2020

Comparison of Pre-Licensure BSN Student Outcomes Between Team-Based and Traditional Learning Methods

Tressa Jane Pedroff
Nova Southeastern University

COMPARISON OF PRE-LICENSURE BSN STUDENT OUTCOMES BETWEEN TEAM-BASED AND TRADITIONAL LEARNING METHODS

Presented in Partial Fulfillment of the
Requirements for the Degree of
Doctor of Philosophy in Nursing Education

Nova Southeastern University

Tressa J. Pedroff

2020

RON AND KATHY ASSAF COLLEGE OF NURSING
NOVA SOUTHEASTERN UNIVERSITY

This dissertation, written by Tressa J. Pedroff, under direction of her Dissertation Committee, and approved by all of its members, has been presented and accepted in partial fulfillment of requirements for the degree of

DOCTOR OF PHILOSOPHY IN NURSING EDUCATION

DISSERTATION COMMITTEE

_____ _____

Dr. Derby-Davis, PhD, RN Date
Chairperson of Dissertation Committee

_____ _____

Dr. Suzanne Edgett Collins, PhD, JD, MPH, RN Date
Dissertation Committee Member

_____ _____

Dr. Dana Mills, PhD Date
Dissertation Committee Member

RON AND KATHY ASSAF COLLEGE OF NURSING
NOVA SOUTHEASTERN UNIVERSITY

Certification

We hereby certify that this dissertation, submitted by Tressa J. Pedroff, conforms to acceptable standards and is fully adequate in scope and quality to fulfill the dissertation requirement for the Doctor of Philosophy in Nursing Education degree.

Approved:

_____ _____

Stefanie J. LaManna, PhD, MPH, APRN, FNP-C, AGACNP-BC Date
Associate Professor
Program Director PhD & DNP Programs
College of Nursing

_____ _____

Marcella M. Rutherford, PhD, MBA, MSN Date
Dean, College of Nursing

CERTIFICATE OF AUTHORSHIP

RON AND KATHY ASSAF COLLEGE OF NURSING
NOVA SOUTHEASTERN UNIVERSITY

Submitted to: Dr. Derby-Davis
Student's Name: Tressa J. Pedroff
Title of Submission: COMPARISON OF PRE-LICENSURE BSN STUDENT OUTCOMES BETWEEN TEAM-BASED AND TRADITIONAL LEARNING METHODS

Certification of Authorship: I hereby certify that I am the author of this document and that any assistance I received in its preparation is fully acknowledged and disclosed in the document. I have also cited all sources from which I obtained data, ideas, or words that are copied directly or paraphrased in the document. Sources are properly credited according to accepted standards for professional publications. I also certify that this paper was prepared by me for this purpose.

Student's Signature: _____

Date of Submission: _____

Acknowledgments

This has been a momentous journey, which I could not have completed without the assistance from my committee, professors, family, and friends. I would like to acknowledge the many people who have helped me in completing this milestone. Firstly, I would like to thank my committee chairperson, Dr. Derby-Davis, whose guidance, calm demeanor, constant encouragement, and intermittent humor kept me motivated to continue to completion. I would also like to thank my committee members for their contributions to this work; Dr. Evans, who pushed me through a successful proposal defense; and Dr. Mills, who expertly picked up the baton from there and advised me on the statistical entities of research, enabling me to reach sound conclusions. Lastly, I would like to thank Dr. Collins, who was there with me every step of the way with her meticulous attention to detail and unwavering commitment to quality.

I would like to thank my treasured colleagues (past and present) from the University of Tampa, each of whom have played some role in this achievement. Additionally, I would like to thank the members of my PhD support group – Dee Adkins, Anne Bizup, and Coleeta Davis – for supporting me through the highs and the lows of this process. I would also like to acknowledge the outstanding professors at Nova Southeastern University for their dedication to the education of nurse scientists.

Finally, I would like to thank God and my circle of friends and family for their endless attention to the maintenance of my well-being during this venture. I am eternally grateful to my husband, Bill and my two children, Olivia and Andrew – without their love and support this would not have been possible.

Contents

List of Tables

List of Figures

Abstract

Background: The increased complexity of healthcare systems requires nurses to have a different skillset, largely not provided in today's nursing curricula. Team-based learning is one possible teaching strategy believed to increase nurses' critical thinking and teamwork self-efficacy. Currently, there is insufficient objective data available that demonstrates improved academic performance and perceptions of teamwork skills in pre-licensure Bachelor of Science in Nursing students.

Purpose: The purpose of this study is to compare the effects of team-based learning and traditional lecture-format teaching strategies among pre-licensure Bachelor of Science in Nursing students in a Foundations of Nursing Practice course.

Theoretical Framework: Vygotsky's social constructivism and Tuckman's group development model provided the framework for this study.

Methods: A quasi-experimental design was used to collect data from a convenience sample of 79 nursing students. Data from a demographic questionnaire, two unit exams, a modified Healthcare Team Questionnaire, and the Team-Based Learning Student Assessment Instrument were analyzed. Hypotheses were tested using an independent group *t*-test, a paired *t*-test and the Pearson correlation coefficient.

Results: There were no statistically significant differences in academic performance, teamwork self-efficacy, and teamwork skills between the two groups. Student participants who experienced team-based learning had higher perceived accountability, satisfaction, and an overall learning experience ($p < .05$) when compared with those who experienced traditional lecture-format teaching.

Conclusions: The study contributes further objective information to what is currently known about the effects of team-based learning in pre-licensure student nurses. The results inform nurse educators that team-based learning may heighten students' learning experiences in terms of accountability and satisfaction, while not jeopardizing their academic performance or perceptions about working in teams.

Chapter One

The Problem and Domain of Inquiry

Challenges for health profession educators have grown over the last few decades with the increased complexity of patient care, faculty shortages, and increasing class sizes. Furthermore, the 2010 Institute of Medicine (IOM) report "The Future of Nursing: Leading change, advancing health" identified specific deficiencies in the current nursing education process. Traditional lecture-format educational models in nursing have an outdated, discipline-specific, silo-based approach – this approach promotes passive lower-level 'task-oriented' thinking (Bressler & Persico, 2016; IOM, 2010). Multifaceted patient-coordination regimens, coupled with the increased complexity of healthcare systems, require nurses to have a special skillset, largely not provided in today's nursing curricula (Horsley et al., 2016). Subsequently, nurses face a great cognitive disconnect when starting clinical practice as they find themselves unprepared to work in teams that require higher-level competencies such as proficient communication, collaboration, and clinical reasoning (Speakman & Arenson, 2015). This disconnect can negatively affect both patient care and healthcare outcomes. To bridge this gap, nurse educators must transform existing nursing curricula to incorporate innovative teaching strategies that promote critical thinkers who can communicate effectively in teams (Benner, Sutphen, Leonard, & Day, 2010). Grounded in social-constructivist education theory, team-based learning (TBL) consists of interactive student engagement, cooperative learning, immediate feedback, and reciprocal teaching (Michaelson & Sweet, 2011). The principal feature of social-constructivist educational theory is that individuals construct meaning as they interact together, sharing their thoughts and experiences (Vygotsky, 1978). The integration of these best teaching practices in nursing education has the potential to influence higher-level learning as well as students' perceptions and confidence regarding teamwork. Additionally, teamwork and collaboration are among the quality

and safety competencies formulated since the publication of the IOM's competencies for nursing in 2003 (Quality and Safety Education for Nurses [QSEN], 2015).

Before the implementation of any new innovative teaching strategy, nurse educators must appraise the evidence-based research (Kalb, O'Conner-Von, Brockway, Rierson, & Sendelback, 2015). Initial studies done in the health fields of medicine, pharmacy, and psychology have identified the benefits of an innovative teaching strategy, TBL, which originated in the 1970s through the work of Michaelsen (Bleske et al., 2016; Haidet, Kubitz, & McCormack, 2014; Huitt, Killins, & Brooks, 2014; Thomas & McPherson, 2011; Whitley et al., 2015). The findings to date have inspired nurse educators to consider TBL as a possible teaching strategy in nursing, though its clear effectiveness and academic outcomes have not yet been well documented (Haidet et al., 2012, 2014; Michaelsen, Parmelee, McMahon, & Levine, 2008; Miles, Larson, & Swanson, 2017; Sisk, 2011).

Problem Statement

Due to the increased complexity of patient care and healthcare systems, nurse educators must change teaching practices to better prepare nurses to be high-level thinkers capable of proficient collaboration and teamwork (Benner et al., 2010). Team-based learning has grown in popularity as a possible teaching strategy to produce nurses with these high-level skills (Parmalee, Michaelson, Cooks, & Hudes, 2012). Although many benefits of TBL have been identified in the literature, currently there is insufficient research demonstrating objective evidence, such as improved exam scores and increased self-efficacy, of indirect measures of teamwork in pre-licensure Bachelor of Science in Nursing (BSN) nursing students (Haidet et al., 2014; Sisk, 2011).

Purpose of the Study

The purpose of this study is threefold: (a) to determine if there is a relationship between the academic performance of pre-licensure BSN nursing students who participate in TBL compared to those who do not participate in TBL; (b) to determine if there is a relationship between teamwork self-efficacy and the interpersonal skills, adaptability, and communication teamwork skills of pre-licensure BSN nursing students who participate in TBL when compared to those who do not participate in TBL; (c) to determine if there is a relationship between experiences in terms of accountability, preferences, and satisfaction between pre-licensure BSN nursing students who participate in TBL when compared to nursing students who do not participate in TBL.

Research Questions and Hypotheses

Research Question 1: Is there a relationship between the academic performance of pre-licensure BSN nursing students who participate in TBL when compared to those who do not participate in TBL?

Hypothesis 1(H_1): There is a relationship between the academic performance of pre-licensure BSN nursing students who participate in TBL when compared to those who do not participate in TBL as measured by unit exam scores.

Null hypothesis (H_0): There is no relationship between the academic performances of pre-licensure BSN nursing students who participate in TBL when compared to those who do not participate in TBL as measured by unit exam scores.

Research Question 2: Is there a relationship between the teamwork self-efficacy and the teamwork skills of interpersonal skills, adaptability, and communication in pre-licensure BSN nursing students who participate in TBL when compared to those who do not participate in TBL?

Hypothesis 2 (H_2): There is a relationship between teamwork self-efficacy and the teamwork skills of interpersonal, adaptability, and communication in pre-licensure BSN nursing students who participate in TBL when compared to those who do not participate in TBL as measured by the modified Healthcare Teams Questionnaire (HTQ)**.**

Null hypothesis (H_0): There is no relationship between teamwork self-efficacy and the teamwork skills of interpersonal, adaptability, and communication in pre-licensure BSN nursing students who participate in TBL when compared to those who do not participate in TBL as measured by the modified HTQ.

Research Question 3: Is there a relationship between pre-licensure BSN nursing students who participate in TBL experiences when compared to nursing students who do not participate in TBL experiences in terms of accountability, preference, and satisfaction?

Hypothesis 3 (H_3): There is a relationship between pre-licensure BSN nursing students who participate in TBL experiences when compared to nursing students who do not participate in TBL in terms of accountability, preference, and satisfaction as measured by the Team-Based Learning Student Assessment Instrument (TBL-SAI) and modified TBL-SAI.

Null hypothesis (H_0): There is no relationship between pre-licensure BSN nursing students who participate in TBL experiences when compared to nursing students who do not participate in TBL in terms of accountability, preference, and satisfaction as measured by the TBL-SAI and modified TBL-SAI.

Significance of the Study

The information gathered from this quasi-experimental, correlational research study has the potential to impact future nursing education, practice, research, and public policy. The

potential implications of the study outcomes for various stakeholders will help to understand the importance and need for the study.

Nursing Education

Findings from landmark work by Benner et al. (2010) indicate the need for nurse educators to change teaching practices to prepare nurses for high-level thinking and the application of clinical reasoning. Traditional healthcare education models that encourage nurses to work without collaboration, engaged in 'task-oriented' behaviors, are no longer appropriate. Nurse educators must use their knowledge of educational theory and curriculum design to advocate for changes in the educational system that foster the higher-level skills required of health professionals today. The data from research studies regarding the implementation of TBL in nursing should influence nurse educators to make decisions regarding a change in educational pedagogy (Miles, Larson & Swanson, 2017).

Nursing Practice

The addition of more objectively measured quantitative research regarding TBL as a way to increase student engagement, improve higher-level critical thinking, and improve teamwork skills would contribute to the necessary paradigm shift in nursing education. The theoretical concepts supporting this teaching method are important to healthcare professionals as the concepts emphasize the use of complex reasoning, accomplished by groups, to solve problems (Middleton-Green & Ashelford, 2013). Moreover, this would directly respond to directives from the IOM (2010) and AACN (American Association of Colleges of Nursing, 2010) to produce nurses with competencies geared toward clinical reasoning skills, which ensure quality and safe patient care (Oldland, Currey, Considine, & Allen, 2017).

Nursing Research

The information from this study contributes to the current knowledge regarding the effects of TBL on pre-licensure student nurses' academic outcomes. Additionally, research consumers will gain a better understanding of students' teamwork self-efficacy, teamwork skills and teamwork experiences in terms of accountability, preference, and satisfaction. Moreover, subsequent researchers can use this design and research methodology to replicate or improve the study in other nursing program courses and student populations.

Public Policy

The information from this study contributes to education, research, and practice changes that relate to public policy issues reported by the IOM over the last few decades. The Agency for Healthcare Research and Quality (AHRQ), the American Association of Colleges of Nursing (AACN), the IOM, and the World Health Organization (WHO) endorse teamwork initiatives that promote patient safety (Horsley et al., 2016). Education and practice changes are often made because of valid contributing research.

Philosophical Underpinnings

This research study was guided by the postpositivist worldview. The postpositivist worldview stems from the positivist paradigm, which was developed in the 19th century by the philosophers Mill, Newton, and Locke. The positivist paradigm consists of some important major assumptions (Horsley et al., 2017). One assumption is the belief that reality does exist and there is a strong desire to understand it (Polit & Beck, 2017). Additionally, the researcher must understand the integral assumption that all knowledge is faulty. Therefore, one cannot emphatically prove a conjecture, known as a hypothesis. Instead, one can only specify a failure that will reject the conjecture or hypothesis (Creswell & Creswell, 2018). Likewise, a research

question can only be answered to a reasonable degree of probability, not with certainty. Another assumption is that measured or observed data shapes a researcher's knowledge when testing a theory. The postpositivist researcher attempts to find truths to explain conditions and to establish causal relationships (Creswell & Creswell, 2018). Lastly, the postpositivist view includes the assumption that absolute objectivity is not possible although maintaining objectivity between the researcher and the participants is the ultimate goal (Polit & Beck, 2017). To maintain neutrality and credibility with data reporting, the researcher must strive to be as objective as possible by holding values in check and closely examining and reducing the chances of bias during the study design (Creswell & Creswell, 2018). Those that cannot be avoided must be included as possible study limitations to maintain insightful transparency. The postpositivist worldview fits well with the quantitative research approach as it reduces ideas into 'testable sets' or variables that are measurable.

Theoretical Framework

Vygotsky's social constructivism (1978) and the model of group development developed by Tuckman (1965) direct the research study. In the following subsections, a historical overview and the major underlying theoretical assumptions of TBL provide insight into how these two theories provide the framework for the study. Then, specific assumptions from Vygotsky's social constructivism and the model of group development by Tuckman are connected to the framework.

Historical Overview of Team-Based Learning

Michaelson developed TBL in the late 1970s as an innovative strategy to maintain successful student learning using small group collaborative activities in the face of growing class sizes (Michaelsen, Knight, & Fink, 2004). This active learning strategy utilizes small student

workgroups in the application of conceptual knowledge through a sequence of activities involving individual preparation, collaborative teamwork, and immediate feedback (Parmalee et al., 2012). The primary goals of the TBL strategy are to instill deep, long-lasting knowledge acquisition and to transform small groups into high performing, cohesive learning teams, which is particularly important in the education of health professionals (Michaelsen et al., 2004). To ensure that the TBL strategy is successful in reaching these goals, educators must have a good understanding of the major theoretical principles and the essential elements of implementation.

Major Theoretical Assumptions Underlying TBL

When properly implemented, TBL includes many of the common elements of the best evidence-based teaching practices (Michaelsen & Sweet, 2011). Those apparent in TBL include cooperative learning, feedback for learning, reciprocal teaching, whole-class interactive teaching, and concept-driven decisions (Petty, 2006). Additionally, traditional humanist, social-cognitive, constructivist, and transformational learning theories have underpinned the development of this teaching strategy (Merriam, Caffarella, & Baumgartner, 2007). Social constructivism is the framework for this teaching strategy.

Definition and Theoretical Assumptions of Social Constructivism

According to social constructivism, learning occurs when individuals construct meaning as they interact, reviewing their thoughts and experiences, facilitated either symbolically or with language (Vygotsky, 1978; Scott, 1998). Two important assumptions of all constructivist theories are that learning is active rather than passive and that learning occurs through collaboration and cooperation among individuals (Merriam et al., 2007). Individuals learn by critically exploring the perspectives of others and consequently, new understandings and possibilities are attained through these collaborative interpretations. This relates specifically to

the team testing and group application exercises that occur during class as part of the TBL process. An additional assumption of social constructivism is that individuals are independently motivated using self-direction, active inquiry, and individuality in each learning task (the antecedents) before the social construction of meaning. This relates specifically to the pre-class preparation that encourages student accountability for readiness testing, a requirement of the TBL teaching strategy. The outcome of these combined theoretical assumptions is that individuals attain higher mental functioning through social engagement (Merriam et al., 2007).

Definition and Theoretical Assumptions of Small Group Development

This research study is also guided by Tuckman (1965). In his model of small group development, he suggests that groups that come together to perform a task or project navigate through development phases known as forming, storming, norming, and performing. The task activities of the initial stage (forming) are orientation and testing. Here the group explores the depth of the assignment and the amount of cooperation required. During the second stage (storming), the task activity involves dealing with emotional responses to the demands of the task, which commonly cause conflict within groups. The third stage (norming) is when the group finds cohesion through the task activity of free expression of opinions. The group can work effectively as a team and members maintain mutually respectful relationships. Finally, stage four (performing) is characterized by the group becoming unified in finding task solutions and the discovery of functional role-relatedness. Later, Tuckman (1965) added two more stages that occur after the teamwork; these are known as adjourning and transforming. In these stages, the groups break apart and become individual performers once again. During the adjournment phase, group members participate in peer feedback to learn more about themselves and the way they interact (Michaelsen & Sweet, 2011).

Using the frameworks of Vygotsky's social constructivism and Tuckman's model for group development, TBL transforms the role of the instructor from the expert, who delivers the information, to the facilitator, who manages the comprehensive learning process. Learners become active participants in the learning process by pre-class preparation and in-class team testing followed by group application activities (Michaelsen et al., 2004). As this is an extreme change from traditional teaching-learning methods, this teaching strategy requires an understanding and inclusion of the four essential components outlined by Michaelson for successful implementation.

Definition of Terms

The definitions of the terms used in this study are described below. Firstly, the two teaching strategies are delineated. The independent and dependent variables are then identified. Finally, each outcome measure is given a theoretical and operational definition.

Team-Based Learning Class

The intervention group participated in TBL as detailed here. There are four essential elements of TBL outlined by Michaelsen (2004). When implemented properly, these elements contribute to the achievement of the goals of this strategy. These elements include the proper formulation and management of groups, student accountability regarding preparation for testing and activities, frequent and timely feedback, and assignment development that promotes learning and team development (Michaelsen & Sweet, 2011). To understand the implementation of each of these essential elements, the most important aspects are summarized as follows:

Groups. The process of team formation is critical – each team must have the appropriate intellectual resources for task completion and the members must be able to interact productively (Michaelsen, Davidson, & Major, 2014). The groups are created purposefully by the instructor

and have between five and seven members. To ensure that equity is maintained and team development can occur, the assets and liabilities of the students must be evenly distributed between the groups (Michaelsen et al., 2014). Students must stay in the same group for the duration of the course, as cohesiveness occurs through time and repetitive interaction.

Accountability. Students remain accountable to both themselves and their team by utilizing the instructor-provided content before class and coming to class prepared for assessment testing and interactive group activities. This process, known as the readiness assurance process (RAP), contains four significant steps (Michaelsen & Sweet, 2011).

1. The student must complete any assigned readings or activities independently before coming to class, to be familiar with the major concepts of the learning module.
2. Upon entering the classroom, the student immediately takes a short individual readiness assurance test (iRAT) containing basic multiple-choice questions about the preparation material.
3. Once the student has turned in the iRAT, they will repeat the same test as a group with their team members, known as the team readiness assurance test (tRAT), which provides immediate feedback, for example in a "scratch-off" form method.
4. After completion of the assessment tests, the student has an opportunity to review the assigned material and appeal any questions missed on the group test. In addition, the instructor has the opportunity to evaluate concepts missed by many students and re-address the appropriate content in a mini-lecture format as necessary.

Feedback. Feedback is provided in several ways and is continuous throughout the TBL process to resolve any confusion about the content and to augment student growth through constructive feedback. Immediate feedback is built into TBL's standard practices with use of the

IF-AT ® (Immediate Feedback-Assessment Technique) product, which shows a positive impact on group development. In addition, discussion of the application-focused assignments allows not only immediate feedback, but also the opportunity for corrective instruction, which rarely occurs with traditional instruction practices (et al Michaelsen., 2014).

The students also have an opportunity to learn about themselves and the way they interact with others through peer evaluation feedback (Michaelsen & Sweet, 2011) The concept of peer evaluation is particularly important in the health professions as healthcare workers need this skillset when working with professionals from other disciplines (Parmelee et al., 2012). Various methods to conduct peer evaluation are available that may allow quantitative and qualitative responses to highlight both positive team behaviors and areas for improvement. Students complete peer feedback on each of their team members, which addresses cooperative learning skills, self-directed learning, and interpersonal perceptions from the evaluator (see Appendix E). The educator compiles the data, makes it anonymous, and gives it to the individual student participants for individual review.

Assignment design. The final and most important element of the TBL strategy is the construction of in-class assignments that require a team effort to deepen the understanding of the module concepts to solve a problem (Michaelsen & Sweet, 2011). To instigate effective group assignments, it is vital to uphold the main components described by Michaelsen et al. (2004), known as the "4 S's": same, significant, specific, and simultaneous. Assignments should be the same for all groups, should be significant to the concept of study, and should require students to make a specific choice or decision. Finally, groups should report responses to the rest of the class simultaneously (Michaelsen & Sweet, 2011). By adhering to these guidelines, in-class group work contributes to course goal attainment and has a greater impact on student learning. In

general, to avoid the pitfalls of group work, such as needless busywork and minimal or split student efforts, activities should require the group to make a specific decision or choice.

In summary, the process of TBL incorporates instructor-created groups that maintain accountability to themselves and the team by preparing for and participating in activities to meet learning outcomes and develop good collaborative team habits.

Traditional Lecture-format Class

The comparison group participated in traditional lecture-format teaching. The traditional lecture format centers primarily on teacher-led lectures and passive student listeners who are tested periodically (Harman & Hills, 2015). The class also included periodic class activities done either independently or in groups, assigned randomly and with no particular structure.

Variables

Independent Variable. The independent variable was the TBL teaching strategy that was utilized in one section of a 14-week, Foundations of Nursing Practice course.

Dependent Variables. The dependent variables included student outcomes of academic performance, teamwork self-efficacy, teamwork skills (interpersonal, adaptability, communication), and student experiences (accountability, preference, satisfaction). Each dependent variable is defined and operationalized below.

Academic Performance

Theoretical Definition: Academic performance is the outcome measure of the level of achievement of the course goals represented by the grade point average (GPA) or course grades (York, Gibson, & Rankin, 2015).

Operational Definition: Academic performance was measured by analysis and comparison of scores of each unit exam ($N = 4$), in both the intervention and comparison groups of the 14-week Foundations of Nursing Practice course in the spring of 2020.

Teamwork Self-Efficacy

Theoretical Definition: Teamwork self-efficacy is an individual's confidence to be able to accomplish the task of working in a team (O'Neil & Herl, 1998).

Operational Definition: Teamwork self-efficacy was measured using a subscale of the modified HTQ consisting of a seven-item scale modified from Marshall's original tool developed in 2001 (Marshall, 2003). The five-point Likert-type responses ranging from 1 (strongly disagree) to 5 (strongly agree) indicate a student's confidence level with their ability to work in a team to complete a task. The higher the score, the more confidence the students have.

Teamwork Skills

Theoretical Definition: Teamwork skills are individual traits of the team members, including interpersonal, adaptability, and communication skills. Interpersonal skills are the ability to interact cooperatively with other team members (Kuehl, 2001; O'Neil, Chung, & Brown, 1997). Adaptability skills are the ability to recognize problems, responding appropriately (Kuehl, 2001; O'Neil et al., 1997). Communication skills are the overall ability to exchange clear and accurate information (Kuehl, 2001; O'Neil et al., 1997).

Operational Definition: Team skills were measured using three separate subscales (also from the modified HTQ developed by Marshall, 2003), consisting of the interpersonal, adaptability, and communication subscales – these are traits important to working in teams. The interpersonal-skills scale includes 11 items with a five-point Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree). Higher scores indicate an increase in cooperative

interactions with other team members. The adaptability-skills scale consists of an eight-item, five-point Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree). Higher scores indicate more active problem recognition and appropriate responses. Communication-skill scale consists of an eight-item, five-point Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree). Higher scores indicate increased levels of clear and accurate exchange of information.

TBL Experience

Theoretical Definition: The TBL experience includes the major concepts of accountability, preference, and student satisfaction (Mennenga, 2012). Accountability is defined as students' preparation and contribution to the team (Mennenga, 2012). Preference is defined as the students' ability to maintain focus, recall material and maintain attention in traditional lecture format or TBL (Mennenga, 2012). Student satisfaction is defined as positive feelings toward either traditional lecture-format teaching or TBL (Mennenga, 2012).

Operational Definition: Students' experiences with TBL were measured using the TBL-SAI developed and validated by Mennenga (2012). The TBL-SAI consists of 33 items that use a five-point Likert response scale ranging from 1 (strongly disagree) to 5 (strongly agree), which are divided into three separate subscales. The accountability subscale consists of eight items that assess student preparation for class and contribution to the team. A higher score indicates a higher level of accountability. The preference subscale consists of 16 items that assess student ability to recall material and student attention level in lectures and TBL. Higher scores in this subscale indicate an increased preference for TBL when compared to traditional lecture-style learning. The satisfaction subscale consists of nine items that assess student satisfaction with TBL. A score of 30 or higher indicates student satisfaction with TBL.

