical and nursing students; however, none examined the newly hired NGN highlighting an immediate area for continued research (King, 2008). The early literature also indicated the need for consistent usage of evaluation tools and the need for research on sustaining the gains acquired with each implementation.

Literature Review of Research

There is a paucity in the literature regarding TeamSTEPPS® and its integration into the orientation of NGNs. The earliest study describing the training strategy by King and others (2008) provided evidence on the utilization of TeamSTEPPS® program made available to the public in 2006. The publication summarized the use of TeamSTEPPS® across multiple disciplines and practice areas such as dentistry, emergency medicine and the OR but did not specify the use of NGNs. The first study utilizing TeamSTEPPS® and the NGN was by Luger and Ford (2019) and only focused on the leadership domain. Both early and subsequent studies demonstrated positive increases in the respective operationalized variables under study such as knowledge, skills, and attitudes as well as

measurements of learning (Baker, D.P., et al., 2010; Clancy, 2016; Clapper, 2019; Gaston, 2016; King, et al., 2008; Peters, 2018; Vertino, 2018).

Teamwork and Attrition Rates

Historically, attrition rates were indirectly attributed to poor teamwork possibly derived from toxic, high-stress, high-acuity work environments (Arrowsmith et al., 2015; Casey et al., 2011; Hayes, 2018; Kaddoura, 2010). Lateral and vertical violence as well as disruptive coworkers has also been noted as an obstacle to teamwork (Rambur et al., 2003). Additional research is needed to correlate attrition rates to successful transition to practice and ultimately job satisfaction in the NGN. Several researchers have purported that job satisfaction is related to the rate of retention or attrition of NGNs (Fallatah, Laschinger & Read, 2017; Liang et al., 2018; Rambur et al., 2003).

Teamwork and Patient Safety

The literature describing outcomes from the first applications of TeamSTEPPS® training strategies were geared toward improving communication. This earlier literature outlined communication strategies and safety measures that were key to changing the trajectory of data trends listed in reports such as *To Err is Human* (IOM, King et al., 2008; Kohn, 1999) and decreasing the growing number of preventable deaths came at the impetus of governmental agencies such as the Department of Defense, The Agency for Healthcare Research and Quality (AHRQ), as well as the office of the United States

President. Patient safety events resulting from preventable errors came with a substantial and unsustainable cost to healthcare organizations and often resulted in irreversible or fatal outcomes for many patients (AHRQ, n.d.).

Teamwork and Job Satisfaction

The historical literature review is indicative of researchers having studied job satisfaction of the experienced nurse ad nauseum. Current literature is still being added that provides results of close examination of this job satisfaction in the NGN population with consideration of current trends (Crawford et al., 2018; Gill et al., 2010; Ortiz, 2016; Theisen & Sandau, 2013). The very population that is intended to relieve staffing shortages and address concerns of retiring staff, is presently still threatened by frustration, anxiety and early departure of NGNs from the profession (Clark, 2012). Researchers have derived from their studies that more supportive educational environments and training programs are needed for the NGN (Arrowsmith et al., 2015; Casey et al., 2011; Hayes, 2018; Kaddoura, 2010). NGNs reported that feeling "part of the team" influenced their level of job satisfaction (Crawford, et al., 2018). These findings have led to the development of lengthy and costly residency programs as well as training models that consist of mentored dyads. A mentored dyad consists of the NGN and an experienced nurse or preceptor. The two are paired for the majority of the orientation with the latter responsible for oversight and support of the NGN. NGN feedback and qualitative data

demonstrated that teamwork was beneficial to NGNs and affected their desire to remain or leave the practice area (Fallatah, Laschinger & Read, 2017; Liang et al., 2018, Rambur et al., 2003).

Literature Review of Variables

Independent Variable: TeamSTEPPS

TeamSTEPPS integration into NGN Orientation plan is the independent variable. There was only a single study of five NGNs in a rural setting that examined implementation of the training program into a NGN orientation (Luger & Ford, 2019). Results indicated increases in leadership measurements, but a notable decrease in teamwork attitudes (Luger & Ford, 2019). This study examined NGNs in a transition to practice program in a rural critical access hospital.

Dependent Variable: Teamwork Attitude Scores

Teamwork Attitude (TA) Scores have been studied as a measurement of the effectiveness of the TeamSTEPPS training program (Baker, et al., 2010). Attitudes influence behaviors. TA scores indicate learning and serve as a standard of improvement after implementation of the training strategy as well. During the research and development of the T-TAQ, Baker et al. (2010) drew upon research from the aviation industry and its use of the Cockpit Management Attitudes Questionnaire to assess participants' coordination, leadership and communication. There is substantial overlap

and similarity of these areas with team structure, leadership, and communication found in the TeamSTEPPS tools used to measure attitudes.

Luger and Ford Study (2019)

Luger and Ford (2019) developed the single study specific to NGNs. The study primarily focused on the leadership domain of TeamSTEPPS® training. Although, the study demonstrated positive increases in knowledge, skills, and attitudes as well as measurements of learning, it had noticeable limitations. Namely, the study was focused on rural geographical areas, consisted of an extremely small sample size of five NGNs. Rural locations may be geographically challenged resulting in NGNs utilizing leadership, delegation and clinical decision-making skills. The rural critical access designation may result in an increased number of patients requiring emergent or time-sensitive care. The study results indicated increases in leadership ability but decreases in attitudes or perceptions about teamwork. As NGNs, the ability to lead is a desired skill, however, functioning as an integral and contributing member of the healthcare team is paramount to patient safety. Leadership is but one area of team structure and requires a symbiotic relationship with each team member to facilitate the continuous loop of effective communication. Again, the study was limited by a small sample as there were only five (5) participants and thus generalizability was limited. Results were calculated using the total scoring method from all areas on the T-TAQ (2019).

The Vertino Study (2014)

A study by Vertino (2014) indicated statistically significant improvement in overall teamwork attitude scores as well as individual team structure domain, evident by a change score of +0.44 (n=26). The total possible as an overall score is 30 points. If scoring the instrument by domain or subscale, a maximum mean of M=5 is possible (See data collection. Participants included registered nurses (n=12), licensed practical nurses (n=7) and nurse's assistants (n=7). The largest percent of change was noted in the licensed practical nurse group (+0.95). This change likely correlates to the licensed practical nurse's scope of practice in that they do not educate, assess or teach. The introduction of the TeamSTEPPS training enhances knowledge on team structure, dynamics, and communication. It should be noted that the majority of the participants were experienced staff. Participants in the study answered exit questions indicative of perception of improved teamwork attitudes after the training strategy. The study however had several limitations. It was conducted on a single unit in a Veteran's Administration hospital. The study did not provide enough details to determine if NGN nurses were included as approximately 19% of participants had experience levels from 0-5 months.

Confounding Variables: Demographic Data Sheet

New Graduate Nurses (NGNs)

The classification as a NGN may be a confounding variable due to their inexperience and difficulty adjusting to the professional practice area. Stressors encountered during the difficult transition period may affect perceptions and influence reporting. The NGNs may be impressionable or overwhelmed with the sheer magnitude of new responsibilities and may not report concerns truthfully for fear of appearing uninformed. The T-TAQ was developed to reduce the socially desired responses in that phrases that were likely to elicit positive responses such as "it is important to" were limited or avoided (Baker, et al., 2008). As the newest members of the healthcare team, NGNs may be vulnerable and feel compelled to answer questions positively out of fear of offending those in supervisory roles.

Age

There is limited data specifically describing studies that focus on age ranges in the NGN. Demographic data may provide important information about age groups such as young, entry level nurses, non-traditional nurses or second- or third- career nurses completing accelerated nursing programs. There has not been a great deal of literature devoted to the variable of age although data is available on non-traditional nursing students and gender minorities, specifically male nurses.

Educational Preparation

The limited studies that involved NGNs and TeamSTEPPS® provided equally limited demographic data summaries (Luger & Ford, 2019; Vertino, 2014). The reported data was not thoroughly stratified as researchers reported the classifications in broad ranges. It was surmised that educational preparation was not a significant factor because all participants had to sit for similar national board licensing exam for their respective state nursing boards. Educational preparation could be a consideration for a future study arm to determine if associate degree, certificate, or baccalaureate traditional or accelerated programs may be responsible for significant differences in teamwork attitudes. An additional consideration is whether accelerated nursing programs also play a role in the development of teamwork attitudes.

Definition of Variables

Independent Variables

Conceptual Definition

TeamSTEPPS® is conceptually defined as an evidence-based teamwork system to improve quality, safety, and efficiency of healthcare (AHRQ, n.d.).

Dependent Variables

Conceptual Definition

Teamwork Attitudes (TA), a measurement of the effectiveness of TeamSTEPPS®, is conceptually defined as beliefs, feelings or behaviors related to teamwork (Dalege et al., 2016). Teamwork Attitudes are operationalized via the T-TAQ as measured scores across the domains that indicate competency. TeamSTEPPS® indicates the two competency outcomes for attitudes are mutual trust and team orientation (AHRQ, n.d.).

Operational Definitions

The *TeamSTEPPS® Teamwork Attitude Questionnaire (T-TAQ)* measures participant's *teamwork attitudes* as related to the five (5) core competencies of TeamSTEPPS®: Leadership, Communication, Situational Monitoring, Mutual Support and Team Structure (Baker et al., 2010). Measurement of teamwork may consist of two methods: 1) a total score of each of the five (5) teamwork constructs; or 2) computation of an average score of the five (5) teamwork constructs. Measurements may be taken at three different points: stand alone, assessment, or evaluation, i.e., to measure change or effect. The proposed study will measure teamwork attitudes by score averages taken at an initial assessment and at evaluation after the intervention.

Dependent Variables

C*onceptual Definitions*

Teamwork is conceptually defined as the dynamic interaction between individuals toward the facilitation of a shared goal.

Attitudes are conceptually defined as beliefs, feelings or behaviors related to teamwork.

Affordances is conceptually defined as a specific combination of the properties of its substance and its surfaces taken with reference to a human being; what is offered, ascertained, perceived, valued by, or provided to, a human being.

Confounding Variables

Conceptual Definitions

New Graduate Nurse (NGN) is conceptually defined as a recent graduate or newly hired nurse who has been employed for a period of less than 6 months. They are prelicensure or have been currently licensed to practice as a registered nurse by their respective state board of nursing and employed in a traditional (4 to 6 week) or residency type (1-2 year) orientation in an acute care hospital setting, academic teaching hospital or other nursing practice area.

Introductory employment period is conceptually defined as the first six (6) months of employment in the initial position of licensed registered nurse.

Gaps in the Literature Review

There were limited studies involving NGNs and TeamSTEPPS® training implementation into the orientation programs (Luger & Ford, 2019). Furthermore, the studies were also limited to rural hospitals which may affect generalizability (Vertino, 2014). The study by Vertino (2014) did not specifically indicate the number of NGNs that were included in the study findings. Based on these limitations, a gap in the literature is evident about the effect of TeamSTEPPS implementation in an NGN orientation program on measurements of teamwork attitudes.

Rationale for Study

Data on Costs of Training and Orientation of NGNs

Training and orientation costs are a pressing issue for many hiring organizations (Fallatah et al., 2006; Pitt et al., 2012; Rambur et al., 2003; Read, 2017). Financial losses due to early departure are an unsustainable model. Figures of $77,000 to $88,000 and as high as 2.1 million are concerning (Baker, 2010; Duffield et al., 2014; Welding, 2011). When NGNs leave after an organization's initial investment in their orientation and training, those dollars are non-recuperable.

Data on Attrition Rates of NGNs

Negative attrition and positive retention rates of the NGN affects staffing matrices, patient outcomes and safety. Constant turnover often results in a less-experienced staff and invite scrutiny of workplace environments.

Data on Patient Safety

Research is limited on the effect of a predominately inexperienced staff on patient safety metrics and value-based purchasing. Additional research is needed to provide quantitative and qualitative data that describes the correlation between NGN teamwork attitudes and patient safety.

Summary and Critique of Literature Review

Summary of Literature Review

This study addresses, and begins to close, a critical gap in knowledge. Little is known about the effect of intentional integration of TeamSTEPPS strategies into the orientation of NGNs on teamwork attitudes. Studies related to NGN teamwork attitudes were limited. Likewise, teamwork is necessary for success in professional socialization, retention, and collaborative skill development of NGNs. Studies have been conducted on medical students and nursing students. Some studies have compared teamwork attitudes in the first years to final semesters of educational preparation (Maguire, et al., 2015). While many studies on teamwork in other professional disciplines was plentiful and

research of several associated topics has been conducted, there remains a paucity in the literature on this phenomenon pertaining to the NGN (Baker, 2010; Friedman et al., 2013; Rambur et al., 2003).

The study provides evidence that implementation of TeamSTEPPS strategies closes a gap in knowledge about NGN teamwork attitudes by adding additional data to supplement or expand what is currently known about the phenomenon (Luger & Ford, 2019; Vertino, 2014).

Critique of Literature Review

The literature review provided two specific TeamSTEPPS studies that were conducted with the rigor and gold standard designs, i.e., randomized control trials, experimental designs with control groups. Both studies reported use of the validated and reliable T-TAQ instrument. (Luger & Ford, 2019; Vertino, 2014). There were limited studies utilizing TeamSTEPPS in NGNs and several included nursing students instead. There were limited studies that examined TeamSTEPPS and its outcomes during or after the orientation of NGNs. Several studies were conducted on healthcare staff in various stages of employment (See Chapter 2, page 58).

The Luger and Ford Study (2019)

The Luger and Ford (2019) study indicated an increase in the leadership domain and a decrease in the teamwork domain. Due to the primarily rural setting, the study did

not demonstrate generalizability across urban populations and focused solely on the leadership attribute. This study did include the NGN as the primary population of interest. Its participants, however, were participating in an adapted transition to practice program in a rural area. Small hospitals in rural areas rarely have affiliation agreements with academic healthcare training facilities. As such, customized hospital programs to aid in NGN transition to practice suffice for addressing NGN transitional needs. The PIs for the Luger and Ford study found that leadership was missing from residency development blueprints and opted for the transition to practice program as it was a variable of interest (Luger & Ford, 2019).

The Vertino Study (2014)

While the study by Vertino (2014) reinforced the data regarding significant increases in teamwork attitudes in registered nurses, licensed practical nurses, and nurse assistants, it also lacked support that NGNs were included in the study. Approximately 19% of participants indicated experience levels of 0-5 months. This study indicated the greatest statistically significant increase was in the licensed practical nurses' group. It is not possible to determine if NGNs were included in this study nor how far they had progressed in their individual orientations in that many indicated experience levels greater than 10 months.

The paucity in the literature of studies focusing on the NGN population underscores the need for additional studies to demonstrate the usefulness of TeamSTEPPS® in developing NGNs' teamwork skills. Limitations identified in the studies such as limited units, geographical area, unspecified experience levels, and educational preparation also emphasize the importance of the study and its contribution to the body of knowledge (Luger & Ford, 2019; Vertino, 2014).

Summary of Chapter

Chapter Two provided a review of literature related to what is known about the integration of TeamSTEPPS strategies within an orientation program on NGN Team Attitudes. The Chapter began with a theoretical and historical overview of literature regarding what is known about the integration of TeamSTEPPS strategies within an orientation program on NGN Team Attitudes. The literature review also explored related variables, e.g., prevalence, demographics, and risk factors. Finally, the Chapter defined variables, identified gaps in the literature, limitations in team-based interaction and education, NGN confidence and competency in communication and discussed the rationale for the study.

Plan for Remaining Chapters

Chapter Three discusses the application of the quantitative quasi-experimental pre/post-test research design. Chapter Four presents the study findings. Chapter Five presents the conclusions, discussion, and recommendations relative to the study findings.

CHAPTER 3: RESEARCH DESIGN

Introduction

Chapter Three presents the research design. The Chapter begins by identifying the specific aims, research question, hypothesis, and the research methodology (i.e., design and rationale) for exploring the aims. The Chapter describes the application of pre- and post-intervention design principles in the study, including participant population, setting, and sampling methods, and data collection, data analysis, and data management strategies. The Chapter also provides a discussion of ethical considerations and techniques utilized to protect the rights and confidentiality of study participants.

Specific Aims, Research Questions, and Hypothesis

The goal of the study was to determine if integration of TeamSTEPPS® into the NGN orientation program will increase teamwork attitudes (TA).

Specific Aim 1

Specific Aim 1 is: In the NGN, determine TA pre-TeamSTEPPS® training, as measured by the TS-Teamwork Attitude Questionnaire (T-TAQ).

Research Question 1 is: In the NGN, what is the TA pre-TeamSTEPPS® training, as measured by the T-TAQ?

Research Hypothesis 1 is: In the NGN, there is no difference in TA pre-TeamSTEPPS® training compared to the mean of reference groups reported in the literature.

Specific Aim 2

Specific Aim 2 is: In the NGN, determine TA post-TeamSTEPPS® training as measured by the T-TAQ.

Research Question 2 is: In the NGN, what is the TA post-TeamSTEPPS® training with TeamSTEPPS strategies integration, as measured by the T-TAQ?

Research Hypothesis 2 is: In the NGN, there is no difference in TA post-TeamSTEPPS® training compared to the mean of reference groups reported in the literature.

Specific Aim 3

Specific Aim 3 is: In the NGN, compare TA pre/post-TeamSTEPPS® training, as measured by the T-TAQ.

Research Question 3 is: In the NGN, what is the relationship between TA pre/post-TeamSTEPPS® training with TeamSTEPPS integration, as measured by the T-TAQ?

Research Hypothesis 3 is: There is no relationship between TA pre/post-TeamSTEPPS® training with TeamSTEPPS integration, as measured by the T-TAQ.

Research Methodology: The Design and Rationale

The Design

The proposed quantitative study utilized a quasi-experimental longitudinal design. The design was longitudinal in nature because participants were assessed over two points in time with assessments conducted at multiple points. Longitudinal designs are beneficial for detecting changes in effect over time or determining the presence and extent of causality (Polit & Beck, 2018). The study incorporated a nonequivalent pretest-posttest comparison group.

The goal of quasi-experimental design is similar to those experimental pretest-posttest designs but lack randomization. They are commonly used to compare two or more groups before and after a given intervention. The primary goal of its use in this study was to determine differences between teamwork attitude scores before and after implementation of a TeamSTEPPS® training strategy in an NGN orientation.

Power Analysis

Power analysis was conducted to determine the sample size. A sample size of n=30 has an 95% power of detecting a significant difference from a one-tailed matched pairs *t*-test. The study goal was to recruit approximately n=30. The study was planned to last 30 months or until approximately 30 participants completed the study, whichever occurred first. Participants were NGNs. The expected age range of participants was 18 years and older.

The Rationale

As described by Polit & Beck (2018), quasi-experimental designs are similar to experimental pretest-posttest designs but lack randomization. Quasi-experimental designs have been lauded for their convenience and practical methods. Although full rigor is not possible, researchers are afforded a few methods to implement controls. This design was most appropriate to examine the effect of integration of TeamSTEPPS strategies on NGN Teamwork Attitudes (TA). The following section will describe the implementation of Gibson's Theory of Affordances, the theoretical framework guiding the study and related principles in the present study.

Population and Setting

Population

The *population* selected for study was new graduate nurses (NGNs) selected from a pool of new hires in their orientation plan.

Setting

The *setting* consisted of an in-person or online platform utilizing email-delivered links to SurveyMonkey®, computer-based learning (CBL) and designated class/conference rooms and various nursing units housing computers needed to complete study components.

Sampling Methods and Access

Sampling Methods

A non-probability convenience sample design was used to access participants who were part of an NGN cohort beginning their first professional nursing positions. NGNs, as the population of interest, are often part of a group of potential participants with similar experience levels and in similar phases of orientation programs. To answer the research questions, the PI selected this method of sampling as participants were the best representation to inform the study. The sample of NGNs should demonstrate similar

results as compared to the population of NGNs with similar characteristics and qualities. The residency or orientation program is typically the first professional entry point into the healthcare career for many NGNs. Orientation and/or residency is a critical time for access to potential participants as well as the ability to capture them prior to exposure to workplace and environmental factors. For this reason, a recruitment flyer targeting NGNs was created and distributed to orientation and residency coordinators or directors to share among their participants. Through initial professional contact with coordinators and directors, convenient access to potential participants was fostered. The NGN's participation in a NGN residency and orientation program improved the researcher's accessibility to potential participants.

The convenience sample was selected from new hire cohorts because similarities in orientation experiences and employment length contribute to the sample's representativeness (Polit & Beck, 2018). Additionally, the design did not use random assignment of participants and was a repeated measures test of the same group. Convenience sampling was utilized because of the readily accessible NGN population participating in an orientation or residency program. As such, an element of bias may be introduced, however, convenience sampling is common in nursing research (Polit & Beck, 2018). Convenience sampling was the best method to provide the best type of participants to inform the study. The PI coordinated with the facility contacts (i.e.,

Director of Professional Practice and Nursing Program Manager/Residency Coordinator) to obtain access to the NGN cohorts for recruitment.