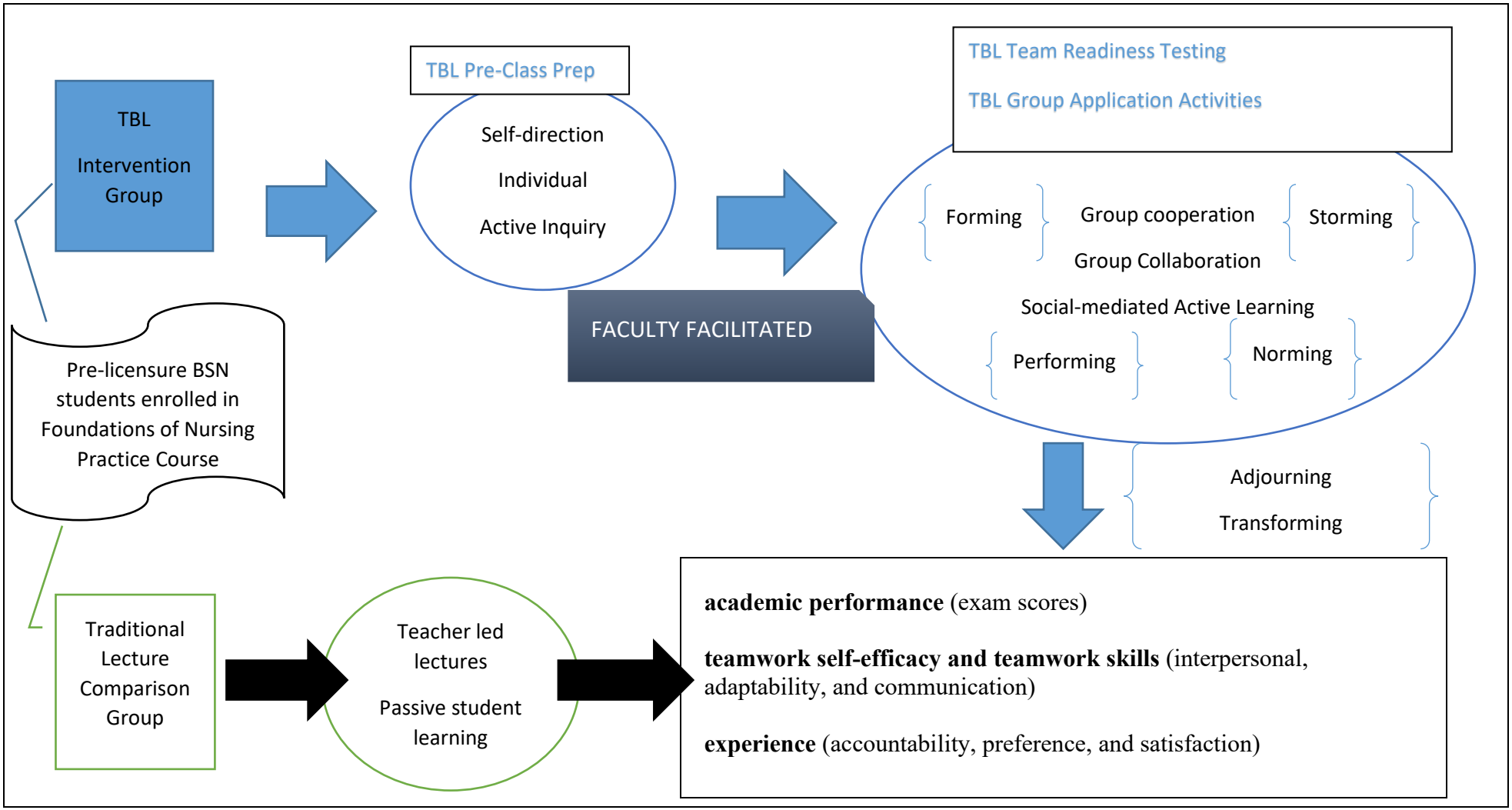
Conceptual Model

Patient care is becoming increasingly complex, requiring healthcare workers to use high-level thinking within a team of professionals to solve patient problems. Traditional lecture-format learning is currently outdated as it is passive, which produces lower-level thinkers conditioned to work individually. Nurse educators are challenged with finding innovative teaching strategies more conducive to producing the skills needed by nurses today. Until now, there has been minimal research into the efficacy of TBL as a method for improving academic performance and teamwork skills when compared to traditional lecture-format teaching. Using Vygotsky's social constructivism and Tuckman's model of group development, the study compares the academic performance; teamwork self-efficacy; and interpersonal, adaptability, and communication teamwork skills of pre-licensure BSN students who participated in TBL with those of students who participated in traditional lecture-format learning. Additionally, the study describes the perceived experiences in terms of accountability, preference, and satisfaction of students regarding the implementation of TBL as well as those students who had traditional lecture-format teaching.

Vygotsky's social constructivism includes the concepts of self-direction and individual active inquiry, which is an integral part of the pre-class preparation required for TBL. Social constructivism also stipulates that group collaboration and cooperation leads to socially mediated active learning, which is the predominant classroom learning methodology during team readiness testing and the group application exercises in TBL. Nursing student teams, working together throughout the semester, undergo phases of small group development (forming, storming, norming, performing, adjourning, and transforming) identified by Tuckman (1965), as they construct new meaning regarding the course content. The primary investigator evaluates the

students' understanding regarding the content of study (measured by academic performance), teamwork self-efficacy, teamwork skills, and TBL experiences between students who participate in the TBL teaching strategy compared to students who experience traditional lecture-format teaching. Figure 1 represents the conceptual model.

Figure 1: Conceptual model, adapted from Vygotsky's social constructivism and Tuckman's model of group development



Chapter Summary

Team-based learning is increasing in popularity as a possible way to increase nurses' critical thinking, teamwork self-efficacy, and teamwork skills to meet patient care needs. Although many benefits of TBL have been identified in the literature, currently there is insufficient research that demonstrates improved academic performance on exams and increased proficiency with teamwork confidence and teamwork skills in pre-licensure BSN nursing students. The purpose of this research study is to compare the use of TBL to traditional lecture-format learning in a Foundations of Nursing Practice course taught to pre-licensure BSN nursing students. Two theories provided the framework for this study. The works of Vygotsky and social constructivism contribute significantly to the educational learning theory behind TBL. Additionally, TBL incorporates the teamwork process model established by Tuckman. The quasi-experimental, correlational study compares pre-licensure BSN nursing students who participated in a TBL course with those who participated in a traditional lecture-format course in the first semester of nursing. The findings from this study contribute to the current knowledge regarding the effects of TBL on pre-licensure student nurses' academic outcomes (exam performance); teamwork self-efficacy; teamwork skills (interpersonal, adaptability, communication); and experiences in terms of accountability, preferences, and satisfaction.

Chapter Two

Literature Review

This chapter presents a review of the current literature relevant to TBL. The search strategies are outlined and an in-depth analysis indicates what is currently known and unknown about TBL. Evaluations of primary study outcomes include the themes of testing performance, student engagement or attendance, student satisfaction, attitudes or experiences concerning teamwork, critical thinking or self-directed learning, and teamwork self-efficacy or teamwork skills. Finally, the summary justifies the significance of the study as a valuable contribution to the literature.

Literature Search Strategy

A search in multiple databases, including ProQuest, CINAHL, ERIC, and Google Scholar, was conducted using the following search terms in various combinations: TBL, active learning, collaborative learning, teamwork, nursing education, teaching strategies, and teaching methods. Peer-reviewed articles from 2007 through 2019 that focused on the basic aspects of TBL as described above were reviewed. Additional articles were discovered using the reference lists of identified publications and the research bibliography page, located in the Team-Based Learning Collaborative organization webpage. The articles excluded from the review either did not utilize the specific required TBL elements or modified them in some way. Since its inception over 40 years ago, the volume of available literature recounting TBL innovations, implementation, and its effectiveness as a viable teaching strategy has grown tremendously (Haidet et al., 2014).

Review and Analysis of the Literature

When implementing innovative teaching strategies, it is important to evaluate whether the desired outcomes are both effective and valid through empirical evidence. Michaelson developed

TBL in the late 1970s by as an innovative strategy to maintain successful student learning using small group collaborative activities in the face of growing class sizes in the academic area of psychology (Michaelsen et al., 2004). This strategy quickly became popular in the training of healthcare professionals due to resource efficiency and the promise of increased active student participation (Haidet et al., 2014). The literature regarding TBL in nursing education has grown over the last few decades, revealing various effectiveness measures of TBL. The most prominent measures are student knowledge acquisition (test performance), student engagement or attendance, student experiences with teamwork (satisfaction and attitudes), critical thinking, and self-directed learning. Only one study has measured teamwork self-efficacy and a small number of studies have addressed isolated components of teamwork skills (interpersonal, adaptability, and communication skills), which are included in this study.

Test Performance Outcome Evaluation

A widely addressed outcome evaluation that represents student learning is test performance. While many studies have reported positive outcomes of student exams post-TBL intervention (Bleske et al., 2016; Branson, Boss, & Fowler, 2016; Harman & Hills, 2015; Della Ratta, 2015; Du & Yang, 2017; Everly, 2013; Khodaveisi et al., 2016; Miles et al., 2017), not all measurements have been of rigorous comparisons, and some have found few to no differences at all (Cheng et al., 2014; Huitt et al., 2015; Mennenga, 2013). For example, Mennenga (2013) conducted a quasi-experimental study comparing TBL and traditional lectures with regards to student engagement and performance on examinations. The sample (N = 143) comprised 74 nursing students (51.7%) in the control group and 69 nursing students (48.3%) in the experimental group, with ages ranging from 20 to 22 years (91.7%). The scores from four unit exams were compared between students taking a community health nursing course using

traditional lecture teaching in fall and TBL in spring. Findings showed no significant difference in the exam scores between participants ($p = .923$). Likewise, in a mixed-methods study by Branney and Priego-Hernández (2018), exam scores were comparable between two cohorts on both traditional lecture content and TBL content questions. While the sample size of this correlational study was substantial ($N = 197$) in this undergraduate nursing applied pathophysiology course, TBL was implemented in only one content module during the semester, and the exam included only one question about the TBL content. Della Ratta (2015) conducted a quantitative study in two sequential fundamental nursing courses at a public university. The study consisted of 80 participants and found an increase in participants' exit exam scores when compared with previous cohorts. However, as the researcher does not provide actual exam data results, statistical significance cannot be determined. The study also lacks any discussion comparing the academic standings of the cohorts before the start of these courses to establish homogeneity.

In a quasi-experimental, quantitative study by Cheng et al. (2014), participants from four designated nursing courses ($N = 387$) showed improved academic performance after the implementation of TBL. Group readiness assurance test (GRAT) mean scores ($M = 88.64$, $SD = 5.52$) were significantly higher than the mean of the iRAT scores ($M = 64.32$, $SD = 12.71$, $t = -41.67$, $p < .001$). Additionally, the average final examination score ($M = 79.04$, $SD = 16.60$) was significantly higher than the iRAT scores ($t = -16.10$, $p < .001$). Similar findings were evident in a descriptive correlational study conducted by Miles et al. (2017), involving implementation of TBL in a community health nursing course. Using a Pearson product correlation coefficient, data collected from 221 participants showed that a significant correlation existed between iRAT scores and the final exam scores ($r = .55$, $p < .001$) and an insignificant positive correlation

existed between team readiness assurance (tRAT) scores and the final exam scores ($r = .13$, $p < .052$). While both of these studies demonstrate TBL's effectiveness in improving academic performance during these courses, since the scores were not compared to a control group, one cannot presume superiority of TBL over traditional lecture-format learning.

In two similar non-simultaneous, quantitative, descriptive studies using medical students, findings demonstrated improved assessment scores among those using TBL compared with those using traditional lecture-format teaching (Du & Yang, 2017; Huitt et al., 2015). Du and Yang (2017), conducted a pilot study using TBL in a medical pathology class (participant group, $N = 160$) and compared final exam scores to a previous semester's medical pathology class that used traditional lecture-format learning (nonparticipant group, $N = 120$). Results showed that the average final test scores for the TBL participants (70.42 ± 0.91) was higher than the average final test scores of non-participants (63.36 ± 1.23). However, the overall significance of the difference was not specified, a weakness preventing accurate interpretation. The strengths of this study were the quasi-experimental design and the inclusion of comparison data in the learning abilities of the two groups at the onset of the study. Anatomy score differences ($p = 0.685$, Cohen's $d = 0.228$) and GPA score differences ($p = 0.268$, Cohen's $d = 0.368$) between the two groups suggest no significant dissimilarities in the learning ability of the two groups. In a similar quasi-experimental quantitative study conducted by Huitt et al. (2015), medical students in an anatomy class showed an overall upward shift in course grades with the implementation of TBL. Participants in the study included a control group ($N = 124$) who received a traditional lecture-format curriculum in the fall of 2010 and 2011 and an experimental group ($N = 88$) who received TBL in the fall of 2012. While the findings showed no significant differences in the mean scores of course grades, written examinations, laboratory practical exams, and final examinations, there

was a positive shift in students' overall course grades for the experimental group with the number of A grades increasing to 5.24% and the number of C grades decreasing to 3.19%. This finding requires cautious interpretation. Additionally, when evaluated separately, there was significant improvement in the scores for unit module exams that were taught with the TBL method (both unit one and four showed $p < 0.001$). This is a significant indication showing variances between TBL subject teaching and lecture teaching within the same group of students.

Five studies found an increase in the scores for post-intervention exams of TBL groups versus lecture-format groups when simultaneous descriptive comparisons were analyzed (Bleske et al., 2016; Branson et al., 2016; Harman & Hills, 2015; Faezi, Moradi, Amin, Akhlaghi, & Keshmiri, 2018; Khodaveisi et al., 2016). Bleske et al. (2016) conducted a quantitative crossover study with 30 pharmacy students enrolled in an elective winter-term course. Test scores (percentage correct) were compared between groups receiving TBL and traditional lecture-format pedagogies. Higher scores were seen in each assessment for those in the TBL group, especially in combination-application and recall questions. However, the study was limited by its small participant size of 30, reducing the power to less than 50%. Moreover, only 48 questions were analyzed from two exams. Furthermore, the reported *p*-values from application questions (0.14), recall questions (0.15) and application and recall questions combined (0.03) demonstrated no statistical significance. The strengths of this study were the use of a crossover experimental design and the comparison of unit test scores as a valid and reliable measure.

Branson et al. (2016), conducted a quantitative, quasi-experimental, post-test design study comparing HESI ® Management scores of those enrolled in a course using TBL (102 participants) and those enrolled in a course using traditional lecture-format learning (119 participants). This sample size indicated a statistical power of > 80% which is a strength of this

study. Furthermore, there was a detailed explanation of the required formal faculty training and course refinements made within the TBL course, utilizing information from previously piloted use of this pedagogy. The results revealed a significant difference between the scores ($t = 12.64$; $p < 0.1$) of those in the traditional lecture-format class (760) and those in the TBL class (812). One limitation of this study was that although characteristics of the control and experimental group participants were provided with regards to age, gender, and ethnicity, no information was provided regarding prior academic standings between the groups.

Khodaveisi et al. (2016) piloted a quasi-experimental study including 58 nursing students in the fourth term of a program focused on learning caretaking of patients with diabetes. The post-test questionnaire included 15 questions on diabetes knowledge and five questions on caretaking performance of patients with diabetes. The data collection tool had a reliability rating confirmed by Cronbach's alpha ($r = 0.83$) by the researcher. The results revealed a significant difference (p value < 0.001) between the mean of knowledge scores after intervention between lecture-based learning (6.40) and TBL (10.45). Additionally, there was a significant difference (p value < 0.001) between the mean total knowledge and performance after intervention between lecture-based learning (10.35) and TBL (14.61). The major strengths of the study include the pre-test/post-test design that provided pre-study comparison data indicating that the two groups had the same level of diabetes care learning before the study, even though they were from two different school campus locations. The independent sample t-test for the two groups showed a mean pre-test score difference of 0.242, which was statistically insignificant ($p = 0.784$). The sample sizes were small and unequal, with a control group of 20 participants compared to the intervention group of 38 participants. Additionally, the study focused on one subject area only.

The small sample size and limited subject quantity decreases the strength of the implications and generalizability to other student populations.

Harman and Hills (2015) also compared pre- and post-TBL intervention exam scores from 347 participants over eight consecutive semesters in a mixed-method study in a psychiatric mental health (PMH) nursing course. The mean scores on the Evolve ®PMH practice exit exam increased from 843.6 in the control group (N = 174) to 939.8 in the intervention group (N =173). The large sample size is a strength of the study. Limitations include the lack of information regarding the validity and reliability of the Evolve® PMH practice exit exam to reflect classroom learning accurately. Additionally, no information is provided regarding the demographics of the groups and their pre-study academic standings.

Finally, only one study in the literature reports the measurement of the application of knowledge over time. Faezi et al. (2018), conducted a quantitative quasi-experimental study with medical students (N = 84) in a rheumatology course. The study compared TBL to conventional lecture-based learning sessions. Analysis of t-test and repeated measures analysis of variance (RM-ANOVA) scores obtained from short answer questions asked three times during the semester showed that over time, the students' scores had declined significantly less when compared to those receiving traditional lecture-based session, F (2, 166) = 4.624, p = 0.011. The effect size of the study based upon partial eta squared (0.01 small, 0.06 moderate, and 0.14 moderate), was moderate. One limitation of the study was the short time and limited number of TBL sessions (N = 3) implemented and analyzed. Additionally, the use of one group of students to compare learning outcomes using different teaching strategies with dissimilar subjects brings the limitations of possible pre-subject student knowledge variances, which were not evaluated

with pre-testing. However, the strength of one-group testing diminishes the need to consider pre-course academic standing diversity between two groups.

Student Engagement or Attendance Outcome Evaluation

Student engagement in the classroom using the TBL method is an expected outcome under the required participative principles and elements of this strategy. Of the studies reviewed, five corroborate this expectation in their published study results. Four of the five studies were comparative descriptive studies that utilized the previously validated Classroom Engagement Survey. These four studies demonstrated significant increased classroom engagement with TBL compared to the traditional lecture format (Clark, Nguyen, Bray, & Levine, 2008; Cheng et al., 2014; Mennenga, 2013; Faezi et al., 2018). However, further analysis of the research design and methodology showed weaknesses in the strength of the outcomes. Both Mennenga (2013) and Clark et al. (2008) discuss the instructors' lack of knowledge regarding the nuances of the TBL teaching strategy with regards to the creation of readiness assessment testing and the development of the application exercises. These instructional design aspects are fundamental to TBL pedagogy and a lack of proficiency in these skills could significantly influence students' perceptions of this teaching and learning method. Furthermore, the lack of a control group comparison (Cheng et al., 2014) and insufficient TBL session number ($N = 3$) with short implementation duration (Faezi et al., 2018) limit the strength of the study results.

Student Satisfaction Outcome Evaluation

Although student satisfaction can contribute to the overall perception of the learning experience for a student, it does not validate a switch to the TBL strategy unless student learning outcomes (increased academic performance and effective collaboration) show a positive

correlation as well (Branson, Boss & Fowler, 2016; Harman & Hills, 2015; Dearnley, Rhodes, Williams, & Prenton, 2018).

In a quantitative descriptive study including Korean nursing student participants (N=139), Roh, Lee, and Choi (2015) surveyed learner perceptions, expected competence, and factors influencing satisfaction with TBL in a nursing course. The instruments used to collect this data were the TBL Course Operation and Evaluation Tool and questionnaires addressing overall satisfaction with TBL. Cronbach's alpha for the Operation and Evaluation Tool for this study was .93. Two experts verified the content validity of the tool. Additionally, the researcher included two items using a seven-point Likert-type scale to assess the overall student satisfaction with TBL. Findings from this study showed that generally students were not strongly satisfied with TBL (33% of nursing students were satisfied with TBL compared with the didactic method and 32% were satisfied with the TBL learning process). The combination of first-time exposure for the students, the radical change from a traditional lecture teaching style, and the limited number of TBL sessions (two two-hour sessions) could have contributed to the results. Findings from other studies indicate that faculty buy-in, resources, and the implementation of the process influence students' satisfaction with TBL. (Michaelsen, 2004; Petty & Means, 2008; Roh et al., 2015).

Du and Yang (2017) conducted a correlational study to measure the effect of TBL on course satisfaction and mastery of pathology content in a group of medical students ($N = 160$). The researchers reported the final exam scores of the TBL participants ($M = 70.42$) were significantly higher than the non-participants ($M = 63.36$), but no statistical analysis data was provided to support this conclusion. Additionally, the researchers reported that students' enthusiasm for studying pathology was indicated by both increased attendance and favorable

participant survey questionnaires. In particular, the survey question reflective of student satisfaction (I enjoyed this learning experience) showed favorable responses (strongly agree or agree) by 124 of the participants (77.55%). While these results do indicate enjoyment of the TBL learning experience, increased attendance cannot be completely attributed to satisfaction with the teaching strategy – the TBL format assures an increase in student attendance due to the requirement of graded assessment tests (iRAT and tRAT) for all TBL sessions. Furthermore, a limitation to the significance of the reported satisfaction data in this study is the lack of satisfaction data collected from the control group; thus, no comparative correlation can be concluded. Further discussion concerning student experiences is evident in data published regarding attitudes toward teamwork.

Attitudes and Experiences Concerning Teamwork

As one of the goals of TBL is the development of student teamworking skills, an appropriate outcome measure of experiences with teamwork has been addressed in several of the studies reviewed. Nine of the ten studies report a significant measurable improvement in students' perceptions of working in groups after the implementation of TBL in a course (Branney & Priego-Hernandez, 2018; Corbridge, Corbridge, Tiffen, & Carlucci, 2013; Currey, Oldland, Considine, Glanville, & Story, 2105; Faezi et al., 2018; Mennenga, 2015). Clark et al. (2008) conducted a correlational study to evaluate whether TBL improved student engagement and attitudes about the value of using groups for learning. The sample ($N = 51$) consisted of nursing students enrolled in a case management course. The nine-item Likert-type Value of Teams survey showed a high reliability for both pre-test and post-test (Cronbach's alpha 0.92 and 0.87 respectively). Findings indicated that while students rated their attitudes about the value of teams

relatively highly, this did not change significantly between the pre-test and the post-test scores (mean difference = 1.16; *t*-test 1.23, *p* = NS).

In several quantitative, post-intervention, descriptive studies, students reported favorable experiences with TBL through a valid and reliable tool developed by Mennenga (Branney & Priego-Hernández, 2018; Corbridge et al., 2013; Faezi et al., 2018; Mennenga, 2015). The TBL-SAI measures total TBL experience and three subscales (accountability, student preference, and student satisfaction). Reliability is substantiated with reported Cronbach's alpha of .941 for the total scale and .782, .893, and .942 respectively for the three subscales (Corbridge et al., 2013). While these studies all found favorable results in total experiences and the three subscales, there were limitations to each study, negating the strength of the findings and generalizability of the information to other student populations. The limitations included small sample sizes (Mennenga, 2013, 2015), small TBL session numbers (Branney & Priego-Hernandez, 2018; Faezi et al., 2018), and inconsistences or biases with implementation (Corbridge et al., 2013; Mennenga, 2013, 2015).

Currey et al. (2015) conducted a mixed-methods study with a pre- and post-intervention design to evaluate students' attitudes towards and engagement with TBL. The sample ($N = 28$) consisted of postgraduate critical care nursing students. Findings showed significant changes in students' attitudes to teamwork using the Team Experience Questionnaire (TEQ). Repeated measures *t*-tests analyzed the five survey categories of the TEQ with increases in overall satisfaction with team experience ($t = 3.799$, $p = 0.001$), team impact on quality of learning ($t = 4.368$, $p < .001$), team impact on clinical reasoning ability ($t = 3.555$, $p = .001$), and professional development ($t = 3.314$, $p = .003$). The domain of satisfaction with peer evaluation did increase; however, the results were not statistically significant. Although the TEQ is very specific to

measuring attitudes toward teamwork, and most of the findings were positive in this regard, the small sample size of 28 participants limits the generalization to other student settings. Furthermore, the validity and reliability measures of the TEQ are not disclosed in this study, although the researcher indicates that Parmelee et al. previously established the validity in a study done with medical students. (Currey et. al., 2015).

Bleske et al. (2016) conducted a quantitative crossover study with 30 pharmacy students enrolled in an elective winter-term course. In addition to evaluating exam scores, the researchers surveyed the students to assess confidence and learning preferences. The researcher-created survey included one question specific to preparation to work on teams. The TBL participants scored higher ($M = 4.43$) in this area than those in the lecture group ($M = 3.00$, $p < 0.01$). However, the validity and reliability of this tool has not been established, so the stability and consistency cannot be confirmed. Huitt et al. (2015) conducted a quasi-experimental quantitative study to evaluate academic performance and to determine students' attitudes toward team collaboration. The control sample ($n = 124$) and experimental sample ($n = 88$) consisted of students enrolled in a gross anatomy class in 2011 and 2012. Both groups demonstrated positive attitudes toward working with teams. However, the experimental groups' scores improved significantly after the TBL intervention (Q1 $P = 0.004$, Q2 $P = 0.004$, Q3 $P = 0.018$, $P < 0.001$, Q4 $P < 0.001$). The use of validated teamwork survey instruments would lend more credibility to the findings in both of these studies; however, validated tools that measure teamwork self-efficacy and teamwork skills are currently lacking.

An explorative qualitative study conducted by Oldland et al. (2017) revealed three common themes regarding students' impressions of the effect of TBL on their actual clinical performance. The sample ($N = 159$) consisted of master's-level critical care nursing students in

Australia. The analysis of reflections came from a question prompt submitted by students electronically at the end of course, which constituted 2.5% of the course grade. The question prompt was "What (if anything) have you learned about yourself as a learner, team member and clinical nurse as a result of participating in Team-Based Learning?" (Oldland et al., 2017, p. 64). Many of the students reported the development of deep learning, increased confidence, and improved professional and clinical behaviors (Oldland et al., 2015). This research, although self-reported by students, is one of the only studies that has explored perceived clinical performance outcomes, which is one of the ultimate goals of the TBL. One limitation in this study was the lack of anonymous reporting and the requirement of the reflection response as part of the course grade. There is a high possibility that participant reflection responses were influenced by the students' desire to please their instructors and influence their grades. Additional studies of this kind, using true experimental comparative groups (TBL vs traditional lecture teaching) and without the possibility of bias are needed to add to knowledge about this topic.

Lastly, Cho and Kweon (2017) conducted a quantitative, quasi-experimental study to examine the effects of a TBL program on the enhancement of communication competence in nursing students. The sample (experimental $n = 35$ and control $n = 33$) consisted of non-equivalent sophomore nursing students from two similar universities in South Korea. The instruments used were the self-efficacy scale (Cronbach's α 0.92), the Global Interpersonal Communication Scale (GICC; Cronbach's α .80), and the Learning Satisfaction Scale (Cronbach's α .91). The results revealed positive changes in the TBL group when compared to those in the traditional lecture-format group in areas of communication efficacy ($t = 2.58$, $p = 0.12$), communication ability ($t = 12.01$, $p < .001$) and learning satisfaction ($t = 2.11$, $p = 0.39$). While these results are encouraging, it is important to consider the small sample size, non-

equivalent group comparison, and student self-reports as limitations to the generalizability of the results to other student populations.

Although Bleske et al. (2016), Corbridge et al. (2013), Currey et al. (2015), Huitt et al. (2015), and Oldland et al. (2015), relate encouraging attitudes of students regarding teamwork after the implementation of TBL strategy, the overall data strength remains weak. Several of the studies contained small sample sizes (Bleske et al., 2016; Currey et al., 2015), while others provided information from tools with limited questions (Bleske et al., 2016; Currey et al., 2015; Huitt et al., 2015). Further research comprising larger sample sizes, conducted with randomized controlled trials, and utilizing validated tools with an adequate number of queries is needed to support the widespread implementation of TBL as a learning strategy to improve students' attitudes about teamwork.

Critical Thinking and Self-Directed Learning Outcome Evaluation

More recently, due to the push for a change in nursing education to address the need for higher-level critical thinkers, several studies have compared critical thinking, self-directed learning, and academic self-efficacy between students using TBL and traditional lecture teaching (Kim & Hong, 2016; Kim & Kang, 2017). Kim and Kang (2017) conducted a quantitative, quasi-experimental study with a pre-test/post-test design to examine the effects of TBL on satisfaction, critical thinking, communication skills, problem-solving, and self-directed learning. The sample (experimental $n = 31$, control $n = 31$) consisted of fourth-year nursing students enrolled in an adult health nursing course. The study provides the reliability of the five instruments utilized: satisfaction tool (Cronbach's $\alpha = 0.94$), critical thinking tool (Cronbach's $\alpha = 0.89$), problem-solving tool (Cronbach's $\alpha = .94$), communication tool (Cronbach's $\alpha = 0.88$), and self-directed learning (Cronbach's $\alpha = 0.95$). The findings showed an increase in satisfaction ($t = 4.798$, $p =$

.000), critical thinking ($t = 5.85$, $p = .000$), problem-solving ability ($t = 5.858$, $p = .000$), communication skill ability ($t = 3.53$, $p = .000$), and self-directed thinking ($t = 7.157$, $p = .000$) in students who participated in TBL compared to those who participated in traditional lecture-based learning. This study provides evidence of both homogeneity of comparison groups as well as adequate sample size. Additionally, TBL was implemented during all sessions of an eight-week course, which provided adequate exposure of the teaching strategy to the experimental group. Kim and Hong (2016) conducted a similar quantitative, quasi-experimental study to examine students' critical thinking, self-directed learning, and academic self-efficacy. The sample (experimental $n = 89$, control $n = 83$), comprised nursing students enrolled in a basic nursing class in two different cities. The reliability measures of the four instruments were given as follows: critical thinking disposition (Cronbach's $\alpha = .85$, this study .86), self-directedness to learning (Cronbach's $\alpha = .73$, in this study .90), academic self-efficacy (Cronbach's $\alpha = .87$, this study .80) and learning satisfaction (Cronbach's $\alpha = .75$, this study .93). The findings indicated that the students who received the TBL program significantly improved their critical thinking ($F = 3.765$, $p = .000$), self-directed learning ($F = .637$, $p = .030$), self-efficacy ($F = .010$, $p = .003$), and satisfaction ($F = 5.072$, $p = .035$). The sample size of this study falls just short of the minimum number identified for each group ($n = 88$) to fulfill the significance level of .05, the effect size of .5 and the power of .95. The information gleaned from these two studies helps to strengthen the use of TBL as a teaching method to increase student self-direction, critical thinking, and problem-solving skills.

Teamwork Self-Efficacy and Teamwork Skills Outcome Evaluation

Two studies closely address the variables chosen for the proposed study. Cho and Kweon (2017) conducted a quantitative, quasi-experimental study to examine the effects of a TBL

program on the enhancement of communication competence (one component of teamwork skills) in nursing students. The sample (experimental $n = 35$ and control $n = 33$) consisted of non-equivalent sophomore nursing students from two similar universities in South Korea. The instruments used were the self-efficacy scale (Cronbach's α 0.92), the GICC (Cronbach's α .80), and the learning satisfaction scale (Cronbach's α .91). Results showed positive changes in the TBL group when compared to those in the traditional lecture-format group in areas of communication efficacy ($t = 2.58$, $p = 0.12$), communication ability ($t = 12.01$, $p < .001$), and learning satisfaction ($t = 2.11$, $p = 0.0.39$). While these results are encouraging, it is important to consider the small sample size, non-equivalent group comparison, and student self-reports as limitations to the generalizability of the results to other student populations. While the results revealed positive changes in the experimental group with the implementation of TBL, the sample size was lacking the numbers needed to establish strength and generalizability.

Park, Kim, Park, and Park (2015) conducted a quantitative prospective study with a pre-test/post-test design to examine the effectiveness of TBL on students' perceived teamwork (self-efficacy and teamwork skills) and academic performance. The convenience sample ($N = 74$) consisted of second-year nursing students enrolled in a health assessment course. Students' perceived teamwork was measured using a teamwork efficacy instrument consisting of eight items with an established reliability (Cronbach's α = .92, this study .93). Students' perceived team skills were measured using a team adaptability skills scale (Cronbach's α = .91, this study .81) and a team interpersonal skills scale (Cronbach's α = .94, this study .88). Findings of this study demonstrated increased teamwork self-efficacy and adaptability and interpersonal teamwork skills ($p < .001$). Additionally, teamwork self-efficacy was significantly associated with team adaptability skills ($r = .38$, $p < .001$) and team interpersonal skills ($r = .62$, $p < .001$).

Team adaptability skills were significantly associated with team interpersonal skills ($r = .50$, $p < .001$). The limitations to this study include convenience sampling comprised of one group (experimental only) and located in one geographical area, limiting its generalizability. This study could be replicated using a quasi-experimental design to strengthen the research evidence supporting TBL and teamwork self-efficacy and teamwork skills. Therefore, the subject of study for this thesis is modeled on Park, Kim, Park, and Park's study and will fill help to fill a gap in the current literature.

Chapter Summary and Justification of the Study

Recent literature regarding TBL reveals both gaps and areas of conceptual redundancy (Park et al., 2015). Academic performance, measured by exam scores, shows inconsistent results with several studies showing no differences between the TBL groups and those receiving traditional lecture-based teaching (Cheng et al., 2014; Huitt et al., 2014; Brooks, 2015; Mennenga, 2013). Other studies in the literature show improved test performance outcomes (Bleske et al., 2016; Harman & Hills, 2015; Della Ratta, 2015; Du & Yang, 2017; Khodaveisi et al., 2016; Miles et al., 2017), although results may lack validity due to insufficient rigor. This leaves room for further research using high-quality evidence with more rigorous methodology and adequate sample sizes. However, a positive correlation may be supported with improved testing when there is formalized teacher training regarding the TBL teaching strategy (Branson et al., 2016). The overall trend of improved test results is promising, although additional studies are needed to demonstrate the testing of higher-level thinking through the use of application or higher questions according to Bloom's taxonomy (Morton & Colbert-Getz, 2016). Improved student engagement with TBL is evident in all studies that have measured this outcome, and research evidence is of moderate quality (Clark et al., 2008; Cheng et al., 2014; Mennenga, 2013;

Faezi et al., 2018). There was evidence that students perceived improved teamwork skills with the implementation of TBL, with use of pre-test/post-test and post-test-only studies. However, this is low-quality evidence due to the limited number of studies measuring this variable ($N = 2$) and the lack studies with contemporaneous group comparisons (Cho & Kweon 2016; Park et al., 2015). A more robust way to demonstrate the effectiveness of TBL on teamwork skills, such as communication and management, would be to measure the actual clinical practice of these skills with observation. As this method is not feasible, this dissertation research utilizes a quasi-experimental design to compare academic performance (unit exam scores), teamwork self-efficacy, and teamwork skills between students who participate in traditional lecture-format teaching and the TBL teaching strategy. The quasi-experimental design was chosen to allow the correlation of variables between the control group and the intervention group concomitantly – one of the primary gaps in the literature is the lack of rigorous experimental studies related to TBL (Cho & Kweon 2016; Park et al., 2015). Additionally, student experiences with either traditional lecture-format learning or TBL in terms of accountability, preference, and satisfaction are described to add evidence to the current literature.

Chapter Three

Methods

This chapter describes the methodology used in the study. The purpose of the study was to compare the academic performance (unit exam scores), teamwork self-efficacy, and teamwork skills (interpersonal, adaptability, and communication skills) of pre-licensure BSN nursing students who participated in TBL with those of pre-licensure BSN nursing students who participated in traditional lecture-format teaching. Additionally, the students' experiences, in terms of accountability, preference, and satisfaction are described for both those who participated in TBL and those who did not participate in TBL. The quantitative methodology was chosen for the study and the reasons for this research approach are outlined in this chapter. Additionally, the research design, assumptions, setting, data collection procedures, protection of human subjects, instrumentation, and statistical strategy are discussed.

Research Design

The study utilized a quasi-experimental correlational design to compare academic performance, teamwork self-efficacy, teamwork skills, and experiences between students who participated in traditional lecture-format teaching and those who participated in the TBL teaching strategy. The quasi-experimental design was chosen to allow the correlation of variables between the comparison group and the intervention group concomitantly – one of the primary gaps in the literature is the lack of more rigorous experimental studies related to TBL (Cho & Kweon 2016; Park et al., 2015). A true experimental design could not be implemented, as students were not randomly assigned to the two groups. Therefore, the primary investigator employed a correlational approach comparing two nonrandomized convenience samples of participants (Creswell & Creswell, 2018). The research approach and design chosen aligns with the basic postpositivist worldview of cause and effect (Creswell & Creswell, 2018). Using the traditional

scientific method of observations and measurements, postpositivists make testable inferences in search of the truth (Petersen & Gencel, 2013). Using the traditional scientific method, quantifiable data collected from nursing student participants can be analyzed to support or reject hypothesized relationships among these variables.

Research Assumptions

Scientific investigation is based on assumptions that are universal, research or theory based, or common-sense principles that are believed to be true but that are not necessarily proven (Nieswiadomy & Baily, 2018). For the study the investigator made the following assumptions:

- The student participants could understand the nature of the survey questions.
- All student participants had opinions about teamwork self-efficacy and teamwork skills at the beginning and end of the semester.
- Student participants in the intervention group had opinions about their experience with the TBL teaching strategy.
- Student participants in the comparison group had opinions about their experience with traditional lecture-format teaching.
- The student participants were truthful with self-report responses to the survey questions.
- The student participants' academic performance (test scores), reflected their actual ability with the consideration of minimal error related to the test, the examiner, the examinee, or the environment.
- The student participants' behavior remained stable over time, specifically during the implementation phase of the study.

- The nursing faculty members for the Foundations of Nursing Practice courses strictly adhered to their assigned teaching strategy (traditional lecture-format or TBL) throughout the implementation phase of the study.
- The nursing faculty members for the Foundations of Nursing Practice courses did not reveal their teaching strategy preference to the students, either overtly or covertly.
- The research instruments measured what they state they measure, resulting in valid research results.

Setting

The setting involved one liberal arts college located in an urban area of the southeastern United States. The university is a medium-sized private institution that offers over 200 academic programs from four colleges and has 9,304 enrolled students. Nursing is one of six departments under the College of Natural and Health Sciences. The nursing department offers three Commission on Collegiate Nursing Education (CCNE) accredited degrees, including a four-year Bachelor of Science (BSN), a Master of Science in nursing (MSN), and Doctor of Nursing Practice (DNP). The BSN program is a pre-licensure program that has approximately 180 to 200 students registered during each spring semester, 80 of whom are incoming first-semester, level-one students. Each spring, a new cohort of students is admitted to the nursing program after a rigorous application process that takes place in the preceding fall of that academic year.

Sampling Plan

The target population for the study was BSN students. The participants were first-semester students enrolled in initial courses of the pre-licensure BSN program at the aforementioned university. Initial courses of the program include Health Assessment, Pathophysiology, Professional Skills, and Foundations of Nursing Practice.

Sampling Strategy

The study utilized a convenience sample of nursing students enrolled in a 3-credit hour Foundations of Nursing Practice course (NUR 201). All first-semester nursing students ($N = 80$) are required to take NUR 201 and are split equally into two sections ($n = 40$ per class) by the program director. To maintain homogeneity between the two groups, the program director divided the students systematically, according to their program admission GPA scores. From a student list with GPAs ranked highest to lowest, the director started at the top and worked her way down, placing every other student in section one or two (C. Botwinski, personal communication, June 6, 2019). In the study, one section (comparison group) experienced traditional lecture-format teaching from a faculty member. The second section (intervention group) experienced the TBL strategy from a second faculty member who had additional training on the TBL teaching strategy. Additionally, the demographic and academic standing of both groups were compared to establish baseline associations between the groups. While participation in the study was voluntary, students in both sections were required to participate in the prospective teaching strategies, as delineated by the faculty of record.

The two faculty members who participated in the study had similar qualifications and teaching experience. Each had a doctorate in nursing: the faculty member assigned to the comparison group held a DNP in nursing administration; the faculty member who implemented the TBL intervention held a Doctor of Philosophy (PhD) in nursing science. Additionally, both faculty members had five years' experience of teaching undergraduate nursing students. Finally, both faculty members had previously taught the Foundations of Nursing Practice course at the aforementioned university.

Eligibility Criteria

To be eligible for participation, participants had to be semester-one nursing students enrolled in the Foundations in Nursing Practice course (NUR 201) at the university in the spring of 2020. Students could be of any age, gender identification, or ethnic or racial origin, but had to be able to read and understand the English language.

Inclusion criteria. The inclusion criteria for the study consisted of semester-one nursing students who were currently enrolled in the Foundations of Nursing Practice course.

Exclusion criteria. The exclusion criteria for the study consisted of students enrolled in semesters two, three, or four in the BSN nursing program. In addition, nursing students who had previously passed the Foundations of Nursing Practice course and were repeating other first-semester nursing courses, such as Health Assessment, Professional Skills in Nursing, and Pathophysiology, were excluded from the study.

Sample Size

The nursing program's annual admission size remains fixed with approximately 80 students accepted each spring. Therefore, the maximum possible sample size for this study was 80 students, with 40 students in the comparison group and 40 students in the intervention group. Utilizing the G* power analysis calculator, the minimum sample size necessary for the independent group *t*-test is 210 participants (n = 105 per group) to yield a confidence level of 95% with a moderate effect size (0.5) and 0.05 probability of error (Faul, Erdfelder, Buchner, & Lang, 2009). Using a larger effect size (0.8) while keeping the other parameters the same, the number of participants needed would be very close to the study sample, with 84 participants needed (n = 42 per group).

Utilizing the G* power analysis calculator, the minimum sample size necessary for the dependent or paired *t*-test is 54 participants in the group to yield a confidence level of 95% with a moderate effect side (0.5) and 0.05 probability of error (Faul et al., 2009). Using a confidence level of 80% while keeping the other parameters the same, the number of participants needed would be 34.

Recruitment

Before starting the recruitment process, the primary investigator conducted a face-to-face discussion with the nursing program director at the university to obtain site approval for the study (see Appendix B). Subsequently, the two faculty members teaching the Foundations of Nursing Practice course were approached to ask for their voluntary participation in the study. After sharing the purpose, specifics, and faculty responsibilities of the study, voluntary consent for participation was obtained both verbally and via email (see Appendix C). In the fall semester of 2019, both faculty members attended monthly meetings with the primary investigator to discuss the particulars of their roles in the study. Topics for discussion included details regarding participant recruitment and consent, weekly testing and teaching activities, survey distribution and collection, and documentation of unit testing. The faculty member delivering the TBL teaching strategy (intervention group) participated in additional scheduled training with the primary investigator that included assistance with the development of pre-class preparation, readiness assessment testing (RAT), group activities, and the peer evaluation instrument as previously defined in Chapter One. Furthermore, the TBL faculty member observed the primary investigator using the TBL strategy with senior-level nursing students in class as part of the training plan. The faculty member delivering traditional lecture-format teaching (comparison

group) did not require additional assistance with the development of alternative individual or non-structured group classroom activities, as she was able to use ones from the previous year.

After satisfactory preparation and Institutional Review Board (IRB) approval (see Appendix A), the primary investigator began recruiting the student participants. During the first week of classes in spring of 2020, the primary investigator attended each section of the Foundations of Nursing Practice course in person to explain the study and distribute the General Informed Consent Form (see Appendix D). The student groups were informed that participation in the study was voluntary and confidential and that they could withdraw at any time during the semester without being penalized. While completion of the demographic, modified HTQ, and TBL-SAI surveys was voluntary, all students were required to participate in the teaching strategies employed in their class section and were evaluated via unit exams as outlined in the course syllabus. Student participants in the TBL (intervention group) were given further instruction about the TBL teaching strategy. Student participants in the traditional lecture-format (comparison group) required no further instruction as the class contained traditional lecture-format teaching with customary classroom activities. Study consent was recognized after the student reviewed the consent form with the primary investigator and signed the general consent form (see Appendix D).

Protection of Human Subjects

Institutional Review Board (IRB) approval was needed due to the use of human subjects as participants (Christensen, Johnson, & Turner, 2013). The academic institution in which the student participants were enrolled and the primary investigator was employed gave IRB approval (see Appendix A). Additional IRB approval was obtained from the academic institution where the primary investigator was enrolled as a student researcher (see Appendix A). After IRB

approvals were obtained, student participant consent was obtained by the primary investigator in person, using a researcher-constructed form consisting of the purpose of the study, anticipated time involvement, confirmation of confidentiality and anonymity, and refusal and withdrawal rights (Richards & Morse, 2013). To protect privacy, both demographics and survey data are reported in aggregate. Several other measures were implemented to protect the rights of the participants. During recruitment, participants were informed that participation in the study was voluntary and that they could withdraw at any time. Additionally, all participant data has been de-identified and is accessible to the primary investigator and research committee only. Hardcopy data is locked in a secure file at the primary investigators home. Electronic data is stored on a password-protected computer. All data will be destroyed after three years.

Risks and Benefits of Participation

When undertaking an investigation that includes human subjects, the researcher should consider both the risks and the benefits to the participants. Due to the voluntary nature of participation, the privacy protection of the test results, and the anonymity of survey instrument data, there was minimal risk to the participants of the study. In addition, based upon a review of the literature, the implementation of TBL teaching strategy has revealed positive perceptions regarding satisfaction (Du & Yang, 2017; Mennenga, 2015). One known risk was the inconvenience of the time commitment for completing the surveys, which equated to approximately 30 minutes total for both the comparison group and the intervention group. Student participants may have experienced a sense of internal reward for contributing to research that will benefit future nursing faculty members and nursing students. As a result of the knowledge obtained from the study, nurse educators can make informed decisions about implementing TBL as a possible effective teaching strategy in the classroom.

The risk of course failure to the student was equal for both groups (comparison and intervention) as the traditional lecture-format assignments and TBL assignments contributed to 10% of the course grade. While different teaching strategies and assignments were utilized between the groups, both faculty members worked from identical course objectives and covered the same course content. Furthermore, both student groups took the same unit exams. Overall, the risk of course failure for either group remained comparable to other courses in the nursing program taught by two different instructors exercising their academic freedom to manipulate teaching methods and approaches.

Rigor

Researchers evaluate quantitative research by considering its scientific merit, otherwise known as rigor. The most notable criteria used to measure the rigor of a study are reliability and internal and external validity (Polit & Beck, 2017). To ensure reliability, the instruments utilized in the study demonstrated Cronbach's alphas in the acceptable range of .70 or above. Details regarding the validity and reliability of each tool are outlined in the Instrumentation section of this chapter. Though the sample was not randomized, internal validity was ensured by using a quasi-experimental design and establishing homogeneity between the comparison and intervention groups, thus controlling confounding participant characteristics. A minimum sample size of 54 participants per group was not met, which reveals a lower statistical power and threatens the external validity of the study. This limitation to the study could not be mitigated due to the fixed student enrollment numbers and the events of COVID-19 that may have contributed to participant attrition.

Data Management and Organization

The TBL intervention occurred in the Foundations of Nursing Practice course during three classes of the 14-week semester. The lecture topics chosen for the TBL intervention were nursing process, professional standards of communication, and ethics and values. Students in the intervention group were oriented to the process of TBL on the first day of class. Students in the comparison group required no additional instruction regarding the traditional lecture-format teaching. Students in both the interventional and the comparison groups had weekly three-hour face-to-face classes for the first seven weeks of the semester and followed the same topical outline, reading assignments, and testing schedule.

Under the guidance of the instructor, students in the TBL group followed the four essential elements of TBL as outlined by Michaelsen and Sweet (2011), including proper formulation and management of groups, student accountability regarding preparation for testing and activities, frequent and timely feedback, and assignment development that promotes learning and team development. The instructor incorporated these essential elements of the TBL process into the study intervention by strictly following the phases below.

1) The first phase is team formation. The process of team formation is critical as each team must have the appropriate intellectual resources for task completion and the members must be able to interact productively (Michaelsen et al., 2014). The instructor, with the assistance of the primary investigator, created teams consisting of five members to make eight teams for this class. To ensure the fairness of assets and liabilities among teams, student participants were evenly distributed between the groups using GPA values and self-reported simple personality testing using shape identification. Student participants remained in these teams for the duration of the course – it is through time and repetitive interaction that cohesiveness occurs (Tuckman, 1965; Michaelsen et al., 2014).

2) The next phase was readiness preparation. During this stage, student participants were accountable to both themselves and their team by utilizing the instructor-provided content before class and by coming to class prepared for assessment testing and interactive group activities. The instructor constructed and provided preparation assignments based on the content learning outcomes of each class topic and included audio-visual recordings, readings, or other written material. Student participants were instructed to complete the assigned preparation tasks before coming to each TBL class. The total time required for pre-class preparation was approximately 60–90 minutes. All pre-class preparatory work was available approximately one week before the readiness testing.
3) The readiness testing phase occurred next. On TBL class days, upon entering the classroom, the student participants took a short iRAT containing basic multiple-choice questions based on the preparation material. The iRATs consisted of 10 to 15 questions and student participants recorded their answers on an individual machine-readable answer sheet. After turning in their iRAT sheets, the participants got into their assigned groups to repeat the same test as a team – the tRAT.
4) Feedback took place in two ways during the next phase. Immediate feedback was given through the IF-AT® product (see Appendix E), which allowed the student participants to receive the correct quiz responses immediately as they were answering each question. After the team assessment test (tRAT), student participants had an opportunity to ask the facilitating instructor for any clarifying explanations after intra-team discussion had taken place. Additionally, the instructor was able to re-address important concepts regarding the topic material in a ‘mini-lecture’ format as needed. Teams were allowed to appeal a

question response if they provided adequate written supporting evidence and at the instructor's discretion.

5) The next phase in the process was the implementation of application exercises. One of the most important elements of the TBL strategy is the construction of in-class assignments that require a group effort to deepen the understanding of the module concepts with the specific objective of solving a problem (Michaelsen & Sweet, 2011). Application activities were developed by the instructor, reviewed by the primary investigator, and followed the "4 S's". They were the *same* for all groups, were *significant* to the concept of study and required the students to have to make a *specific* choice or decision. At the end of this activity, the teams reported their responses to the rest of the class simultaneously using large self-sticking wallpapers (Michaelsen & Sweet, 2011).
6) The final phase is peer evaluation. At the end of the TBL intervention, the student participants would customarily be allowed to learn about themselves and the way they interact with others through peer evaluation feedback (Michaelsen & Sweet, 2011). The concept of peer evaluation is particularly important in the health professions as they will need this skillset when working with professionals from other disciplines (Parmelee et al., 2012). During this phase, the instructor would distribute a peer evaluation form that allows both quantitative and qualitative responses to highlight positive team behaviors and areas for improvement (see Appendix F). Student participants would complete a form for each member of the team and turn in the forms to the instructor before leaving class. The faculty would distribute peer evaluation data to each team member, assuring the anonymity of the evaluators. Due to the outbreak of the coronavirus (COVID-19) pandemic and the transition of classes to an online platform at midterm, the primary investigator terminated the study

early. For this reason, the peer evaluation phase of the procedure was omitted to avoid the possibility of excessive stress placed on the student and faculty participants during this unpredictable time.

Data Collection

After giving consent on the first day of class, student participants received a copy of their signed consent forms. The originals were stored in a designated safe in the primary investigator's home office. The primary investigator then gave instructions for completing the initial demographic and modified HTQ pre-test surveys. Student participants used a coding method so that information could be linked (pre-test/post-test) but remained unidentifiable. The coding method consisted of combining the first two letters of the city in which the student was born with the first two letters of the student's birth month. There were no random duplicates in codes. The primary investigator collected the de-identified survey information and placed it in a large manila envelope. The primary investigator assured anonymity by de-identifying any data collected and completing reports in statistical aggregate only.

On the last day of class, student participants in both comparison and intervention groups electronically completed the post-test questionnaire on students' perceived teamwork using the modified HTQ through the survey software Qualtrics©. In addition, the intervention group participants completed an electronic TBL-SAI survey using Qualtrics© about their experiences with TBL. The comparison group participants completed the modified TBL-SAI about their experiences with traditional lecture-format teaching and periodic unstructured group work. Academic performance data from unit exam scores from both groups were collected throughout the semester using the Research Study Data Collection Tool (see Appendix G). All de-identified data was tabulated, appraised for relationships, and is reported in Chapter 4.

Instrumentation

The instrument used to measure student academic performance was unit exam scores on the first two exams given in the first part of the semester. Exam scores were scaled numerical scores ranging from zero to 100, with a higher score indicating better academic performance. The aggregate means, median, mode, and standard deviations were measured once the de-identified scores were received for each group. In addition to the demographic survey (see Appendix H), both student participant groups were asked to complete the modified HTQ, including teamwork self-efficacy and teamwork skills (interpersonal, adaptability, and communication skills) at the beginning of the semester (pre-test) and at the end of the semester (post-test; see Appendix K). Finally, the intervention group completed the TBL-SAI on the last day of the semester (see Appendix L) and the comparison group completed a modified version of the TBL-SAI to assess students' experiences in terms of accountability, preference and satisfaction (see Appendix N).

Instrument 1-Demographic Survey. At the start of the study, demographic data was collected on each participant including age, gender identification, race or ethnicity, current cumulative GPA, current number of earned college credits, and past experiences with TBL (see Appendix H). Descriptive statistics including means, standard deviations (SD), frequencies, and percentages are used to describe the socio-demographics and educational experiences of the groups. This data is useful for identifying differences or establishing homogeneity between the groups. Moreover, the information can be used for future research study comparison and replication purposes.

Scoring. The measures for scoring the demographic data consisted of both nominal- and continuous-level data. Numbers were used to represent characteristics of the student participants

(gender, ethnicity, previous TBL experience) for labeling and identification purposes. When entering the nominal data into SPSS, the assignment of numbers was arbitrary but consistent for analysis and the display of results. Continuous data was entered numerically and measured using a scale for age, GPA, and number of college credits.

Instrument 2-Modified HTQ. The instrument used to measure teamwork self-efficacy and interpersonal, adaptability, and communication teamwork skills came from the HTQ developed by Marshall and O'Neil in 2001 (see Appendix I). Both developers granted permission to use parts of the HTQ tool and to make minor modifications as needed for the study (see Appendix J). Four subscales of the complete questionnaire were used in the study to include teamwork self-efficacy *(n* = 8) and interpersonal *(n* = 11), adaptability *(n* = 8) and communication *(n* = 8) teamwork skills. One item was removed from the original teamwork self-efficacy subscale as it pertained to patient satisfaction scores, which are not measured in the study. This reduced the item number to seven *(n* = 7). Inclusion of these and all items from the other three subscales, the modified HTQ contained a total of 34 questions (see Appendix K). Additionally, the tool was modified from a four-point Likert scale consisting of never (1), sometimes (2), often (3), and almost always (4) to a five-point Likert scale where 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree. This modification was made to include a neutral option for the respondent and to keep the tool aligned with the other survey tool used in the study to decrease the possibility of student participant confusion when using multiple tools with dissimilar question formats.