Recruitment flyers were distributed by the Nursing Program manager at the Texas facility and the Director of Professional Practice at the Louisiana facility who served as facility contacts for the PI. Due to minimal participation, the PI reached out to facility contacts to discuss and arrange more aggressive recruitment strategies to increase enrollment. Strategies included a scheduled in-person option in conjunction with scheduled orientation activities. Finally, limitations due to low participation and COVID-19 restrictions could have severely impaired adherence to study timelines but were mitigated using the non-probability convenience sampling approach.

Participant Inclusion Criteria

Participants included in the study were:

- 18 years of age or older.
- Able to speak, read, write, and understand English.
- Recent or imminent graduate of an accredited nursing program (diploma, certificate or baccalaureate) or:
    - Currently licensed to practice as a registered nurse applicant or registered nurse by their respective state board of nursing,

- Currently employed in a traditional (4 to 6 week) or residency type (1-2 year) Orientation,
- Employed less than 6 months but has not completed 50% of their employment orientation or residency plan.

- Employed in an acute care hospital setting or academic teaching hospital.
- Employed in Medical-Surgical, Telemetry, Emergency, and Critical Care units or other nursing care areas.

Participant Exclusion Criteria

Participants were excluded from the study who:

- Did not meet the inclusion criteria listed above; and,
- Were employed in school nurse or home health settings. In these settings, nurses practiced more autonomously, independently, and interdisciplinary interactions and involvement may have been severely limited, thus limiting potential research data. Home health and school settings allow independent function of nurses. Therefore, due to low frequency of interdisciplinary (healthcare team) interactions within these practice settings, these NGNs were excluded.

Recruitment

The recruitment occurred in-person or online via use of a study flyer outlining the study overview. The PI coordinated recruitment efforts with residency program directors and professional practice directors of the Texas and Louisiana academic healthcare facilities serving as the recruitment sites. The PI was invited to speak to cohorts during orientation, share the research study flyer and invite participants to participate in the study. Although the study was approved for social media and special-interest website recruitment, this method was not utilized because the number needed per the power analysis had been obtained from the two participating organizations. Participants were recruited from two (2) large, academic teaching hospitals in Louisiana and Texas that serve as training sites for several healthcare disciplines. Large cohorts of NGNs are hired on a rolling basis to alleviate supply and demand issues due to continuous turnover, retirement, and voluntary departure for other reasons. NGN cohorts enter employment every one to two weeks among multiple units and practice areas. The two facilities are two of the largest employers or healthcare staff in their respective regions.

Sample Access

The Director of Professional Practice and the NGN Transition into Professional Practice Program (TRIPP) coordinator for the Louisiana facility was an early advocate

and champion for the research project. The chair of the facility's nursing research council arranged for the student to present the proposed project via permission from the council, consisting of individuals from diverse educational institutions and laypersons.

The Nursing Program Manager/Residency Coordinator at the Texas facility proved to be an essential resource for recruiting participants and arranged for the PI to visit during a residency educational session. The PI was allowed to recruit via flyer and to speak to potential participants during breaks between residency and orientation or on-boarding content. The Nursing Program manager and Residency Program coordinator for the Texas facility was an integral resource and connection for potential participants. They coordinated and offered the PI an opportunity to personally invite NGNs and share the recruitment flyer during breaks in their orientation.

Previous no-contact recruitment efforts via an emailed recruitment flyer were nonproductive and garnered virtually no responses. Thus, an IRB change request was required to recruit and deliver study components in-person. The PI obtained the request and was approved to recruit according to the newly established protocol.

Ethical Considerations

Human Subjects: IRB Approval

Procedures for the study were approved by the University of Texas Medical Branch (UTMB) Institutional Review Board (IRB) (See Appendix A). A feasibility review was conducted. The proposed study also was reviewed and approved by the Nursing Research Council of the Louisiana recruitment site and an endorsement letter was obtained (See Appendix B).

Human Subjects: Confidentiality

The primary risks to participants in this study were loss of confidentiality and emotional distress. Study participants' confidentiality was protected in a number of ways. The researcher maintained a confidential list of potential study participants. The researcher assigned a unique study identification number to replace each participant's name and any information that could be linked to the participant was removed from the data. During the subject consent process, the researcher explained the potential risks of loss of confidentiality and the strategies that were used to mitigate those risks. The study participants also were informed that they had the option of not participating and they

could end their participation at any time. Emotional distress also was a potential risk to the study participants but was mitigated with a referral to pastoral care when needed. There were no participants reporting adverse reactions or emotional distress during the study.

Measurement Methods

The Protocol

Protocol Development

The protocol was developed and customized according to each residency program's specifications and schedules. Feedback from each facility's orientation coordinator (Residency Program Manager and Director of Professional Practice) regarding the orientation structure and specific needs of each facility's NGNs was reviewed and considered by the PI. Approaches were different according to each facility, necessitating multiple options that allowed for a "best fit" based on each facility. Every effort was made to prevent disruption of their current orientation structure, schedule or calendar of orientation events. Coordination with the professional practice director and residency program director eliminated scheduling issues and provided the best opportunity to approach potential participants.

Protocol Methodology

A detailed, replicable study protocol was followed once Institutional Review Board approval was obtained (See Table 4.9, Protocol Methodology).

The Tool: Teamwork Attitudes Questionnaire (T-TAQ)

Psychometric Properties of the T-TAQ

The tool used to measure the dependent variable Teamwork Attitudes (TA), was the Teamwork Attitudes Questionnaire (T-TAQ). The T-TAQ was developed by Baker and others (2010). The sequential steps for its development were conducted in the following order: review of the literature, development of the items, testing the pilot, selection of the items, and psychometric testing. The validity established for the T-TAQ is .36 to .63 according to the Pearson correlation co-efficient and are indicative of a fair to moderate relationship. The reliability for the T-TAQ is also acceptable with Cronbach's alpha values of .70-.83 (Baker, et al., 2010). The tool uses a Likert-scale response that includes strongly disagree, disagree, neutral, agree and strongly agree. The scale assigns each response a point value of 1 to 5, respectively unless reverse scoring is indicated. There are four (4) items that are reverse scored. Three items are in the mutual support domain and one item is in the communication domain. Items are reversed scored

to eliminate confusion of negatively worded questions or items. By reverse scoring certain responses, variables remain consistent for instrument scoring.

The T-TAQ assesses individual aspects of the main principles of teamwork (Baker, et al., 2008). The T-TAQ consists of thirty (30) questions on a 5-point scale. The scale responses consist of "strongly disagree," "disagree," "neutral," "agree" to "strongly agree." There are five (5) subscales with six (6) sets of questions each. The T-TAQ measures teamwork attitudes across the subscales for leadership, team structure, mutual support, situation monitoring and communication. The T-TAQ has a construct coefficient alpha of .70 for team structure, .81 for leadership, .83 for situation monitoring, .70 for mutual support and .74 for communication. The T-TAQ has a test-retest correlation of .36 for mutual support & team structure to .63 for situation monitoring & communication (Baker, et al., 2008).

Data Collection Process

Data for the study consisted of demographic data, and Pre/Post-test T-TAQ scores. This pilot study assessed teamwork attitudes in NGNs before and after the TeamSTEPPS® intervention. T-TAQ results were collected before and after the TeamSTEPPS® intervention.

Demographic Data

Demographic data included the participant's age in years, gender, race/ethnicity, level of education, orientation length, type unit of employment, and length of time employed (Table 4.1, 4.2). Questions were formatted with multiple choice answer options (i.e., "*What type of orientation or residency program are you attending*?" and "*How long is your orientation or residency program*?")

Administration of the T-TAQ

First, the PI formatted the entire T-TAQ instrument into a SurveyMonkey® questionnaire. The "logic" feature of the SurveyMonkey® software was used to create custom variables labeled as "USID" for tracking responses, organizing data and pairing survey responses according to the participant's assigned unique study ID (USID). Settings were programmed to maintain anonymous IP addresses.

Next, participants were provided a unique email link containing their USID formatted into the survey link which brought them to the online SurveyMonkey® platform for the demographic survey as well as the 30- item T-TAQ survey or accessed the items via a QR-code for scanning during in-person recruitment sessions. The QR code directed participants to the SurveyMonkey® link to the online T-TAQ. A different

custom link or QR code was used for each of the survey components and paired according to each participant's USID.

Finally, results were collected via SurveyMonkey® while maintaining anonymous IP addresses.

Limitations and Assumptions

Limitations

The following *limitations* were identified in this study:

- Sample Size: While the sample size of thirty (30) was adequately powered for the study according to an a priori power analysis, additional participants may have contributed to a greater statistical significance. There were several favorable responses ("agree" and "strongly agree") noted among the majority of the participants. Because most respondents already reported affirmative responses, there was little room for the range of positive improvement. Small sample sizes can introduce bias and limit generalizability. Therefore, increasing the number of participants can decrease the risk of Type I statistical errors. Recruitment and enrollment of additional participants was a major study limitation due to multiple factors including, but not limited to the

ongoing restrictions in place due to the pandemic and the demands of orientation.

- COVID-19 Pandemic: The current climate of COVID-19 and staffing issues made recruitment difficult.
- Recruitment Site: The study was conducted at two recruitment sites, thereby affecting generalizability.
- Orientation Period: The orientation period is typically a vulnerable and challenging time for NGNs. Multiple requirements of orientation and the stressors of the new job could have competed with the desire to participate in a research study.

Assumptions

The following assumptions guided this study:

- Convenience sampling is an effective method by which to obtain the NGN sample for this quasi-experimental pre/posttest study.
- The TeamSTEPPS® training module may be equally effectual when delivered to the NGN either online or via a live presentation.
- The TS-Teamwork Attitude Questionnaire (T-TAQ) is an efficacious measurement of teamwork attitudes in the NGN.

- Gibson's Theory of Affordances model may be used effectively to guide the study and interpret its results.
- Within the TeamSTEPPS® framework, the concept of situational awareness, which results from situational monitoring is associated with the concept of affordance.

Data Analysis Procedures

Data Analysis

The goal of data analysis in a quantitative quasi-experimental longitudinal study with pre/post-test design is to describe and categorize nominal, interval, or continuous data to illustrate changes, trends, variation, or the lack thereof, before and after an intervention in the absence of a control group. Data analysis indicates differences between participant means and relationship to means in existing research on TA in the literature.

Gibson's Theory of Affordances

The Theory of Affordance.

Gibson's Theory of Affordances was used to guide the study and interpret its results (Clapper et al., 2018; Gibson, 1977, 1979). Affordance theories emphasize components or areas of competency that is paramount to the NGN's success in transition. Situational monitoring, derived from within the TeamSTEPPS® framework is the skill

most related to an affordance. Competency in situational monitoring results in the achievement of situational awareness. It most accurately describes the ability to perform assessment and information gathering, a novice skill in the NGN. Furthermore, it seeks to explain the underlying reasoning behind what data or information the NGN deems worthy of communicating with other members of the healthcare team. As the affordance is relative to environmental position, the NGN must gain competency in understanding what affordances are available and how to evaluate them for their usefulness. For example, respiratory therapists receive most of the affordances from pulmonary assessments, data, equipment, and monitors. The NGN must understand the importance of many of the discipline-specific affordances and integrate their useful and disperse the information obtained accordingly. These novice healthcare practitioners may be limited by tunnel-vision, fixation, and failure to view clinical situations through a broad and interprofessional lens. Through interprofessional competency in mutual respect of role responsibility, NGNs would utilize this skill to classify the information and delineate it according to disciplines. Unfortunately, the ability to practice this skill during training prior to introductory employment in professional practice is often infrequent. Nevertheless, an entry-level competency in team communications is expected by most hiring organizations.

The Concept of Affordance.

The affordance theory is a psychological theory of behavior. The theory has been well-researched. Researchers assert an affordance cannot be examined separate from the subject's environment and/or perspective. Gibson believed that an *affordanc*e offers a subject an opportunity to react based on the offerings or affordances realized from the environment (Clapper et al., 2018; Gibson, 1977, 1979; Sadler & Given, 2007). *Situational monitoring* is defined as scanning the environment in the TeamSTEPPS curriculum. Gibson further explains that the affordance is reciprocal to the perception by the perceiver. Attitudes shape perceptions. Affordances can be extensions of the body or organism and dictate usage according to that relationship. These relationships may create meta-affordances in technology-driven environments such as the healthcare system (Overhill, 2012). Therefore, optimal teamwork competencies afford us the opportunity to communicate and operate effectively as a member of the healthcare team.

Affordance Gaps.

Affordance gaps or lack of understanding can be used to describe the novice assessment or environmental scanning in NGNs. This lack of perception of the affordance offered by the clinical situation encountered, e.g., subjective or objective data, can be enhanced by teamwork training strategies such as simulation, which provides clinical opportunities to practice with interprofessional colleagues. Little is known about

the NGN's ability to ascertain, infer or integrate the affordances into clinical interventions during their introductory practice. Situation monitoring or environmental scanning is a novice skillset upon entry into the profession in the NGN.

Affordances and TeamSTEPPS.

Theoretically, affordances answer the question, "How can I use this?" or "What will I do with this item or information?" By providing an opportunity for action, the affordance necessitates a perceived usefulness by the possessor. The NGN has the responsibility for receiving information or clinical data, evaluating it and then determining its usefulness from their personal perspective. This concept is important to understand as Gibson (1979) indicates the data, device or clinical information does not merely possess an affordance on its own. The affordance, however, is a user-derived concept only after its use and importance has been validated by the user (Gibson, 1977, 1979: Sadler, 2007). The theory is vulnerable for bias as well. There has been documentation of bias in observations that failed to acknowledge the negative effect of the affordance in addition to the positive effect or derived actions (Bardy, et al., 1995). In patient safety, there is always a consequence for an action or an inaction. Referring to Gibson's original distinction that affordances may be for good or ill, the notion illustrates the dual nature of the affordance and its dynamic nature.

Situation Monitoring components in TeamSTEPPS provide an introduction to the team-based structure within the healthcare system. It is the very nature of the team-based structure that serves as the source of conflict in communication and teamwork for experienced providers and more so novice team members (Baker, et al., 2008). James Gibson posited that affordances were derived from the environment with regard to the individual. Donald A. Norman added that affordances could be perceived or actual (Norman, 1988). Norman further described affordances to be connected with a user's skills, experience, knowledge and culture (Vyas et al., 2017). Norman's description further supports the use of the affordance theory when examining situation monitoring in NGNs, most of whom are novices in these areas. With the included emphasis on culture, safety culture can also be analyzed from the NGN viewpoint. TeamSTEPPS components offer no delineation based on skill level or ability to competently perform the stipulated task. Researchers have described affordances as tangible objects in healthcare (i.e., in-patient unit design, healthcare record or EMR, equipment) to nontangible (use or purpose). It is important to consider that ability, knowledge or skill can inversely affect the way the affordance is perceived or utilized (Rich et al., 2021; Vyas, et al., 2017).

Previous research further underscores the importance of understanding the backdrop of the healthcare systems, organizational factors and physical environment as factors affecting affordances (Richet al., 2021). Finally, situation monitoring requires an

awareness of others in addition to self-awareness and encourages input from others outside the immediate healthcare team (Baker, et al., 2008). Monitoring one's personal status is just as important and can be facilitated with the I'M SAFE tool. Practice during the pandemic was wrought with high propensity for burnout and mental and emotional stressors related to patient care, See Table 4.7., Situation Monitoring – Affordance Comparison.

Specific Aim 1

Specific Aim 1: In the NGN, determine TA pre-TeamSTEPPS® training, as measured by the TeamSTEPPS® Teamwork Attitude Questionnaire (T-TAQ).

Research Question (RQ) 1: In the NGN, what is the TA pre-TeamSTEPPS® Training, as measured by the T-TAQ?

RQ1 Analysis: Compute pre-test means for Team Structure (TS), Leadership (LD), Mutual Support (MS), Situation Monitoring (SM), Communication (CM) subset.

RQ1 Variables: (Pretest means for Team Structure questions 1-6, Leadership questions 1-6, Mutual Support questions 1-6, Situation Monitoring questions 1-6, Communication questions 1-6)

Specific Aim 2

Specific Aim 2: In the NGN, determine TA post-TeamSTEPPS® training, as measured by the T-TAQ.

Research Question (RQ) 2: In the NGN, what is the TA post- TeamSTEPPS® Training with TeamSTEPPS strategies integration, as measured by the T-TAQ?

RQ2 Analysis: Compute post-test means for Team Structure (TS), Leadership (LD), Mutual Support (MS), Situation Monitoring (SM), Communication (CM) subset.

RQ2 Variables: (Posttest means for Team Structure questions 1-6, Leadership questions 1-6, Mutual Support questions 1-6, Situation Monitoring questions 1-6, Communication questions 1-6).

Specific Aim 3

Specific Aim3: In the NGN, compare TA pre/post-TeamSTEPPS® training, as measured by the T-TAQ.

Research Question (RQ) 3: In the NGN, what is the relationship between TA pre-/post-TeamSTEPPS® training with TeamSTEPPS integration, as measured by the T-TAQ?

RQ3 Analysis: Compute difference between means using paired t-test: (Complete scale mean computations for Team Structure, Leadership, Situation Monitoring, Mutual Support, Communication comparing Pretest Mean and Posttest Mean values).

RQ3 Variables: Full scale values of pre/posttest (Team Structure, Leadership, Situation Monitoring, Mutual Support, Communication)

Data Analysis Software

Data were analyzed using IBM SPSS Statistics 27.0 (SPSS Statistics Grad Pack 27.0 Standard Version, n.d.; Morse & Richards, 2002). Data analysis included *test of differences* such as paired samples *t-test* to determine if there was a difference in the Teamwork Attitude scores before and after the TeamSTEPPS intervention. Alpha of less than <0.05 was used as a standard to determine if there is statistical significance.

Summary of Chapter

Chapter Three presented the research design. The Chapter began by identifying the research question, and the research methodology (i.e., design and rationale) for exploring the aims. The Chapter described the application of quasi-experimental pre-/post-test longitudinal design with principles in the study, including participant population, setting, and sampling method, and data collection, data analysis, and data management strategies. The Chapter also provided a discussion of ethical considerations and techniques utilized to protect the rights and confidentiality of study participants.

Plan for Remaining Chapters

Chapter Four presents the study findings. Chapter Five presents the conclusions, discussion, and recommendations relative to the study findings.

CHAPTER 4: RESULTS AND FINDINGS

Introduction

Chapter Four provides a presentation of sample characteristics and a psychometric estimate for the sample. In addition, major findings and conclusions are introduced, with a summary of findings.

The Sample

Power Analysis

An a priori power analysis was performed with G*-Power software, using a one-tailed paired *t*-test with pre-test mean and standard deviation of 4.20, 0.82 and post-test mean and standard deviation of 4.64, 0.29 (Faul et al., 2007; Vertino, 2014). The analysis indicated that for a sample size of thirty (30) and an effect size of 0.61, the power was computed at 95%, based on statistics derived from the literature review for a similar study (Faul et al., 2007; Vertino, 2014). The target sample size of thirty (30) participants was slightly exceeded as thirty-three (33) participants were recruited. Actual power achieved for the sample size of thirty-three (33) participants was computed at 96% and an effect size of 0.61.

Sample Characteristics

Seven (7) NGN cohorts were approached for recruitment. Two-hundred fifty-one (251) total NGNs were invited to participate in the study. Of this total, one-hundred

eighty-five (185) were invited via an in-person presentation and sixty-nine (69) were invited via email. A total of forty (40) NGNs enrolled in the study. A paltry enrollment of 16% emphasized associated challenges with research recruitment during and post heightened pandemic restrictions. After inclusion criteria and completion of all study components was verified, seven (7) of the forty (40) participants were excluded for failure to meet criteria for inclusion. These respondents were excluded based on missing values and criteria as defined via case wise method. Thirty-three (33) remaining participants were included in the study. See, Table 4.1, Participants' Demographic Data; Table 4.2 Educational Preparation and Practice Area.

Participants' Demographic Data

The number of NGNs who participated in the study were eight (8 or 24.2%) males and thirty-three (25 or 75.8%) females. The sample ranged in age from eighteen (18) to forty-nine (49) years with 66.7% (n=22) in the 18-29 years age range (Table 4.1, Participant's Demographic Data). Ethnicity of the sample was identified in the following categories: 42.4% (n=14) of the NGNs were Caucasian, 18.2% (n=6) were African American, 33% (n=11) were Asian/Pacific Islander/Native Hawaiian, 3% (n=1) were American Indian/Alaskan Native, and 3% (n=1) identified as Other (Multiracial). The ethnic breakdown of the participants was 36.4% (n=12) Hispanic/Latino and 63.6% (n=21) non-Hispanic/Latino. See, Table 4.1, Participants' Demographic Data.

Educational Preparation

The sample of NGNs had been licensed as nurses between one (1) to four (4) months with 36.4% employed for two (2) months (M = 2.27). Twenty-three (23 or 69.7%) of the participants were baccalaureate/bachelor's degree-prepared and ten (10 or 30.3%) participants were associate-degree prepared nurses. See, Table 4.2, Educational Preparation and Practice Area.

Practice Area

The majority of NGN participants were employed in high-risk units such as critical care, progressive or step-down (27.3%, n=9), emergency department (18.2%, n=6), NICU (6.1%, n=2) and Surgery/Operating Room (21.2%, n=7). Patients in these units are often sicker and have higher acuity. Teamwork and communication failures can be catastrophic. Medical-surgical units were home to 18.2% (n=6) of NGNs in the study.

Type of Orientation Plan

All of the participants were in an orientation or residency program of some type. The lengths of the orientation or residency programs varied from six (6) weeks (i.e., 2 or 6.1%), twelve (12) weeks (i.e., 2 or 6.1%), six (6) months (i.e., 12 or 36.4%) to one (1) year (i.e., 17 or 51.5%). The orientation or residency program lengths were not stratified according to practice area. The comparison group differed from the sample group by

orientation (majority of study participants were in formal residency program), length of experience (more experienced nurses were in the comparison group) and educational preparation (practical nurses and nursing assistants were in the comparison group).

Introduction to Major Findings and Conclusions

The goal of the present study was to determine the effect of the integration of TeamSTEPPS® strategies within an NGN orientation program on teamwork attitudes. As noted previously, Chapter Four presents the findings of this study in accordance with the Specific Aims, Research Questions, and Hypotheses.

Specific Aim 1

- *Specific Aim 1:* In the NGN, determine TA pre-TeamSTEPPS training, as measured by the TS-Teamwork Attitude Questionnaire (T-TAQ).
- *Research Question 1*: In the NGN, what is the TA pre-TeamSTEPPS® Training, as measured by the T-TAQ?
- *Research Hypothesis 1*: In the NGN, there is no difference in TA scores pre-TeamSTEPPS® training compared to the mean of the reference group reported in the literature.
- *Research Hypothesis 1 Findings.* Research Hypothesis 1 was not confirmed. Data analysis revealed the following findings:

There were differences in pretest TA scores (M=4.24) of the study sample in relation to pretest TA scores (M=4.20) of the reference study, although the values were not statistically significant. The study population scores were higher than the mean reference scores, indicating a slightly more positive attitude than the reference group (Vertino, 2014), which differed in educational preparation and licensure (reference group consisted of registered nurses, practical nurses, and nursing assistants), licensure level, age, and experience (greater experience in reference group).

- *Research Hypothesis 1 Conclusions.* The following conclusions may be drawn from the findings revealed from the data analysis:

  The NGNs enter the workforce with overall positive attitudes about teamwork in comparison to experienced staff of varying experience levels found in the literature. This is a confounding variable, as interprofessional and team-based interaction has been limited during some NGN's educational preparation and the recent pandemic. Open-ended participant survey responses such as, "*My educational program did have us do interdisciplinary training. However, being able to put it into practice was hindered due to COVID restrictions*," affirmed such limitations. Alternatively, 18.18% (n=6) NGNs had participated in a previous TeamSTEPPS® training while 81.82% (n=27) had not. There were

9.09% (n=3) NGNs reporting previous military experience while 90.91% (n=30) did not. Military experience is a likely source for previous TeamSTEPPS® exposure. Additional research is needed to determine if other causes may affect TA in new graduate nurses as they transition into practice.

Specific Aim 2

- *Specific Aim 2**:*** In the NGN, determine post-TeamSTEPPS® training TA with TeamSTEPPS integrated, as measured by the T-TAQ.
- *Research Question 2***:** In the NGN, what is the TA post- TeamSTEPPS® training with TeamSTEPPS strategies integration, as measured by the T-TAQ?
- *Research Hypothesis 2*: In the NGN, there is no difference in TA post-TeamSTEPPS® training compared to the mean of reference groups reported in the literature.
- *Research Hypothesis 2 Findings**:*** Research Hypothesis 2 was not confirmed**.** Data analysis revealed the following findings:

  There were differences in the NGNs' TA posttest score (M=4.31) as compared to the mean reference group score (M=4.64). Again, study group comparisons to the study found in the literature serve as a point of framework due the paucity in the literature on the population of interest. Both the NGN study group and the participants in the reference group from the literature review showed evidence of

an increase in TA scores after implementation of the TeamSTEPPS® training strategy. However, the study participants' scores were slightly lower than the reference study mean posttest scores. Total overall posttest TA scores in the NGN study participants (M=21.57 or M=4.31) and the reference group (M=23.24 or 4.64). These statistics indicated a difference of -1.67/-0.33 based on the T-TAQ scoring method (total/avg) used.

- *Research Hypothesis 2 Conclusions***.** The following conclusions may be drawn from the findings revealed from the data analysis:

  TeamSTEPPS® training has shown that it positively impacts TA scores in nurses of various educational preparation, licensure levels and experience including the NGN.

Specific Aim 3

- *Specific Aim 3:* In the NGN, compare TA pre/post-TeamSTEPPS® training, as measured by the T-TAQ.
- *Research Question 3***:** In the NGN, what is the relationship between TA pre/post-TeamSTEPPS® training with TeamSTEPPS integration, as measured by the T-TAQ?

- *Research Hypothesis 3*: In the NGN, there is no relationship between TA pre/post-TeamSTEPPS® training with TeamSTEPPS integration, as measured by the T-TAQ?
- *Research Hypothesis 3 Findings.* Research Hypothesis 3 was not confirmed**.** Data analysis revealed the following findings: There was a relationship between TA pre/post- TeamSTEPPS® training with TeamSTEPPS integration, as measured by the T-TAQ in that total TA scores computed from the mean TA subscale scores increased from pretest (M=4.24) to posttest (M=4.31) at evaluation for a total gain of +.07. Some subscale scores increased in relationship to pretest versus posttest values such as *Team Structure* (M1=4.53, M2=4.65, +0.12), *Leadership* (M1=4.69, M2=4.70, +0.01), *Situation Monitoring* (M1=4.60, M2=4.67, +0.07) and *Communication* (M1=4.08, M2=4.26, +0.18) while *Mutual Support* (M1=3.29, M2=3.29. +/-0.00) remained unchanged (See Table 4.3, an NGN TeamSTEPPS® Subscale Paired Samples Statistics). Differences between these groups' pre/post test scores demonstrated practical significance although not statistically significant. Practical significance generally relates to the magnitude or bidirectionality of a purported effect as its merit has been determined by researchers whereas, clinical significance is related to the clinical impact or importance on a patient, etc. (Carpenter et al., 2021) with or without statistical

significance. As such, improvements in TA are deemed beneficial to practice in general.

- *Research Hypothesis 3 Conclusions***.** The following conclusions may be drawn from the findings revealed from the data analysis:

  Implementation of TeamSTEPPS® strategies into an NGN orientation plan increases TA scores in the NGN population.

Summary of Findings and Conclusions

Research Hypothesis 1

Findings.

Data analysis revealed the following findings:

- Research Hypothesis 1 was not confirmed. There were differences in NGN pretest TA scores (M=4.20) in relation to mean TA scores (M=4.24) of the reference group reported in the literature, although the values were not statistically significant. The study population scored higher than the mean scores, indicating an overall more positive attitude than the reference group, which differed in educational preparation, licensure level, age, and experience.

Conclusions

The following conclusions may be drawn from the findings revealed from the data analysis:

- Positive Teamwork Attitudes. The NGN enters the workforce with overall positive attitudes about teamwork in comparison to experienced staff of varying experience levels. This is a confounding variable, as interprofessional and team-based interaction has been limited during educational preparation and the recent pandemic. More research is needed to determine if other causes affect TA in new graduate nurses over time.

Research Hypothesis 2

Findings

Data analysis revealed the following findings:

- Research Hypothesis 2 was not confirmed. There were differences in the NGNs' TA score (M=4.31) as compared to the mean score (M=4.64) of the reference group. Both groups demonstrated increases in the TA score. The NGN study group and the reference group from the literature review showed evidence of an increase in TA scores after implementation of the TeamSTEPPS® training strategy. The NGN posttest TA scores improved overall after implementation of the TeamSTEPPS® training. Differences between these two scores demonstrate practical significance although not statistically significant.

Conclusions

The following conclusions may be drawn from the findings revealed from the data analysis:

- Positive Impact on TA Scores. TeamSTEPPS® has shown that it positively impacts TA scores in nurses of various licensure levels and experience. TeamSTEPPS® also improved TA scores in NGN study participants.

Research Hypothesis 3

Findings

Data analysis revealed the following findings:

- Research Hypothesis 3 was not confirmed. There was a relationship between TA pre/post- TeamSTEPPS® training with TeamSTEPPS integration, as measured by the T-TAQ. Total TA scores computed from the mean TA subscale scores increased from pretest (M=4.24) to posttest (M=4.31) evaluation for a total gain of +.07. Again, subscale scores also increased in relationship to pretest versus posttest values such as *Team Structure* (M1=4.53, M2=4.65, +0.12), *Leadership* (M1=4.69, M2=4.70, +0.01), *Situation Monitoring* (M1=4.60, M2=4.67, +0.07) and *Communication* (M1=4.08, M2=4.26, +0.18) while *Mutual Support* (M1=3.29, M2=3.29. +/- 0.00) remained unchanged (See Table 4.3, an NGN TeamSTEPPS® Subscale Paired Samples Statistics).

Conclusion

The following conclusion may be drawn from the findings revealed from the data analysis:

- TeamSTEPPS® increases TA Scores. TeamSTEPPS® when implemented into a NGN orientation or residency program has been shown to increase TA in the NGN population.

Summary of Chapter

Chapter Four presented the findings of this study, which explored three (3) research questions. This Chapter began with a presentation of sample characteristics and a psychometric estimate for the sample. In addition, major findings and conclusions were introduced, with a summary of findings.

Plan for Remaining Chapters

Chapter Five provides an interpretation of the findings. This interpretation will include conclusions, discussions, and recommendations for future research.

Chapter 5: Conclusions, Discussions, and Recommendations

Introduction

Chapter Five presents a brief summary of this research, beginning with a review of the study's problem and methodology used to answer the research question(s). The Chapter then presents a comparison of the findings to the extant literature; the implications of the study; the study's strengths, limitations, and assumptions; recommendations for further research; and ends with the conclusions.

Statement of the Problem

The problem this study sought to address was that little was known about the potential relationships between a TeamSTEPPS® based orientation program and New Graduate Nurse (NGN) teamwork attitude scores. As a result, there was a critical gap in knowledge related to the phenomenon that may benefit organizational stakeholders. Teamwork is necessary for successful outcomes with professional socialization, retention, and skill development of all NGNs.

Review of Methodology

Theoretical Framework

James Gibson's Theory of Affordances was the theoretical framework of the study. This study was based on the premise that affordances are properties that an animal

or organism is offered, perceives, or is ascertained from its surroundings (Clapper, 2019; Gibson, 1977, 1979;). The organism uses these affordances to determine its usefulness or a course of action relative to the affordance. In the NGN, assessment and interpretation of clinical findings and their usefulness to the NGN vary tremendously. The transition to practice gap has exposed deficits in entry-level skills such as clinical judgement and decision-making among others expected from hiring organizations (Casey et al., 2011). The COVID-19 pandemic exacerbated the gap in the number and type of clinical patient encounters necessary for development of "real world" assessment opportunities. Researchers have posited that an organism's abilities also shape affordances (Overhill, 2012). Therefore, it is paramount to consider the novice nature of the NGN and work to enhance clinical abilities during their transition to practice. The TeamSTEPPS® subscale of situation monitoring is central to educating NGNs methods to acquire, compile, interpret, and utilize environmental and clinical information, whether real or perceived (Sadler, 2007).

Sampling

The NGNs participating in this study represented a subset of the newest hires to two large organizations and were within their first 6 months of introductory employment. The NGNs were recent or imminent graduates currently participating in a structured residency. A total of thirty-three (33) NGNs participated in the study. Demographic data

revealed approximately 67% were ages 18-29, 24% were ages 30-39, and 9% were ages 40-49. No participants were aged fifty (5)0 and older. The majority of participants were within the first (24%), second (36.4%), or third (27.3%) month of their orientation. This sample is representative of a population of NGNs.

Data Management

The PI ensured safeguarding of study data by adherence to all protections to maintain confidentiality and integrity of research data. Measures taken included, but were not limited, to the use of a dedicated, password-protected research laptop, masking of participant identity with unique study identification numbers, attainment of IRB approval and obtaining participant informed consent.

Data Analysis

Statistical Package for the Social Sciences (SPSS) statistical analysis software was utilized to obtain descriptive and quantitative statistics for data analysis and reporting. All assumptions required for the various statistical analysis were reviewed and ensured when possible. The use of the TeamSTEPPS® Teamwork Assessment Questionnaire (T-TAQ), a valid and reliable instrument, ensured consistent measurement of the desired variable (Baker et al., 2010).

Interpretation of Major Findings and Conclusions

The goal of the present study was to determine the effect of integration of a TeamSTEPPS® training program on NGNs teamwork attitude (TA) scores.

Research Hypothesis 1

Findings.

Data analysis revealed the following findings: *Research Hypothesis 1 was not confirmed*:

- The Scores. NGNs scored higher (M=4.24) than the comparison mean of the reference group (M=4.20) on pretest TA scores.
- The Significance. There was not a statistical difference in the pretest mean and standard deviations, when compared to measurements identified in the literature.

Conclusions

The following conclusions may be drawn from the findings revealed from the data analysis:

- Transition Shock and Anxiety. NGNs currently in orientation, may feel anxiety and transition shock (Arrowsmith et al., 2015; Beecroft et al., 2007; Casey et al., 2011). The TA scores reported, which were higher than measurements identified in the literature, could be the result of response bias or response style. The tendency to view the world through "rose-colored glasses," i.e., an overall

positive self-reporting, is a common measurement artifact noted in behavioral research (Nunnally & Bernstein, 1994). The PI personally met with the cohorts of potential NGN participants, introducing the study and recruitment, in an effort to increase enrollment. These modifications were necessary, as repeated previous efforts were futile.

- Effect of a Likert Scale. As such, the PI must acknowledge that the NGN may have chosen the responses most socially desirable, approved, or expected. To control for this type of bias, a 5-point Likert scale was utilized to provide participants varying degrees to which they could have responded. Nunnally & Berstein (1994) also noted that self-knowledge, frankness, and/or actual adjustment may be reasons participants choose socially desirable responses. Each of these three (3) factors could have influenced the NGN's self-reporting on instrument items.
- Surveying in a Group Setting. The NGNs were given the research surveys in a group setting utilizing an online survey. All participants completed the assessments individually.
- Abbreviated TeamSTEPPS® Training. Finally, NGNs completed an abbreviated online version of the TeamSTEPPS® video toolkit that was approximately less than 45 minutes in duration. The Vertino (2014) and Luger & Ford (2019) studies

utilized more traditional versions of TeamSTEPPS®, which were substantially longer in duration and provided additional content. Both programs introduced the basic principles of TeamSTEPPS® as well as communication tools and strategies.

Research Hypothesis 2

Findings

Data analysis revealed the following findings: *Research Hypothesis 2 was not confirmed*:

- The Scores. The posttest scores were slightly lower than the comparison means found in the literature review (Vertino, 2014). The NGNs posttest mean was 4.31 while the comparison study participants reported a mean of 4.64.
- The Significance. The results were not statistically significant, however indicated a practical significance following the training program evidenced by the small increase in scores. Results having practical significance indicate that the effect is meaningful or useful to the field of study or real-world application. Increases in teamwork attitude scores are beneficial no matter the effect size.

Conclusions

The following conclusions may be drawn from the findings revealed from the data analysis:

- The Comparison Study. The comparison study did not consist solely of NGNs. Less than 19% of the study participants from the Vertino (2014) study had been employed less than five (5) years. The researcher assumed that experience level, age, type licensure and practice areas could have been confounding variables, impacting the TA scores.

  After the implementation of the training program, the delivery method was re-evaluated for its merit. It is plausible that the abbreviated TeamSTEPPS® course, while beneficial for rapid deployment with minimal impact on orientation scheduling, may not have allowed the NGNs an opportunity to practice or return-demonstrate some of the tools and strategies within the course or engage interprofessional colleagues. Although the custom 2-hour course was initially considered, after consulting with facility contacts, the PI opted for the abbreviated, online course for its ease of deployment. Utilization of the more structured course may have better assisted the NGNs to fully understand the concepts, resulting in more thoroughly informed participants. The structured course presents NGNs with an opportunity to practice, return-demonstrate, and may reinforce TeamSTEPPS® concepts, thereby possibly altering the TA responses.

- The Samples. The two samples from the reference groups and the study group were not similar in makeup. The groups had heterogeneity, as one of the comparison samples consisted of registered nurses, licensed practical nurses, and nursing assistants, and represented multiple licensure groups (Vertino, 2014). The second reference group (Luger & Ford, 2019) from the literature was also extremely small and focused solely on the leadership domain of TeamSTEPPS®. The second reference group was geographically different from the research sample as it was from a primarily rural area rather than urban or suburban area (Luger & Ford, 2019). The NGN study was a repeated measures analysis on the same group of participants. Comparisons were made against the two reference groups to incorporate and detect any differences contrasted in the extant literature as the state of science was extremely limited on the population of interest.
- Effect of Demographics and Confounding Variables. These sample demographics and confounding variables could be responsible for the differences in TA scores.
- Abbreviated TeamSTEPPS® Training Tool. Finally, NGNs completed an abbreviated online version of the TeamSTEPPS® video toolkit that was approximately less than 45 minutes in duration. As previously indicated, the Vertino (2014) and Luger & Ford (2019) studies utilized more traditional versions of TeamSTEPPS® that were substantially longer in duration (i.e. four hours) and

provided additional content. Both programs introduced the basic principles of TeamSTEPPS® as well as communication tools and strategies.

Research Hypothesis 3

Findings

Data analysis revealed the following findings: *Research Hypothesis 3 was not confirmed*:

- The Scores. The total change scores overall in the NGNs from pretest to posttest scores was +.07 with a pretest mean of 4.24 and posttest mean of 4.31, i.e., of total TA scores across all domains. Some subscale scores increased in relationship to pretest versus posttest values such as *Team Structure* (M1=4.53, M2=4.65, +0.12), *Leadership* (M1=4.69, M2=4.70, +0.01), *Situation Monitoring* (M1=4.60, M2=4.67, +0.07) and *Communication* (M1=4.08, M2=4.26, +0.18) while *Mutual Support* (M1=3.29, M2=3.29. +/-0.00) remained unchanged (See Table 4.3, a NGN TeamSTEPPS® Subscale Paired Samples Statistics).

Conclusions

The following conclusions may be drawn from the findings revealed from the data analysis:

- *Research versus Reference Study.*
    - Change Scores. The NGNs experienced the greatest change scores in the domains for Team Structure (+0.12) and Communication (+0.18) from pretest to posttest results. Understanding team structure, roles and responsibilities underscores the importance of team training and its subsequent impact on team dynamics. Communication is paramount to providing care as part of the interprofessional team across all units and practice areas. Competency is especially warranted in high-risk units. As a frame of reference, the comparison study revealed a total change score of +0.44 with mean scores for the registered nurses of M=4.29 and change of 0.40 (Vertino, 2014). A major difference noted was that the nurses in the Vertino study had a mean experience level of 12 months. The NGNs in this study were compared against themselves. No NGN had been employed longer than 6 months.
    - Time Intervals. It should be noted that the difference between assessments conducted at Time 1 (assessment/pretest) and Time 2 (evaluation/posttest) was also shorter. NGNs were reassessed approximately thirty-five (35) minutes later with the T-TAQ at Time 2 immediately after completing the training program in order to prevent attrition and failure to recall. These

shortened repeated measures interval may contribute to social desirability and temporal response bias (Nunally & Berstein, 1994).

- Sample Demographics and Confounding Variables. These sample demographics and confounding variables may be responsible for the differences in TA scores. An effect similar to the Luger & Ford (2019) study was found in that while scores in one domain increased, scores in one or more domains decreased. In the NGNs, overall TAs increased in all domains except Mutual Support, which remained unchanged from M1=3.29 to M2=3.29. Conversely, Communication TA scores increased from pre-/posttest values from M1=4.08 to M2=4.26, which was near statistical significance, p=0.57.

- *Variables of Theoretical Interest.*
  - Patient Safety. The individual situation monitoring subscale indicated increases in all queries except SM5 which corresponded with: "*It is appropriate to continue to assert a patient safety concern until you are certain it has been heard.*" The individual mean score from this item decreased from M1=4.79 to M2=4.76, p=.003. The paired samples *t*-test of the pre/posttest scores for this item were M=.030, *SD* .47, *t*=.373, *df* 32, p=.712 (2-tailed). From a patient safety standpoint, this is valuable to key stakeholders such as

interprofessional education champions, quality improvement personnel, ethics boards and medical management offices.