Validity. The original HTQ (see Appendix I) contains six of O'Neil's teamwork dimensions, one scale from O'Neil's Trait Thinking Questionnaire and three new scales developed by Marshall (personal communication, June 23, 2019). The authors of the original

Trait Thinking Questionnaire established face, content, and construct validity in several ways. The experts performed an extensive literature review and incorporated this research into the development of the instrument. Moreover, the original instrument was tested in six previous studies (Marshall, 2003).

Reliability. The reliability of the teamwork self-efficacy scale yielded a Cronbach's alpha of .88 when revisions were made after a pilot study (Marshall, 2003). The initial Cronbach's alpha reliability scores for the interpersonal, adaptability, and communication subscales were .86, .86, and .86 respectively (Marshall, 2003). Since then, Kim, Choi, and Kang (2011) have reported the teamwork self-efficacy subscale to have a Cronbach's alpha of .92, the adaptability subscale to have a Cronbach's alpha of .91, and the interpersonal subscale to have a Cronbach's alpha of .94 in their study with nursing students. More recently, Park, et al., (2015) have reported a Cronbach's alpha of .93 for teamwork efficacy, .81 for adaptability team skills, and .88 for interpersonal team skills in their study with nursing students in a health assessment class. Due to the modifications made to the HTQ for the study, the primary investigator completed additional Cronbach's alpha testing to assess sustained reliability of the tool.

Scoring. Teamwork self-efficacy was measured using a seven-item questionnaire with a five-point Likert-type scale. The responses ranged from 1 (strongly disagree) to 5 (strongly agree), with a possible range of 7–35. With this scale and the ranges offered, higher scores indicate the student participants' confidence with their ability to work in a team to complete a task. The three teamwork skill components that were measured included interpersonal skills (11 items), with a possible range of 11–55; adaptability (8 items), with a possible range of 8–40; and communication (8 items), with a possible range of 8–40.

Instrument 3-TBL-SAI, Modified TBL-SAI. The instrument used to assess the student experience with TBL was the TBL-SAI, developed by Mennenga in 2010 (see Appendix L). After psychometric testing, the modified TBL-SAI instrument contained 33 items using a five-point Likert scale, with possible responses of strongly disagree, disagree, neither disagree or agree (neutral), agree, or strongly agree. The instrument consists of three subscales that specifically assess student accountability, preference, and satisfaction. The accountability subscale consists of eight questions assess student preparation for class and contribution to the team. The preference for lecture or TBL subscale consists of 16 questions that assesses student ability to recall material and student attention level in lecture and TBL. The student satisfaction subscale consists of nine questions that assess student satisfaction with TBL. Permission to use the TBL-SAI was granted by the developer (see Appendix M). The comparison group completed a modified version of the TBL-SAI containing questions that measure accountability, preference, and satisfaction with traditional lecture-style teaching and unstructured group activities (see Appendix N). Modifications were made with permission from Mennenga, the developer (see Appendix O). It is noted that the validity and reliability of the modified TBL-SAI have not been previously established. However, psychometric testing was completed using the data collected in this study.

Validity. Mennenga established construct validity for the TBL-SAI with thorough reviews of the literature in 2009 and 2012 that identified the major concepts for subscales of the tool (Mennenga, 2012). Additionally, Mennenga (2012) used the conceptual model for TBL that was developed by Haidet, Schneider, and Onady in 2008 to guide her development of the original 45-item tool. After analysis of the content validity index values for individual items and comments by a panel of four experts on TBL, seven items were deleted and one item was added

(Mennenga, 2012). The remaining 39-item instrument produced a satisfactory scale content validity of 0.89. Each of the three subscales also generated acceptable scale content validity index values: accountability scored 0.90, preference for lecture or TBL scored 0.89, and student satisfaction scored 0.89 (Mennenga, 2012)

Reliability. To verify the reliability of the instrument, Mennenga (2012) performed factor analysis and internal consistency assessments on each of the factors, subscales, and the total scale. After removing six items, the final 33-question instrument yielded an acceptable Cronbach's alpha of .941. Scores for the accountability, preference, and satisfaction subscales yielded Cronbach's alphas of .782, .893, and .942 respectively (Mennenga, 2012).

Scoring. The TBL-SAI was scored separately for each of the three subscales, as well as being given a score for the total instrument. As the responses are based upon a five-point Likert scale, the ranges are displayed from the lowest possible score (all responses of 1) to the highest possible score (all responses of 5). An average score of neutral is computed by multiplying the item number by three. The accountability subscale contains eight items; therefore, the possible score range is from 8 to 40, with a score of 24 considered neutral. The preference subscale contains 16 items; therefore, possible scores range from 16 to 80, with a score of 48 considered neutral. The satisfaction subscale contains nine items, so possible scores range from 9 to 45, with a score of 27 considered neutral. Finally, the total instrument contains 33 items, so possible scores range from 33 to 165, with a score of 99 considered neutral. The higher the score, the more favorable the TBL experience for the participants. Any score that is greater than the neutral score is considered a positive experience for the participant.

Data Storage

All electronic quantitative data remains de-identified and is stored on the primary investigator's university-issued computer, which is password protected. The raw data remains de-identified in hardcopy form and is stored in locked safe at the primary investigator's home office. Only the researcher and the members of the dissertation committee have access to the data. After the requisite three years, all hardcopy data about the study will be shredded and all electronic data pertaining to the study will be erased from the computer hard drive.

Data Analysis and Statistical Strategy

The goal of this study was to compare the academic performance, teamwork self-efficacy and teamwork skills between two groups of nursing students experiencing two different teaching strategies. Statistical analysis of data included the use of the IBM Statistical Package for Social Sciences (SSPS) 26 software to assess differences in mean, median, mode, and SD. Descriptive statistics including means, SD, frequencies, and percentages were utilized to describe participant demographics and TBL characteristics.

Data Cleaning

The primary investigator visually inspected all de-identified data for completeness before entry into the SPSS system. Since data entry is prone to error, all entries were double-checked for accuracy and errors were removed (Polit & Beck, 2017). Once this process was completed, the primary investigator commenced with data cleaning, observing for missing data, outliers, and wild codes. Missing data were identified by running a missing value analysis in SPSS. Outliers were identified by constructing frequency distributions and validating that the values outside the normal range were true (Polit & Beck, 2017). Additionally, since wild codes can contribute to faulty statistics, the coded values were tracked using a de-identified code so that any variations could easily be rectified (Polit & Beck, 2017).

Descriptive Analysis

Descriptive statistics including mean, SD, frequencies, and percentages were used to describe participant demographics and previous education characteristics attained from the demographic survey. An independent samples *t*-test was performed to establish homogeneity of the groups (Polit & Beck, 2017). If there is a limited amount of variability between groups, they are considered homogenous (Polit & Beck, 2017). Participant unit exam results were collected as secondary de-identified scores and transferred to SPSS as a data set. Hardcopy survey data was entered into SPSS for comparisons and analysis of normal distribution using the Shapiro-Wilk test (Ghasemi & Zahediasl, 2012). The parametric procedure for testing the difference between two independent groups (comparison and intervention) is the independent group *t*-test. The paired *t*-test was used to analyze the pre-test and post-test survey results of the matched pairs in the comparison group and the intervention group respectively (Polit & Beck, 2017). The data was normally distributed, so neither the Mann-Whitney test for the independent groups nor the Wilcoxon signed ranks for the dependent groups was performed (Polit & Beck, 2017). Finally, the independent group *t*-test was used to compare mean values from the TBL-SAI survey and modified TBL-SAI survey results to assess the relationship between the two groups.

Reliability Testing

Reliability testing for internal consistency of the instruments used in the study required the assessment of Cronbach's alphas using SPSS 26. This measurement appraises the extent to which the various items of an instrument are correctly measuring the main attribute being examined (Polit & Beck, 2017). When items are intercorrelated at a high level, there is high internal consistency. The normal range is usually between .00 and +1.00, with the higher levels equating to better internal consistency (Polit & Beck, 2017). While values of .80 would be

desirable, levels of .70 or higher were accepted for the study (Downing & Yudowsky, 2009). The length of a tool can affect the internal consistency measures, therefore if the number falls outside the desired range, more items related to the same construct could be added (Polit & Beck, 2017).

Reliability can also determine the extent to which each item's score is free from error in measurement. This is commonly done with the reliability coefficient or Pearson's R. The values can range from .00 to +1.00, and when numbers drop below .8 (for human subjects testing), the item can be dropped and the test can be re-run.

Hypothesis Testing

Hypothesis testing was carried out for each of the research questions once the data was run on SPSS 26 and the assumptions of parametric data were satisfied. These assumptions included the following: 1) the grouping variables were dichotomous; 2) the outcome data was evenly distributed; 3) the variable was at the interval or ratio level (continuous); 4) and the data was collected from an independent variable (Plichta & Kelvin, 2013).

Research Question 1: Is there a relationship between unit exam scores of pre-licensure BSN nursing students who participate in TBL and those who do not participate in TBL?

Hypothesis 1(H_1): There is a relationship between exam scores of pre-licensure BSN nursing students who participate in TBL compared to those who do not participate in TBL.

Null hypothesis (H_0): There is no relationship between exam scores of pre-license BSN nursing students who participate in TBL compared to those who do not participate in TBL.

The statistical test used to test the first hypothesis was the independent group *t*-test. This test was chosen as unit exam scores are considered interval data. The difference between the means of unit exam scores between the control and the experimental group was examined. The parametric procedure for testing the difference between two independent means (experimental

versus comparison) is the *t*-test for independent groups (Polit & Beck, 2017). The parametric assumption of normal distribution was met, so the Mann-Whitney test was not necessary. The alpha level of significance for the *p*-value in this study was set at 0.05 (Plichta & Kelvin, 2013). If the $p < 0.05$, then the null hypothesis would be rejected, indicating that there was a relationship between exam scores of students who participated in TBL and those who participated in traditional lecture-format teaching. It would then be important to identify the direction of the difference in exam scores as favorable to the TBL group (intervention group) to support hypothesis one.

Research Question 2: Is there a relationship between the teamwork self-efficacy and the teamwork skills of interpersonal skills, adaptability, and communication in pre-licensure BSN nursing students who participate in TBL when compared to those who did not participate in TBL?

Hypothesis 2 (H_2): There is a relationship between teamwork self-efficacy and the teamwork skills of interpersonal skills, adaptability, and communication in pre-licensure BSN nursing students who participate in TBL when compared to those who do not participate in TBL as measured by the modified HTQ**.**

Null hypothesis (H_0): There is no relationship between teamwork self-efficacy and the teamwork skills of interpersonal skills, adaptability, and communication in pre-licensure BSN nursing students who participate in TBL compared to those who do not participate in TBL as measured by the modified HTQ.

The statistical test used to test the second hypothesis was the independent group *t*-test to compare the teamwork self-efficacy and teamwork skills scores between the comparison and experimental groups, looking for any differences. The alpha level of significance for the *p*-value

in the study was set at 0.05 (Plichta & Kelvin, 2013). If the $p < 0.05$, then the null hypothesis would be rejected, indicating a difference between the participants' teamwork self-efficacy and teamwork skills with the implementation of the teaching strategies utilized. Additionally, the paired *t*-test was used to compare pre-test to post-test scores using the modified HTQ to identify differences within the same group of people after a teaching strategy intervention. According to Polit and Beck (2017), the paired *t*-test is used when two measurements are obtained from the same group or paired sets, indicating that the scores are not independent. Although Likert scales are normally ordinal, in this study, the scores are evaluated in their totality, with equal distance allowing measurement at the interval level. The means of these two values were compared. The paired *t*-test has been used with this instrument in previous studies by utilizing the questionnaire responses at the interval level (Park et al., 2015). Since the parametric assumptions of normal distribution were met, the Wilcoxon signed ranks test was not necessary. The primary investigator evaluated each group separately (comparison = traditional lecture-format; intervention = TBL) to ascertain any relationships within the group between the beginning and the end.

Research Question 3: Is there a relationship between pre-licensure BSN nursing students who participate in TBL experiences compared to nursing students who do not participate in TBL experiences in terms of accountability, preference, and satisfaction?

Hypothesis 3 (H_3): There is a relationship between pre-licensure BSN nursing students who participate in TBL experiences compared to nursing students who do not participate in TBL in terms of accountability, preference, and satisfaction as measured by the TBL-SAI and modified TBL-SAI.

Null hypothesis (H_0): There is no relationship between pre-licensure BSN nursing students who participate in TBL experiences compared to nursing students who do not participate in TBL in terms of accountability, preference, and satisfaction as measured by the TBL-SAI and modified TBL-SAI.

The statistical test used to test hypothesis three was the independent group *t*-test. The parametric procedure for testing the differences between two independent means (comparison and intervention) is the *t*-test for independent groups (Polit & Beck, 2017). Since the parametric assumptions of normal distribution were met, the Mann-Whitney test was not necessary to perform. The alpha level of significance for the p-value in this study is set at 0.05 (Plichta & Kelvin, 2013). Based upon the scoring outlined previously for this instrument, a higher score in any of the three subscales (accountability, preference, and satisfaction) or the total equates with a more favorable (increased) experience. The mean from each subscale and the total were evaluated separately to identify where they fell in relation to the neutral score in each area. Scores that were greater than the neutral score of each category were considered favorable.

Additionally, to measure whether the three subscale variables were in any way related, a correlation coefficient (Pearson's *r*) analysis was done to quantitatively describe the magnitude and direction of variables (Polit & Beck, 2017). The correlation coefficient ranges from -1.00 to +1.00. Positive numbers indicate a positive correlation between variables. Completely unrelated variables equal a correlational coefficient of zero. A negative or inverse relationship between variables is indicated with numbers ranging from zero to -1.00 (Polit & Beck, 2017). The examination of this statistical analysis helps to explain the relationship among the three subscales of the TBL-SAI.

Chapter Summary

This chapter discussed the research design and methodology used by the researcher for the study. A quasi-experimental correlational design was used to evaluate the effect of the TBL teaching strategy compared with the traditional lecture-format teaching on pre-licensure nursing students' academic performance, teamwork self-efficacy, and teamwork skills, as well as their experiences in terms of accountability, preference, and satisfaction. After IRB approval from the study site, semester-one nursing students from a pre-licensure BSN nursing program at a moderate-sized private university in the southeastern United States were recruited as voluntary participants and experienced either traditional lecture-format teaching or TBL in a Foundations of Nursing Practice course.

At the end of the semester, data from participant unit scores and responses from the modified HTQ, the TBL-SAI, and the modified TBL survey were analyzed after appropriate data cleaning, using SPSS software. Descriptive statistics and independent group *t*-tests were used to compare the demographics of the sample participants. Hypothesis testing included the use of independent group *t*-tests, paired *t*-tests and Pearson's correlation coefficient.

Chapter Four

Results

The purpose of this study was threefold: (a) to determine if there is a relationship between academic performance of pre-licensure BSN nursing students who participated in TBL compared to those who did not participate in TBL, (b) to determine if there is a relationship between teamwork self-efficacy and the teamwork skills of interpersonal, adaptability and communication in pre-licensure BSN nursing students who participated in TBL as compared to those who did not participate in TBL, (c) to determine if there is a relationship between experiences in terms of accountability, preferences and satisfaction between pre-licensure BSN nursing students who participated in the TBL as compared to nursing students who did not participate in TBL.

The primary investigator recruited from 80 student participants registered in two different sections of the Foundations of Nursing Practice course at a moderately sized private college. Each section consisted of 40 students, which allowed for the possibility of an equal number of participants between the comparison (n = 40) and the intervention group (n = 40). Of the 80 pre-licensure BSN students approached, 79 consented to be in the study – 40 from the comparison group and 39 from the intervention group. This yielded a participation rate of 98.75%. The reason that the one student declined to participate in the study is unknown.

As outlined in chapter Three, it was intended that this study take place over the entire academic semester (14 weeks) and in a face-to-face classroom setting. Due to the outbreak of the COVID-19 pandemic, a global public health emergency, several unavoidable changes occurred within the study setting that required an alteration in the original methodology of the research study. In mid-March, face-to-face classes at the University of Tampa ended, and all courses immediately transitioned to the online learning format for the remainder of the spring semester.

At that time, only three of the five planned TBL modules (intervention doses) were completed. Logistical challenges with conducting online TBL coupled with increased stress in student and faculty participants during this national health crisis resulted in the termination of the intervention portion of the study by the primary investigator. Therefore, the data and the results are based upon the teaching interventions and testing completed during the first half (7 weeks) of the academic semester only. The intervention group was unable to complete peer-to-peer feedback paper forms as planned. However, the end-of-study surveys were successfully converted to an electronic format so that post-study data could be collected. Data cleaning occurred after the study on all components of the collected data including paper format surveys (beginning) and electronic surveys (ending).

Data Cleaning

All 79 participants supplied demographic and pre-test data. Data cleaning revealed surveys with infrequent, random missing responses and no visible outlier or wild responses. Two respondents did not answer the previous TBL experience question on the demographic survey; therefore, that data was not included in the demographic frequencies. Missing data was identified by running a missing value analysis in SPSS. Subgroup mean substitutions were made for the missing responses on the modified HTQ, TBL-SAI, and modified TBL surveys under the assumption that the participants randomly and unintentionally skipped a question (Polit & Beck, 2017). All other data was complete with no obvious outliers. This was confirmed by constructing frequency distributions and validating that the values outside the normal range were true. There were 79 pre-test modified HTQ surveys completed by the student participants on paper on the first day of the research study. Due to the events of COVID-19 resulting in the transition from face-to-face to online learning, the students completed all post-study surveys electronically

online using Qualtrics© software system. Unfortunately, several students failed to complete the online post-study surveys, resulting in fewer paired data for analysis. Pre-test and post-test modified HTQ surveys were linked using the coding system previously discussed. This yielded 64 paired modified HTQ surveys available for analysis, resulting in an 81% participant response rate. Completed pre-test modified HTQ surveys that did not have a paired post-test response were excluded from the data analysis. Additionally, post-study modified TBL-SAI surveys were completed by 30 out of 40 comparison group participants for a return of 75%, and post-study TBL-SAI surveys were completed by 34 of the 39 intervention group participants for a return of 87.2%. All participant exam scores for both unit one and unit two were available for analysis with no visible outliers, which yielded a 100% response rate.

Descriptive Analysis

Description of the Sample

The total participant sample contained 79 level-one pre-licensure BSN nursing students. There were 40 students (50.6%) in the comparison group and 39 students (49.4%) in the intervention group. Demographic characteristics of the comparison and intervention groups were compared to determine the homogeneity between the two groups. The *t*-test for independent groups was used for parametric data, and chi-square was used for non-parametric data. The mean student age of the comparison group was 19.5 with an SD of 0.64, while the mean student age of the intervention group was 19.7 with an SD of 1.52. There was no significant statistical difference in age between the two groups ($t = -.738$, $df = 77$, $p = .463$).

The comparison group consisted of two males (5%) and 38 females (95%), while the intervention had two males (5.1%) and 37 females (94.9%). With a count of < 5 in two cells (50%), the non-parametric assumptions were violated. Therefore, Fisher's Exact Test was

utilized to evaluate the significance level of $p = 1.000$, indicating no differences in gender distribution between the two groups.

Ethnic demographic of the comparison group contained 29 Non-Hispanic White (72.5%), nine Hispanic White (22.5%), two Hispanic Black (2.5%) and two Asian participants (2.5%). The intervention group contained 35 Non-Hispanic White (89.7%), two Hispanic White (5.1%), one Hispanic Black (2.6%), and one other (2.6%) participant. Once more, as the non-parametric assumptions were violated with > 20% of the cells less than five, the researcher used the chi-square likelihood ratio to identify a significance level of $p = .053$, $df = 5$. This indicates that there were no statistical differences in ethnicities between the two groups.

The mean GPA of the comparison group was 3.64 with an SD of 0.22, while the mean GPA of the intervention group was 3.61 with an SD of 0.18. There was no statistical difference in GPA levels between the comparison and intervention groups ($t = .487$, $df = 77$, $p = .628$).

The mean number of college credits for the students in the comparison group was 62.65 with an SD of 17.65, while the mean number of college credits for the students in the intervention group was 62.82 with an SD of 19.32. There was no statistical difference in number of college credits between the comparison and intervention group ($t = -.041$, $df = 77$, $p = .967$).

Lastly, in reviewing the previous TBL class history of the comparison group, one student (2.5%) had two previous classes with TBL, five students (12.5%) had one previous class with TBL, and 32 students (80%) had no previous classes with TBL. Two students (5%) failed to indicate the information regarding previous TBL class history, therefore this information was not factored into the data analysis. In the intervention group, one student (2.6%) had four or more previous classes with TBL, one student (2.6%) had two previous classes with TBL, four students (10.3%) had one previous class with TBL and 33 students (84.6%) had no previous classes with

TBL. Again, as the non-parametric assumptions were been violated with > 20% of the cells less than five, the primary investigator used the chi-square likelihood ratio, which indicated no statistical difference ($df = 3$, $p = .682$) with previous TBL classes between the two groups. Table 1 illustrates the descriptive analysis of demographic characteristics and the level of significance for each category. While there were some minor differences in the ethnic demographics and previous TBL experience between the two groups, overall, there were no statistically significant differences between the two groups and homogeneity was established (see Table 1).

Table 1
Demographic Characteristics of Participants (N = 79)

Characteristic	Comparison Group	Intervention Group	Significance *p*
Age	Mean = 19.5 *SD* = 0.64	Mean = 19.7 *SD* = 1.52	.463
Gender			1.000
Male	2 (5%)	2 (5.1%)	
Female	38 (95%)	37 (94.9%)	
Ethnicity			.053
Non-Hispanic: White	29 (72.5%)	35 (89.7%)	
Non-Hispanic: Black			
Hispanic: White	9 (22.5%)	2 (5.1%)	
Hispanic: Black	1 (2.5%)	1 (2.6%)	
Asian	1 (2.5)		
Other		1 (2.6%)	
GPA	Mean = 3.64 *SD* = 0.22	Mean = 3.61 *SD* = 0.18	.628
College credits	Mean = 62.65 *SD* = 17.65	Mean = 62.82 *SD* = 19.32	.967
Previous TBL Class History			.682
No previous TBL Classes	32 (80%)	33 (84.6%)	
One previous TBL Class	5 (12.5%)	4 (10.3%)	
Two previous TBL Classes	1 (2.5%)	1 (2.6%)	
Three previous TBL Classes			
Four or more previous TBL Classes		1 (2.6%)	

*p < .05 .

Responses to the Measurements

The study's dependent and independent variables were measured using scores obtained from two unit exams and three specific questionnaires. The questionnaires included the modified HTQ, the TBL-SAI, and a modified TBL-SAI. The mean exam score for the comparison group on test one was 89.6 (*SD* = 5.69) and the mean exam score for the intervention group was 89.9 (*SD* = 6.68). The mean exam score for the comparison group on test two was 88.25 (*SD* = 6.42) with the mean exam score on test two for the intervention group of 80.51 (*SD* = 5.55). Findings indicated that there was no statistically significant difference in exam scores between the groups (see Table 2).

Table 2
Descriptive Statistics for Exam Scores

	Comparison Group (*n* = 40)		Intervention Group (*n* = 39)				
	Mean	*SD*	Mean	*SD*	*t*	*df*	*p*
Exam 1	89.6	5.69	89.9	6.68	-.250	77	.803
Exam 2	88.25	6.42	88.25	6.42	-.933	77	.353

*p < .05

Teamwork self-efficacy was measured using a seven-item questionnaire with a five-point Likert-type scale. The responses range from one (strongly disagree) to five (strongly agree), with a possible range of 7–35. With this scale and the ranges offered, scores indicated the students' confidence regarding their ability to work in a team to complete a task. The three teamwork skill components that were measured included interpersonal skills (11 items), with a possible range of 11–55; adaptability (eight items), with a possible range of 8–40; and communication (eight items) with a possible range of 8–40. The pre-test and post-test means and *SD*s from each of the four subscales for both groups (comparison and intervention) are shown in Table 3.

Table 3

Descriptive Statistics for the Modified HTQ

	Comparison Group (n = 30)				Intervention Group (n = 34)			
	Pre-test		Post-test		Pre-test		Post-test	
	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*
Teamwork Self-Efficacy	30.83	3.68	31.26	3.10	29.94	3.32	30.29	2.82
Teamwork skills								
Interpersonal	50.56	3.30	48.83	4.44	49.11	4.12	49.11	4.70
Adaptability	35.80	3.37	34.63	3.57	33.76	3.84	34.64	3.07
Communication	36.16	3.62	34.93	3.80	34.97	3.64	35.38	3.94

Additionally, a paired t-test was completed with each of the two groups to evaluate changes over time in students' perceived teamwork self-efficacy and interpersonal, adaptability, and communication teamwork skills. The only statistically significant change in the comparison group students' perceived teamwork was in the interpersonal category (t = 2.36, p = .025). The score within this subscale, though still high within the range, decreased from the pre-test to the post-test, indicating a slight decrease in perceived interpersonal skills from the start to the end of the semester. Both the adaptability and communication subscales also decreased between pre- and post-test evaluation, but these were not statistically significant. The teamwork self-efficacy subscale showed a slight increase from pre- to post-test evaluation; however, this increase was of no statistical significance (see Table 4).

Table 4

Changes over time in comparison group students' perceived teamwork (n = 30)

Characteristics	Pre-test	Post-test	*t*	*df*	*p*
	Mean *SD*	Mean *SD*			
Team self-efficacy	30.83 ± 3.68	31.26 ± 3.10	-.739	29	.466
Teamwork skills					
Interpersonal	50.56 ± 3.20	48.83 ± 4.44	2.36	29	.025*
Adaptability	35.80 ± 3.37	34.63 ± 3.57	1.58	29	.125
Communication	36.16 ± 3.62	34.93 ± 3.80	1.74	29	.092

*p <.05

Similarly, the intervention group showed no statistically significant change in perceived teamwork self-efficacy and teamwork skills over time. The intervention group did have a slight increase in three out of the four subscales, with the interpersonal subscale showing no change over time (see Table 5).

Table 5

Changes over time in intervention group students' perceived teamwork (n = 34)

Characteristics	Pre-test	Post-test	*t*	*df*	p
	Mean SD	Mean SD			
Team self-efficacy	29.94 ± 3.32	30.29 ± 2.82	-.608	33	.547
Teamwork skills					
Interpersonal	49.11 ± 4.12	49.11 ± 4.70	.000	33	1.000
Adaptability	33.76 ± 3.84	34.64 ± 3.07	-1.339	33	.190
Communication	34.97 ± 3.64	35.38 ± 3.94	-.627	33	.535

*p <.05

The instrument that was used to assess the student experience with TBL in the study was the TBL-SAI, developed by Mennenga in 2010. The TBL-SAI instrument has 33 items that use a 5-point Likert scale, with possible responses of strongly disagree, disagree, neither disagree or agree (neutral), agree, or strongly agree. The instrument consists of three subscales that assess student accountability, preference, and satisfaction regarding the TBL teaching strategy. The accountability subscale consists of eight questions that assess student preparation for class and contribution to the team. The preference for lecture or TBL subscale consists of 16 questions that

assess student ability to recall material and student attention level in lecture and TBL. The student satisfaction subscale consists of nine questions that assess student satisfaction with TBL. The comparison group completed a modified version of the TBL-SAI to capture their experiences with traditional lecture-format teaching and periodic, unstructured group activities. The same categories, question numbers, and Likert scales were used to measure student experiences in the modified TBL-SAI. However, the investigator modified the questions, replacing the term "team-based learning" with the term "traditional lecture and group work" as appropriate. Reverse scoring (5, 4, 3, 2, 1), was completed on the negatively stated items per the instrument developer for the TBL-SAI (H. Mennenga, personal communication, June 1, 2020). In addition, the primary investigator completed reverse scoring on the modified TBL survey in concordance with the modifications made to the instrument for the comparison group learners.