- Two-challenge Rule and CUS Strategy. The abbreviated course introduced participants to multiple communication tools (SBAR, Brief, Huddle, etc.), specifically the Two-challenge rule and CUS strategy. The traditional training provides explicit examples of assertion and escalation issues and also provides participants an opportunity to actively practice the strategies with expert coaching and guidance from a TeamSTEPPS® master trainer ideally in an interprofessional training environment. The near statistically significant results indicating an increase in the Communication subscale TA (M1=4.08, M2=4.26, +0.18) demonstrate the importance of the team training. Communication has been repeatedly designated a major root cause of sentinel events and preventable injury and death by The Joint Commission (TJC, n.d.). Furthermore, NGNs constantly report a lack of confidence and competency in communicating among other providers and note it as a source of stress and angst.
- Situation Monitoring. The overall NGNs' Situation Monitoring subscale score increased from M1=4.60 to M2=4.66, indicating overall positive attitudes in this domain. A test of differences was not statistically significant with a

calculated M=-.07, *SD* .21 *t* -1.78 *df* 32 *p*=.09 (2-tailed). Notably, initial scores for the Situation Monitoring subscale were lower in the reference group (M1=4.17, *SD* 0.957 M2=4.65, *SD* 0.424). Theoretically, Situation Monitoring is directly proportionate to affordances as to assessment. This skill is underdeveloped in the NGN. To positively impact patient safety and prevent death and injury, these tools should be integrated into the NGN orientation and training using scenarios or simulated instances to employ the communication techniques.

Comparison to Extant Literature

Theoretical Framework: Gibson's Theory of Affordances

Theoretical Concepts

An ***affordance*** is defined as a specific combination of the properties of its substance and its surfaces taken with reference to a human being; what is offered, ascertained, perceived, valued by or provided to a human being (Gibson, 1977, 1979).

The ***environment*** is defined as the objects, conditions, or circumstances by which one is surrounded. The environment is also inclusive of influential factors that affect evolution, existence, maturity, or development (Merriam-Webster, n.d.). Notwithstanding the physical connotation of the term ***environment***, Merriam-Webster considers also the "aggregate" summative and collective cultural and/or societal conditions as a prominent

influence as well. The results of the SM5 item exploring the NGN's perception that "safety concerns should be asserted until heard" may foreshadow undisclosed hierarchical issues. These covert issues may affect the NGNs' overall positive outlook and excitement many enter the workforce demonstrating. Finally, the work *environment* may be caustic, unhealthy or toxic. These results may point to clandestine factors affecting attrition and retention rates.

Literature Review of Research

The study's findings support and expand upon the knowledge gained by the work of previous researchers.

Specific Aim 1

The goal of the study was to explore pre-TeamSTEPPS® training TA with TeamSTEPPS integrated, as measured by the T-TAQ.

- Teamwork Attitudes. The study findings highlighted the overall positive attitudes regarding teamwork in NGNs. Although scores were higher than those of experienced nurses, positive attitudes can be impacted by interactions with other members of the interprofessional team.
- Gap in Knowledge. The current study supports findings related to a gap in knowledge regarding what is known about NGNs and their attitudes about teamwork.

- Retention and Attrition. Also consistent with the literature, there is limited research on NGNs' attitudes regarding teamwork over time and their effect on retention and attrition.
- 1st Contribution to the Literature. The current study makes an important contribution to the literature in that regardless of level of experience, this sample of NGNs begin their professional nursing careers with overall positive attitudes about teamwork. However, whether these positive attitudes erode over time is not known. The results underscore the need for additional study and expanding the training platform to incorporate educational methods for NGNs.
- 2nd Contribution to the Literature. The current study makes an important contribution to the literature in that it adds to the body of literature regarding what is known about teamwork attitudes in NGNs prior to the implementation of a team training program. The current study also adds data to the existing literature regarding TeamSTEPPS® effect in the NGN population.
- Experience versus Competency. The study revealed the complexity of shaping and developing NGNs' attitudes about teamwork. The study also revealed an unknown relationship between experience and competency in situational awareness and mutual support of team members as evidenced by subscale score differences between each pre/posttest scores between the study participants.

Mutual Support individual items varied across participants with increases in some and decreases in others when examined item by item across participants. Residency programs have been shown to improve perceptions and readiness for practice for NGNs (Arrowsmith, et al., 2015; Casey, et al., 2011; Gill et al., 2010). NGNs have reported concerns about their competency in communication and functioning as a member of the healthcare team. Stakeholders may find them valuable for assessment of competency in NGNs.

- Teamwork Domains. The study provides an important contribution to the literature. In addition to revealing significant information related to the study's research question, key information was garnered about the complexities in other factors that may influence the NGNs' attainment of competency in other teamwork domains such as leadership, communication, and team structure.
- Confounding Variables. It is unknown if other confounding factors, i.e., positive or negative interactions with other team members, influenced development of competency in teamwork or affect TA scores in general.
- Orientation and Residency. In addition, the study revealed the gap in knowledge about NGN's attitudes about teamwork. The study also exposed the struggles NGNs face balancing the expectations of formal residency, limiting their willingness to participate in additional research-based activities.

Specific Aim 2

The study findings highlight that application of the TeamSTEPPS® program in NGNs resulted in improved TA scores.

- Findings in the Extant Literature. The current study supports findings related to results found in the extant literature that TeamSTEPPS® training does increase TA scores.
- Study Scores. The goal of the study was to explore post-TeamSTEPPS® training TA with TeamSTEPPS integrated, as measured by the T-TAQ. Also consistent with the literature, was there was a notable increase in the scores in the study population. Differences were not statistically significant although practically significant and deemed worthwhile to the NGN's professional development. Utilizing the multi-scoring method of the T-TAQ, provided more detailed information of which specific areas were primarily impacted regardless of overall score analysis when examined on a domain-by-domain basis.
- Attitudes and Teamwork. The study revealed the complexity of shaping and developing NGNs' attitudes about teamwork. Stakeholders must assess initial competencies for values. Dedicated and protected time for implementation of a formal TeamSTEPPS® training should be incorporated into orientation and

residency programs. The quality and composition of the team training programs can positively impact the course interactions and impact teamwork competency.

- Experience and Competency. The study also revealed an unknown relationship between experience and competency in Situational Monitoring and Mutual Support of team members as evidenced by subscale score differences of -1.77 and .040, respectively in the study group. The study also highlighted the importance and potential for improvement in communication skills as evident by the increase in the Communication TA scores that were near statistical significance. The study also underscores the importance that nursing schools should incorporate and provide opportunities for NGNs to practice communication strategies with interprofessional team members.
- Contributions to the Literature. The study provides an additional important contribution to the literature because in addition to revealing important information related to the study's research question, it provides information about which components of teamwork may require additional focus during orientation especially if scores are lower than the means for similar populations in the literature.

- Magnitude of Training Strategies. In addition, the study illuminated the magnitude of the effect of the TeamSTEPPS® training strategy related to the comparative studies found in the literature.

Specific Aim 3

The study findings highlight the overall positive attitudes NGNs have concerning teamwork. Their responses indicate substantial agreement with statements indicative of perceptions regarding teamwork.

- Posttest TA Scores. The goal of the study was to explore post-TeamSTEPPS® training TA scores with TeamSTEPPS integrated, as measured by the T-TAQ. The current study supports the findings of increased posttest TA scores after TeamSTEPPS® implementation in NGN populations in relation to previous studies found throughout the literature (Luger & Ford, 2019, Vertino, 2014). Although the studies in extant literature included nursing/ medical students, medical professionals, experienced medical/nursing staff and nonmedical participants, the benefit of the training strategy was evidenced by increases in TA scores.
- Impact of TeamSTEPPS®. Also consistent with the literature, TeamSTEPPS® does positively impact teamwork attitudes. Per the conceptual model, the impact of team training not only affects team members, but the patient and family as

well. The training further highlights the team, patient, and family-centric nature of the program with equal distribution of responsibility for shared patient outcomes. The changes in mean scores for communication are important. It was surmised, that these increases although not statistically significant are clinically and practically significant given their proposed impact on the patient and family as well. Staffing shortages necessitate employing NGNs into specialty and HRU's. These specialty units often require lengthy orientations due to the complex nature and acuity of patients admitted (Arrowsmith et al., 2015). The existing shortage of nurses exacerbated by the pandemic necessitates a continued hiring of NGNs into these specialty areas. Teamwork and communication are a necessary skillset in the HRU, as mistakes can result in injury and mortality in these extremely vulnerable patient populations.

- Contribution to the Literature. The current study makes an important contribution to the literature in that it adds to the body of knowledge on NGNs' attitudes regarding teamwork. The study provides important data for organizational stakeholders, preceptors, directors of orientation, transition to practice and residency programs.
- Remediation and Reinforcement. The study also provides information about potential deficits that may require remediation or reinforcement for NGNs. The

results of the study may contribute to healthier work environments by educating NGNs about the structure of teams and mutual respect of roles. The study provided evidence supporting the provision of tools to address incivility, assertion and escalation strategies needed to optimize patient safety.

- Shaping Attitudes. The study revealed the complexity of shaping and developing NGNs' attitudes about teamwork. The study also revealed an unknown relationship between experience and competency in situational awareness and mutual support of team members as evidenced by subscale score differences of -1.77 and .040. The negative *t* score indicates a difference in the directionality and that mean two (2) or posttest mean was larger than the pretest mean. The aforementioned results are practically significant but were not statistically significant in the current study participants. The practical significance is that scores for teamwork attitudes improved or increased after the training. As demonstrated by comparison studies found in the literature (Vertino, 2014), larger and more statistically significant differences were found in the comparison study participants representing more experienced nurses versus new graduate nurses with little to no experience. As such, experience may be a confounding factor.
- Efficacy of the Program. The study provides an additional important contribution to the literature because in addition to revealing key information related to the

study's research question, it provided data regarding two (2) cohorts of newly hired professionals from various practice areas and educational backgrounds. Efficacy of the training program as per the study sample can be expected to follow similar trajectories as sample characteristics remain consistent.

- Teamwork Attitudes. In addition, the study illuminated the teamwork attitudes of the NGN transitioning into the first professional nursing role.

Study Implications

Specific Aim 1

The overall findings of the evaluation TA scores indicate that NGNs enter the profession bearing a positive outlook. Regardless of the well-documented variation in educational curriculum, most NGNs enter the workforce with generally positive attitudes about teamwork. It is plausible that interactions with other team members or exposure to novel situations may affect the NGNs' attitudes over time. Poor attitudes and ineffective teams contribute to unhealthy work environments. Unhealthy work environments contribute to turnover and poor retention rates. Additional research must be conducted to isolate factors from other causes.

Over 15.9% of NGN left their jobs in 2019 (Song & McCreary, 2020). NGNs continue to report intent to leave or will leave the profession within the next year to third year of employment (Fallatah, et al., 2017, Gill, et al., 2010). Organizational leaders and educational partners should note that communication and efficient and effective communication were skills ranked “Number 1” (99%) and “Number 3” (98.6%) by respondents of a previous study (Brown & Crookes, 2016). Teamwork and multidisciplinary teamwork were ranked “Number 6” (98.0%). NGNs deem these skills necessary, and their self-ranking of importance demonstrated a need for implementation into the orientation program. Because nurses value these skills, team training and communication programs such as TeamSTEPPS® are sound investments and have the potential for positive return on investment (ROI) and nurse retention. Employees that communicate effectively and efficiently contribute to safer and healthier work environments.

NGNs continue to leave their introductory positions at an alarming rate. Organizational leaders must consider all potential factors that may influence the NGNs’ decision to remain or leave their first nursing jobs. Improving interprofessional communication is one step in mitigating the continued loss of nurses.

Specific Aim 2

While the study findings indicate the subtle success of the TeamSTEPPS training program in increasing Teamwork Attitudes, it should be noted that the composition of the sample from the literature review and from which the mean comparison scores were derived, differs in experience and position. The additional confounding variables practice area (clinical and/or geographical), educational preparation, experience and type of nursing position, could contribute to changes in Teamwork Attitude scores. While the online survey served to obtain greater access to participants, in doing so, socially desirable responses could easily be obtained by virtue of the PI's introduction to the purpose of the research study. The dedicated or protected time to deliver the course components should be embedded into the orientation or residency program. The training should also be supplemented through the use of simulation scenarios and implementation in clinical settings. Providing NGNs with adequate time to interactively employ the strategies in clinical practice may enhance uptake of skills and bolster retention of course content. Domains of teamwork are necessary for NGN development and successful transition.

Specific Aim 3

The results indicate TeamSTEPPS positively impacts most Teamwork Attitude scores. Except for mutual support, positive changes were noted in all subscales. Because the NGNs are inundated with new policies, procedures, and processes, it is possible that many are overwhelmed with the requirements of independent nursing practice far different than the academic aspect. It is also likely that due to stress and transition shock, many if not all may benefit from mutual support themselves and therefore do not see themselves in the position to provide support to others. Based upon NGN self-ranking scores found in the literature (Brown & Crookes, 2016), new graduate nurses value the attainment of competency in communication and teamwork skills. The continued attrition and exodus of NGNs necessitates that attention be given the matter to halt the current trends. Organizations may only ensure their patient populations are cared for by a competent and skilled communicator when they have been educated to do so. The benefits may be realized in several clinical and practice areas as well as patient outcomes.

Study Strengths

Examination of the study's methodology and findings reveals several strengths. These strengths are as follows:

Specific Aim 1

- Power Analysis. Conducting a power analysis strengthens quantitative studies (Faul et al., 2007, Sage, 2014). Performing a power analysis with G*power utilizing data from the literature provides the researcher with the number needed to obtain adequate power for the study. The study was adequately powered at 95% with a .05 percent chance of statistical error.
- Methodology. Examination of the study's methodology and findings reveals several strengths. Posttest differences utilizing a paired samples *t*-test using the participant unique study ID (USID) to pair variables provided a detailed comparison.
- Group Observation. An additional strength of the study was that the researcher was able to observe the participants complete the instrument in a group setting free from distraction. Because study participants began with essentially high teamwork attitude scores, minimal strides were expected in posttest results.
- Recruitment. The study's participant recruitment strategy via flyer and in-person invite was an additional strength. The method would garner precisely the type of study participants to best inform the study.
- Training and Residency Program Development. Finally, the study results may provide information that will enhance the development of training and residency

programs. Significantly lower attitude scores may indicate issues originating in the educational preparation program, prior to the NGN's arrival to the hiring organization.

Specific Aim 2

- Power Analysis. As previously stated, performing a power analysis with G*power utilizing data from the literature provides the researcher with the sample size needed to obtain adequate power for the study. The study was adequately powered at 95% with a .05 percent chance of statistical error.
- Methodology. Posttest differences utilizing a paired samples *t*-test using the participant unique study ID (USID) to pair variables provided a detailed comparison and provider the researcher with statistical information about the current state of NGNs TA and what the literature supports. Strengths were as previously mentioned.
- Training and Residency Program Development. Finally, the study results may provide information that will enhance development of residency curriculum and orientation training programs. The results may also better inform the hiring organization of teamwork needs and educational deficits so that stakeholders may provide timely support in the NGNs' transition to practice.

Specific Aim 3

- Methodology. The quasi-experimental study design was appropriate to test for changes in effect over two time points. It is a superior design when the studies lack randomization (Polit & Beck, 2018). The quasi-experimental method was a convenient and practical design as was the convenience sampling and recruitment technique.
- Power Analysis. An a priori power analysis was conducted to determine the number of participants needed for an adequately powered sample. The number enrolled minimally exceeded the number needed for adequate power.
- Data Analysis. Descriptive statistics provided additional information about the study participants. Statistical controls were utilized to control for bias when possible. These controls included performing a power analysis, utilization of a valid, reliable instrument with 5-point Likert scale and adherence to a detailed protocol which ensured replicability. Leveraging the use of online survey platforms such as SurveyMonkey® improved survey completion, collection and analysis rates. The online video toolkit provided a convenient and user-friendly option to introduce the team training concepts and communication strategies with minimal impact on the NGNs existing orientation plan and curriculum.

- Group Observation. An additional strength of the study was that the researcher was able to observe participants complete the study components in a group setting enabling observation of participants during the intervention. Although a small number of NGNs completed the intervention independently via a self-paced online course per the initial IRB-approved protocol, the lack of participants necessitated a request for additional protocol changes to increase enrollment. As a result, the majority of the participants participated in an in-person, live, PI-guided delivery of the TeamSTEPPS® video toolkit as an alternative to the traditional course or self-paced online course.
- Recruitment. The study's participant recruitment strategy was an additional strength. The convenience sample recruited from NGN cohorts in a residency program. The NGN cohort provided a sample of accessible participants best able to inform the study of which NGNs was the population of interest. Recruitment strategy was severely impacted by the COVID-19 pandemic so much that additional recruitment strategies were considered including social media and internet specialty group access was sought via IRB approval. None of the study participants were recruited via social medial or internet specialty groups. Team training champions at both recruitment sites, namely the director of professional practice, and the residency program coordinator were instrumental in improving

study recruitment. The nursing research support organization at the Texas recruitment site provided a grant funding the $5 gift cards for each participant as compensation for their time completing the study components. Once the number needed for adequate power was obtained, the study enrollment was closed.

- Improved Teamwork. Finally, the study results may provide information that will enhance NGN teamwork attitudes and contribute to healthier work environments. Results may better inform preceptors and clinical educators. These findings may assist organizations in the development of residency and orientation programs that embed teamwork strategies into future orientation and transition to practice programs. These findings may also reveal relationships to retention, attrition and burnout rates.

Limitations and Assumptions

Limitations

Sample Size

The study was limited by the small sample size. The study was also limited by enrollment challenges due to the pandemic. Finally, the intensive residency and orientation demands resulted in competition for study enrollment. As a result of the challenges to recruitment, a total of forty (40) NGNs were recruited. Seven (7) NGNs

were excluded due to missing information (n=4) and failure to meet all study inclusion criteria (n=3), resulting in a total of thirty-three (33) participants enrolled in the study.

TeamSTEPPS® Delivery

Another limitation was that the study did not utilize multiple methods of TeamSTEPPS® delivery. There were no comparisons or differentiation available regarding the use of the abbreviated video toolkit, the essentials course or the full TeamSTEPPS® course. There was no opportunity for application of skills such as role play, case studies or simulation. There was also no participant representation from specialty hospitals such and Women's and Children or Pediatric hospitals.

Immediate Post-assessment Period

A potential limitation of the study was that there was an immediate post-assessment period between the pre/posttest. A true longitudinal study would assess participants at an optional third timepoint to assess for additional changes over time. Increasing the timeframe before the post evaluation would allow the NGNs more time to actively implement and use the skills taught in the TeamSTEPPS® course.

The Design: Quasi-Experimental

Finally, true experimental research includes a control group against which the NGNs TA scores are statistically compared. True experimental research includes randomization and blinding.

Recommendations for Future Research

The following recommendations for future research arose from this study:

- A randomized clinical trial (RCT) should be conducted. These types of research are the gold standard and contain the control and randomization needed for true experimental research. Future research studies should attempt to compare the different methods of TeamSTEPPS® training delivery.
- The geographical reach of the study should be expanded to increase generalizability.
- A multi-site study should be conducted to decrease bias and improve generalizability.
- The sample population should be increased to provide a more representative sample to ensure participants are represented from every practice area, ethnic group, race and gender designation (i.e., Women and Children, Pediatric).
- A similar study should be done that incorporates TeamSTEPPS® strategies with simulation-based training and uses Objective Structured Clinical Exams (OSCE's) to operationally measure competency in achieving objectives related to the five (5) domains of teamwork attitudes, especially that of situation monitoring. The quantitative measurement can provide useful information regarding the efficacy

of the training relative to assessment skills and environmental scanning in the clinical practice arena.

- Further research is also recommended to include ratio of NGNs to existing or total nursing staff employed at the given facilities. The ratio may provide more context to the percentage the NGN accounts of the total nursing population.
- Further research is recommended to include an additional time point. A longitudinal third time point (T3) could assess elapsed time retention of skills and TA gains associated with the training.
- Finally, recommendations for further research may implore human resources or talent acquisition representatives to evaluate retention rates of the NGN at year 1, 2, and 3.

Conclusions

Results

The purpose of the research study was to determine if integration of TeamSTEPPS strategies within an NGN orientation or residency program affected teamwork attitudes. TeamSTEPPS did improve Teamwork Attitudes overall for NGN participants. Upon measuring pre/posttest situation monitoring TA score means, the implementation of TeamSTEPPS® in an NGN orientation program did show improvement in this competency area (See Table 4.5 (a) NGN TeamSTEPPS® Situation

Monitoring Subscale Paired Samples Statistics). Results indicated the training program was beneficial to NGNs and positively impacted teamwork attitude change scores. Review of individual subscales provided much more detailed information for organizational stakeholders. Scores that indicated extremely low or poor attitudes (ie. Items with a patient safety focus), may require additional education and attention during orientation.

TeamSTEPPS® Techniques

Communication, situation monitoring, mutual support, leadership, and team structure are the important TeamSTEPPS® techniques of emphasis for the NGN. Furthermore, analysis and interpretation of relevant information should be shared in a timely manner with the team and its leadership according to the team makeup or structure. The ability to successfully perform the aforementioned competency is known as clinical problem solving or clinical decision making (Casey, et al., 2011). NGNs who struggle with competency in this area may experience issues with delegation, prioritization and recognition of clinically significant issues.

Clinical Decision-making: Communication

As such, clinical decision-making hinges upon the NGN's level of comfort and confidence in their ability to communicate and coordinate care. The NGN accomplishes this through leveraging their competency in each of the five (5) TeamSTEPPS areas. The

information gleaned from situation monitoring alone provides the majority of content for communication. Effective communication skills are essential to patient safety and poor communication is a root cause of patient errors. The sharing of the information among the team helps facilitate teamwork. Teams that work better together, perform better overall. NGNs need confidence and communication skills to speak up when patient safety issues arise. When NGNs feel a part of the team, they experience more workplace satisfaction (Crawford, 2019, 2018; Gill et al., 2010; Ortiz, 2016; Theisen & Sandau, 2013).

Competent Teamwork

Likewise, the NGN who is competent in the domains of teamwork understands that a proficient team's structure promotes open communication and interactively engages colleagues utilizing tools that minimize negative ramifications from unchecked hierarchy or power dynamics. By recognizing and utilizing TeamSTEPPS® tools to ensure efficient teamwork, the NGN contributes to the culture of safety and the healthy workplace environment. TeamSTEPPS® tools enhance patient safety and team performance. Competent practitioners model communication strategies and facilitate transfer and reception of clear messages and welcome others to seek clarification when necessary. Finally, in instances where de-escalation or assertion is needed, the culture ensures an open space to do so. Healthy workplace environments create places where the

NGN can thrive as they transition to practice. These environments support the development of their professional identity and may even impact satisfaction with career choice, retention, and intent to stay.

Summary of Chapter

Chapter Five presented a brief summary of this research, beginning with a review of the study's problem and methodology used to answer each research question. The Chapter then presented a comparison of the findings to the extant literature; the implications of the study; the study's strengths, limitations, and assumptions; recommendations for further research; and ended with the conclusions.

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EDUCATION:

8/2017-present Doctoral Candidate
University of Texas Medical Branch at Galveston
PhD in Nursing Program Graduate School of Biomedical Sciences
UTMB GSBS, Galveston, TX

8/2007-12/2011 Master of Nursing – Adult Health Clinical Nurse Specialist
Scholarly Project: "Improving Delirium Recognition and Treatment"
Louisiana State University Health Sciences Center, New Orleans, LA
Honor Graduate

2003 Commissioned – Congregational Nurse
Basic Preparation for Parish (Congregational) Nurses
The McFarland Institute, New Orleans, LA

5/1999-5/2003 Bachelor of Science in Nursing
Southern University School of Nursing, Baton Rouge, LA
Honor Graduate

8/1984-5/1988	High School Diploma Scotlandville Magnet High School, Baton Rouge, LA

CERTIFICATIONS & TRAINING:

7/2022	Certified Simulation Healthcare Educator® (CHSE®)
12/2017	Center For Medical Simulation Comprehensive Instructor Course
8/2017	GE ® Lakelean Change Acceleration Process Workshop
5/2017	TeamSTEPPS Master Trainer Course, Tulane University
2015 to 2021	Certified Critical Care Registered Nurse (CCRN) American Association of Critical Care Nurses
2014	Lean Six Sigma Project Management - Yellow Belt
2013 to present	Advanced Practice Registered Nurse (APRN), Louisiana State Board of Nursing
2013 to 2023	Certified in Adult Health clinical Nurse Specialist (ACNS-BC) American Nurses Credentialing Center
2013 to 2017	Trauma Neuro Critical Care Nurse (TNCC) Emergency Nurses Association
2006 to 2011	Peripherally Inserted Central Catheter (PICC), Provider Bard
2004 to 2006	Chemotherapy & Biotherapy Provider, Oncology Nurses Society (ONS)
2003 to Present	Registered Nurse (RN), Louisiana State Board of Nursing

PROFESSIONAL AND TEACHING EXPERIENCE:

Professional Experience:

08/2017 to Present	**Predoctoral Research Preparation**, Department of Nursing, University of Texas Medical Branch, Galveston, TX

Teaching Experience:

8/2013-05/2017	**Adjunct Clinical Instructor**, Nursing 410 Southern University School of Nursing, Baton Rouge, LA
8/2003-05/2014	**Nursing Clinical Preceptor**, Nursing 420 Southern University School of Nursing, Baton Rouge, LA

Technical Skills and Experience:

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MEMBERSHIPS IN PROFESSIONAL SOCIETIES:

National:

2003 – 2005	Sigma Theta Tau International (Undergraduate)
2009 – Present	Student Member, American Association of Critical Care Registered Nurses (AACN)
2011 – Present	National Association of Clinical Nurse Specialist (NACNS)
2011 – Present	American Nurses Association (ANA)
2012 – Present	Sigma Theta Tau International (Epsilon Nu Chapter)
2017 - Present	The National Society of Leadership and Success Honor Society (Sigma Alpha Pi) Selected by campus administration to participate among top students in a leadership program including:

- Leadership Training Day: Coached in leadership and success skills via an introspective and interactive training session.
- Speaker Events: Participated in seminars led by celebrities and best-selling authors on topics such as leadership, time management, and goal setting.
- Success Networking Teams:
    - Participated in peer based leadership development teams
    - Experience in setting and achieving goals, receiving coaching, coaching others, and holding others accountable to commitments.
- Recipient of The National Engaged Leader Award (NELA)

2020 – Present	Society for Simulation in Healthcare (SSH)
April 2018-2020	Delta Sigma Theta Sorority, Incorporated Project XIII Coordinator/Charitable Partnerships, Chair
April 2020-2022	Delta Sigma Theta Sorority, Incorporated International Awareness & Involvement, Chair
April 2021-2022	Baton Rouge Delta Development Corporation Executive Board, Executive Board member

April 2021 to present	Louisiana NIH Community Engagement Alliance Against Covid Disparity LA -CEAL Community Ambassador
February 2022 to present	Louisiana Community Engagement Alliance Against Covid Disparity Community Advisory Board
	Board Member
2003 – 2005	Louisiana State Nurses Association (LSNA)
2011 – Present	Louisiana State Nurses Association (LSNA)
2011 – Present	Baton Rouge District Nurse's Association (BRDNA)

BOARD CERTIFICATION:

July 2022 to July 2026	Certified Simulation Healthcare Educator®	CHSE®
June 2018 to June 2023	Adult Health Clinical Nurse specialist	ACNS-BC
March 2021 to March 2024	Critical Care Registered Nurse –K	CCRN-K

LICENSURE INFORMATION:

July 2003 to January 31, 2023	Louisiana Registered Nurse	RN
October 2013 to January 31, 2023	Clinical Nurse Specialist –AH	APRN

HONORS, AWARDS & SCHOLARSHIPS:

2022	Doctoral Program of the School of Nursing Scholarship
2021	Graduate School of Biomedical Sciences 50/50 Award
2021	Laura Bassi Foundation Publication/Editorial Assistance
2020	Crawford & Hattie Jackson Foundation Award
2019	Gale Foundation Academic Achievement Award
2019	The John P. McGovern Chair in Nursing Award *(UTMB; Galveston, TX)*
2018	UTMB School of Nursing Alumni Association Fund – GSBS Scholarship
2018	The John P. McGovern Chair in Nursing Award *(UTMB; Galveston, TX)*

2018	J. Michael Leger, PhD, RN Family Nursing PhD Scholarship
2018	Crawford & Hattie Jackson Foundation Award
2011	Joyce Travelbee Award (LSUHSC; New Orleans, LA)
2011	Who's Who Among Students in American Universities and Colleges
2005	Chi Eta Phi Sorority Novice Nurse of the Year
2003	Southern University School of Nursing Faculty Award
2003	Louisiana League for Nursing Sister Mary Agnes Fortier Award

COMMUNITY SERVICE, ACTIVITIES AND APPOINTMENTS:

Ongoing	Political Awareness and Social Involvement Committee Delta Sigma Theta Sorority, Incorporated	Member
Ongoing	International Awareness and Involvement Committee Delta Sigma Theta Sorority, Incorporated	Member
Ongoing	Physical and Mental Health Committee Delta Sigma Theta Sorority, Incorporated	Member
Ongoing	Cajun Classic Wheelchair Tennis Tournament No Affiliation	Volunteer
Ongoing	Port Allen Care Center Nursing Home Ministry	Member
Ongoing	Louisiana State Police Barracks Prison Ministry	Member
Ongoing	The King's Children Youth Group Sponsor	Member
Yearly	Capitol Area American Heart Walk	Team Captain
Yearly	Susan G. Komen Race for the Cure	Participant
Yearly	American Society for Suicide Prevention Out of the Darkness Walk	
Yearly	St. Jude Run	Team Captain
Yearly	Ryan's Run for Sickle Cell Awareness	Team Captain
Yearly	A Walk to Remember Alzheimer's Foundation	Participant
Yearly	Sisters Network Breast Cancer Run for African American Women	
Monthly	Parish/Congregational Nursing The King's Children Wellness Ministry	Facilitator

11/17/2018	Habitat for Humanity RESTORE Service Project Delta Sigma Theta Sorority, Incorporated	Volunteer
10/13/2018	Chapter and Development Center Cleanup Delta Sigma Theta Sorority, Incorporated	Volunteer
04/2018	Cultural Diversity and Inclusion Council	Representative Division of Academic Affairs
2021	Alliance of Independent Academic Medical Centers (AIAMC) Justice Equity Diversity and Inclusion (JEDI) Initiaive VIII Team	OLOLMedical Education
2016-2017	DAA Flood Relief Support	Team Member
10/2016	ACGME Excellence in Academics Workgroup	Master Educator Interprofessional Education Committee
5/2013	"Life Begins at 50", Our Lady of the Lake Regional Medical Center, Baton Rouge River Center	Volunteer registered nurse

BIBLIOGRAPHY:

Oral presentations:

1. **Debbra T. Pogue**. The Cognitive Conundrum: Improving Delirium Recognition and Treatment". *Gerontology 101 Conference (Our Lady of the Lake Regional Medical Center)*. November, 2001. CE credits awarded.
2. **Debbra T. Pogue**. TeamSTEPPS & Interprofessional Simulation to Enhance Team Skills of Students. *2016 Safety and Quality Day (Our Lady of the Lake Regional Medical Center)*. April 5, 2016
3. **Debbra T. Pogue, Keeley Harmon & Claude D'antonio**. TeamSTEPPS Essentials for Simulation Health Professionals. *Laerdal MiniSUN Conference (Franciscan University). May, 1, 2018*

PUBLICATIONS:

Pogue, D. & O'Keefe, M. (2021). The Effect of Simulation-Enhanced Orientation on Graduate Nurses: An Integrative Review. The Journal of Continuing Education in Nursing, 52(3), 150–156. https://doi.org/10.3928/00220124-20210216-10

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REFERENCES: Available upon request.

Appendix A

Research Protocol & Overview

The Effect of Integration of TeamSTEPPS® Strategies within an Orientation Program on New Graduate Nurse Team Attitudes

Research Study Protocol

Debbra T. Pogue, MN APRN, Principal Investigator

Sponsor: Departmental Account

University of Texas Medical Branch at Galveston Graduate School of Biomedical Sciences

Version Number 10

April 13, 2022

1. Introduction and Purpose

New graduate nurses (NGNs) comprise 60-70% of new hires. Turnover claims over 28% and may affect patient safety due to poor transition into the healthcare team. Orientation is a stressful time of anxiety, transition shock and socialization into new team roles which may affect intent to leave. NGN turnover costs in 2005 were as high as $22,000-$77,200 with up to 75% leaving their jobs within year one. Recent trends have not improved. Summarily, the transition to practice period is a vulnerable time during which organizations should seize opportunities for retention of these newest professionals. TeamSTEPPS® strategies have been utilized to improve Team Attitudes across many disciplines and practice areas.

Thus, the underlying purpose of this study is to determine if integration of TeamSTEPPS® into the NGN orientation program will increase teamwork attitudes (TA), a critical component of a successful healthcare team. Therefore, this research will explore the effect on the integration of TeamSTEPPS® strategies within an orientation program for NGNs on teamwork attitudes (TA).

Specific Aims and Research Questions

This proposal is designed to explore the following *specific aims*:

- **Specific Aim 1:** In the NGN, determine Teamwork Attitudes (TA) pre-orientation, as measured by the TeamSTEPPS®-Teamwork Attitude Questionnaire (T-TAQ).

  Research Question 1: In the NGN, what is the TA pre-orientation, as measured by the T-TAQ?

- **Specific Aim 2:** In the NGN, determine TA post-orientation with TeamSTEPPS® strategies integration, as measured by the T-TAQ.

  Research Question 2: In the NGN, what is the TA post-orientation with TeamSTEPPS® strategies integration, as measured by the T-TAQ?

- **Specific Aim 3**: In the NGN, compare TA pre-orientation and post-orientation with TeamSTEPPS® strategies integration, as measured by the T-TAQ.

Research Question 3: In the NGN, what is the relationship between TA pre-orientation and post-orientation with TeamSTEPPS® integration, as measured by the T-TAQ?

Null Hypothesis: In the NGN, there is no relationship between TA pre-orientation and post-orientation with TeamSTEPPS® integration, as measured by the T-TAQ?

The study is quantitative and not a clinical trial. There are no Primary and Secondary Study Endpoints. The study risks are reasonable in relation to the potential benefits to subjects and society because they will serve to inform stakeholders of opportunities for improved retention and patient safety. While the risks of potential data or confidentiality breaches may be minimal threats, the benefit to society outweighs the risks through efforts improve patient safety.

2. Background:

The purpose of the study is to address a gap in knowledge concerning the effect on Teamwork Attitudes of the integration of TeamSTEPPS® within an NGN orientation program. There is a continued problem of retention and attrition of newer nurses. New nurses are key components of the current and future nursing workforce.

NGNs report feelings of anxiety, inadequacy, poor communication skills, and lack of preparation to perform as a registered nurse (Casey et al., 2011, Gill et al., 2010). These factors may influence turnover intention as well as retention (Beecroft, et al., 20074). Duffield and others (2014) reported the United States had the 2nd highest turnover rate (26.8%) among its counterparts New Zealand (44.3%), Canada (19.9%) and Australia (15.1%). As previously stated, NGNs comprise the bulk of most organizations' workforce as approximately 60-70% of new hires. The direct and indirect costs associated with the attrition can range from $10,000 to $88,000 based on the cost calculation method (Duffield, et al., 2014). Associated attrition costs cover advertising, recruitment, training and even termination. It is prudent to properly develop teamwork and communication skills to successfully integrate them into the healthcare team.

TeamSTEPPS® training has been used by multiple disciplines to improve teamwork and communication skills. It has been well-studied in organizational, medical and nursing literature, however there is limited literature regarding its impact on the development of the NGN's skillset. Research has shown that the program positively impacts patient safety, communication and team attitudes (Baker, D.P., et al., 2010, Clancy, 2016, Clapper, 2019, Gaston, 2016, King, et al., 2008, Peters, H., 2018, Vertino, B, 2018). However, there is a gap in knowledge concerning the effect of integration of TeamSTEPPS® within an NGN orientation program on Teamwork Attitudes. Therefore, the proposed study will test the central hypothesis that integration of TeamSTEPPS® strategies within an NGN orientation program will increase Teamwork Attitudes.

Developed from over 50 years of research and publicly disseminated in 2006 (King, H. et al., 2008), Team Strategies and Tools to Enhance Performance and Patient Safety (TeamSTEPPS®) is a training strategy created and jointly funded by the Agency for Healthcare Research and Quality (AHRQ) and the Department of Defense (DoD) to improve outcomes and decrease preventable deaths resulting from teamwork and communication failures. Team training actually began several years before implementation of patient safety initiatives and the Institute of Medicine's (IOM) pivotal 1999 publication *To Err is Human,* which highlighted the shocking number of approximately 200,000 preventable deaths.

King and others (2008) state TeamSTEPPS® is developed based on teamwork theory consisting of a shared set of attitudes, skills and knowledge (ASKs). These 8 competencies include team leadership, mutual performance monitoring, backup behavior, adaptability, team/collective orientation, shared mental model, mutual trust and closed-loop communication. Research by Baker (2003) specifically tied these ASKs to healthcare with each serving as the foundational basis of TeamSTEPPS®. The instructional teamwork framework was further refined to 4 competencies: Leadership, Situation Monitoring, Mutual Support and Communication.

An important skill NGNs must develop is the integration of subjective and objective data to formulate and evaluate nursing interventions. As such, James Gibson's theory of affordances was selected as the theoretical framework. Defined as "a specific combination of the properties of its substance and its surfaces taken with reference to an

animal" and its environment or what is offered, ascertained, perceived, valued by or provided whether bad or good (Gibson, 1977, Clapper et al., 2018), the original theory referenced animals, their environments and later humans. Clapper (2018) adapted the theory to describe situational monitoring for pediatric, medical and emergency medicine physicians. A novel application is to apply the theory to NGNs to describe situational awareness.

It is hypothesized that in the NGN, that there is no relationship between TA pre-orientation and post intervention with TeamSTEPPS® integration, as measured by the T-TAQ.

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Concise Summary of Project:

The study will incorporate a quasi-experimental nonequivalent pre/post-test design. As described by Polit & Beck (2018), quasi-experimental designs are similar to experimental pre/post-test designs but lack randomization. They are commonly used to compare two or more groups before and after a given intervention. The design is longitudinal in nature because participants will be assessed over an extended period of time with assessments conducted at multiple points. Longitudinal designs are beneficial for detecting changes in effect over time or determining the presence and extent of causality (Polit & Beck, 2018). There are no drugs, placebos or interventions for this study. There will be no pharmacologic or other interventions utilized in this study.

A power analysis indicated a sample size of thirty (30) participants be utilized. The projection provides an adequate sample to address study attrition.

The study will not involve the use of existing charts, records, or specimens and will solely rely on data obtained through the demographic data surveys and the T-TAQ instrument. Again, approximately 30 participants will be the maximum number that will be reviewed to compile the data to address the research questions.

The study will last approximately thirty (30) months starting May 2021 and concluding in June 2023. The following are conditions which would result in the subject exiting the study prior to the expected completion date including, but not limited to non-compliance and subject withdrawal of consent:

- The study is discontinued.
- You are unable to keep appointments or to follow the researcher's instructions.
- The researchers believe that participation in the research is no longer safe or feasible for you.

4. Study Procedures:

a. The principal investigator (PI) will recruit potential participants from Our Lady of the Lake Regional Medical Center and the University of Texas Medical Branch and additional collaborating facilities via the research study flyer and/or through email. The PI will also market the study state/nationwide and recruit via nursing-specific online platforms, social media and special interest group websites. Sites may be public, private or closed groups. The following sites are proposed for increased study recruitment. Sites include:
    i. AllNurses.com
    ii. Nurse.com (OnCourse Learning)

iii. GroupMe Nursing Redz
iv. GroupMe Medical Redz
v. ANA community
vi. Chi Eta Phi Nursing Sorority
vii. AACN.org
viii. https://www.socialpsychology.org/
ix. Facebook
x. Twitter
xi. RSS feed

Our Lady of the Lake: The PI will distribute the flyers to Our Lady of the Lake NGNs through their director of professional development and post the flyers in conspicuous places such as breakrooms, lounges, etc. Interested NGNs will then reach out to the PI if interested in participating in the study.

University of Texas Medical Branch: For the University of Texas Medical Branch participants, the recruitment study flyer will be provided via an email to the UTMB Nurse Residency Program (NRP) coordinator, Deven Barriault. The UTMB NRP coordinator will then send the study recruitment flyer to any nurse residency cohorts that meet the study criteria. Interested UTMB NGNs will then reach out to the PI if interested in participating in the study. The PI will present the TS training virtually or in-person via guided exploration of the online video toolkit to UTMB NGN cohorts as a component of onboarding/orientation.

Leonard Chabert Medical Center (LCMC): The PI will present the research study flyer and invite to NGN cohorts at LCMC and the affiliate facility Children's Hospital with approval of the Director of Clinical Nursing Education. Interested NGNs will then reach out to the PI if interested in participating in the study.