The accountability subscale contains eight items; therefore, the possible scores range is from 8 to 40, with a score of 24 considered neutral. The preference subscale contains 16 items; therefore, possible scores range from 16 to 80, with a score of 48 considered neutral. The satisfaction subscale contains nine items; therefore, possible scores range from 9 to 45, with a score of 27 considered neutral. Finally, the total instrument contains 33 items; therefore, possible scores range from 33 to 165, with a score of 99 considered neutral. The higher the score, the more favorable the learning experience (traditional lecture format or TBL) for the participants. An average score of neutral was computed by multiplying the item number by three. In the accountability category, greater than the neutral score of 24 is considered a positive experience for the participant. The mean score for the comparison group was 27.5 (SD = 3.22); the mean score for the intervention group was 34.14 (SD = 3.32). There is a statistically significant difference between the two scores (p = .000) indicating higher levels perceived accountability in

participants who experienced TBL compared to participants who experienced traditional lecture-format teaching. In the preference subcategory, any score greater than the neutral score of 24 is considered a positive experience for the participant. The mean score for the comparison group was 51.63 (*SD* = 6.52); the mean score for the intervention group was 52.64 (*SD* = 6.88). There was no statistically significant difference between the two groups ($p = .549$), indicating that the participants in both groups equally preferred the respective teaching strategies they experienced, whether traditional lecture-format teaching or TBL.

In the satisfaction subcategory, any score greater than the neutral score of 27 is considered a positive experience. The mean score for the comparison group was 30.86 (*SD* = 6.58), and the mean score for the intervention group was 34.73 (*SD* = 5.17). There is a statistically significant difference between the two scores ($p = .011$) indicating higher levels of perceived satisfaction with TBL then those who participated in traditional lecture-format teaching. Finally, in the TBL total survey, any score greater than the neutral score of 99 is considered a positive overall experience. The mean score for the comparison group was 110 (*SD* = 13.14), and the mean score for the intervention group was 121.52 (*SD* = 11.78). There is a statistically significant difference between the two scores ($p = .000$), indicating that the intervention group had a more favorable perceived experience overall with TBL than those who experienced traditional lecture-format teaching. While both groups had positive experiences in the three subcategories and the total survey, the intervention group had statistically significantly more favorable experiences than the comparison group in accountability, satisfaction, and total experience categories (see Table 6).

Table 6
Differences of Student Experiences Between groups

	Comparison Group (n = 30)		Intervention Group (n = 34)				
	Mean	*SD*	Mean	*SD*	*t*	*df*	*p*
Accountability (neutral 24)	27.50	3.22	34.14	3.51	-7.843	62	.000*
Preference (neutral 48)	51.63	6.52	52.64	6.88	-.602	62	.549
Satisfaction (neutral 27)	30.86	6.58	34.73	5.17	-2.62	62	.011*
Survey Total (neutral 99)	110.00	13.14	121.52	11.78	-3.70	62	.000*

*$p < .05$

Reliability Testing

Reliability of the teamwork self-efficacy scale yielded a Cronbach alpha of .88 when revisions were made after a pilot study was completed (Marshall, 2003). The initial Cronbach's alpha reliability for the interpersonal, adaptability, and communication subscales were .86, .86, and .86 respectively (Marshall, 2003). Since then, Kim, Choi, and Kang (2011) reported the teamwork self-efficacy to have a Cronbach's alpha of .92, adaptability to have a Cronbach's alpha of .91, and the interpersonal subscale to have a Cronbach's alpha of .94 in their study with nursing students. More recently, Park and Park (2015) reported Cronbach's alphas of .93 for teamwork efficacy, .81 for adaptability, and .88 for interpersonal team skills in their study with nursing students in a health assessment class. Due to the modifications made on the modified HTQ for this study, the researcher completed additional Cronbach's alpha testing with both groups (comparison and intervention) on both the pre-test and post-test survey data. The Cronbach's alphas of each subscale of the Modified HTQ indicate continued reliability of the tool since a Cronbach's alpha of greater than .80 was found in each subscale (see Table 7).

Table 7

Reliability Testing: Cronbach's alpha *for Modified HTQ*

	Comparison Group (n = 30)		Intervention Group (n = 34)	
	Pre-test Significance Level	Post-test Significance Level	Pre-test Significance Level	Post-test Significance Level
Teamwork Self-Efficacy	.877	.877	.821	.836
Teamwork skills				
Interpersonal	.805	.889	.855	.903
Adaptability	.830	.916	.839	.803
Communication	.876	.886	.836	.880

Previous reliability testing during the development of the TBL-SAI produced an acceptable Cronbach's alpha of .941 on the total instrument. Scores for the accountability, preference, and satisfaction subscales yielded Cronbach's alphas of .782, .893, and .942 respectively (Mennenga, 2012). Reliability testing completed in this study revealed a satisfactory Cronbach's alpha of .849 for the total instrument and Cronbach's alphas of .757 for accountability subscale, .752 for the preference subscale, and .874 for the satisfaction subscale. Modifications were made to the TBL-SAI to capture the learning experience perceptions of the comparison group (modified TBL-SAI survey). Therefore, there is no previous reliability information on this instrument. Consequently, reliability testing was done on this research data, generating acceptable Cronbach's alphas of .872 for the total instrument, .707 for the preference subscale, and .923 for the satisfaction subscale. The accountability subscale yielded a less-than-acceptable Cronbach's alpha of .639, which could indicate an internal consistency issue with the questions in this subscale. An item-total statistic indicated that if questions one and two were deleted from this subscale, the Cronbach's alpha would increase to a satisfactory level of .749. These two items relate to preparation for class, and while they relate specifically to accountability, they are not typically related to traditional lecture-format teaching (see Table 8).

Table 8
Descriptive Scale if Item Deleted: Accountability Subscale on the Modified TBL-SAI

	Item-Total Statistics		
Item Number	Scale mean if item deleted	Corrected item-total correlation	Cronbach's alpha if item deleted
#1 Spend time studying before class to be more prepared.	25.73	.028	.694
#2 I feel I have to prepare for this class to do well.	25.60	.190	.642
#3 I contribute to my group's learning.	23.20	.499	.561
#4 My contribution to the group is not important.	23.13	.134	.655
#5 My group members expect me to assist them in their learning.	23.86	.703	.484
#6 I am accountable for my group's learning.	24.33	.302	.621
#7 I am proud of my ability to assist my group in learning.	23.23	.600	.562
#8 I need to contribute to the group's learning.	23.40	.424	.589

Hypothesis Testing

Hypothesis testing was carried out for each of the research questions using the Statistical Program for Social Sciences © (SPSS). The assumptions of parametric data were satisfied. These assumptions included the following: 1) the grouping variables were dichotomous; 2) the outcome data were evenly distributed; and 3) the variables were at the interval or ratio level (continuous), and the data was collected from an independent variable (Plichta & Kelvin, 2013).

Research Question 1: Is there a relationship between unit exam scores of pre-licensure BSN nursing students who participate in TBL as compared to those who do not participate in TBL?

Hypothesis 1(H_1): There is a relationship between exam scores of pre-licensure BSN nursing students who participate in TBL compared to those who do not participate in TBL.

Null hypothesis (H_0): There is no relationship between exam scores of pre-license BSN nursing students who participate in TBL compared to those who do not participate in TBL.

Statistical Analysis

The statistical test used to test hypothesis one was the independent group *t*-test since unit exam scores are considered interval data and the difference of means of unit exam scores between the comparison and the intervention group were examined. The alpha level of significance for the *p*-value in this study is set at 0.05 (Plichta & Kelvin, 2013). Analysis of the first exam revealed $p = .803$ $(t = -.250, df = 77)$; analysis of unit exam two revealed $p = .353$ $(t = -.933, df = 77)$. The findings indicate that there was no relationship between the exam scores for pre-licensure BSN nursing students who participated in TBL compared with those who did not participate in TBL; therefore, the null hypothesis is accepted.

Research Question 2: Is there a relationship between the teamwork self-efficacy and the teamwork skills of interpersonal skills, adaptability, and communication in pre-licensure BSN nursing students who participate in TBL as compared to those who do not participate in TBL?

Hypothesis 2 (H_2): There is a relationship between teamwork self-efficacy and the teamwork skills of interpersonal skills, adaptability and communication in pre-licensure BSN nursing students who participate in TBL as compared to those who do not participate in TBL as measured by the modified HTQ**.**

Null hypothesis (H_0): There is no relationship between teamwork self-efficacy and the teamwork skills of interpersonal skills, adaptability and communication in pre-licensure BSN nursing students who participate in TBL compared to those who do not participate in TBL as measured by the modified HTQ.

Statistical Analysis

The statistical test that was used to test hypothesis two was the independent *t*-test. First, the researcher used this test to examine if there were differences between the comparison and intervention groups regarding teamwork self-efficacy and teamwork skills at the start of the study. There were no statistically significant differences found between the two groups regarding teamwork self-efficacy and the teamwork skills of interpersonal skills and communication. However, the mean scores of the adaptability teamwork skill were higher in the comparison group than the intervention group at a statically significant level (see Table 9).

Table 9
Pre-test Differences for Teamwork Self-Efficacy and Teamwork Between groups that did or did not have TBL

	Comparison Group (n = 30)		Intervention Group (n = 34)				
	Mean	*SD*	Mean	*SD*	*t*	*df*	*p*
Teamwork Self-Efficacy	30.83	3.686	29.94	3.329	1.017	62	.313
Teamwork skills							
Interpersonal	50.56	3.302	49.11	4.125	1.554	62	.125
Adaptability	35.80	3.377	33.76	3.845	2.236	62	.029*
Communication	36.16	3.620	34.97	3.647	1.314	62	.194

* $p < .05$

Next, the primary investigator used the independent group *t*-test to see if there were differences between the student groups regarding teamwork self-efficacy and teamwork skills after experiencing either traditional lecture-format teaching or TBL. The findings indicated no

statistically significant differences between the two groups (see Table 10). Therefore, the null hypothesis 2 is accepted, indicating that there is no relationship between teamwork self-efficacy and the teamwork skills of interpersonal skills, adaptability and communication for pre-licensure BSN nursing students who participate in TBL compared to those who do not participate in TBL

Table 10

Post-test Differences for Teamwork Self-Efficacy and Teamwork Between groups that did or did not have TBL

	Comparison Group (n = 30)		Intervention Group (n = 34)				
	Mean	*SD*	Mean	*SD*	*t*	*df*	*p*
Teamwork Self-Efficacy	31.26	3.106	30.29	2.823	1.392	62	.194
Teamwork skills							
Interpersonal	48.83	4.441	49.11	4.708	-.248	62	.805
Adaptability	34.63	3.576	34.64	3.073	-.017	62	.987
Communication	34.93	3.805	35.38	3.946	.462	62	.646

*p <.05

Research Question 3: Is there a relationship between pre-licensure BSN nursing students who participate in TBL experiences compared to nursing students who do not participate in TBL experiences in terms of accountability, preference, and satisfaction?

Hypothesis 3 (H_3): There is a relationship between pre-licensure BSN nursing students who participate in TBL experiences compared to nursing students who do not participate in TBL in terms of accountability, preference, and satisfaction as measured by the TBL-SAI and the modified TBL-SAI.

Null hypothesis (H_0): There is no relationship between pre-licensure BSN nursing students who participate in TBL experiences compared to nursing students who do not participate in TBL in terms of accountability, preference, and satisfaction as measured by the TBL-SAI and modified TBL-SAI.

Statistical Analysis

The statistical test used to test hypothesis three was the independent group *t*-test, and all parametric assumptions were met. The alpha level of significance for the *p*-value in this study is set at 0.05 (Plichta & Kelvin, 2013). The findings indicated that there was no statistically significant difference between the two groups in the preference scale ($p = .549$). However, there were statistically significant differences in the learning experiences between the comparison and intervention group in the accountability ($p = .000$), satisfaction ($p = .11$) and total instrument ($p = .000$) categories (see Table 11). Consequently, the null hypothesis is rejected. Students who participated in TBL had experiences that were more favorable in terms of accountability, satisfaction and overall total experiences.

Table 11
Differences of Student Experiences Between groups that did or did not have TBL

	Comparison Group ($n = 30$)		Intervention Group ($n = 34$)				
	Mean	*SD*	Mean	*SD*	*t*	*df*	*p*
Accountability (neutral 24)	27.50	3.22	34.14	3.51	-7.843	62	.000*
Preference (neutral 48)	51.63	6.52	52.64	6.88	-.602	62	.549
Satisfaction (neutral 27)	30.86	6.58	34.73	5.17	-2.62	62	.011*
Survey Total (neutral 99)	110.00	13.14	121.52	11.78	-3.70	62	.000*

*$p < .05$

Additionally, to measure whether the three subscale variables were in any way related, a correlation coefficient (Pearson's *r*) was run to quantitatively describe the magnitude and direction of variables (Polit & Beck, 2017). This analysis revealed that students' accountability positively correlated with their perceived satisfaction ($r = .447$) in the intervention group, with a significance level of $p = .008$ (see Table 12). Additionally, students' satisfaction positively

correlated with the preference for TBL (r = .475) in the intervention group, with a significance level of p = .005 (see Table 12).

Table 12
Inter-correlations for Accountability, Learning Preference, and Student Satisfaction in the TBL group

Measure on TBL-SAI	1	2	3
Accountability			
Preference for Lecture or TBL	.046		
Student satisfaction	.447**	.475**	

** Correlation is significant at the 0.01 (2-tailed)

In the comparison group result, a positive correlation (r = .624) occurred between students' learning preference and perceived satisfaction (p = .000). There was no correlation between accountability and preference or between accountability and student satisfaction (see Table 13).

Table 13
Inter-correlations for Accountability, Learning Preference, and Student Satisfaction in the lecture format teaching group

Measure on Modified TBL Survey	1	2	3
Accountability			
Preference for Lecture or TBL	.357		
Student satisfaction	.188	.624**	

** Correlation is significant at the 0.01 (2-tailed)

Chapter Summary

This chapter presented the results of the study in terms of a descriptive comparison of the sample, descriptive results of the study variables, measurement assessment, and the statistical analysis of the hypothesis testing. A total of 79 students consented to be in the study and were

included in the demographics and exam data analysis. A total of 64 students completed all three surveys for full data analysis. Findings from the demographic descriptive statistics revealed that the two study groups (comparison and intervention) were homogenous concerning age, gender, and ethnicity demographics. Additionally, the groups had comparable GPAs, average earned college credits, and previous experiences with TBL. In terms of hypothesis testing, findings indicated no significant relationship in the academic performance or teamwork skills between students who participated in TBL and those who did not participate in TBL. However, results from this study indicated that there was more accountability, perceived satisfaction, and overall positive learning experiences in students who participated in TBL than in those who participated in traditional lecture format teaching.

Chapter Five

Introduction

This chapter provides a summary of the study and discusses the findings regarding each of the research questions. The purpose of the study was threefold: firstly, to determine if there was a relationship between the academic performances of pre-licensure BSN students who participated in TBL as compared to those who did not participate in TBL; secondly, to determine if there was relationship between the teamwork self-efficacy and the teamwork skills of interpersonal skills, adaptability, and communication in pre-licensure BSN nursing students who participated in TBL as compared to those who did not participate in TBL; lastly, to determine if there was a relationship between pre-licensure BSN nursing students who participated in TBL experiences compared to nursing students who did not participate in TBL experiences in terms of accountability, preference, and satisfaction. Additionally, this chapter relates conclusions that were drawn, limitations to consider, and implications for nurse educators regarding application to practice, public policy and future research.

Summary of the Study

Multifaceted patient-coordination regimens, coupled with the increased complexity of healthcare systems, requires nurses to have a different skillset, largely not provided in today's nursing curricula (Horsley et al., 2016). Traditional lecture-format educational models in nursing have a discipline-specific, silo-based approach that is outdated as it promotes passive, lower-level, 'task-oriented' thinking (Bressler & Persico, 2016; IOM, 2010). Consequently, nurse educators need to change teaching practices to better prepare nurses to be high-level thinkers capable of effective collaboration and teamwork (Benner et al., 2010).

Team-based learning has grown in popularity as a possible teaching strategy to produce nurses with these high-level skills (Parmalee et al., 2012). This teaching strategy was founded on

Vygotsky's social constructivism (1978), which has guided this study. The theory postulates that when prepared students work together to apply knowledge and construct new meanings, this results in higher mental functioning (Merriam et al., 2007; Michaelsen et al., 2004). Team-based learning incorporates active learning through work in small and large groups in which students collaborate to construct new meaning surrounding concepts. It is conjectured that utilizing TBL as a nursing education pedagogy would produce nurses equipped with higher-level thinking, as demonstrated by improved academic performance on unit exam scores.

Additionally, TBL incorporates the teamwork process model established by Tuckman (1965), which also provided the theoretical framework for this study. Team collaboration and interaction is necessary for peer learning with TBL. Working within a group, moving through the stages of forming, storming, norming and performing, student participants have opportunities to work in teams and develop superior teamwork self-efficacy and teamwork skills of interpersonal skills, adaptability, and communication. Perceptions of these factors were captured using the modified HTQ. According to Farland et al. (2013), approximately 40 hours of exposure with teamwork activities is required for group members to go through Tuckman's stages of collaboration, therefore intervention dosing plays a role in the success of TBL.

Although many benefits of TBL have been identified in the literature, currently there is insufficient research demonstrating objective evidence such as improved exam scores and increased self-efficacy on indirect measures with teamwork in pre-licensure BSN nursing students (Haidet et al., 2014; Sisk, 2011). The study sought to determine if there were relationships relating to TBL's theoretical premises by measuring academic performance, teamwork self-efficacy, and the teamwork skills of interpersonal skills, adaptability, and communication. Additionally, experiences in terms of accountability, preference, and satisfaction

were measured in both groups to identify differences and contribute to the current literature regarding these teaching strategies. The following hypotheses were tested in this study:

Hypothesis 1: There is a relationship between the academic performances of pre-licensure BSN nursing students who participate in TBL compared to those who do not participate in TBL, as measured by unit exam scores.

Hypothesis 2: There is a relationship between teamwork self-efficacy and the teamwork skills of interpersonal skills, adaptability, and communication in pre-licensure BSN nursing students who participate in TBL as compared to those who do not participate in TBL, as measured by the modified HTQ.

Hypothesis 3: There is a relationship between pre-licensure BSN nursing students who participate in TBL compared to nursing students who do not participate in TBL in terms of accountability, preference, and satisfaction as measured by the TBL-SAI and TBL-SAI.

This study utilized a quasi-experimental correlational design to compare academic performance, teamwork self-efficacy, teamwork skills, and experiences between students who participated in traditional lecture-format teaching and those who experienced the TBL strategy. Due to the events of COVID-19 and the required transition to online learning in the middle of the academic semester, the TBL strategy was stopped early, after three intervention doses. This poses an internal threat to validity that will be discussed in the Limitations section of this paper. The results presented here are based upon the first seven weeks of the course instead of the original plan of 14 weeks. Data was collected via paper surveys at the start of the study and with electronic surveys via Qualtrics© at the end of the study. The data was analyzed using SPSS 26.0 software. After establishing homogeneity between the comparison and the intervention group,

hypotheses were tested using independent group *t*-test, paired group *t*-test, and Pearson product-moment correlations.

Integration of Findings from Previous Literature

Hypothesis 1 stated that there is a relationship between the academic performances of pre-licensure BSN nursing students who participate in TBL compared to those who do not participate in TBL, as measured by unit exam scores. This hypothesis was not supported in the study. The results from the *t*-test analysis showed that there was no statistically significant difference between the two groups in either of the unit exam scores. Therefore, while the students who participated in TBL did not do better in exams than those who had traditional lecture-format teaching, the comparable scores suggest that TBL is equally as effective as traditional teaching methods. These results are consistent with studies by Mennenga (2012) and Huitt et al. (2015), in which unit exams scores were comparable between students who had TBL and traditional lecture-format teaching. This differs from other research that revealed improved academic performance when TBL was implemented into the classroom (Bleske, 2016; Harman & Hills, 2015; Branson, 2016; Du & Yang, 2017). There are several possible reasons why the study results deviated from previous quasi-experimental studies. One reason could be due to the shortened implementation time of the study from 14 weeks to seven, due to the COVID-19 pandemic. According to Tuckman (1965), it takes time for a team to reach the final stages of performing, so perhaps the student teams were not yet working at an optimal level and transforming student integration of knowledge at a testable level.

Another possible explanation for the conflicting results of this study could be due to inappropriate measures used to assess the higher-level learning. Studies that exhibited increased exam performance were done on students in the latter part of their nursing program and with

comprehensive tests that likely contained more application- and analysis-level questions. The objective of TBL, based on the assumptions of social constructivism, is to produce learners capable of a deeper, longer-lasting understanding required for exams with a higher cognitive level. Unit exams in the first-semester nursing courses are primarily composed of questions that test a lower cognitive level (knowing and understanding), therefore the depth of learning may not be have been reflected in the exam scores in this study.

Hypothesis 2 stated that there is a relationship between teamwork self-efficacy and the teamwork skills of interpersonal, adaptability, and communication in pre-licensure BSN nursing students who participate in TBL as compared to those who do not participate in TBL as measured by the modified HTQ**.** This hypothesis was not supported by the results in the study. Both participant groups had positive perceptions of their ability to work in teams effectively, using important teamwork skills with no significant differences between them. Additionally, TBL participants' perceptions about their ability to work in teams showed no appreciable change over the semester. This is contrary to evidence related in previous literature (Kim & Kang, 2017; Kim & Hong, 2016; Park et al., 2015) in which participants who experienced TBL had a significant improvement in their perceived abilities to work effectively in teams, with improved interpersonal, adaptability, and communication skills. This could be directly related to the limited number of opportunities in which the students were able to work in their teams (three intervention doses) due to the unavoidable changes with the COVID-19 pandemic. Another possible contributing factor to a lack of change in students' perceptions from pre-test to post-test may be related to an initial overestimation of teamwork self-efficacy and teamwork skills. During the first semester of the nursing program, students have no exposure to working with the healthcare team in a clinical setting. Thus, their responses to teamwork survey questions is most

likely based upon previous classroom teamwork experiences, in which they feel quite confident. It is conceivable that student self-reports on the pre-test, in both groups, may have been overestimated, thus showing no changes over time when compared to the post-test surveys. Furthermore, results revealed no statistically significant difference between the groups after the study with regards to teamwork self-efficacy and perceived teamwork skills. Though both groups had positive perceptions about teamwork, neither teaching strategy had a superior effect on how students perceived their teamwork self-efficacy and teamwork skills after the study. This information contributes greatly to the literature, as previous studies have not addressed comparisons between these two teaching strategies using the modified HTQ.

Hypothesis 3 stated that there is a relationship between pre-licensure BSN nursing students who participate in TBL experiences compared to nursing students who do not participate in TBL in terms of accountability, preference, and satisfaction. Results revealed that students who participated in TBL had higher levels of accountability, satisfaction, and the overall TBL experience when compared with students who had traditional lecture-format teaching. Previous studies of this kind evaluated student experiences with the teaching strategy of TBL only and did not compare them with students who experienced traditional lecture-format teaching. Therefore, the conclusion can be drawn from the study that TBL may be superior to traditional lecture-format teaching in effectively increasing student accountability and satisfaction in the classroom. These findings can be further supported to a higher level of probability through additional repetitive and rigorous research. This contributes unique information to the current literature regarding student experiences with TBL and traditional lecture-format teaching. It is important to note that the intervention group revealed similar positive perceptions regarding accountability, preference, and satisfaction as in previous studies

(Branney & Priego-Hernández, 2018; Branson et al., 2016; Corbridge et al., 2013; Faezi et al., 2018; Mennenga, 2013; Mennenga, 2015).

Implications of the Findings

The objective of the study was to determine if there is a relationship between the academic performance, teamwork self-efficacy or teamwork skills, and student experiences of pre-licensure BSN nursing students who participated in TBL when compared to those who did not participate in TBL. Results revealed no statistically significant differences between the two groups with regards to academic performance or teamwork self-efficacy and teamwork skills. However, there was a statistically significant difference between the comparison and intervention groups regarding their perceived experiences with the two teaching strategies. Students who participated in TBL reported higher levels of accountability, satisfaction, and the overall learning experience when compared to those who participated in traditional lecture-format teaching. These findings have implications that may influence future nursing education, practice, research, and public policy.

Implications for Nursing Education

Findings from landmark work by Benner et al. (2010) indicate the need for nurse educators to change teaching practices to prepare nurses for high-level thinking and the application of clinical reasoning. Moreover, recommendations from the IOM (2010), "The Future of Nursing: Leading change, advancing health" indicate that nursing education needs to prepare nursing graduates to work both collaboratively and effectively with other health professionals in a rapidly changing, complex healthcare system. The data from the study may influence nurse educators to make decisions regarding a change in educational pedagogy from passive student learners to more active student learners to meet these two educational directives.

The study supports the assumption the change in educational theory and classroom design will not diminish academic outcomes (test scores) and is likely to increase student accountability and satisfaction with learning. Learners who are more satisfied with their learning experiences move toward the goal of life-long learning – an integral message identified by the IOM (2010) as part of the transformation of nursing education. The results show that students will benefit by maintaining teamwork self-efficacy and teamwork skills, even if they do not show actual improvements in these areas with TBL. The use of an educational pedagogy that uses students working in teams helps to contribute to IOM's (2010) goal of preparing nurses to work collaboratively with other healthcare professions. Finally, due to the COVID-19 global pandemic and the need to transition to online education, it is evident that there is a lack of readily available resources for implementing TBL virtually. This study supports the need for nurse educators to develop these approaches in the future.

Implications for Nursing Practice

The additional information gathered from this study regarding TBL as a conceivable way to increase student nurses' accountability and satisfaction has direct implications for future nurses working in practice. This directly contributes to directives from the IOM (2010) and AACN (2010) to produce nurses with competencies geared toward clinical reasoning skills which ensure quality and safe patient care (Oldland et al., 2017). Student nurses who are more accountable in the classroom setting may become nurses who are more accountable to patient quality and safety initiatives in the practice setting as part of the healthcare team. Although patient safety issues are known to have multiple causative factors, research by Aveling, Parker, and Dixon-Woods (2016) revealed that without the moral responsibility (accountability) of the individual healthcare member, safety would be impossible. Furthermore, as nursing has been

identified as one of the most trusted professions, nurse professionals hold themselves answerable to both themselves and others, otherwise known as accountability (Baite & Steelman, 2014).

Furthermore, students familiar with the nursing responsibilities related to accountability and teamwork skills practiced with TBL are likely to experience an improved transition to the role of a new graduate nurse. Kovner et al., (2007) identified a need to focus on the difficulties facing new nurses with the transition from education to practice to minimize new nurses leaving the nursing profession, contributing to a high turnover rate. This directly addresses nursing attrition, one of the IOM focuses in the 2010 report "The Future of Nursing: Leading change, advancing health."