Woman's Hospital: The PI will present the research study flyer and invite to NGN cohorts at Woman's Hospital with approval of the Director of Clinical Nursing Education. Interested NGNs will then reach out to the PI if interested in participating in the study.

b. NGN participants contacting the PI via email as indicated per the study recruitment flyer will receive email correspondence containing the email script and UTMB fast fact sheet outlining goals of the study and what participation

entails. Potential NGN participants contacting the PI via phone will be read the telephone script and UTMB fast fact sheet if contact is made by phone. All participants will receive a copy of the UTMB fast fact sheet outlining goals of the study and what participation entails via email. All participant questions regarding the study will be answered.

c. Should the participant decline to participate, the PI will thank the prospective subject, conclude all interactions, and terminate communication without further contact.
d. Should the participant agree to participate, the PI will confirm the participant's intent to participate in the study.
e. Participants will provide the PI with a working email address, i.e. provide valid contact information for follow up. The consent narrative (UTMB fast fact sheet) will be read. Consent will be obtained.
f. Once enrolled into the study, the participant's identity will be masked, and they will be provided a unique study ID for completion of all study components.
g. Participants will be emailed a link to the consent form, the demographic data sheet and the first T-TAQ survey.
h. Completion of the demographic data and T-TAQs will be construed as consent to participate in the study.
i. After completion of the demographic survey and initial T-TAQ survey, participants will receive TeamSTEPPS training via one of the following methods:
   1) Participants will be assigned an online, self-paced TS video toolkit delivery provided by CDC/AHA via website
   2) Participant in an online or in-person, PI-guided deployment of the online TS video toolkit delivery and review of the website provided by CDC/AHA or
   3) Their facility's current TeamSTEPPS orientation method already in place
j. After completion of the TeamSTEPPS® course, participants will be emailed a link to complete the 2nd T-TAQ survey.
k. Participants who fail to complete the 2nd T-TAQ will receive reminder emails at 35 and 40 days after. Participants do not have to complete the 2nd T-TAQ if they wish to withdraw. Participants reserve the right to withdraw at any time during the study.
l. Data collection will be discontinued after 24 months or 100% completion of sample participants, whichever occurs first.
m. Participants will be provided a $5 digital Starbucks gift card as compensation for their time.

5. Sub-Study Procedures:

There are no sub-study procedures.

6. Criteria for Inclusion of Subjects:

- 18 years of age or older,
- Speak, read, write and understand English,
- Recent or imminent graduate of an accredited nursing program (diploma, certificate or baccalaureate) or:
- Currently licensed to practice as a registered nurse applicant or registered nurse by their respective state board of nursing,
- Currently employed in a traditional (4 to 6 week) or residency type (1-2 year) orientation,
- Employed less than 6 months but has not completed 50% of their employment orientation plan,
- Employed in an acute care hospital setting or academic teaching hospital,
- Employed in Medical-Surgical, Telemetry, Emergency, and Critical Care units or other nursing care areas with the exception of home health and school nursing

7. Criteria for Exclusion of Subjects:

Participants will be excluded if they do not meet any of the inclusion criteria listed above. The nurses shall also be excluded if they are employed in school nurse or home health settings. In these settings, nurses practice more autonomously, independently and interdisciplinary interactions and involvement may be severely limited, thus limiting potential research data. Home health and school settings allow independent function of nurses. Therefore, due to low frequency of interdisciplinary (healthcare team) interactions within these practice settings, these NGNs will be excluded. Failure to complete and submit any component that is construed as consent, or research component, will be cause for exclusion from the study.

8. Sources of Research Material:

There are no identified sources of research material other than that collected during this study.

9. Recruitment Methods and Consenting Process:

Participants will be recruited from a pool of newly hired NGNs at Our Lady of the Lake Regional Medical Center, a large, academic teaching facility in Baton Rouge, Louisiana and The University of Texas Medical Branch at Galveston, a large academic teaching facility in Galveston, Texas. Recruitment will occur via the Study Recruitment Flyer distributed to potential participants by posting in conspicuous departmental and commons area breakrooms or shared with potential participants during their department meetings or via email invite. The PI will distribute and post the flyers. The flyer will outline the purpose, inclusion criteria and will provide the contact information of the PI. If interested, the potential NGN participants will contact the PI by phone or email as instructed in the recruitment flyer. The proposed study will be submitted for Institutional Review Board (IRB, Appendix E) approval through University of Texas Medical Branch (UTMB). The PI is not required to complete dual IRB applications to recruit participants from the academic healthcare facility per the Office of Research of the organization serving as the recruitment site. A feasibility review will be completed by the Office of Research of the recruitment site to obtain an endorsement letter necessary for permission to recruit and conduct research. Once IRB approval has been obtained, the PI will begin recruitment via the Study Recruitment Flyer or email invite as indicated. If interested, the potential NGN participants will contact the PI by phone or email as instructed in the recruitment flyer.

Potential NGN participants contacting the PI via phone will be read the telephone script and UTMB fast fact sheet if contact is made by phone. Potential NGN participants contacting the PI via email will receive the UTMB fast fact sheet via email for review. All participants will receive a copy of the UTMB fast fact sheet outlining goals of the study and what participation entails via email. The UTMB fast fact sheet will provide information necessary to obtain consent. All participant questions regarding the study will be answered. Consent will be obtained after reading the email script or being read the telephone script and review of the UTMB fast fact sheet. The UTMB fast fact sheet shall serve the purpose of obtaining consent. The PI will track attainment of consent using the UTMB fast fact sheet. The record of consent will be stored in the master study record and code book will be saved on a password-protected drive separately from all other study forms and assessments.

There is no undue influence as participants have no reporting structure to the principal investigator. Participation in the study will not affect their careers.

To maintain participant confidentiality, participant identity will be masked by providing a unique identification number. The unique identifier will be generated by the PI and assigned to the participants. Each ID is associated with a participant's name and will be kept in a separate locked file, away from actual assessment data. Participants will be required to use their unique identification number consistently throughout the study as it will be used to complete assessments. Participants who forget or misplace their unique ID may contact the PI for retrieval.

Subject data confidentiality will be strictly maintained, and the protection of data integrity ensured, by keeping all study materials under lock in the primary investigator's office. A dedicated research laptop will be utilized for all study data collection and analysis. The laptop, external drive and all thumb drives will be password protected. Online surveys via SurveyMonkey® will be structured so that IP addresses remain anonymous. The researcher has valid CITI research training certificates, current curriculum vitae and conflict of interest forms completed for protection of human subjects. All data and materials will be destroyed within one year of conclusion and dissemination of results. Privacy and security statements from SurveyMonkey are available online and will be provided to participants for review.

10. Potential Risks:

There are minimal risks of participation in this study. Recollection of past unpleasant memories or situations may cause uncomfortable feelings. You may also become fatigued. You have the option to stop or continue surveys at your discretion. Periodically assess whether you appear to be distressed or fatigued; options are to take breaks, termination of the data collection session, or continuing the data collection session at a later time. Subsequently, the participants experiencing discomfort, depression or other adverse effects, will be offered support services from pastoral care, a preceptor or supervisor and offered a change of scenery or removal to a safe space or neutral area.

Any time information is collected; there is a potential risk for loss of confidentiality. Every effort will be made to keep your information confidential;

however, this cannot be guaranteed. Information will be transcribed as reported by you however, there will be no use of any personal information which may identify you. All study reports will use a unique identifier instead of your name and will not report any information that could be linked to you. Study data, forms and recordings will be kept in secure, locked environment with password protected storage on a dedicated research laptop.

11. Subject Safety and Data Monitoring:

You have the option to stop or continue surveys at your discretion. Periodically assess whether you appear to be distressed or fatigued; options are to take breaks, termination of the data collection session, or continuing the data collection session at a later time.

The principal investigator and statistician/dissertation committee member will be the only ones who have access to the study data.

12. Procedures to Maintain Confidentiality:

The participant identity will be masked by providing a unique identification number. The unique identifier will be generated by the PI and assigned to the participants. Each ID is associated with a participant's name and will be kept in a separate locked file, away from actual assessment data. Participants will be required to use their unique identification number consistently throughout the study as it will be used to complete assessments. Participants who forget or misplace their unique ID may contact the PI for retrieval.

A codebook will be created and stored on a hard drive with the de-identified demographic and other data and all related study materials. A separate hard drive will be used to store the master record of participants, their unique ID assignment and any identified data and will be kept independently of the hard drive containing de-identified information.

Subject data confidentiality will be strictly maintained, and the protection of data integrity ensured, by keeping all study materials under lock in the primary investigator's office. A dedicated research laptop will be utilized for all study data collection and analysis. The laptop, external drive and all thumb drives will be password protected.

Online surveys via SurveyMonkey® will be structured so that IP addresses remain anonymous. The researcher has valid CITI research training certificates, current curriculum vitae and conflict of interest forms completed for protection of human subjects. All data and materials will be destroyed within one year of conclusion and dissemination of results.

The researcher does not intend to apply for a Certificate of Confidentiality from the NIH because it is not applicable to this study.

13. Potential Benefits:

There is no direct benefit for participation in this study. Additionally, it is anticipated that the findings of the study will benefit others and assist us in learning more about NGN attitudes about teamwork. Additionally, information learned will better inform scientists, healthcare providers and employers so that they may improve healthcare, although no guarantees can be made. There will be no reimbursement for participation in this study.

14. Biostatistics:

SPSS software: IBM SPSS Statistics Grad Pack 27.0 Standard Version will be used for the data management and compilation of demographic variables or other descriptive data (SPSS Statistics Grad Pack 27.0 Standard Version, n.d., Morse & Richards, 2002).

Statistical analysis of data will be conducted by using *t*-tests to examine the difference between two dependent means (Portney & Watkins, 2015).

Gibson's Theory of Affordances will be the theoretical framework guiding the research and data analysis (Clapper et al., 2018; Gibson, 1979). The Theory of Affordances will also be utilized to organize the data and test the null hypothesis from an interpretive viewpoint.

Power analysis was conducted using G*Power software using a one-tailed paired *t*-test with pre-test mean and standard deviation of 4.20, 0.82 and post-test mean and

standard deviation of 4.64, 0.29 (Faul et al., 2007; Vertino, 2014). For a **sample size** of 30 and an effect size of 0.61, the power is 95% (Faul et al., 2007).

Appendix B

IRB Application/Expedited Review Request

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Institutional Review Board
301 University Blvd.
Galveston, TX 77555-0158
Submission Page

04-May-2021

MEMORANDUM

TO: Debbra Pogue
Grad School Biomedical Science GSBS9999

FROM: Jacqueline S. Meyer PhD
Vice-Chairman, IRB #1

RE: Initial Study Approval

IRB #: IRB # 20-0255

Submission Number: 20-0255.003

TITLE: Graduate Nurse Perceptions of Supportive and Inhibitory Relationships Within the Healthcare Team

DOCUMENTS:
Research Protocol
Fast Fact Sheet
Verbal Consent Script/Info Sheet
Demographic data Sheet
Email Script
Research Flyer
Subsequent Email Script
Survey Monkey Demographic
Survey Monkey TTAQ1
Survey Monkey TTAQ2
Telephone Script
TTAQ

The UTMB Institutional Review Board (IRB) reviewed the above-referenced research protocol via an expedited review procedure on **04-May-2021** in accordance with 45 CFR 46.110(a)-(b)(1). Having met all

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Institutional Review Board
301 University Blvd.
Galveston, TX 77555-0158
Submission Page

22-Jun-2021

MEMORANDUM

TO: Debbra Pogue
Grad School Biomedical Science GSBS9999

FROM: Dwight Wolf, MD
Chairman, IRB

RE: Amendment/Miscellaneous Request Approval

IRB #: IRB # 20-0255

Submission Number: 20-0255.011

TITLE: The Effect of Integration of TeamSTEPPS(R) Strategies Within an Orientation Program on New Graduate Nurse Team Attitudes

DOCUMENTS: SurveyMonkey_v4_TS_DemographicData052621.pdf
SurveyMonkey_v4_TS_TTAQ1_052621.pdf
SurveyMonkey_v4_TS_TTAQ2_052621.pdf

The **Miscellaneous Response** request to the above referenced study has been reviewed via an expedited review procedure on **22-Jun-2021** and approved by the UTMB Institutional Review Board (IRB) in accordance with 45 CFR 46.110(a)-(b)(2).

The approval period for this modified research protocol begins on **22-Jun-2021**. Amendment approvals do not change the approval period of the protocol. Therefore, the expiration date will remain the same as was determined for the protocol at the time of initial or continuing review.

If you have any questions, please do not hesitate to contact the IRB office via email at IRB@utmb.edu.

Appendix C

Narrative for Obtaining Verbal Consent

This study is under the direction of *UTMB Faculty* and will not begin until approved by University of Texas Medical Branch (UTMB) IRB

Narrative for Obtaining Consent

(May be shared with potential participant either verbally or via email)

Introduction. I am Debbra Pogue, a doctoral student at the University of Texas Medical Branch in Galveston, Texas (UTMB), PhD Nursing Program. You are being asked to take part in this study as a participant in a research project entitled The Effect of Integration of TeamSTEPPS® Strategies within an Orientation Program on New Graduate Nurse (NGN) Team Attitudes. The purpose of the study is to determine if integration of TeamSTEPPS® strategies within the NGN orientation program will increase measurements of Teamwork Attitudes. You are being asked to participate because you may be able to provide information that can assist in learning more about NGN attitudes about teamwork. Approximately 30 NGNs will take part in this study in Louisiana, conducted through UTMB.

Data Collection. Data for the study will be collected online. The maximum duration for the initial demographic data collection will not exceed 30 minutes. The initial T-TAQ survey will not exceed 45 minutes. Study participants also may be asked to participate in a one and one half (1 ½) hour TeamSTEPPS® Training Session, followed by a second T-TAQ survey that will not exceed 45 minutes in length. The study time period will be over approximately six (6) months.

Voluntary Participation. Your participation is strictly voluntary, and you may revoke your consent at any time by simply not participating in the study any longer. The researchers reserve the right to remove you from the study for any of the following reasons: the principal investigator is unable to continue with this research study, or you are unable to keep study appointments or follow the researcher's instructions.

Study Risks. There are minimal risks of participation in this study. Recollection of past unpleasant memories or situations may cause uncomfortable feelings. You may also become fatigued. You have the option to stop or continue surveys at your discretion. Periodically assess whether you appear to be distressed or fatigued; options are to take breaks, termination of the data collection session, or continuing the data collection session at a later time.

Confidentiality. Any time information is collected; there is a potential risk for loss of confidentiality. Every effort will be made to keep your information confidential; however, this cannot be guaranteed. Information will be transcribed as reported by you however, there will be no use of any personal information which may identify you. All study reports will use a unique identifier instead of your name and will not report any information that could be linked to you. Study data, forms and recordings will be kept in secure, locked environment with password protected storage on a dedicated research laptop.

Benefits. There is no direct benefit for participation in this study. Additionally, it is anticipated that the findings of the study will better inform scientists, healthcare providers and employers so that they may improve healthcare, although no guarantees can be made. There will be no reimbursement for participation in this study.

Questions. Do you have any questions regarding the information just received? Do you have any questions for regarding this research study or study expectations?

Consent. If you agree to take part in this study, consent will be construed by your completing the Demographic Survey and the TeamSTEPPS® Team Attitudes Questionnaires (T-TAQ).

Appendix D

Informed Consent

The University of Texas Medical Branch at Galveston
Minimal Risk Consent Form

Protocol Title: The Effect of Integration of TeamSTEPPS® Strategies Within an Orientation Program on New Graduate Nurse Team Attitudes

IRB Number: 20-0255

Sponsor: Departmental Sponsor

Principal Investigator: Debbra T. Pogue, 10038 Sandhill Court, Baton Rouge, LA 70809, Phone (225)603-7623 Fax (225)757-4247

Why am I being asked to take part in this research study?
You are being asked to take part in this study because as a new graduate nurse, you may be able to provide information relevant to the study.

Study Summary:

The study is entitled The Effect of Integration of TeamSTEPPS® Strategies within an Orientation Program on New Graduate Nurse Team Attitudes.

How many people will take part in this study?
Approximately 30 people will take part in this study in Louisiana, Texas and other states as per recruitment state/nationwide via nursing specific online platforms, social media and special interest group websites and conducted through UTMB. The duration of the study shall not exceed thirty (30) months.

The study shall consist of a demographic data survey, a survey assessing your attitudes about teamwork, a training course on teamwork strategies and a second survey re-assessing your attitudes about teamwork. No study component will last longer than 45 minutes.

The following things you should know about this research study:

- The purpose of the study is to determine if integration of TeamSTEPPS® strategies within the NGN orientation program will increase Teamwork Attitudes. You are being

asked to participate because you may be able to provide information that can assist the researcher in learning more about NGN attitudes about teamwork. If you choose to participate, you will be asked to give consent by reviewing the fast fact sheet and completing the following online procedures: completion of a demographic survey, initial survey, a less than 45 min. training course, and a second survey after the training course. The study will last approximately thirty (30) months, starting in May 2021 and concluding in June 2023.

There are minimal risks such as recollection of unpleasant memories or situations that may cause uncomfortable feelings is possible. Participants are afforded the ability to determine if and when they wish to stop or continue the surveys or participation in the study. You will periodically assess your emotional state; options offered are to take breaks, termination or continuance as desired or indicated by the participant. Should you experience discomfort, depression or other adverse effects, you will be referred for support services from pastoral care, a preceptor or supervisor and offered a change of scenery or removal to a safe space or neutral area.

Any time information is collected; there is a potential risk for loss of confidentiality. Every effort will be made to keep your information confidential; however, this cannot be guaranteed. Information will be transcribed as reported by you however, there will be no use of personal information which may identify you.

Please take your time to read this entire form and ask questions before deciding if you want to take part in this research project.

DETAILED RESEARCH CONSENT

What is the purpose of this research study?
The purpose of the study is to determine if **integration** of TeamSTEPPS® strategies within the NGN orientation program will increase Teamwork Attitudes. You are being asked to participate because you may be able to provide information that can assist me in learning more about NGN attitudes about teamwork.

How many people will take part in this study?
Approximately 30 people will take part in this study in Louisiana, Texas and other states as per recruitment state/nationwide via nursing specific online platforms, social media and special interest group websites and conducted through UTMB.

What procedures are involved as part of this research study?
If you agree to take part, you will be asked to give consent and complete the following procedures online: a demographic survey (approx. 3 min), initial survey (approx. 3 min), a less than

45 min. online or in-person training module, and a second survey (approx. 3 min.) after completing the training module.)

What are the possible risks for choosing to participate in this research study?
There are minimal risks of participation in this study. Recollection of unpleasant memories or situations that may cause uncomfortable feelings is possible. Participants are afforded the ability to determine if and when they wish to stop or continue the surveys or participation in the study. You will periodically assess your emotional state; options offered are to take breaks, termination or continuance as desired or indicated by the participant.

Any time information is collected; there is a potential risk for loss of confidentiality. Every effort will be made to keep your information confidential; however, this cannot be guaranteed. Information will be transcribed as reported by you however, there will be no use of personal information which may identify you.

What are the potential benefits for participating in this research study?
You will not directly benefit from your participation in this research project. However, it is anticipated that the findings of the study will better inform scientists, healthcare providers and employers so that they may improve healthcare, although no guarantees can be made.

Will I be reimbursed for participating in this research study?
There will be no reimbursement for participation in this study. You will be provided a $5 digital or physical Starbucks gift card as compensation for your time.

Is there an alternative treatment/procedure?
The alternative is not to participate in the study.

How will my information be protected?
All results obtained in this study will be kept confidential and only available to the research study team. Your individual information will not be reported, only the results of all participants as a group.

How will my privacy be protected?
We have rules to protect information about you. Federal and state laws and the federal medical Privacy Rule also protect your privacy. By signing this form, you provide your permission, called your "authorization," for the use and disclosure of information protected by the Privacy Rule.

The researcher working on the study will collect information about you. This includes things learned from the procedures described in this consent form. They may also collect other information including your name, zip code, age range. To protect your identity with respect to collected information, your information will be coded. All study documents will be kept locked in

a file cabinet in the investigator's office and stored to password-protected devices (laptop, encrypted external storage drives).

The researcher will be the only one to know your identity and that you are in the research study. We cannot do this study without your authorization to collect and use your information. You do not have to give us this authorization. If you do not give us your authorization, then you may not join this study.

We will use and disclose your information only as described in this form; however, people outside UTMB who receive your information may not be covered by this promise or by the Federal Privacy Rule. We try to make sure that everyone who needs to see your information keeps it confidential – but we cannot guarantee that your information will not be re-disclosed.

The use and disclosure of your information will be limited to the duration of the study and subsequent analysis of the associated data. All participant records and study materials will be destroyed within 1 year of the study conclusion and dissemination of results. You may revoke (cancel) your permission to use and disclose your information at any time by notifying the Principal Investigator of this study by phone or in writing, or by simply not participating further. If you contact the Principal Investigator by phone, you must follow-up with a written request that includes the study number and your contact information. The Principal Investigator's name, address, phone and information are on page one of this consent form.

If you do cancel your authorization to use and disclose your information, your part in this study will end and no further information about you will be collected. Your revocation (cancellation) would not affect information already collected in the study, or information we disclosed before you wrote to the Principal Investigator to cancel your authorization.

Who can I contact with questions about this research study? If you have any questions, concerns or complaints before, during or after the research study, or if you need to report a research related injury or bad side effect, you should immediately contact **Debbra T. Pogue** at **225-603-7613** or, if after normal office hours, also at **225-603-7613 or dpogue@utmb.edu.**

This study has been approved by the UTMB Institutional Review Board (IRB). If you have any complaints, concerns, input or questions regarding your rights as a subject participating in this research study or you would like more information about the protection of human subjects in research, you may contact the IRB Office, by email at irb@utmb.edu.

Do I have to participate?
Your participation in this study is completely voluntary. You may refuse to participate or stop your participation in this research study at any time without penalty or loss of benefits to which you are otherwise entitled. Participation in this study will not affect your career.

CONSENT TO PARTICIPATE:
The purpose of this research study, procedures to be followed, risks and benefits have been explained to you. You have been given the opportunity to ask questions, and your questions have been answered to your satisfaction. You have been told who to contact if you have additional questions. By completing the study assessments, you are confirming that you have read this consent form and voluntarily agree to participate as a subject in this study. Your completion of any of the study components will be construed as consent.

Researcher will record as record of oral/construed consent:

Printed Name of Participant	Date

◯ Oral Consent Obtained for all study procedures

◯ Online/Construed Consent Obtained for all study procedures

Using language that is understandable and appropriate, I have discussed this project and the items listed above with the subject.

Person Obtaining Consent	Date and Time of Consent Obtained

Printed Name of Person Obtaining Consent

Appendix E

Fast Facts Sheet

IRB Approved
14-Apr-2022-

FAST FACT SHEET **IRB# 20-0255**

Study Name: The Effect of Integration of TeamSTEPPS® Strategies within an Orientation Program on New Graduate Nurse Team Attitudes

Contact Information:
Principal Investigator: Debbra T. Pogue Office 225/757-4243 Mobile 225/603-7613

Purpose:
The purpose of the study is to determine if integration of TeamSTEPPS® strategies within the NGN orientation program will increase measurements of Teamwork Attitudes. You are being asked to participate because you may be able to provide information that can assist in learning more about NGN attitudes about teamwork. Approximately 30 NGNs will take part in this study in Louisiana, Texas, and other states as per recruitment state/nationwide via nursing-specific online platforms, social media and special interest group websites. The study will be conducted through UTMB. Your participation is strictly voluntary and may be revoked at any time. Participation will not affect the career of any study participant.

Concise Summary:
You will be asked to review the study fast fact sheet and provide consent. If you agree to participate, you will be asked to complete the following study components:

1) A phone or online or in-person session providing informed consent and review of the fast fact sheet
2) A phone, online or in-person session for completion of the demographic survey (about 3 minutes to complete) & initial T-TAQ assessment (about 3 minutes to complete)
3) One training session via one of the following three methods: a) online, self-paced computer-based learning session, b) or an in-person PI-guided deployment and review of the computer-based learning learning session (less than 1 hour to complete) or c) the facility's preexisting TeamSTEPPS training program already in place.
4) A phone, online or in-person follow-up session for the evaluation T-TAQ assessment (about 3 minutes to complete)

**Completion times are estimates and actual times may be significantly less than those indicated.*

The completion of the study components will occur in-person or online on your unit of employment, conference rooms or classrooms using computer workstations or mobile devices within the academic healthcare facility or other locations. The study will last approximately thirty (30) months, starting in May 2021 and concluding in June 2023. Data collection will be discontinued after 24 months or 100% completion of sample participants, whichever occurs first.

Risks/Benefits:
There are minimal risks of participation in this study. Recollection of past unpleasant memories or situations may cause uncomfortable feelings. You may also become fatigued. You have the option to stop or continue surveys at your discretion. Periodically assess whether you appear to be distressed or fatigued; options are to take breaks, termination of the data collection session, or continuing the data collection session at a later time. In the event you experience discomfort, depression or other adverse effects, you will

Appendix F

Demographic Data Survey

Research Study Demographic Data Survey

The Effect of Integration of TeamSTEPPS Within an Orientation Program on New Graduate Nurses

Please complete all questions. One answer is required for each question.

* 1. What is your age?

- ◯ 18 to 29
- ◯ 30 to 39
- ◯ 40 to 49
- ◯ 50 to 69
- ◯ 70 and above

* 2. What is your gender?

- ◯ Female
- ◯ Male
- ◯ Prefer Not to Respond
- ◯ Other (please specify)

* 3. Which race best describes you? (Please choose only one.)

- ◯ American Indian or Alaskan Native
- ◯ Asian / Pacific Islander / Native Hawaiian
- ◯ Black or African American
- ◯ White / Caucasian
- ◯ Multiple ethnicity / Other (please specify)

* 4. What is your ethnicity

- ◯ Hispanic / Latino
- ◯ Not Hispanic / Non Latino

* 5. What is the zip code where you live?

* 6. About how many months/days have you been employed (in your current position)?

Months

Days (If less than one (1) month)

* 7. What type of educational preparation (in nursing) do you have?

- Associate
- Bachelor or Baccalaureate
- Diploma
- Other (please specify)

* 8. What type of nursing degree were you awarded?

- Associate's degree
- Baccalaureate or bachelor's degree
- Diploma in Practical Nursing
- Master's degree
- Other (please specify)

* 9. What is the date you became licensed? (Enter month, i.e. May and year, i.e. 2020)

Month

Year

* 10. On what type of nursing unit are you employed?

- Med Surgical
- Telemetry or Cardiac
- Oncology
- Surgery or Operating Room
- Emergency Department
- Other (please specify)
- Critical Care, Progressive or Step Down
- Pediatric
- Neurology
- Renal

* 11. What type of orientation or residency program are you attending/did you attend?

- ◯ Regular orientation (No residency program)
- ◯ Residency program (extended training/orientation)

* 12. How long is the orientation or residency program?

- ◯ 4 week
- ◯ 6 week
- ◯ 12 week
- ◯ 6 month
- ◯ 1 year
- ◯ 2 year
- ◯ Other (please specify)

* 13. Have you completed more than 50% of your orientation program?

- ◯ Yes
- ◯ No

Appendix G

Study Recruitment Flyer

RESEARCH STUDY
NEWLY HIRED GRADUATE NURSES

Share your experiences!

I am interested in The Effect of Integration of TeamSTEPPS® Strategies within an Orientation Program on New Graduate Nurse Team Attitudes.

The purpose of the study is to determine if integration of TeamSTEPPS® strategies within the NGN orientation program will increase measurements of Teamwork Attitudes. You are being asked to participate because you may be able to provide information that can assist in learning more about NGN attitudes about teamwork. Participation is voluntary. All responses will be kept confidential and your data will be de-identified.

Want to Participate? Please contact:

Student researcher, Debbra T. Pogue, PhD(c) MN APRN ACNS-BC at 225.603.7613 or via email at dtpogue@utmb.edu. Participants are required to complete one online demographic survey (approx. 3 min), one brief initial survey (approx. 3 min.), an online training session (less than 1 hr.) and complete a brief follow-up survey (approx. 3 min.) after the training session. Participants may be contacted to collect missing information or clarify responses.

No Cost

Help inform stakeholders

Your Opinion Matters

Provide Valuable Career Insight

ALL RESPONSES CONFIDENTIAL

DEBBRA POGUE
PhD Candidate
225.603.7613
dtpogue@utmb.edu

Appendix H

T-TAQ TeamSTEPPS® Teamwork Attitude Questionnaire 1

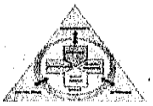
APPENDIX B:
TEAMSTEPPS™ TEAMWORK ATTITUDES QUESTIONNAIRE ADMINISTRATION INSTRUCTIONS

TeamSTEPPS™ Teamwork Attitudes Questionnaire
Administration Instructions

Read the following instructions aloud prior to administering the T-TAQ:

Please complete the following questionnaire by placing a check mark [√] in the box that corresponds to your level of agreement from *Strongly Disagree* to *Strongly Agree*. Please answer every question and select only one response for each question. The questionnaire is anonymous, so please do not put your name or any other identifying information on the questionnaire.

[Optional]: **On the last page you will find questions about your background and experience. Please provide your responses to each question in the space provided. Thank you for your participation.**



TeamSTEPPS™ Teamwork Attitudes Questionnaire

The purpose of this survey is to measure your impressions of various components of teamwork as it relates to patient care and safety.

Instructions: Please respond to the questions below by placing a check mark (√) in the box that corresponds to your level of agreement from *Strongly Disagree* to *Strongly Agree*. Please select only one response for each question.

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Team Structure						
1.	It is important to ask patients and their families for feedback regarding patient care.					
2.	Patients are a critical component of the care team.					
3.	This facility's administration influences the success of direct care teams.					
4.	A team's mission is of greater value than the goals of individual team members.					
5.	Effective team members can anticipate the needs of other team members.					
6.	High-performing teams in health care share common characteristics with high-performing teams in other industries.					
Leadership						
7.	It is important for leaders to share information with team members.					
8.	Leaders should create informal opportunities for team members to share information.					
9.	Effective leaders view honest mistakes as meaningful learning opportunities.					
10.	It is a leader's responsibility to model appropriate team behavior.					
11.	It is important for leaders to take time to discuss with their team members plans for each patient.					
12.	Team leaders should ensure that team members help each other out when necessary.					

PLEASE CONTINUE TO THE NEXT PAGE

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Situation Monitoring						
13.	Individuals can be taught how to scan the environment for important situational cues.					
14.	Monitoring patients provides an important contribution to effective team performance.					
15.	Even individuals who are not part of the direct care team should be encouraged to scan for and report changes in patient status.					
16.	It is important to monitor the emotional and physical status of other team members.					
17.	It is appropriate for one team member to offer assistance to another who may be too tired or stressed to perform a task.					
18.	Team members who monitor their emotional and physical status on the job are more effective.					
Mutual Support						
19.	To be effective, team members should understand the work of their fellow team members.					
20.	Asking for assistance from a team member is a sign that an individual does not know how to do his/her job effectively.					
21.	Providing assistance to team members is a sign that an individual does not have enough work to do.					
22.	Offering to help a fellow team member with his/her individual work tasks is an effective tool for improving team performance.					
23.	It is appropriate to continue to assert a patient safety concern until you are certain that it has been heard.					
24.	Personal conflicts between team members do not affect patient safety.					

PLEASE CONTINUE TO THE NEXT PAGE

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Communication						
25.	Teams that do not communicate effectively significantly increase their risk of committing errors.					
26.	Poor communication is the most common cause of reported errors.					
27.	Adverse events may be reduced by maintaining an information exchange with patients and their families.					
28.	I prefer to work with team members who ask questions about information I provide.					
29.	It is important to have a standardized method for sharing information when handing off patients.					
30.	It is nearly impossible to train individuals how to be better communicators.					

Please provide any additional comments in the space below.

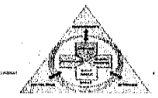
Thank you for your participation!

The TTAQ-1 Contains the following additional questions:

1. Do you have military experience? (Veteran, Active or Reserve Duty)
2. Have you ever participated in a TeamSTEPPS training program in school or in the military (If applicable)?
3. Did your educational program provide you with the opportunity to learn and engage in the clinical care or classroom environment with other disciplines (i.e. medical students, radiology students, respiratory care students, physical therapy students, etc.)?
4. Based on your current level of experience, do you feel that your educational program adequately prepared you to function as a member of a multidisciplinary team of healthcare providers?
5. Please share any other comments you'd like to make.

Appendix I

T-TAQ TeamSTEPPS® Teamwork Attitude Questionnaire 2



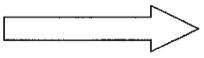
TeamSTEPPS™ Teamwork Attitudes Questionnaire

The purpose of this survey is to measure your impressions of various components of teamwork as it relates to patient care and safety.

Instructions: Please respond to the questions below by placing a check mark (√) in the box that corresponds to your level of agreement from *Strongly Disagree* to *Strongly Agree*. Please select only one response for each question.

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Team Structure						
1.	It is important to ask patients and their families for feedback regarding patient care.					
2.	Patients are a critical component of the care team.					
3.	This facility's administration influences the success of direct care teams.					
4.	A team's mission is of greater value than the goals of individual team members.					
5.	Effective team members can anticipate the needs of other team members.					
6.	High-performing teams in health care share common characteristics with high-performing teams in other industries.					
Leadership						
7.	It is important for leaders to share information with team members.					
8.	Leaders should create informal opportunities for team members to share information.					
9.	Effective leaders view honest mistakes as meaningful learning opportunities.					
10.	It is a leader's responsibility to model appropriate team behavior.					
11.	It is important for leaders to take time to discuss with their team members plans for each patient.					
12.	Team leaders should ensure that team members help each other out when necessary.					

PLEASE CONTINUE TO THE NEXT PAGE



		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Situation Monitoring						
13.	Individuals can be taught how to scan the environment for important situational cues.					
14.	Monitoring patients provides an important contribution to effective team performance.					
15.	Even individuals who are not part of the direct care team should be encouraged to scan for and report changes in patient status.					
16.	It is important to monitor the emotional and physical status of other team members.					
17.	It is appropriate for one team member to offer assistance to another who may be too tired or stressed to perform a task.					
18.	Team members who monitor their emotional and physical status on the job are more effective.					
Mutual Support						
19.	To be effective, team members should understand the work of their fellow team members.					
20.	Asking for assistance from a team member is a sign that an individual does not know how to do his/her job effectively.					
21.	Providing assistance to team members is a sign that an individual does not have enough work to do.					
22.	Offering to help a fellow team member with his/her individual work tasks is an effective tool for improving team performance.					
23.	It is appropriate to continue to assert a patient safety concern until you are certain that it has been heard.					
24.	Personal conflicts between team members do not affect patient safety.					

PLEASE CONTINUE TO THE NEXT PAGE

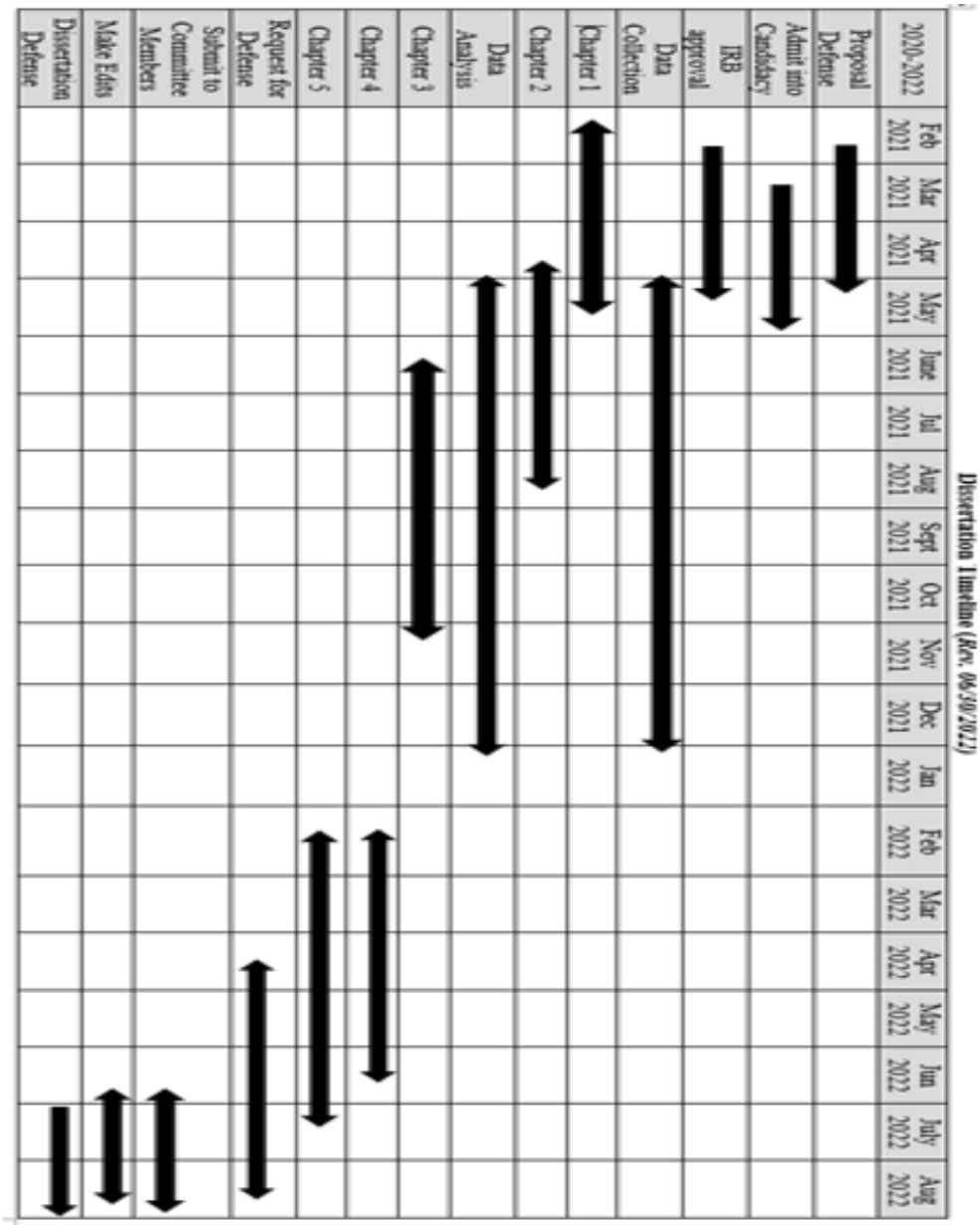
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Communication						
25.	Teams that do not communicate effectively significantly increase their risk of committing errors.					
26.	Poor communication is the most common cause of reported errors.					
27.	Adverse events may be reduced by maintaining an information exchange with patients and their families.					
28.	I prefer to work with team members who ask questions about information I provide.					
29.	It is important to have a standardized method for sharing information when handing off patients.					
30.	It is nearly impossible to train individuals how to be better communicators.					

Please provide any additional comments in the space below.

Thank you for your participation!

Appendix J

Research Timeline



Appendix K

Budget

BUDGET & BUDGET JUSTIFICATION

PERSONNEL (Unless restricted by grant requirements)

Item #	Position/Title	Total # of Hours	Hourly Rate	Total
1				$ -
2				$ -
3				$ -
4				$ -
			Personnel Total	$ -

CONSUMABLE SUPPLIES (Include only if not provided by institution)

Item #	Supplies	Costs	% Tax	Total
6	Flyers (50 @ .20 each)	$10.00	10.0%	$ 11
7	Printer Ink (1 & $62.99)	$62.99	10.0%	$ 69
8				
9				
10				
			Consumable Supplies Total	$ 80

PERMANENT EQUIPMENT (To be kept by institution after study is done)

Item #	Equipment	Costs	% Tax	Total
11	Dedicated Laptop	$800.00	10.0%	$ 880
12	samsung-t7-500gb-external-usb-3-2-gen-2-portable-solid-state-drive-with-hardware-encryption-metallic-red	$109.99	10.0%	$ 121
13	Thumb drives 32 GB (3 pack)	$16.97	10.0%	$ 19
14				
15				
16				
17				$ -
			Permanent Equipment Total	$ 1,020

TRAVEL (Related only to conduct of study)

Item #	Mileage/Gas/Parking Fees/Etc.	Costs	% Tax	Total
16	Rental vehicle	$120.00	10.0%	$ 132
17	Gas	$100.00	10.0%	$ 110
18	Hotel/Accommodations	$175.00	10.0%	$ 192
19				$ -
20				$ -
			Travel Total	$ 434

OTHER COSTS

Item #	Miscellaneous Costs	Costs	% Tax	Total
21	Virus Protection (McAfee)	$99.00	10.0%	$ 109
22	Misc Office Supplies (Notebooks, Pens, Pencils, Paper, Highlighters, Folders, Binders, Index Tabs)	$200.00	10.0%	$ 220
23	Gift Cards 30 Qty @ $5/each	$150.00		$ 150
			Other Costs Total	$ 479

BUDGET TOTALS

Sub Total	$	2,013
% Indirect Costs		0%
Indirect Costs	$	-
TOTAL PROJECT BUDGET REQUEST	$	2,013

JUSTIFICATION

Item #	Describe justification for budget items here.
	Computer equipment supports password-protected dedicated laptop for maintenance of confidentiality and protection of human subjects.
	External hard drive/mass storage device also provides protection of human subjects' data and prevents breach in confidentiality or loss of data with equipment/laptop malfunction.