Implications for Public Policy

The IOM, AHRQ, AACN, and WHO endorse patient safety initiatives that include teamwork to enhance clinicians critical thinking skills (Horsley et al., 2016). While this study found that TBL did not directly influence teamwork self-efficacy or skills, this teaching strategy did improve student perceptions of both accountability and satisfaction when compared to traditional lecture-format teaching. Nurses educated with a better understanding of accountability and higher expectations of accountability may be more likely to be more accountable to patients through safety research and application initiatives. The results of this study revealed a need for future studies that contribute to the continued development of educational pedagogies that transform nursing education. Therefore, nurse leaders should advocate for public policies that fund nurse scientists to research educational pedagogies that include students working in teams.

Implications for Nursing Research and Knowledge Development

Information from this study contributes to the current knowledge of the effects of TBL on pre-licensure student nurses in terms of academic performance, perceptions of teamwork, and

learning experiences. Although there were no significant findings related to academic performance and perceptions of teamwork, the study findings did show an increase in accountability, satisfaction, and overall learning experiences when the TBL strategy was implemented. This further validates Vygotsky's theory, which states that learners create new meanings at a higher level when they work in teams. For this to occur, students must come to class prepared by completing pre-class assignments, which makes them more self-directed and accountable learners. According to Vygotsky (1978), these required antecedents contribute to the success of social constructivism.

The study findings also reveal numerous opportunities for future research in this area. Future academic performance comparisons could include testing students at the application or analysis level, often implemented in higher-level nursing courses. Additionally, as tests are not the only way to assess learning, further research should explore the effect of TBL on other measurable student outcomes that incorporate higher-level thinking. Likewise, as students' teamwork self-efficacy and teamwork skills showed no appreciable change, future studies should consider incorporating more exposure to class teamwork activities (TBL modules) so that teams have the time required to reach the functional teamwork stage of performing. Additionally, researchers should consider evaluating these entities after students have experienced clinical teamwork to investigate this hypothesis further. Research that includes nursing students from other geographical areas of the country, academic institutions, or nursing program types may yield a more diverse population, making the outcomes more generalizable to other nursing student populations. As learned from the unavoidable transition to an entirely online platform, further research is needed to develop and assess the implementation of the TBL strategy online.

Reliability testing on the modified TBL-SAI used in this study indicate that further revisions and psychometric testing is needed to affirm the validity of this modified tool.

Researchers can use this design and research methodology to replicate the study using a larger sample size, more TBL modules, and formal faculty training with TBL to improve the trustworthiness of the data outcomes. There was a significant student participant attrition from beginning (paper surveys done in class) to the end of the study (electronic surveys done online) due to the COVID-19 pandemic. Post-test survey collection occurred during a very stressful time for the student participants as they had to leave the university abruptly and transition to an online learning platform. As such, researchers should consider surveys given in class as a more dependable method to maintain the sample size.

Limitations

Findings from the study may contribute to nursing education, practice, policy, and further research. However, several limitations have been identified that must be considered when evaluating the application of this teaching strategy with other student populations in other geographical areas. The limitations of this study include small sample size, participants from one academic institution in one geographical location, self-reporting surveys, faculty inexperienced with TBL, and matters related to the unanticipated events associated with the COVID-19 pandemic. These limitations of the study will be discussed with regards to their threats to external or internal validity and the type of errors that can occur.

Threats to External Validity

According to Polit and Beck (2017)**,** external validity is the extent to which the outcomes inferred from the study can truthfully apply to other settings and populations. The academic institution and program in the study were chosen for convenience and accessibility to the

investigator. Participants in this study were traditional college students who were predominantly female, non-Hispanic White people. Thus, the results of the study can only be generalized to populations with similar characteristics. The fact that the sample comes from one pre-licensure BSN program in a moderately sized, private university in the southeastern U.S limits the generalizability to students from other geographical areas and diverse populations. Additionally, the results are not generalizable to students in other levels of the program or other nursing programs such as Licensed Practical Nursing (LPN), Associate Degree Nursing (ADN), or Registered Nurse-to-BSN nursing programs.

Another threat to external validity is the small sample size (n = 30, comparison group; n = 34, intervention group) due to the initial fixed student enrollment size and attrition of student participants completing the post-intervention surveys. The small sample size in this study led to a decrease in the power and confidence level required (see Chapter 3), which may lead to a type II error. A type II error occurs when the investigator accepts the null hypothesis to be true when they should not (Downing & Yudkowsky, 2009). Essentially, a smaller sample size may not show significant differences in teamwork self-efficacy and teamwork skills between the comparison and the intervention group. A larger sample size may reveal a significant difference between the groups with the intervention of the TBL teaching strategy. Additionally, due to the shortened length of the study, only the first two unit exams were appropriate for analysis. Significant differences may have been noted in exams three and four, done in the second half of the semester where testing contained items at a higher cognitive level.

Threats to Internal Validity

Internal validity is the degree of probability to which the outcomes in a research study were caused by the intervention rather than other extraneous variables (Polit & Beck, 2017).

Threats to internal validity encompass a wide range of factors that compromise the truth-value (*p*-value) of data collected (Polit & Beck, 2017). Threats to internal validity may lead to what is known as a type I error. A type I error occurs when the null hypothesis is rejected when it is in fact true. The quasi-experimental correlational design used in this study, risks competing explanations for what has caused the outcomes (Polit & Beck, 2017). This causes a threat to the internal validity of this study in several ways. Firstly, the nonrandomized sample methodology does not guarantee that the groups are equivalent. To mitigate this threat, students were placed into the groups systematically, according to GPA ranking, which contributed to establishing academic homogeneity between the comparison and intervention groups. Therefore, the outcomes observed should reflect the effects of the independent variable, rather than any original differences in the groups. Secondly, maturation of the participants during the study with regards to study habits and teamwork exchanges could result from the passage of time rather than the independent variable. Finally, the testing and instrumentation of self-report and pre- and post-test surveys lend to either participant bias or boredom, thus possibly affecting the internal validity of the data results (Polit & Beck, 2017). While most nursing studies involve data collected through self-reporting surveys because of the advantages of directness, efficiency, and versatility, there are weaknesses to consider when interpreting these results (Polit & Beck, 2017). Self-reporting relies on the trustworthiness of the participant, which can be affected by the accuracy of their understanding of the questions being asked and their desire to present themselves positively. Moreover, the participants' circumstances on survey collection days may affect how they respond to the questions. In this study, post-test survey collection occurred during a very stressful time for the student participants, as they had to leave the university abruptly and transition to an online learning platform.

Another threat to internal validity causing a possible limitation to the study was the lack of previous experience with the TBL strategy of the faculty member teaching the intervention group. Furthermore, due to the infrequency of TBL employed as a teaching strategy at the university, the student participant sample had limited previous experiences with TBL. Therefore, the lack of experience of both faculty and students with the TBL strategy may have affected the implementation process and student responses regarding accountability, preference, and satisfaction on the TBL-SAI (Clark et al., 2008; Mennenga, 2013; Mennenga, 2015).

Lastly, disruption from the Covid-19 pandemic caused a substantial threat to internal validity. One consequence of COVID-19 was the shortened educational intervention dosing with the teaching strategy of the study, which may have led to either positive or negative biases. According to Tuckman's teamwork model, it takes time for teams to work effectively together to construct new learning. Farland et al. (2019) reported that it takes over 40 hours to work effectively in teams. It is likely that the teams in the intervention group were not working at their full potential after seven weeks, with only three doses (9 hours) of the intervention completed. This could lead to a lack of valid results when evaluating unit exam scores, modified HTQ surveys, and the TBL-SAI and modified TBL-SAI surveys.

Recommended Future Studies

Since exams in first-semester nursing courses are primarily comprised of questions that test at a lower cognitive level (knowing and understanding), the depth of learning may not be have been reflected in the exam scores in this study. Future research could include academic performance comparisons in advanced nursing courses, where testing is done at a higher cognitive level (application or analysis). The fact that the sample came from one pre-licensure BSN program in a moderately sized, private university in the southeastern region of the U.S,

limits the generalizability to students from other geographical areas and diverse populations. Prospective research that includes nursing students from other geographical areas of the country, academic institutions, or nursing program types may yield a more diverse population, making the outcomes more generalizable to other nursing student populations. The small sample size in this study led to a decrease in the power and confidence level. The reduction of student exposure to the TBL modules due to early termination of the intervention dosing may have affected the study outcomes. In addition, lack of faculty and student experiences with TBL could have affected the implementation process and students' perceptions regarding the teaching strategy. Therefore, researchers can use this design and research methodology to replicate the study using a larger sample size, increasing the number of TBL modules, and incorporating more formal faculty training with TBL to improve the trustworthiness of the data outcomes.

Chapter Summary

The purpose of this study was to compare the use of TBL with traditional lecture-format teaching in a first-semester Foundations of Nursing Practice course in pre-licensure BSN nursing students. With a quasi-experimental design, the study compared the academic performance, teamwork self-efficacy, teamwork skills (interpersonal skills, adaptability, and communication) and student experiences (accountability, preference, and satisfaction) between those who experienced TBL and those who experienced traditional lecture-format teaching. Data were collected from a convenience sample of 79 pre-licensure BSN nursing students enrolled at a moderate-sized private university in Florida. The implementation of TBL was to occur over a fourteen-week academic semester. However, it was ended early (after seven weeks) due to the global COVID-19 pandemic and a mandatory change to an online learning format. At the start of the study, data were collected from the comparison group (n = 40) and the intervention group (n

= 39) using a researcher-designed demographic survey and the modified HTQ (Marshall, 2003) in paper format. After the study, data were collected from the comparison group (n = 30) and the intervention group (n = 34) using the same modified HTQ, the TBL-SAI (Mennenga, 2010) and the researcher-modified TBL-SAI electronically via Qualtrics©. Additionally, exam scores were collected for both student groups for unit exams one and two.

Homogeneity between the two groups was established using *t*-test for independent groups for parametric data and chi-square for non-parametric data. Hypotheses were tested using independent group *t*-test, paired group *t*-test and Pearson's product-moment correlations. Hypotheses 1 and 2 were not supported. Hypothesis 3 was supported as students who participated in TBL had a more favorable experience in terms of accountability, satisfaction, and the total experience, when compared with students who participated in traditional lecture-format teaching. Additionally, when participating in TBL, students' accountability positively correlated with their perceived satisfaction, and students' satisfaction positively correlated with the preference for TBL.

The findings from this study indicated that the academic performance, teamwork self-efficacy, and teamwork skills of students participating in TBL were equivalent to those of students participating in traditional lecture-format teaching. However, student experiences were more favorable toward TBL in terms of accountability and satisfaction. This supports the idea that using the TBL pedagogy may enhance the students' learning experience, while neither jeopardizing their academic performance nor their perceptions about working in teams. These findings also suggest that the increased accountability with TBL positively correlates to student learning satisfaction. The results from this study added a new dimension to the literature, not previously studied, that is valuable to nurse educators who are considering changes to current

traditional educational pedagogy. TBL may produce students who have greater positive perceptions related to accountability and satisfaction. Nurses who are accountable in student learning in teams will likely be more accountable when following safe practice and quality of care initiatives and when supporting public policy recommendations through research.

References

American Association of Colleges of Nursing. (2010). Quality and safety education for nurses (QSEN). Retrieved from https://www.aacnnursing.org/Faculty/Teaching-Resources/QSEN

Aveling, E. L., Parker, M., & Dixon-Woods, M. (2016). What is the role of individual accountability in patient safety? A multi-site ethnographic study. *Sociology of health & illness*, *38*(2), 216-232. https://doi.org/10.1111/1467-9566.12370

Baite, R., & Steelman, V. M. (2014). Accountability in nursing: Why it is so important in patient safety. *Association of Perioperative Registered Nurses, 100*(5), 537-541. http://dx.doi.org/10.1016/j.aorn.2014.08.008

Benner, P., Sutphen, M., Leonard, V., & Day, L. (2010). *Educating nurses: A call for radical transformation.* San Francisco, CA: Jossey-Bass.

Bleske, B., Remington, T., Wells, T., Klein, K, Guthrie, S., Tingen, J., ... Dorsch, M. (2016). A randomized crossover comparison of team-based learning and lecture format on learning outcomes. *American Journal of Pharmaceutical Education, 80*(7), 1-5.

Branney, J., & Priego-Hernández, J. (2018). A mixed-methods evaluation of team-based learning for applied pathophysiology in undergraduate nursing education. *Nursing Education Today, 61*, 127-133. doi:https://doi.org/10.1016.j.nedt.2017.11.014

Branson, S., Boss, L., & Fowler, D. (2016). Team-based learning: Application in undergraduate baccalaureate nursing education. *Journal of Nursing Education and Practice, 6*(4), 59-64. doi:10.5430/jnep.v6n4p59

Bressler, T., & Persico, L. (2016). Interprofessional education: Partnership in the educational process. *Nurse Education in Practice, 16*(1), 144-147. http://dx.doi.org/10.1016/j.nepr.2015.07.004

Cheng, C., Liou, S., Hsu, T., Pan, M., Liu, H., & Chang, C. (2014). Preparing nursing students to be competent for future professional practice: Applying the team-based learning-teaching

strategy. *Journal of Professional Nursing, 30*(4), 347-356. doi:10.1016/j.profnurs.2013.11.005.

Cho, Y. H., & Kweon, Y. (2017). Effects of team-based learning on communication competence for undergraduate nursing students. *Journal of Korean Academic Psychiatric Mental Health Nursing, 26*(1), 101-110. doi:10.12934/jkpmhn.2017.26.1.101

Christensen, L., Johnson, R., & Turner, L. (2013). *Research methods: Design and analysis* (12th ed.). Upper Saddle River, NJ: Pearson

Clark, M., Nguyen, H. T., Bray, C., & Levine, R. (2008). Team-based learning in an undergraduate nursing course. *Journal of Nursing Education, 47*(3), 111-117.

Corbridge, S., Corbridge, T., Tiffen, J., & Carlucci, M. (2013). Implementing team-based learning in a nurse practitioner curriculum. *Nurse Educator, 38*(5), 202-205. doi:10.1097./NNE.0b013e3182a0e416.

Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). Thousand Oaks, CA: Sage

Currey, J., Oldland, E., Considine, J., Glanville, D., & Story, I. (2015). Evaluation of postgraduate critical care nursing students' attitudes to, and engagement with, team-based learning: A descriptive study. *Intensive and Critical Care Nursing, 31*(1)*,* 19-28. doi:10.1016/j.iccn.2014.09.003.

Dearnley, C., Rhodes, C., Roberts, P., Williams, P., & Prenton, S. (2018). Team based learning in nursing and midwifery higher education; A systematic review of the evidence for change. *Nurse Education Today, 60*, 75-83. http://dx.doi.org/10.1016/j.nedt.2017.09.012

Della Ratta, C. (2015). Flipping the classroom with team-based learning in undergraduate nursing education. *Nurse Educator, 40*(2), 71-74. doi:10.1097/NNE.0000000000000112.

Downing, S. M., & Yudkowsky, R. (Ed.). (2009). *Assessment in health professions education.* London, United Kingdom: Routledge.

Du, B., & Yang, X. (2017). The effect of team-based learning on conventional pathology education to improve students' mastery of pathology. *International Journal of Higher Education, 6*(3), 12-20.

Everly, M. C. (2013). Are students' impressions of improved learning through active learning methods reflected by improved test scores? *Nurse Education Today, 33*(2), 148-151. http://dx.doi.org/10.1016/j.nedt.2011.10.023

Faezi, S., Moradi, K., Amin, A., Akhlaghi, M., & Keshmiri, F. (2018). The effects of team-based learning on learning outcomes in a course of rheumatology. *Journal of Advances in Medical Education & Professionalism, 6*(1), 22-30.

Farland, M. Z., Sicat, B. L., Franks, A. S., Pater, K. S., Medina, M. S., & Persky, A. M. (2013). Best practices for implementing team-based learning in pharmacy education. *American Journal of Pharmacy Education, 77*(8), 1-10. http://doi.org/10.5688/ajpe778177

Faul, F., Erdfelder, E., Buchner, A., & Lang, A.-G. (2009). Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods, 41*(4), 1149-1160.

Ghasemi, A., & Zahediasl, S. (2012). Normality tests for statistical analysis: A guide for non-statisticians. *International Journal of Endocrinology & Metabolism, 10*(2), 486-489. doi:10.5812/ijem.3505

Haidet, P., Kubitz, K., & McCormack, W. T. (2014). Analysis of the team-based learning literature: TBL comes of age. *Journal of Excellence in College Teaching, 25*(3-4), 303-333.

Haidet, P., Levine R. E., Parmelee, D. X., Crow, S., Kennedy, F., Kelly, P. A., Perkowski, L., ... Richards, B. F. (2012). Guidelines for reporting team-based learning activities in the medical and health sciences education literature. *Academic Medicine, 87*(3), 292-299.

Harman, B. R., & Hills, R. (2015). Transforming psychiatric mental health nursing education with team-based learning. *Archives of Psychiatric Nursing, 29*(6), 413-418. doi: 10.1016/j.apnu.2015.06.014

Horsley, T. L., Reed, T., Muccino, K., Quinones, D., Siddall, V. J., & McCarthy, J. (2016). Developing a foundation for interprofessional education within nursing and medical curricula. *Nurse Educator, 41*(5), 234-238. doi:10.1097/NNE.0000000000000255.

Huitt, T. W., Killins, A., & Brooks, W. S. (2014). Team-based learning in the gross anatomy laboratory improves academic performance and students' attitudes toward teamwork. *Anatomical Sciences Education, 8*(2)*,* 95-103

Institute of Medicine. (2010). *The future of nursing: Leading change, advancing health.* Washington, DC: The National Academic Press.

Kalb, K. A., O'Conner-Von, S. L., Brockway, C., Rierson, C. L., & Sendelbach, S. (2015). Evidence-based teaching practice in nursing education: Faculty perspectives and practices. *Nursing Education Perspectives, 36*(4), 212-219.

Khodaveisi, M., Qaderian, K., Oshvandi, K., Soltanian, A. R., Vardanjani, M. M., & Khalili, A. (2016). Comparison of two methods: TBL-based and lecture-based in nursing care of patients with diabetes in nursing students. *International Journal of Medical Research & Health Sciences, 5*(8), 211-217.

Kim, H., Choi, E., & Kang, H. (2011). Simulation module development and team competency evaluation. *Journal of Korean Academy of Fundamentals of Nursing, 18*(3), 392.

Kim, E., & Hong, S. (2016). Effects of team-based learning on nursing students' major satisfaction, critical thinking, communication skills, problem solving, and self-directed learning of nursing students. *Information, 19*(8 Suppl. B), 3371-3376.

Kim, S., & Kang, J. (2017). Effects of team-based learning in nursing education. *Information, 20*(11), 7947-7954.

Kovner, C. T., Brewer, C. S., Fairchild, S., Poornima, S., Kim, H., & Djukic, M. (2007). Newly licensed RNs' characteristics, work attitudes, and intentions to work. *AJN The American Journal of Nursing*, *107*(9), 58-70.

Kuehl, M. A. (2001). *Teamwork Skills and Their Impact Upon the United States Marine Corps Aviation Community* (Unpublished doctoral dissertation). Los Angeles: University of Southern California.

Marshall, L. C. (2003). *The relationship between efficacy, team-work, effort and patient satisfaction* (Unpublished doctoral dissertation). Los Angeles: University of Southern California.

Mennenga, H. A. (2015). Time to adjust: Team-based learning 2 years later. *Nurse Educator*, *40*(2), 75-78. doi:10.1097/NNE.0000000000000116.

Mennenga, H. A. (2012). Development and psychometric testing of the team-based learning student assessment instrument. *Nurse Educator, 37*(4), 168-172.

Mennenga, H. A. (2013). Student engagement and examination performance in a team-based learning course. *Journal of Nursing Education, 52*(8), 475-479. doi:10.3928/01484834-20130718-04

Merriam, S., Caffarella, R., & Baumgartner, L. (2007). *Learning in adulthood: A comprehensive guide* (3rd ed.). Hoboken, NJ: John Wiley & Sons.

Michaelsen, L. K. (2004). Getting started with team-based learning. In L. K. Michaelsen, A. B. Knight, & L. D. Fink (Eds.). *Team-based learning. A transformative use of small groups in college teaching* (pp. 27-50). Sterling, VA: Stylus.

Michaelsen, L. K., & Sweet, M. (2011). Team-based learning. *New Directions for Teaching and Learning, 128,* 41-51.

Michaelsen, L. K., Davidson, N., & Major, C. H. (2014). Team-based learning practices and principles in comparison with cooperative learning and problem-based learning. *Journal of Excellence in College Teaching, 25*(3 & 4), 57-84.

Michaelsen, L. K., Knight, A. B., & Fink, L. D. (Eds.). (2004). *Team-based learning. A transformative use of small groups in college teaching.* Sterling, VA: Stylus.

Michaelsen, L. K., Parmelee, D. X., McMahon, K. K., & Levine, R. E. (Eds.). (2008). *Team-based learning for health professions education.* Sterling, VA: Stylus.

Middleton-Green, L., & Ashelford, S. (2013). Using team-based learning in teaching undergraduate pathophysiology for nurses. *Health and Social Care Education, 2*(2), 53-58. https://doi.org/10.11120/hsce.2013.00031.

Miles, J. M., Larson, K. L., & Swanson, M. (2017). Team-based learning in a community health nursing course: Improving academic outcomes. *Journal of Nursing Education, 56*(7), 425-429. doi:10.3928/01484834-20170619-07

Morton, D. A., & Colbert-Getz, J. M. (2016). Measuring the impact of the flipped anatomy classroom: The importance of categorizing an assessment by Bloom's taxonomy: Impact of the flipped anatomy classroom. *Anatomical Science Education, 10*(2), 170-175. doi:10.1002/ase.1635

Nieswiadomy, R. M., & Bailey, C. (2018). *Foundations of nursing research* (7th Ed.) New York, NY: Pearson

O'Neil, H., Chung, G., & Brown, R. (1997). Use of networked simulations as a context to measure team competencies. In H. F. O'Neil, Jr. (Ed.), *Workforce Readiness: Competencies and Assessments* (pp. 411-452). Mahwah, NJ: Lawrence Erlbaum Associates.

Oldland, E., Currey, J., Considine, J., & Allen, J. (2017). Nurses perceptions of the impact of team-based learning participation on learning style, team behaviours and clinical performance: An exploration of written reflections. *Nurse Education in Practice, 24*, 62-69.

O'Neil, H. F., & Herl, H. (1998). Reliability and validity of a trait measure of self-Regulation. In *the Annual Meeting of the American Educational Research Association*.

Park, H., Kim, C. K., Park, J., & Park, E. (2015). Effects of team-based learning on perceived teamwork and academic performance in a health assessment subject. *Science Direct, 22*(3)*,* 299-305.

Parmelee, D., Michaelsen, L. K., Cook, S., & Hudes, P. D. (2012). Team-based learning: A practical guide: AMEE guide no. 65. *Medical teacher*, *34*(5), 275-287.

Petersen, K., & Gencel, C. (2013). Worldviews, research methods, and their relationship to validity in empirical software engineering research. In *2013 Joint Conference of the 23rd International Workshop on Software Measurement and the 8th International Conference on Software Process and Product Measurement* (pp. 81-89). New York, NY: IEEE. Retrieved from http://dl.acm.org/citation.cfm?id=2551833

Petty, G. (2006). *Evidence based teaching.* Gloucestershire, United Kingdom: Nelson-Thorne.

Petty, M. E., & Means, K. M. (2008). Reinvigorating a residency program through team-based learning: The experience of a physical medicine and rehabilitation program. In S. P. Kellar & E. A. Kelvin (Ed.), *Munro's statistical methods for health care research* (6th ed., pp. 203-213). Philadelphia, PA: Lippincott Williams and Wilkins

Plichta, S. B., & Kelvin E. (2013). *Munro's statistical methods for health care research.* (6th ed.)

Philadelphia: Lippincott Williams and Wilkins

Polit, D. F., & Beck, C. T. (2017). *Nursing research: Generating and assessing evidence for nursing practice* (10th ed.). Philadelphia, PA: Lippincott Williams and Wilkins

Quality and Safety Education for Nurses. (2015.). QStudent#6 teamwork and collaboration, Retrieved from http://qsen.org/teamwork-collaboration/

Richards, L., & Morse, J. M. (2013). *Readme first for a user's guide to qualitative methods* (3rd ed.). Thousand Oaks, CA: Sage

Roh, Y. S., Lee, S. J., & Choi, D. (2015). Learner perception, expected competence and satisfaction of team-based learning in Korean nursing students. *Nurse Education Perspectives, 36*(2), 118-120. doi:10.5480/13-1200

Scott, P. (1998). Teacher talk and meaning making in science classroom: A Vygotskian analysis and review. *Studies in Science Education, 32,* 45-80.

Sisk, R. (2011). Team-based learning: Systematic Research Review. *Journal of Nursing Education, 50*(12), 665-669. doi:10.3928/01484834-20111017-01.

Speakman, E., & Arenson, C. (2015). Going back to the future: What is all the buzz about interprofessional education and collaborative practice. *Nurse Educator,40*(1), 3-4.

Thomas, M. D., & McPherson, B. J. (2011). Teaching positive psychology using team-based learning. *The Journal of Positive Psychology, 6*(6), 487-491.

Tuckman, B. W. (1965). Developmental sequence in small groups. *Psychological Bulletin, 63*(6), 384-399.

Vygotsky, L. S. (1978*). Mind in society: The development of higher psychological processes.* Cambridge, MA: Harvard University Press.

Whitley, H. P., Bell, E., Eng, M., Fuentes, D. G., Helms, K. L., Maki, E. D., & Vyas, D. (2015). Practical team-based learning from planning to implementation. *American Journal of Pharmaceutical Education*, *79*(10), 1-12.

York, T. T., Gibson, C., & Rankin, S. Defining and Measuring Academic Success. *Practical Assessment, Research & Evaluation*, *20*, 1-20. Retrieved from https://scholarworks.umass.edu/cgi/viewcontent.cgi?article=1260&context=pare

Appendix A

IRB Approvals

Research Compliance <reply-to+46de9d06-af49-4666-8681-d94fe84c3979@email.submittable.com>
Wed 4/22/2020 7:58 PM

Dear Tressa Pedroff:
We have received your update for proposal 19-115. These changes have been noted and you can continue collecting data. Please advise us of any changes.

Sincerely,

Stephen Blessing
IRB Committee Chair

Research Compliance <reply-to+d5fefae4-0d5c-40f9-aecf-ae075db74e44@email.submittable.com>
Tue 1/21/2020 1:59 PM

Dear Tressa Pedroff:
We have received your update for proposal 19-115. These changes have been noted and you can continue collecting data. Please advise us of any changes.

Sincerely,

Stephen Blessing
IRB Committee Chair

Research Compliance <reply-to+f6972b8a-e946-46b0-8be0-54e42e06e4b4@email.submittable.com>
Mon 12/2/2019 2:12 PM

Tressa Pedroff:

The IRB has granted your proposal, 19-115: Comparison of pre-licensure BSN student outcomes between team-based and traditional learning methods, exempt status as described in 45 CFR 46.104 of the Department of Health and Human Services Policy for the Protection of Human Subjects. This indicates that no further involvement by the IRB is necessary.