Figure 1. ***A Prior Power Analysis***

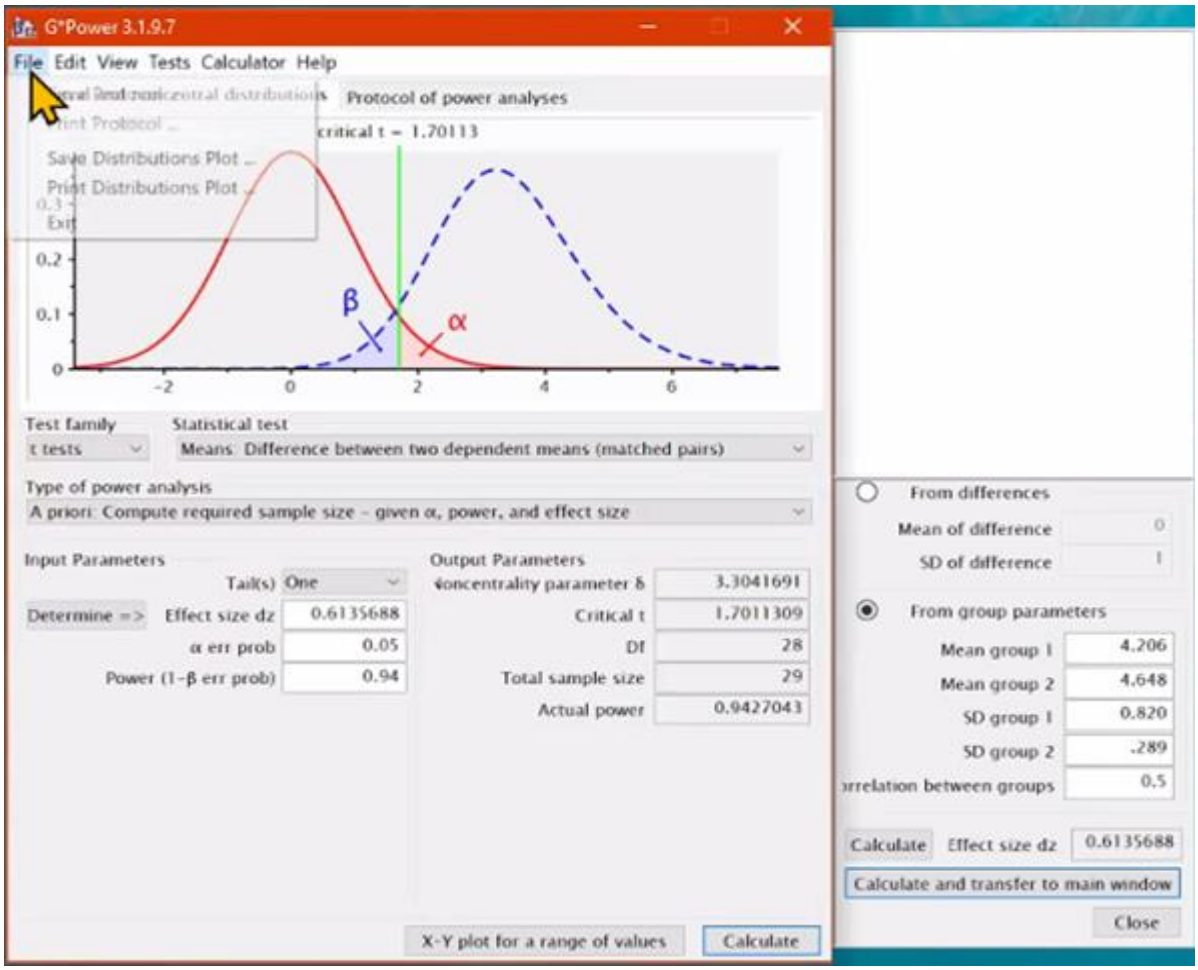


Figure 2. ***Representation of Dual Nature of Affordance Theory***

Note:
Proceedings of the American Society for Information Science and Technology, Volume: 49, Issue: 1, Pages: 1-4, First published: 24 January 2013, DOI: (10.1002/meet.14504901340). Author, Heidi Overhill© 2013 Photo used with permission.

Physical affordances differ based on the perspective and perceived usefulness by the user: *Xena the American Bulldog finds a stick "chewable," while her friend Rob finds it "graspable*"

Figure 3. ***TeamSTEPPS® Conceptual Model***

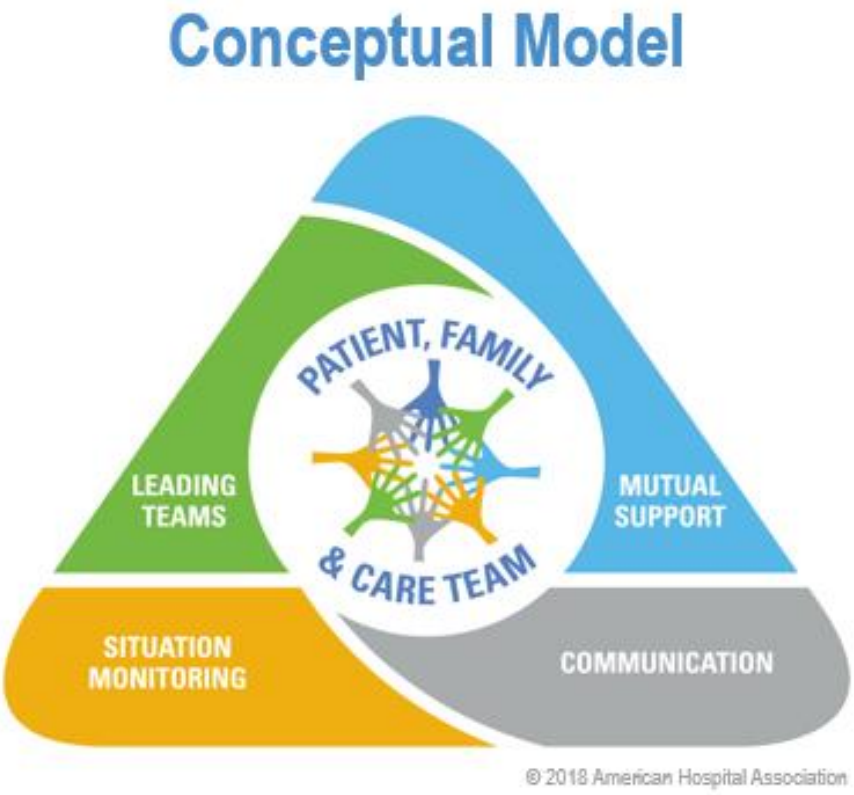


Figure 3. TeamSTEPPS® Conceptual Model

Table 4.1.

Participant's Demographic Data

Variable	N	M(SD)	%
Gender	**N=33**		
Male	8		24.2%
Female	25		75.8%
Age	**N=33**		
18-29 years	22		66.7%
30-39 years	8		24.2%
40-49 years	3		9.1%
50 + years	0		0%
Race	**N=33**		
White/Caucasian	14		42.4%
Asian/Pacific Islander/Native Hawaiian	11		33.3%
Black/African American	6		18.2%
American Indian/Alaskan Native	1		3.0%
Other/Multiracial	1		3.0%
Ethnicity	**N=33**		
Hispanic/Latino	12		36.4%
Non-Hispanic/Non-Latino	21		63.6%

Table 4.2. ***Educational Preparation and Practice Area***

Variable	N	M(SD)	%
Educational Prep	**N=33**		
Associate Degree	10		30.3%
Bachelor/Baccalaureate	23		69.7%
Unit Type	***N=33***		
Critical Care/Progressive/Stepdown	9		27.3%
Emergency Department	6		18.2%
Medical-Surgical	6		18.2%
Neurology	1		3.0%
Oncology	*2*		6.1%
Surgery/Operating Room	7		21.2%
Other (NICU, Labor & Delivery, Woman's Health)	*2*		6.1%
Months Employed in Current Job	**N=33**	2.27 (±.977)	
1 month	8		24.2%
2 months	12		36.4%
3 months	9		27.3%
4 months	4		12.1%

Table 4.3. (a) ***NGN TeamSTEPPS® Subscale Paired Samples Statistics***

NGN TeamSTEPPS® Subscale Paired Samples Statistics					
		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	SCALE_TS_AVG_PRE	4.53	33	.47224	.08221
	SCALE_TS_AVG_POST	4.65	33	.36977	.06437
Pair 2	SCALE_LD_AVG_PRE	4.69	33	.35049	.06101
	SCALE_LD_AVG_POST	4.70	33	.39972	.06958
Pair 3	SCALE_SM_AVG_PRE	4.60	33	.40169	.06992
	SCALE_SM_AVG_POST	4.67	33	.42287	.07361
Pair 4	SCALE_MS_AVG_PRE	3.29	33	.66671	.11606
	SCALE_MS_AVG_POST	3.29	33	.74100	.12899
Pair 5	SCALE_CM_AVG_PRE	4.08	33	.42517	.07401
	SCALE_CM_AVG_POST	4.26	33	.52047	.09060

Table 4.3. (b) ***NGN TeamSTEPPS® Subscale Paired Samples Correlations***

NGN TeamSTEPPS® Subscale Paired Samples Correlations				
	Variable	N	Correlation	Sig.
Pair 1	SCALE_TS_AVG_PRE & SCALE_TS_AVG_POST	33	.317	.072
Pair 2	SCALE_LD_AVG_PRE & SCALE_LD_AVG_POST	33	.750	.000
Pair 3	SCALE_SM_AVG_PRE & SCALE_SM_AVG_POST	33	.869	.000
Pair 4	SCALE_MS_AVG_PRE & SCALE_MS_AVG_POST	33	.481	.005
Pair 5	SCALE_CM_AVG_PRE & SCALE_CM_AVG_POST	33	.388	.026

Table 4.3. (c) ***NGN TeamSTEPPS® Subscale Paired Samples t-Test***

NGN TeamSTEPPS® Subscale Paired Samples *t* –Test

		Paired Differences			
					95% Confidence Interval of the Difference
	Variable Pair	Mean	Std. Deviation	Std. Error Mean	Lower
Pair 1	SCALE_TS_AVG_PRE - SCALE_TS_AVG_POST	-.11616	.49910	.08688	-.29314
Pair 2	SCALE_LD_AVG_PRE - SCALE_LD_AVG_POST	-.02020	.26925	.04687	-.11567
Pair 3	SCALE_SM_AVG_PRE - SCALE_SM_AVG_POST	-.06566	.21221	.03694	-.14090
Pair 4	SCALE_MS_AVG_PRE - SCALE_MS_AVG_POST	.00505	.71986	.12531	-.25020
Pair 5	SCALE_CM_AVG_PRE - SCALE_CM_AVG_POST	-.18182	.52929	.09214	-.36950

Table 4.3. (d) ***NGN TeamSTEPPS® Paired Samples t-Test***

NGN TeamSTEPPS® Paired Samples *t* -Test					
		Paired Differences 95% Confidence Interval of the Difference Upper	t	df	Sig. (2-tailed)
Pair 1	SCALE_TS_AVG_PRE - SCALE_TS_AVG_POST	.06081	-1.337	32	.191
Pair 2	SCALE_LD_AVG_PRE - SCALE_LD_AVG_POST	.07527	-.431	32	.669
Pair 3	SCALE_SM_AVG_PRE - SCALE_SM_AVG_POST	.00959	-1.777	32	.085
Pair 4	SCALE_MS_AVG_PRE - SCALE_MS_AVG_POST	.26030	.040	32	.968
Pair 5	SCALE_CM_AVG_PRE - SCALE_CM_AVG_POST	.00586	-1.973	32	.057

Table 4.4. (a) ***NGN TeamSTEPPS® Subscale Paired Samples Effect Sizes***

NGN TeamSTEPPS® Subscale Paired Samples Effect Sizes					
			Standardizer[a]	Point Estimate	95% Confidence Interval Lower
Pair 1	SCALE_TS_AVG_PRE - SCALE_TS_AVG_POST	Cohen's d	0.4991	-0.233	-0.577
		Hedges' correction	0.50505	-0.23	-0.57
Pair 2	SCALE_LD_AVG_PRE - SCALE_LD_AVG_POST	Cohen's d	0.26925	-0.075	-0.416
		Hedges' correction	0.27246	-0.074	-0.411
Pair 3	SCALE_SM_AVG_PRE - SCALE_SM_AVG_POST	Cohen's d	0.21221	-0.309	-0.657
		Hedges' correction	0.21474	-0.306	-0.649
Pair 4	SCALE_MS_AVG_PRE - SCALE_MS_AVG_POST	Cohen's d	0.71986	0.007	-0.334
		Hedges' correction	0.72844	0.007	-0.33
Pair 5	SCALE_CM_AVG_PRE - SCALE_CM_AVG_POST	Cohen's d	0.52929	-0.344	-0.692
		Hedges' correction	0.53559	-0.339	-0.684

Table 4.4. (b) ***NGN TeamSTEPPS® Subscale Paired Samples Effect Sizes***

NGN TeamSTEPPS® Subscale Paired Samples Effect Sizes			
			95% Confidence Interval[a] Upper
Pair 1	SCALE_TS_AVG_PRE - SCALE_TS_AVG_POST	Cohen's d	0.115
		Hedges' correction	0.114
Pair 2	SCALE_LD_AVG_PRE - SCALE_LD_AVG_POST	Cohen's d	0.267
		Hedges' correction	0.264
Pair 3	SCALE_SM_AVG_PRE - SCALE_SM_AVG_POST	Cohen's d	0.042
		Hedges' correction	0.042
Pair 4	SCALE_MS_AVG_PRE - SCALE_MS_AVG_POST	Cohen's d	0.348
		Hedges' correction	0.344
Pair 5	SCALE_CM_AVG_PRE - SCALE_CM_AVG_POST	Cohen's d	0.01
		Hedges' correction	0.01

Table 4.5. (a) ***NGN TeamSTEPPS® Situation Monitoring Subscale Paired Samples Statistics***

NGN TeamSTEPPS® Situation Monitoring Subscale Paired Samples Statistics

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	SM1_PRE	4.4545	33	.50565	.08802
	SM1_POST	4.5455	33	.56408	.09819
Pair 2	SM2_PRE	4.6667	33	.47871	.08333
	SM2_POST	4.7576	33	.43519	.07576
Pair 3	SM3_PRE	4.3939	33	.70442	.12262
	SM3_POST	4.5152	33	.71244	.12402
Pair 4	SM4_PRE	4.6364	33	.48850	.08504
	SM4_POST	4.6970	33	.46669	.08124
Pair 5	SM5_PRE	4.7879	33	.41515	.07227
	SM5_POST	4.7576	33	.50189	.08737
Pair 6	SM6_PRE	4.6667	33	.59512	.10360
	SM6_POST	4.7273	33	.45227	.07873

Table 4.5. (b) ***NGN TeamSTEPPS® Situation Monitoring Subscale Paired Samples t-Test***

NGN TeamSTEPPS® Situation Monitoring Subscale *t*-Test Paired Samples Test					
		Paired Differences			
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower
Pair 1	SM1_PRE - SM1_POST	-.09091	.45851	.07982	-.25349
Pair 2	SM2_PRE - SM2_POST	-.09091	.29194	.05082	-.19443
Pair 3	SM3_PRE - SM3_POST	-.12121	.41515	.07227	-.26842
Pair 4	SM4_PRE - SM4_POST	-.06061	.34816	.06061	-.18406
Pair 5	SM5_PRE - SM5_POST	-.03030	.46669	.08124	-.13518
Pair 6	SM6_PRE - SM6_POST	-.06061	.49620	.08638	-.23655

Table 4.5. (c) ***NGN TeamSTEPPS® Situation Monitoring Subscale Paired Samples t-Test***

NGN TeamSTEPPS® Situation Monitoring Subscale Paired Samples *t*-Test					
Paired Samples Test					
		Paired Differences 95% Confidence Interval of the Difference			
		Upper	*t*	df	Sig. (2-tailed)
Pair 1	SM1_PRE - SM1_POST	.07167	-1.139	32	.263
Pair 2	SM2_PRE - SM2_POST	.01261	-1.789	32	.083
Pair 3	SM3_PRE - SM3_POST	.02599	-1.677	32	.103
Pair 4	SM4_PRE - SM4_POST	.06284	-1.000	32	.325
Pair 5	SM5_PRE - SM5_POST	.19579	.373	32	.712
Pair 6	SM6_PRE - SM6_POST	.11534	-.702	32	.488

Table 4.6. (a) ***NGN TeamSTEPPS® Complete Scale Paired Samples Effect Sizes***

NGN TeamSTEPPS® Complete Scale Paired Samples Effect Sizes					
			Standardizer[a]	Point Estimate	95% Confidence Interval Lower
Pair 1	SCALE_TS_AVG_PRE - SCALE_TS_AVG_POST	Cohen's d	0.4991	-0.233	-0.577
		Hedges' correction	0.50505	-0.23	-0.57
Pair 2	SCALE_LD_AVG_PRE - SCALE_LD_AVG_POST	Cohen's d	0.26925	-0.075	-0.416
		Hedges' correction	0.27246	-0.074	-0.411
Pair 3	SCALE_SM_AVG_PRE - SCALE_SM_AVG_POST	Cohen's d	0.21221	-0.309	-0.657
		Hedges' correction	0.21474	-0.306	-0.649
Pair 4	SCALE_MS_AVG_PRE - SCALE_MS_AVG_POST	Cohen's d	0.71986	0.007	-0.334
		Hedges' correction	0.72844	0.007	-0.33
Pair 5	SCALE_CM_AVG_PRE - SCALE_CM_AVG_POST	Cohen's d	0.52929	-0.344	-0.692
		Hedges' correction	0.53559	-0.339	-0.684

Table 4.6. (b) ***NGN TeamSTEPPS® Complete Scale Paired Samples Effect Sizes***

NGN TeamSTEPPS® Complete Scale Paired Samples Effect Sizes				
				95% Confidence Interval[a] Upper
Pair 1	SCALE_TS_AVG_PRE - SCALE_TS_AVG_POST	Cohen's d		0.115
		Hedges' correction		0.114
Pair 2	SCALE_LD_AVG_PRE - SCALE_LD_AVG_POST	Cohen's d		0.267
		Hedges' correction		0.264
Pair 3	SCALE_SM_AVG_PRE - SCALE_SM_AVG_POST	Cohen's d		0.042
		Hedges' correction		0.042
Pair 4	SCALE_MS_AVG_PRE - SCALE_MS_AVG_POST	Cohen's d		0.348
		Hedges' correction		0.344
Pair 5	SCALE_CM_AVG_PRE - SCALE_CM_AVG_POST	Cohen's d		0.01
		Hedges' correction		0.01

Table 4.7. ***Situation Monitoring – Affordance Comparison***

Situation Monitoring	**Affordance**	**TeamSTEPPS Tool**	**NGN Skillset or Focus**
1.Individuals can be taught how to scan the environment for important situational cues.	Environmental Situational	STEP Mnemonic • **Status** of the Patient • **Team Members** • **Environment** • **Progress** Toward Goal Brief Huddle SBAR	Assessment Reassessment Adjusting Interventions Report Handoff
2. Monitoring patients provides an important contribution to effective team performance.	Clinical data	Situation Monitoring Situation Awareness Shared Mental Model Huddle Debrief Handoff IPASS	Problem Solving Process Improvement Root Cause Analysis Sentinel Events
3. Even individuals who are not part of the direct care team should be encouraged to scan for and report changes in patient status.	Social Interprofessional Interdisciplinary	Shared Mental Model Briefs Huddles Debrief SBAR Two-Challenge Rule CUS Tool	Interdisciplinary Team Patient Advocate Conflict Resolution Speak Up Effective Communication
4. It is important to monitor the emotional and physical status of other team members.	Interprofessional Interdisciplinary	STEP Mnemonic • **Status** of the Patient • **Team Members** • **Environment** • **Progress** Toward Goal	Self-awareness
5. It is appropriate	Situational	Mutual Support	Task Assistance

for one team member to offer assistance to another who may be too tired or stressed to perform a task.	Interprofessional Interdisciplinary Equipment Environmental	STEP Task Assistance Feedback	Feedback
6. Team members who monitor their emotional and physical status on the job are more effective.	Physical Cues Verbal Cues Social	I'm SAFE Mnemonic Illness Medication Stress Alcohol & Drugs Fatigue Eating & Elimination	Self-Care Self-Actualization

Table 4.8. ***Protocol Methodology***

	Protocol Methodology
1	Study recruitment flyer was distributed to potential NGN participants by facility contacts, the Nursing Program Manager and Director of Professional Practice for the respective facilities.
2	NGN participants were invited to take part in the study via flyer or in-person invitation by the PI after coordinating with facility contacts
3	Interested NGN participants contacted the PI.
4	A study overview and the study fast facts sheet was distributed to NGNs,
5	Informed consent was obtained from NGNs electing to participate in the study.
6	Demographic data was collected from the NGNs.
7	A T-TAQ assessment was performed via an online survey platform.
8	The TeamSTEPPS® training module was delivered via: a) an online, self-paced module via the CDC Project Firstline website or, b) an in-person, PI-led delivery of the TeamSTEPPS training module or, c) via the organization's existing TeamSTEPPS training program already in place if applicable.
9	An evaluation T-TAQ assessment was performed via an online survey platform.
10	Participants were given a five-dollar ($5) coffee gift card as an accommodation for their time.
11	Data was analyzed.