If the protocol is modified from this submission, please notify the IRB as soon as possible. We have a form available with which to update your proposal.

Sincerely,

Dr. Stephen Blessing
IRB Committee Chair

IRB Inbox <irb@nova.edu>
Fri 4/17/2020 11:17 AM
To: Tressa Pedroff;

Tressa Pedroff; Marcia Derby-Davis

Dear Tressa Pedroff,

The IRB Office has reviewed your Amendment to your study, Comparison of pre-licensure BSN student outcomes between team-based and traditional learning methods, and determined that the study remains EXEMPT.
You may continue work on the study and immediately incorporate the approved Amendment.
Please email the IRB Office know if you require a formal memorandum in this regard.

Thank you for your cooperation,
Institutional Review Board
Nova Southeastern University
954-262-5369

NOVA SOUTHEASTERN UNIVERSITY
NSU Institutional Review Board

MEMORANDUM

To: **Tressa Pedroff**
Ron and Kathy Assaf College of Nursing

From: **Office of the Institutional Review Board**

Date: **January 17, 2020**

Subject: **IRB Exempt Amendment Approval Memo**

TITLE: **Comparison of pre-licensure BSN student outcomes between team-based and traditional learning methods– NSU IRB Protocol Number 2019-545**

Dear Principal Investigator,

Your submission has been reviewed and approved by the Institutional Review Board on November 5, 2019. You may proceed with your study.

Please Note: If you receive stamped copies of consent, assent, and recruiting materials indicating approval date, these documents must be used when recruiting and consenting or assenting participants.

Level of Review: Exempt

Type of Approval: Amendment

Exempt Review Category: Exempt 1: Educational research in educational settings

Post-Approval Monitoring: The IRB Office conducts post-approval review and monitoring of all studies involving human participants under the purview of the NSU IRB. The Post-Approval Monitor may randomly select any active study for a Not-for-Cause Evaluation.

Final Report: You are required to notify the IRB Office within 30 days of the conclusion of the research that the study has ended using the IRB Closing Report Form.

The following modifications were approved:

- Addition of/change to informed consent/assent documents(s) and/or procedures

Translated dDocuments: No

CC: Marcia Derby-Davis

Marcia Derby-Davis

3301 College Avenue • Fort Lauderdale, Florida 33314-7796

(954) 262-5369 • 866-499-0790 • Fax: (954) 262-3977 • Email: *irb@nova.edu* • Web site: *www.nova.edu/irb*

NOVA SOUTHEASTERN UNIVERSITY

Institutional Review Board

MEMORANDUM

To: **Tressa Pedroff**

From: **Gesulla Cavanaugh,**
Center Representative, Institutional Review Board

Date: **November 20, 2019**

Re: **IRB #: 2019-545; Title, "Comparison of pre-licensure BSN student outcomes between team-based and traditional learning methods"**

I have reviewed the above-referenced research protocol at the center level. Based on the information provided, I have determined that this study is exempt from further IRB review under **45 CFR 46.101(b) (Exempt 1: Educational research in educational settings)**. You may proceed with your study as described to the IRB. As principal investigator, you must adhere to the following requirements:

1) CONSENT: If recruitment procedures include consent forms, they must be obtained in such a manner that they are clearly understood by the subjects and the process affords subjects the opportunity to ask questions, obtain detailed answers from those directly involved in the research, and have sufficient time to consider their participation after they have been provided this information. The subjects must be given a copy of the signed consent document, and a copy must be placed in a secure file separate from de-identified participant information. Record of informed consent must be retained for a minimum of three years from the conclusion of the study.

2) ADVERSE EVENTS/UNANTICIPATED PROBLEMS: The principal investigator is required to notify the IRB chair and me (954-262-5369 and Gesulla Cavanaugh, respectively) of any adverse reactions or unanticipated events that may develop as a result of this study. Reactions or events may include, but are not limited to, injury, depression as a result of participation in the study, life-threatening situation, death, or loss of confidentiality/anonymity of subject. Approval may be withdrawn if the problem is serious.

3) AMENDMENTS: Any changes in the study (e.g., procedures, number or types of subjects, consent forms, investigators, etc.) must be approved by the IRB prior to implementation. Please be advised that changes in a study may require further review depending on the nature of the change. Please contact me with any questions regarding amendments or changes to your study.

The NSU IRB is in compliance with the requirements for the protection of human subjects prescribed in Part 46 of Title 45 of the Code of Federal Regulations (45 CFR 46) revised June 18, 1991.

Cc: Marcia Derby-Davis
Marcia Derby-Davis

Appendix B

Site Approval Letter

Nova Southeastern University
3301 College Avenue
Fort Lauderdale, FL 33314-7796

Subject: Site Approval Letter

To whom it may concern:

This letter acknowledges that I have received and reviewed a request by Tressa Pedroff to conduct a research project entitled "COMPARISON OF PRE-LICENSURE BSN STUDENT OUTCOMES BETWEEN TEAM-BASED AND TRADITIONAL LEARNING METHODS" and I approve of this research to be conducted at our facility.

When the researcher receives approval for his/her research project from the Nova Southeastern University's Institutional Review Board/NSU IRB, I agree to provide access for the approved research project. If we have any concerns or need additional information, we will contact the Nova Southeastern University's IRB at (954) 262-5369 or irb@nova.edu.

Sincerely,

Carol Botwinski

Carol Botwinski, EdD, APRN, NNP-BC
Director/Chair Department of Nursing
Associate Professor
Office: GHS 543
Office Phone: (813) 257-3089

Appendix C

Voluntary Faculty Consent

From: Melissa Culp
Sent: Wednesday, May 29, 2019 1:39 PM
To: Elizabeth Sassatelli
Cc: Tressa Pedroff
Subject: RE: planning for my dissertation study intervention

Awesome, I am so excited. Thanks for including me - Melissa

From: Elizabeth Sassatelli
Sent: Wednesday, May 29, 2019 1:00 PM
To: Melissa Culp
Cc: Tressa Pedroff
Subject: Re: planning for my dissertation study intervention

Yes. I committed this to Tressa previously. We will have to work closely to combine weekly content. This will be an interesting study to partake in. Tressa, whatever you need we will accommodate

Elizabeth H. Arruda, PhD(c), RN
Instructor of Nursing
Office Telephone Number: 813-257-3486

From: Melissa Culp
Sent: Tuesday, May 28, 2019 7:36:40 PM
To: Elizabeth Sassatelli
Subject: FW: planning for my dissertation study intervention

Hi Liz,
What do you think? What could I do to fill the other time up since this would be more than the materials we have already built but would not want to skew the results? Plus do you think our students could handle that much lecture time all at once or would it be better suited to junior or senior students that have 3 hours classes? I am game if you are -

From: Tressa Pedroff
Sent: Tuesday, May 28, 2019 7:25 PM
To: Melissa Culp; Elizabeth Sassatelli
Subject: planning for my dissertation study intervention

Good evening ladies,
I am reaching out to you regarding my plan for implementing my study intervention in the spring of 2020 in your Foundations of Nursing course. I have spoken with both of you verbally but need to now put this in writing and confirm your willingness to participate in this study.

Before you commit, you will need to be appraised of some information:

The study is based upon the implementation of a teaching strategy.....in one of the classes, while the other remains the control.
Team-based learning (Elizabeth's section) while the other section remains with the traditional lecture based teaching (Melissa's section)

I will be measuring the student's unit exam scores, teamwork perceptions/skills as well as student's experiences with TBL.

I am not sure how familiar either of you are with this strategy, but the bottom line is that to work effectively, the course will need to be a three-hour course once a week, and not a 1 hour 15 minute course twice a week. The reason is that the intervention requires time for the students to testing(IRAT), group testing(GRAT), mini lecture and a group activity with simultaneous class reporting. This will take a minimum of 2 hours and sometimes can take an entire 3-hour period.

I am essentially asking both of you if you are willing to change your course to a 3-hour course for the spring of 2020, so that I can implement this intervention. It will be important for both sections to be the same course length as I am comparing the outcomes of the two sections and would not want to have that be a confounding variable. I realize that this may be a lot to ask but would appreciate your careful consideration before going with an alternative option.

Please let me know ASAP. I have just completed Chapter 1 and 2 of my dissertation based upon this projected plan and am about to write chapter 3, which essentially requires that I am sure of the study design and methods.

also, let me know if you have any questions and/or concerns, I am more than happy to discuss this over the phone or in person.
I have attached my dissertation draft so that you can read a little about the study purpose and plan.

Tressa Pedroff, PhD (c), MSN, RN
Clinical Instructor
Department of Nursing

email: tpedroff@ut.edu
office phone #: 813-257-3844

Appendix D

General Informed Consent Form

NSU Consent to be in a Research Study Entitled

COMPARISON OF PRE-LICENSURE BSN STUDENT OUTCOMES BETWEEN

TEAM-BASED AND TRADITIONAL LEARNING METHODS

Who is doing this research study?

College: Ron and Kathy Assaf College of College of Nursing

Principal Investigator: Tressa J. Pedroff, MSN, RN

Faculty Advisor/Dissertation Chair: Marcia Derby-Davis, Ph.D., RN

Site Information: The University of Tampa, 401 W. Kennedy Blvd., Tampa, FL, 33606-1490

Funding: Unfunded

What is this study about?

This is a research study, designed to test and create new ideas that other people can use. The purpose of this research study is to evaluate the effect of the team-based learning strategy compared with traditional lecture-format teaching in pre-licensure nursing students' academic performance, teamwork self-efficacy and teamwork skills, as well as their experiences in terms of accountability, preference, and satisfaction. This study will provide information to nurse educators in order to make informed decisions about implementing team-based learning as a regular teaching strategy in the classroom

Why are you asking me to be in this research study?

You are being asked to be in this research study because you are a pre-licensure nursing student enrolled in the Foundations of Nursing Practice course at the University of Tampa in the spring of 2020

This study will include about 80 people.

What will I be doing if I agree to be in this research study?

While you are taking part in this research study, there will be two sessions for completion of the survey instruments. The first session will take place during the first class and take approximately 10 minutes. The second session will take place during the last class and will take approximately 20 minutes

Research Study Procedures - as a participant, this is what you will be doing:

Participating in the teaching strategy assigned to the Foundations of Nursing Practice section/ course faculty of record for either the comparison group or the intervention group.

Comparison group will be using traditional lecture-format learning with individual and unstructured group activities throughout the 15 week academic semester. The intervention group will be using team-based learning throughout the 15 week academic semester. Team-based learning consists of four essential elements that include the proper formulation and management of groups (same throughout the semester), student accountability regarding preparation for testing and activities(individual and group readiness testing), frequent and timely feedback(from faculty and peers), and assignment development that promotes learning and team development(group application activities).

Both participant groups will complete demographic survey and the Healthcare Team Questionnaire-modified pre-test during the first class. (10 minutes total for both surveys)

Both participant groups will complete the Healthcare Team Questionnaire-modified post-test and the Team-based Learning Student Assessment Instrument (original or modified version) during the last class of the semester. (20 in total for both surveys)

The total student cohort (n=80) is divided into two groups (n=40 per group) systematically, according to their program admission GPA scores. The program director starts at the top of the student list, with GPA's ranked highest to lowest and works her way down placing every other student in section one or two systematically. The groups were then randomly assigned to either the comparison group or the intervention group.

Participation with providing unit exam score data and completion of all surveys is voluntary, however, all students are required to participate in the teaching strategies employed in their class section.

Could I be removed from the study early by the research team? Researchers may need to remove you from the study early if you withdraw from the Foundations of Nursing Practice course anytime during the semester

Are there possible risks and discomforts to me?

This research study involves minimal risk to you. To the best of our knowledge, the things you will be doing have no more risk of harm than you would have in everyday life.

Privacy risks are minimal due to the voluntary nature of participation and confidentiality measures instituted during the study. Physical risks include the time commitment related to completing the surveys, which equates to approximately 45 minutes total for either participate groups

What happens if I do not want to be in this research study?

You have the right to leave this research study at any time, or not be in it. If you do decide to leave or you decide not to be in the study anymore, you will not get any penalty or lose any services you have a right to get. If you choose to stop being in the study, any information collected about you **before** the date you leave the study will be kept in the research records for 36 months from the end of the study but you may request that it not be used.

What if there is new information learned during the study that may affect my decision to remain in the study?

If significant new information relating to the study becomes available, which may relate to whether you want to remain in this study, this information will be given to you by the investigators. You may be asked to sign a new Informed Consent Form, if the information is given to you after you have joined the study.

Are there any benefits for taking part in this research study?

There are no direct benefits from being in this research study. We hope the information learned from this study will help to contribute to the research on this topic and benefit future nursing faculty and nursing students. Participants may feel internal rewards for their contribution to this research.

Will I be paid or be given compensation for being in the study?

You will not be given any payments or compensation for being in this research study.

Will it cost me anything?

There are no costs to you for being in this research study.

How will you keep my information private?

Information we learn about you in this research study will be handled in a confidential manner, within the limits of the law and will be limited to people who have a need to review this information. All participant data will be de-identified. Unit exam scores will be reported in aggregate only. Pre and post-test surveys will be coded for linking purposes Information will be sent to the gate keeper in aggregate form only. This data will be available to the researcher, the Institutional Review Board and other representatives of this institution, and any regulatory and granting agencies (if applicable). If we publish the results of the study in a scientific journal or book, we will not identify you. All confidential hardcopy data will be kept securely in a locked file cabinet in the researcher's home and electronic data will be stored on a password-protected computer. All data will be kept for 36 months from the end of the study and destroyed after that time by shredding hardcopy data and deleting electronic files.

What Student/Academic Information will be collected and how will it be used?

The following information will be collected from student educational records: unit exam scores. These records will be used to compare academic testing performance outcomes between the comparison and intervention group. These records will be given to the Principal Investigator by the faculty of record for each of the participant groups, reported in aggregate. No student identifiers will be attached the mean unit exam score.

Whom can I contact if I have questions, concerns, comments, or complaints?
If you have questions now, feel free to ask us. If you have more questions about the research, your research rights, or have a research-related injury, please contact:

Primary contact:

Tressa J. Pedroff, Ph.D. (c) MSN, RN can be reached at 727-687-0559.

If primary is not available, contact:

Dr. Derby-Davis, Ph.D., RN can be reached at 561-805-2108.

Research Participants Rights

For questions/concerns regarding your research rights, please contact:

Institutional Review Board

Nova Southeastern University

(954) 262-5369 / Toll Free: 1-866-499-0790

IRB@nova.edu

You may also visit the NSU IRB website at www.nova.edu/irb/information-for-research-participants for further information regarding your rights as a research participant.

All space below was intentionally left blank.

Research Consent & Authorization Signature Section

Voluntary Participation - You are not required to participate in this study. In the event you do participate, you may leave this research study at any time. If you leave this research study before it is completed, there will be no penalty to you, and you will not lose any benefits to which you are entitled.

If you agree to participate in this research study, sign this section. You will be given a signed copy of this form to keep. You do not waive any of your legal rights by signing this form.

SIGN THIS FORM ONLY IF THE STATEMENTS LISTED BELOW ARE TRUE:

- You have read the above information.
- Your questions have been answered to your satisfaction about the research.

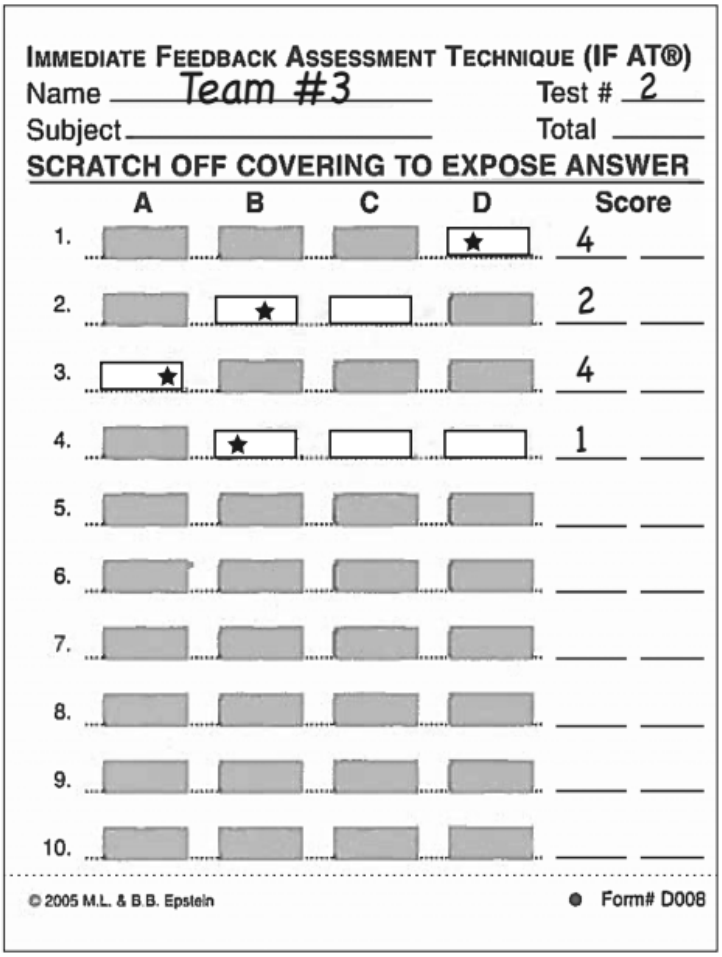
Adult Signature Section

I have voluntarily decided to take part in this research study.

Printed Name of Participant	Signature of Participant	Date
Printed Name of Person Obtaining Consent and Authorization	Signature of Person Obtaining Consent & Authorization	Date

Appendix E

Immediate Feedback-Assessment Technique (IF-AT)



IMMEDIATE FEEDBACK ASSESSMENT TECHNIQUE (IF AT®)

Name Team #3 Test # 2

Subject _____ Total _____

SCRATCH OFF COVERING TO EXPOSE ANSWER

	A	B	C	D	Score	
1.				★	4	
2.		★			2	
3.	★				4	
4.		★			1	
5.						
6.						
7.						
8.						
9.						
10.						

 ● Form# D008

Hello Tressa,

Our apologies for the delay in getting back to you.

Thank you for reaching out to us.

Use of the IF-AT image is granting permitting that the answer code on the bottom and at least 1/2 of the bottom of the form are not exposed.

Please let me know if you have any questions.

Best,

Seth

Seth Barry

Dir. of Operations and Sales
Epstein Educational Enterprises
(513) 531-3400
(513) 531-3401 (fax)
info@epsteineducation.com
www.epsteineducation.com

-------- Original Message --------
Subject: Contact Request - From Website
From: info@epsteineducation.com <info@epsteineducation.com>
Date: Mon, July 22, 2019 1:15 pm
To: info@epsteineducation.com

The following individual submitted this information via the Epstein contact form at 1:15:26 PM
Name: Tressa J. Pedroff
Title: Lecturer I
Company: University of Tampa
E-mail: tpedroff@ut.edu

Comments: Good afternoon, I am currently using your product in one of my courses. Additionally, I am completing my research dissertation on a project using team-based learning and the IF-AT products. I plan to show an example of one of the IF-AT assessment cards in the Appendix of my study. It is clearly visible that this product is a copyrighted product and will be printed in its entire form. I am inquiring if this is acceptable to your company and if there is anything else that is required to sure there are no copyright infringements.

Sincerely,

Tressa J. Pedroff

Appendix F

TEAM-BASED LEARNING
PEER FEEDBACK

Team: _____Colleague you are evaluating: _____

NUR 201 Comprehensive Your name (evaluator): _____

PART ONE: QUANTITATIVE ASSESSMENT *(*CHECK ***ONLY ONE BOX*** FOR EACH OF THESE 12 ITEMS)

COOPERATIVE LEARNING SKILLS:	NEVER	SOMETIMES	OFTEN	ALWAYS
Arrives on time and remains with team during activities				
Demonstrates a good balance of active listening & participation				
Asks useful or probing questions				
Shares information and personal understanding				

SELF-DIRECTED LEARNING:	NEVER	SOMETIMES	OFTEN	ALWAYS
Is well prepared for team activities				
Shows appropriate depth of knowledge				
Identifies limits of personal knowledge				
Is clear when explaining things to others				

INTERPERSONAL SKILLS:	NEVER	SOMETIMES	OFTEN	ALWAYS
Gives useful feedback to others				
Accepts useful feedback from others				
Is able to listen and understand what others are saying				
Shows respect for the opinions and feelings of others				

PART TWO: QUALITATIVE ASSESSMENT (*FOR EACH ITEM,* WRITE ***AT LEAST ONE*** SENTENCE, BUT ***NOT MORE THAN THREE*** SENTENCES) ***The quality of feedback that you write is important. Consider these guidelines when providing constructive feedback:***

a) Are specific behaviors clearly described? (vs. vague generalizations)
b) Are content and tone constructive and helpful? (vs. petty, mean, antagonistic)
d) Is the feedback descriptive ("I feel our team would benefit if you gave us your opinion earlier in the discussion.") rather than evaluative? ("You treated us unfairly by keeping quiet during our discussions.")

1) What is the single most valuable contribution this person makes to your team?

2) What is the single most important way this person could alter their behavior to more effectively help your team?

Please upload one document for each of your team members to the BB course by _____. This information will be complied and given to each group members as an anonymous peer feedback report. Thank you

Appendix G

Research Study Data Collection Tool

Course: Foundations of Nursing Practice

Spring 2020

Group: _____ (Comparison or Intervention)

Faculty Name: _____ (Dr. Culp or Dr. Sassatelli)

Unit Exam #: _____(One, Two, Three or Four)

Participating student exam scores:

#1 _____	#21_____
#2_____	#22_____
#3_____	#23_____
#4_____	#24_____
#5_____	#25_____
#6_____	#26_____
#7_____	#27_____
#8 _____	#28_____
#9 _____	#29_____
#10 _____	#30_____
#11_____	#31_____
#12 _____	#32_____
#13_____	#33_____
#14 _____	#34_____
#15_____	#35_____
#16_____	#36_____
#17_____	#37_____
#18_____	#38_____
#19_____	#39_____
#20_____	#40_____

Appendix H

Demographic Data Survey

1) What is your age? _____

2) Which of the following sex identities best fits you?

   o Male

   o Female

   o Intersex

   o Other: Please write your sex identity _____

3) What is your race/ethnicity?

   o Non-Hispanic: White

   o Non-Hispanic: Black

   o Hispanic: White

   o Hispanic: Black

   o Asian

   o Other

4) What is your current cumulative Grade Point Average (GPA)? _____

5) What is your current number of earned college credits? _____

6) Please indicate your previous experience with Team-based Learning (TBL).

   o No previous experience with TBL

   o 1 previous class with TBL

   o 2 previous classes with TBL

   o 3 previous classes with TBL

   o 4 or more previous classes with TBL

Appendix I

HEALTHCARE TEAMS QUESTIONNAIRE 12/01/01

SCORING KEY
HEALTH CARE TEAM QUESTIONNAIRE

Scales	Items
Self-Efficacy (N=8)	9, 19, 31, 43, 55, 65, 77, 84
Collective Efficacy (N=8)	3, 15, 25, 37, 49, 61, 71, 83
Individual Effort (N=8)	2, 12, 22, 34, 46, 58, 68, 80
Collective Effort (N=8)	1, 6, 16, 28, 40, 52, 62, 74
Coordination (*N* = 8)	5, 14, 24, 33, 42, 53, 63, 72
Decision Making (*N* = 9)	7, 17, 26, 35, 45, 54, 64, 73, 82
Leadership (*N* = 8)	8, 18, 27, 36, 47, 56, 66, 75
Interpersonal (*N* = 11)	4, 10, 20, 29, 38, 44, 48, 57, 67, 76, 81
Adaptability (*N* = 8)	11, 21, 30, 39, 50, 59, 69, 79
Communication (*N* = 8)	13, 23, 32, 41, 51, 60, 70, 78
Frequency/Access (N=4)	85, 86, 87, 88

Self-Efficacy Trait Subscale (L. Marshall & H. F. O'Neil, 2001)

9. I'm certain of my knowledge of how to work in a team .
19. I'm confident I have the basic teamwork skills.
31. I'm confident I can coordinate teamwork activities with others on my team.
43. I'm confident I can do an excellent job on assignments and tasks.
55. I'm certain I have excellent patient care task-related skills.
65. I expect to do well in my work.
83. Considering the difficulty of the work, the team, and my skills, I think I will do well on today's patient care assignment.
84. I believe I will contribute to my team's patient satisfaction ratings.

Collective-Efficacy Trait Subscale (L. Marshall & H. F. O'Neil, 2001)

3. I believe that my team will contribute to our team's patient satisfaction ratings.
15. I'm certain that my team has knowledge of how to work in a team .
25. I'm confident my team has the basic teamwork skills.
37. I'm confident my team can coordinate teamwork activities.
49. I'm confident my team can do an excellent job on assignments and tasks.
61. I'm certain my team has excellent patient care task-related skills.
71. I expect my team will do well on our work.
77. Considering the difficulty of the work, the team's skills, I think my team will do well on today's patient care assignment.

Effort Trait Sub-scale (O'Neil and Herl, 1998)

2. I work hard to do well even if I don't like a task.
12. I put forth my best effort on tasks.
22. I work as hard as possible on tasks.
34. I concentrate as hard as I can when doing a task.
46. I work hard on a task even if it does not count.
58. I am willing to do extra work on tasks to improve my knowledge.
68. I believe practice makes perfect
80. I use methods and procedures for working together that are just right for the tasks I have to perform.

Collective Effort (L. Marshall & H. F. O'Neil, 2001)

1. My team uses methods and procedures for working together that are just right for the tasks we have to perform.
6. My team works hard to do well even if they don't like a task
16. My team puts forth it's best effort on tasks.
28. My team works as hard as possible on tasks.
40. My team concentrates as hard as they can when doing a task.
52. My team works hard on a task even if it does not count.
62. My team is willing to do extra work on tasks to improve our knowledge.
74. My team believes practice makes perfect

COORDINATION - Organizing team activities to complete a task on time
5.When I work as part of a team, I organize team activities to complete tasks on time.
14. When I work as part of a team, I keep track of time.
24.When I work as part of a team, I allocate the tasks according to each team member's abilities.
33.When I work as part of a team, I help ensure the proper balancing of the workload.
42.When I work as part of a team, I do my part of the organization in a timely manner.
53.When I work as part of a team, I track other team members' progress.
63.When I work as part of a team, I try to meet the task deadlines when time is of the essence.
72.When I work as part of a team, I emphasize the meeting of deadlines.

DECISION MAKING - Using available information to make decisions
7. When I work as part of a team, I identify possible alternatives.
17. When I work as part of a team, I understand and contribute to the organizational goals.
26. When I work as part of a team, I know the process of making a decision.
35. When I work as part of a team, I know how to weigh the relative importance among different issues.
45. When I work as part of a team, I prepare sufficiently to make a decision.
54. When I work as part of a team, I solicit input for decision making from my team members.
64. When I work as part of a team, I am able to change decisions based upon new information.
73. When I work as part of a team, I am asked to provide technical information which team decisions are based upon.
82. When I work as part of a team, I know where to find information needed to make sound decisions.

LEADERSHIP - Providing direction for the team
8. When I work as part of a team, I exercise leadership.
18. When I work as part of a team, I teach other team members.
27. When I work as part of a team, I serve as a role model in formal and informal interactions.
30. When I work as part of a team, I lead when appropriate, mobilizing the group for high performance.
47. When I work as part of a team, I lead the team effectively.
56. When I work as part of a team, I demonstrate leadership and ensure team results.
66. When I work as part of a team, I try to bring out the best in others.
75.When I work as part of a team, I coach and mentor others.

INTERPERSONAL - Interacting cooperatively with other team members
4. When I work as part of a team, I try to resolve conflicts with other team members in a pleasant, but fair manner.
10. When I work as part of a team, I work well with men and women from diverse backgrounds.
20. When I work as part of a team, I interact cooperatively with other team members.
29. When I work as part of a team, I conduct myself with courtesy.
38. When I work as part of a team, I respect the thoughts and opinions of others in the team.
44. When I work as part of a team, I try to get to know my team members on a personal basis.
48. When I work as part of a team, I treat others with courtesy.
57. When I work as part of a team, I contribute to the positive atmosphere of the working environment.
67. When I work as part of a team, I trust my team members.
76. When I work as part of a team, I accept individual differences among members.
81. When I work as part of a team, I treat all my team members as equals.

ADAPTABILITY - Recognizing problems and responding appropriately
11. When I work as part of a team, I consider all viewpoints in order to solve problems sooner.
21. When I work as part of a team, I point out potential problems for the team to solve.
30. When I work as part of a team, I seek a work-around alternative when a problem arises.
39. When I work as part of a team, I can identify potential problems readily.
50. When I work as part of a team, I willingly contribute solutions to resolve problems.
59. When I work as part of a team, I adapt readily to varying conditions and demands.
69. When I work as part of a team, I recognize conflict.
79. When I work as part of a team, I identify needs or requirements and develop quality/timely solutions.

COMMUNICATION - Clear and accurate exchange of information
13. When I work as part of a team, I ensure the instructions are understood by all team members prior to starting the task.
23. When I work as part of a team, I ask questions when I do not understand the instructions that were given.
32. When I work as part of a team, I ask for the instructions to be clarified when it appears not all the team members understand the task.
41. When I work as part of a team, I communicate in a manner to ensure mutual understanding.
51. When I work as part of a team, I seek and respond to feedback.
60. When I work as part of a team, I listen attentively.
70. When I work as part of a team, I clearly and accurately exchange information.
78. When I work as part of a team, I pay attention to what others are saying.

PART II. QUESTIONNAIRE

Directions: This set of questions is to help us understand the way you think and feel about working with others. We know that different parts of your life, such as your job, recreational activities, or service to your community, may involve working with others and have different requirements, and that you may react differently in each kind of activity. Nonetheless, read each statement below and indicate how you generally think or feel. There are no right or wrong answers. Do not spend too much time on any one statement. Remember, give the answer that seems to describe how you generally think or feel.

		Almost never	Sometimes	Often	Almost always
1.	My team uses methods and procedures for working together that are just right for the tasks we have to perform.	1	2	3	4
2.	I work hard to do well even if I don't like a task.	1	2	3	4
3.	I believe that my team will contribute to our team's patient satisfaction ratings.	1	2	3	4
4.	When I work as part of a team, I try to resolve conflicts with other team members in a pleasant, but fair manner.	1	2	3	4
5.	When I work as part of a team, I organize team activities to complete tasks on time.	1	2	3	4
6.	My team works hard to do well even if they don't like a task	1	2	3	4
7.	When I work as part of a team, I identify possible alternatives.	1	2	3	4
8.	When I work as part of a team, I exercise leadership.	1	2	3	4
9.	I'm certain of my knowledge of how to work in a team .	1	2	3	4
10.	When I work as part of a team, I work well with men and women from diverse backgrounds.	1	2	3	4
11.	When I work as part of a team, I consider all viewpoints in order to solve problems sooner.	1	2	3	4
12.	I put forth my best effort on tasks.	1	2	3	4

	Almost never	Sometimes	Often	Almost always
13. When I work as part of a team, I ensure the instructions are understood by all team members prior to starting the task.	1	2	3	4
14. When I work as part of a team, I keep track of time.	1	2	3	4
15. I'm certain that my team has knowledge of how to work in a team.	1	2	3	4
16. My team puts forth it's best effort on tasks.	1	2	3	4
17. When I work as part of a team, I understand and contribute to the organizational goals.	1	2	3	4
18. When I work as part of a team, I teach other team members.	1	2	3	4
19. I'm confident I have the basic teamwork skills.	1	2	3	4
20. When I work as part of a team, I interact cooperatively with other team members.	1	2	3	4
21. When I work as part of a team, I point out potential problems for the team to solve.	1	2	3	4
22. I work as hard as possible on tasks.	1	2	3	4
23. When I work as part of a team, I ask questions when I do not understand the instructions that were given.	1	2	3	4
24. When I work as part of a team, I allocate the tasks according to each team member's abilities.	1	2	3	4
25. I'm confident my team has the basic teamwork skills.	1	2	3	4
26. When I work as part of a team, I know the process of making a decision.	1	2	3	4
27. When I work as part of a team, I serve as a role model in formal and informal interactions.	1	2	3	4
28. My team works as hard as possible on tasks.	1	2	3	4
29. When I work as part of a team, I conduct myself with courtesy.	1	2	3	4

	Almost never	Sometimes	Often	Almost always
30. When I work as part of a team, I seek a work-around alternative when a problem arises.	1	2	3	4
31. I'm confident I can coordinate teamwork activities with others on my team.	1	2	3	4
32. When I work as part of a team, I ask for the instructions to be clarified when it appears not all the team members understand the task.	1	2	3	4
33. When I work as part of a team, I help ensure the proper balancing of the workload.	1	2	3	4
34. I concentrate as hard as I can when doing a task.	1	2	3	4
35. When I work as part of a team, I know how to weigh the relative importance among different issues.	1	2	3	4
36. When I work as part of a team, I lead when appropriate, mobilizing the group for high performance.	1	2	3	4
37. I'm confident my team can coordinate teamwork activities.	1	2	3	4
38. When I work as part of a team, I respect the thoughts and opinions of others in the team.	1	2	3	4
39. When I work as part of a team, I can identify potential problems readily.	1	2	3	4
40. My team concentrates as hard as they can when doing a task.	1	2	3	4
41. When I work as part of a team, I communicate in a manner to ensure mutual understanding.	1	2	3	4
42. When I work as part of a team, I do my part of the organization in a timely manner.	1	2	3	4
43. I'm confident I can do an excellent job on assignments and tasks.	1	2	3	4
44. When I work as part of a team, I try to get to know my team members on a personal basis.	1	2	3	4
45. When I work as part of a team, I prepare sufficiently to make a decision.	1	2	3	4

	Almost never	Sometimes	Often	Almost always
46. I work hard on a task even if it does not count.	1	2	3	4
47. When I work as part of a team, I lead the team effectively.	1	2	3	4
48. When I work as part of a team, I treat others with courtesy.	1	2	3	4
49. I'm confident my team can do an excellent job on the assignments and tasks.	1	2	3	4
50. When I work as part of a team, I willingly contribute solutions to resolve problems.	1	2	3	4
51. When I work as part of a team, I seek and respond to feedback.	1	2	3	4
52. My team works hard on a task even if it does not count.	1	2	3	4
53. When I work as part of a team, I track other team members' progress.	1	2	3	4
54. When I work as part of a team, I solicit input for decision making from my team members.	1	2	3	4
55. I'm certain I have excellent patient care task-related skills.	1	2	3	4
56. When I work as part of a team, I demonstrate leadership and ensure team results.	1	2	3	4
57. When I work as part of a team, I contribute to the positive atmosphere of the working environment.	1	2	3	4
58. I am willing to do extra work on tasks to improve my knowledge.	1	2	3	4
59. When I work as part of a team, I adapt readily to varying conditions and demands.	1	2	3	4
60. When I work as part of a team, I listen attentively.	1	2	3	4
61. I'm certain my team has excellent patient care task-related skills.	1	2	3	4
62. My team is willing to do extra work on tasks to improve our knowledge.	1	2	3	4

	Almost never	Sometimes	Often	Almost always
63. When I work as part of a team, I try to meet the task deadlines when time is of the essence.	1	2	3	4
64. When I work as part of a team, I am able to change decisions based upon new information.	1	2	3	4
65. I expect to do well in my work.	1	2	3	4
66. When I work as part of a team, I try to bring out the best in others.	1	2	3	4
67. When I work as part of a team, I trust my team members.	1	2	3	4
68. I believe practice makes perfect	1	2	3	4
69. When I work as part of a team, I recognize conflict.	1	2	3	4
70. When I work as part of a team, I clearly and accurately exchange information.	1	2	3	4
71. I am confident my team will do well on our work.	1	2	3	4
72. When I work as part of a team, I emphasize the meeting of deadlines	1	2	3	4
73. When I work as part of a team, I am asked to provide technical information which team decisions are based upon.	1	2	3	4
74. My team believes practice makes perfect	1	2	3	4
75. When I work as part of a team, I coach and mentor others.	1	2	3	4
76. When I work as part of a team, I accept individual differences among members.	1	2	3	4
77. Considering the difficulty of the work, the team, and my skills, I think I will do well on today's patient care assignment.	1	2	3	4
78. When I work as part of a team, I pay attention to what others are saying.	1	2	3	4
79. When I work as part of a team, I identify needs or requirements and develop quality/ timely solutions.	1	2	3	4

	Almost never	Sometimes	Often	Almost always
80. I use methods and procedures for working together that are just right for the tasks I have to perform.	1	2	3	4
81. When I work as part of a team, I treat all my team members as equals.	1	2	3	4
82. When I work as part of a team, I know where to find information needed to make sound decisions.	1	2	3	4
83. Considering the difficulty of the work, the team skills, I think my team will do well on today's patient care assignment.	1	2	3	4
84. I believe I will contribute to my team's patient satisfaction ratings.	1	2	3	4

85. At work, I sometimes work as part of a team (please circle): Yes No

If you answered **YES** to the above question, please answer the following questions (circle your answers).

86. At work, how often do you work as part of a team?	Almost never	Sometimes	Often	Almost always
87. Did your high school or college provide sufficient training or education in teamwork?	Almost never	Sometimes	Often	Almost always
88. My organization provides training in teamwork.	Almost never	Sometimes	Often	Almost always

89. **Thank you…**

Appendix J

Authorization to use HTQ

From: Harry Oneil <honeil@usc.edu>
Sent: Monday, June 3, 2019 5:35 PM
To: Tressa Pedroff
Cc: Harry Oneil
Subject: Re: permission for use of the Healthcare Teams Questionnaire

You have my permission
I would be interested in your dissertation abstract of your research when you are done
Thanks

Harry O'Neil
Professor of Educational Psychology and Technology
University of Southern California
15366 Longbow Dr.
Sherman Oaks CA 91403
Phone: (c) 818- 648-0472
Fax: (w) 310-267-0152
E-mail honeil@usc.edu

From: Tressa Pedroff <TPEDROFF@UT.EDU>
Date: Monday, June 3, 2019 at 2:12 PM
To: Harry Oneil <honeil@usc.edu>
Subject: permission for use of the Healthcare Teams Questionnaire

Good afternoon,
I am currently a doctoral student at Nova Southeastern University in Florida and a nurse educator at the University of Tampa.
My doctoral dissertation is based upon the teaching strategy of team-based learning in nursing education. As part of my study, I plan to measure students' teamwork self-efficacy and some components of teamwork skills that are part of your Healthcare teams questionnaire. I plan to implement TBL in the spring of 2020 in a fundamentals of nursing class and would like permission to use parts of Healthcare teams questionnaire tool as part of my study.
Please let me know if you need any other information from me regarding details of my planned study and the use of your tool.
thanks so much!

Tressa Pedroff, PhD (c), MSN, RN
Lecturer I
Department of Nursing
University of Tampa

email: tpedroff@ut.edu
office phone #: 813-257-3844
From: Lori Marshall <lori@inspireglobalIlc.com>

Sent: Tuesday, July 2, 2019 8:16 PM

To: Tressa Pedroff

Subject: Re: HTQ info

Of course you can use them as needed. You'd run alphas on the scales with 5 pt and I don't think it would reduce by much.

You'd be citing the HTQ and have that info.

Sounds exciting!

Lori

Get Outlook for Android

From: Tressa Pedroff <TPEDROFF@UT.EDU>

Sent: Monday, July 1, 2019 12:19:30 PM

To: Lori Marshall

Subject: Re: HTQ info

Good afternoon Lori,

Thanks so much for your comprehensive explanation and inclusion of all of your work on the HTQ.

I have reviewed the information and would like permission to use 4 of the scales only in your original version of the HTQ

Self-efficacy trait subscale ((N=7) dropping the last question as my proposed study does not include measure of patient satisfaction

Interpersonal (N=11)

Adaptability (N=8)

Communication (N= 8)

My intention is to measure teamwork self-efficacy and the teamwork skills(3) that I have outlined above as a pre-test/post-test after the intervention of the teaching strategy Team-based learning (TBL) in a group of nursing students in a Foundations of Nursing Practice course, and comparing to that of traditional lecture-style teaching.

I feel these are the most pertinent to the team-based teaching strategy and I would like to keep the survey instrument size manageable.

Additionally, since I am also using another survey tool that measures the student's experience with Team-based learning (TBL-SAI, developed by Mennenga in 2010). I am inquiring if it would be ok to change your 4 point Likert scale to a 5 point Likert scale (1-strongly disagree, 2-disgree agree, 3-neutral, 4-agree, 5-strongly agree) to keep continuity and decrease confusion in the respondents with using different two scales.

I look forward to hearing back from you as my methodology chapter is still in the planning stage at this point.

I have enclosed the abstract to my proposed study so that you have a basic idea of the study purpose/goals.

Please let me know of any questions.

Tressa Pedroff, PhD (c), MSN, RN
Lecturer I
Department of Nursing
University of Tampa

email: tpedroff@ut.edu
office phone #: 813-257-3844

Appendix K

Modified HTQ for use in the Proposed Study

Directions: This set of questions is to help the researcher understand the way the participant thinks and feels about working with others. The researcher understands that different parts of your life, such as your job, recreational activities, or service to your community, may involve working with others and have different requirements, and that you may react differently in each kind of activity. Nonetheless, read each statement below and indicate how you generally think or feel using the scale for the items as follows:
1=strongly disagree
2=disagree
3= neither disagree or agree (neutral)
4= agree
5= strongly agree

There are no right or wrong answers. Do not spend too much time on any one statement. Remember to respond with the answer that seems to describe how you generally think or feel.

Teamwork Self-efficacy Subscale

1. I'm certain of my knowledge of how to work in a team.	1	2	3	4	5
2. I'm confident I have the basic teamwork skills.	1	2	3	4	5
3. I'm confident I can coordinate teamwork activities with others on my team.	1	2	3	4	5
4. I'm confident I can do an excellent job on assignments and tasks.	1	2	3	4	5
5. I'm certain I have excellent patient care task-related skills.	1	2	3	4	5
6. I expect to do well in my work	1	2	3	4	5
7. Considering the difficulty of the work, the team, and my skills, I think I will do well on today's patient care assignment.	1	2	3	4	5

Interpersonal Subscale - Interacting cooperatively with other team members

1. When I work as part of a team, I try to resolve conflicts with other team members in a pleasant, but fair manner.	1	2	3	4	5
2. When I work as part of a team, I work well with men and women from diverse backgrounds.	1	2	3	4	5
3. When I work as part of a team, I interact cooperatively with other team members.	1	2	3	4	5
4. When I work as part of a team, I conduct myself with courtesy.	1	2	3	4	5
5. When I work as part of a team, I respect the thoughts and opinions of others in the team.	1	2	3	4	5
6. When I work as part of a team, I try to get to know my team members on a personal basis.	1	2	3	4	5
7. When I work as part of a team, I treat others with courtesy.	1	2	3	4	5
8. When I work as part of a team, I contribute to the positive atmosphere of the working environment.	1	2	3	4	5
9. When I work as part of a team, I trust my team members.	1	2	3	4	5
10. When I work as part of a team, I accept individual	1	2	3	4	5

differences among members.					
11. When I work as part of a team, I treat all my team members as equals.	1	2	3	4	5

Adaptability Subscale - Recognizing problems and responding appropriately

1. When I work as part of a team, I consider all viewpoints in order to solve problems sooner**.**	1	2	3	4	5
2. When I work as part of a team, I point out potential problems for the team to solve.	1	2	3	4	5
3. When I work as part of a team, I seek a work-around alternative when a problem arises.	1	2	3	4	5
4. When I work as part of a team, I can identify potential problems readily.	1	2	3	4	5
5. When I work as part of a team, I willingly contribute solutions to resolve problems.	1	2	3	4	5
6. When I work as part of a team, I adapt readily to varying conditions and demands.	1	2	3	4	5
7. When I work as part of a team, I recognize conflict.	1	2	3	4	5
8. When I work as part of a team, I identify needs or requirements and develop quality/timely solutions.	1	2	3	4	5

Communication Subscale - Clear and accurate exchange of information

1. When I work as part of a team, I ensure the instructions are understood by all team members prior to starting the task.	1	2	3	4	5
2. When I work as part of a team, I ask questions when I do not understand the instructions that were given.	1	2	3	4	5
3. When I work as part of a team, I ask for the instructions to be clarified when it appears not all the team members understand the task.	1	2	3	4	5
4. When I work as part of a team, I communicate in a manner to ensure mutual understanding	1	2	3	4	5
5. When I work as part of a team, I seek and respond to feedback.	1	2	3	4	5
6. When I work as part of a team, I listen attentively.	1	2	3	4	5
7. When I work as part of a team, I clearly and accurately exchange information.	1	2	3	4	5
8. When I work as part of a team, I pay attention to what others are saying.	1	2	3	4	5

Appendix L

Team-based Learning Student Assessment Instrument

Team-based Learning Student Assessment Instrument (TBL-SAI)

This instrument asks you about your experiences with team-based learning. There are no right or wrong answers. Please be honest and report your true reaction to each question by circling the number for the response that best describes your answer.

Accountability Subscale
The subscale assesses student preparation for class and contribution to the team.
The scale for the items is as follows:
1=Strongly Disagree
2=Disagree
3=Neither Disagree or Agree (Neutral)
4=Agree
5=Strongly Agree

1. Spend time studying before class in order to be more prepared.	1	2	3	4	5
2. I feel I have to prepare for this class in order to do well.	1	2	3	4	5
3. I contribute to my team's learning.	1	2	3	4	5
4. My contribution to the team is not important.	1	2	3	4	5
5. My team members expect me to assist them in my learning.	1	2	3	4	5
6. I am accountable for my team's learning.	1	2	3	4	5
7. I am proud of my ability to assist my team in learning.	1	2	3	4	5

8. I need to contribute to the team's learning.	1	2	3	4	5

Preference for Lecture or Team-Based Learning Subscale

This Subscale assess student ability to recall material and student attention level in lecture and team-based learning.

The scale for the items is as follows:

1=Strongly Disagree
2=Disagree
3=Neither Disagree or Agree (Neutral)
4=Agree
5=Strongly Agree

9. During traditional lecture, I find myself thinking of non-related things.	1	2	3	4	5
10. I am easily distracted during traditional lecture.	1	2	3	4	5
11. I am easily distracted during team-based learning activities.	1	2	3	4	5
12. I am more likely to fall asleep during lecture than during class that use team-based learning activities.	1	2	3	4	5
13. I get bored during team-based activities.	1	2	3	4	5
14. I talk about non-related things during team-based learning activities.	1	2	3	4	5
15. I easily remember what I learn when working in a team.	1	2	3	4	5
16. I remember material better when the	1	2	3	4	5

instructor lectures about it.					
17. Team-based learning activities help me recall past information.	1	2	3	4	5
18. It is easier to study for tests when the instructor has lectured over the material.	1	2	3	4	5
19. I remember information longer when I go over it with team members during the GRATS used in team-based learning.	1	2	3	4	5
20. I remember material better after the application exercises used in team-based learning.	1	2	3	4	5
21. I can easily remember material from lecture.	1	2	3	4	5
22. After working with my team members, I find it difficult to remember what we talked about during class.	1	2	3	4	5
23. I do better on exams when we used team-based learning to cover the material.	1	2	3	4	5
24. After listening to lecture, I find it difficult to remember what	1	2	3	4	5

the instructor talked about during class.					

Student Satisfaction Subscale

This subscale assesses student satisfaction with team-based learning.

The scale for the items is as follows:

1=Strongly Disagree

2=Disagree

3=Neither Disagree or Agree (Neutral)

4=Agree

5=Strongly Agree

25. I enjoy team-based learning activities.	1	2	3	4	5
26. I learn better in a team setting.	1	2	3	4	5
27. I think team-based learning activities are an effective approach to learning.	1	2	3	4	5
28. I do not like to work in teams.	1	2	3	4	5
29. Team-based learning activities are fun.	1	2	3	4	5
30. Team-based learning activities are a waste of time.	1	2	3	4	5
31. I think team-based learning helped me improve my grade.	1	2	3	4	5
32. I have a positive attitude toward team-based learning activities.	1	2	3	4	5
33. I have had a good experience with team-based learning.	1	2	3	4	5

Please add any comments you may have about your experience with team-based learning.

Appendix M

Authorization to use TBL-SAI

From: Mennenga, Heidi <Heidi.Mennenga@SDSTATE.EDU>
Sent: Tuesday, June 11, 2019 3:53 PM
To: Tressa Pedroff
Subject: RE: Permission to use the TBL-SAI tool

Hi Tressa,
Please feel free to use my tool. Thank you, Heidi

SOUTH DAKOTA STATE UNIVERSITY

Heidi Mennenga, PhD, RN, CNE
Associate Professor
College of Nursing
SWG 313, Box Box 2275
Brookings, SD 57007
P: (605) 688-7954
www.sdstate.edu

From: Tressa Pedroff
Sent: Monday, June 3, 2019 4:58 PM
To: heidi.mennenga@sdstate.edu
Subject: Re: Permission to use the TBL-SAI tool

Good afternoon Dr. Mennenga,

I am currently a doctoral student at Nova Southeastern University in Florida and a nurse educator at The University of Tampa.
My doctoral dissertation is based upon the teaching strategy of team-based learning in nursing education. I plan to implement TBL in the spring of 2020 in a fundamentals of nursing class and would like permission to use your TBL-SAI tool as part of my study.
Please let me know if you need any other information from me regarding details of my planned study and the use of your tool.

Thanks so much!

Tressa Pedroff, PhD (c), MSN, RN
Lecturer I
Department of Nursing
University of Tampa

email: tpedroff@ut.edu
office phone #: 813-257-3844

Appendix N

Modified TBL-SAI

This instrument asks you about your experiences with traditional lecture and group activity learning. There are no right or wrong answers. Please be honest and report your true reaction to each question by circling the number for the response that best describes your answer.

Accountability Subscale
The subscale assesses student preparation for class and contribution to the group activity.
The scale for the items is as follows:
1=Strongly Disagree
2=Disagree
3=Neither Disagree or Agree (Neutral)
4=Agree
5=Strongly Agree

1. Spend time studying before class in order to be more prepared.	1	2	3	4	5
2. I feel I have to prepare for this class in order to do well.	1	2	3	4	5
3. I contribute to my group's learning.	1	2	3	4	5
4. My contribution to the group is not important.	1	2	3	4	5
5. My group members expect me to assist them in their learning.	1	2	3	4	5
6. I am accountable for my group's learning.	1	2	3	4	5
7. I am proud of my ability to assist my group in learning.	1	2	3	4	5
8. I need to contribute to the group's learning.	1	2	3	4	5

Preference for Lecture or Group Activity Learning Subscale

This Subscale assess student ability to recall material and student attention level in lecture and group activity learning.

The scale for the items is as follows:

1=Strongly Disagree
2=Disagree
3= Neither Disagree or Agree (Neutral)
4=Agree
5=Strongly Agree

9. During traditional lecture, I find myself thinking of non-related things.	1	2	3	4	5
10. I am easily distracted during traditional lecture.	1	2	3	4	5
11. I am easily distracted during group learning activities.	1	2	3	4	5
12. I am more likely to fall asleep during lecture than during class that uses group learning activities.	1	2	3	4	5
13. I get bored during group activities.	1	2	3	4	5
14. I talk about non-related things during group learning activities.	1	2	3	4	5
15. I easily remember what I learn when working in a group.	1	2	3	4	5
16. I remember material better when the instructor lectures about it.	1	2	3	4	5

17. Group learning activities help me recall past information.	1	2	3	4	5
18. It is easier to study for tests when the instructor has lectured over the material.	1	2	3	4	5
19. I remember information longer when I go over it with group members.	1	2	3	4	5
20. I remember material better after the application exercises used in group learning.	1	2	3	4	5
21. I can easily remember material from lecture.	1	2	3	4	5
22. After working with my group members, I find it difficult to remember what we talked about during class.	1	2	3	4	5
23. I do better on exams when we used group learning activities to cover the material.	1	2	3	4	5
24. After listening to lecture, I find it difficult to remember what the instructor talked about during class.	1	2	3	4	5

Student Satisfaction Subscale

This subscale assesses student satisfaction with group learning activities.
The scale for the items is as follows:
1=Strongly Disagree
2=Disagree
3=Neither Disagree or Agree (Neutral)
4=Agree
5=Strongly Agree

25. I enjoy group learning activities.	1	2	3	4	5
26. I learn better in a group setting.	1	2	3	4	5
27. I think group learning activities are an effective approach to learning.	1	2	3	4	5
28. I do not like to work in groups.	1	2	3	4	5
29. Group learning activities are fun.	1	2	3	4	5
30. Group learning activities are a waste of time.	1	2	3	4	5
31. I think group learning helped me improve my grade.	1	2	3	4	5
32. I have a positive attitude towards group learning activities.	1	2	3	4	5
33. I have had a good experience group learning.	1	2	3	4	5

Please add any comments you may have about your experience with traditional lecture format and group learning activities.

*Modified from the Team-based learning student learning instrument developed in 2010, with permission granted by the author Heidi A. Mennenga.

Appendix O

Hi Tressa,
Please note any change to the instrument may affect reliability and validity so you will need to be clear you modified it without further psychometric testing. Thank you,

SOUTH DAKOTA STATE UNIVERSITY

Heidi Mennenga, PhD, RN, CNE
Associate Professor
College of Nursing
SWG 313, Box Box 2275
Brookings, SD 57007
P: (605) 688-6924
www.sdstate.edu

From: Tressa Pedroff <TPEDROFF@UT.EDU>
Sent: Tuesday, October 15, 2019 1:51 PM
To: Mennenga, Heidi <Heidi.Mennenga@SDSTATE.EDU>
Subject: Re: Permission to use the TBL-SAI tool

Hi Heidi,

I will be using your tool and just defended my study proposal. So that is good news! I wonder if can have your permission to modify your tool as I would like to ask some of these same questions to my comparison group(traditional lecture-format) .....but will be changing the terminology to be in alignment with traditional lecture learning.

Please let me know.

Tressa Pedroff, PhD (c), MSN, RN

Lecturer I

Department of Nursing

University of Tampa

email: tpedroff@ut.edu

office phone #: 813-257-3844