2024

# Impact of Traditional Education and Learner-Centered Education on Standardized Tests

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Walden University
2023

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Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Psychology

Walden University

May 2023

Abstract

There is a current shortage of approximately 45,000 nurses and nursing faculty to train student nurses, a number that is projected to grow. One proposed method to combat the shortage is to transition from traditional lecture-based classrooms to a learner-centered approach. Asking or requiring faculty to transition an entire nursing program from one teaching method to another without supporting data could be a waste of valuable time and resources. It could also prove detrimental to a program if students were unable to pass the NCLEX-RN exam, and a program was forced to close. The current study examined whether there was a link between teaching and learning model and student performance using the lens of Piaget's theory of constructivism. Archived student test data from four graduated classes of approximately 239 students were used from both a traditional four-year baccalaureate nursing program and an accelerated second-degree baccalaureate nursing program. Chi-squared and t-tests were used to analyze the data. The results indicated that students who were enrolled in the learner-centered nursing program performed similarly to traditional program students on most courses on the Assessment Technologies Institute (ATI) proctored exams; students in the traditional program passed the NCLEX-RN at a higher rate. Findings may be used by educators for positive social change by moving toward learner-centered models in nursing instruction; this can help graduate more nurses, alleviate the nursing shortage, and provide care for more people.

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# Chapter 1: Introduction to the Study

## Introduction

There are approximately 996 baccalaureate nursing programs in the United States. Within these nursing programs, approximately 363,433 students are pursuing a 4-year baccalaureate degree at a given point (American Association of Colleges of Nursing [AACN], 2021a). Within these approximately 996 programs, there are roughly 18,996 nursing faculty. Despite the number of faculty, there are approximately 1,827 open positions for nursing faculty (AACN, 2005). There are more than 2.9 million nurses in the U.S. (U.S. Bureau of Labor Statistics, 2020,) and an estimated 200,000 open nursing positions that will be created each year ((AACN, 2021c) These numbers indicate a current deficit that will continue to grow.

There are potential limits on how many students graduate, as the number of faculty determines the number of nursing students that can be supervised. As the national nursing shortage gets larger, the pressure on nursing schools to graduate more prepared students increases. There is also a push to transition courses from a traditional in-person, lecture-based approach to a learner-centered approach, in which students complete learning-based assignments and activities before coming to class and completing hands-on or more practical, real-life, interactive scenarios (Bloomberg & Pitchford, 2017). Blumberg (2009) indicated that learner-centered learning is a new concept that nursing faculty are being encouraged to transition their courses to from the traditional lecture-based classroom. In the traditional lecture-based classroom, faculty lecture to students and give students all the knowledge that they need to get through a course. According to

Blumberg (2009), this traditional lecture-based approach leaves nursing students with little drive to dig deeper into the content. They learn only what they need to pass the next test before moving on to new content.

Additional challenges come from all students being tied to the same learning schedule. Weaker students may not be able to keep up with a fast-paced course, and students who are stronger could get bored and not have challenging enough content to keep them engaged. Blumberg (2009) indicated that the transition from traditional lecture-based learning to student-focused learning in nursing school would allow students to take responsibility for their own education. They would be able to focus on building up their individual areas of weakness while having the freedom to dig deeper into content areas that they need to. It would also not keep them sitting in lectures for extended periods of time being spoon-fed material, but rather they would be enabled to assimilate knowledge as independent thinkers. It would also allow them to then come into clinical settings with knowledge bases that allowed them to put into practice skills that they had learned about, so that previous class time could now be used as practice time (Blumberg, 2009). In this learner-centered approach, the breakdown of time the students interact with content remains largely the same as in lecture-based learning.

In lecture-based learning, students may have required reading but come to class with minimal preparation Blumberg (2009). They are lectured to and then complete post-lecture activities. After class and homework, they have some sort of clinical experience applying the content they were lectured on in the classroom, regardless of if they fully understood it. This means that clinical time is often an extension of the classroom. In the

learner-centered setup, students would have a specific set of assigned activities that they would be required to complete before coming to a learning activity Blumberg (2009). The learning activity, which can be in-class, online, or in a clinical setting, is a hands-on experience where the information learned is put into practice. This is often in a slower way than in the clinical setting (i.e., a complicated dressing change can be taken step by step and discussed, or a complicated code blue scenario can be broken down one decision at a time), which allows students to discuss each aspect of "why" behind the decision-making method. Simulated patient experiences could occur in these learning activities to help reinforce the knowledge the students have gained. Feedback is given right away, and students can further strengthen areas of weakness. Unlike the traditional classroom-lecture model, there may be minimal follow-up homework Blumberg (2009). Students are then better prepared to enter the clinical setting and work with live patients.

The learner-centered approach is also a concept that allows nursing schools to move courses to the online or blended approach; traditional, in-person lecture is not possible in the online environment. Despite the lack of supporting data to show that learner-centered learning has any impact on student performance, faculty are being encouraged to transition to this format. This push comes both from within colleges, as administrations look for ways to maximize faculty numbers amid growing shortages, and from outside (Billings & Halstead, 2009: Blumberg, 2009) as different individuals attempt to try and solve the growing nursing shortage in the United States (Oyelana, et al., 2022). This transition is not simply just a format change, but one that requires faculty to recreate their entire course presentations and assignments. Homework that was once

given after a lecture had been completed, now must be refocused and turned into learning activities that will help students learn about the concepts. Additionally, rather than hours' worth of lecture time, faculty must identify ways to impart knowledge to students through various learning activities, all while considering the varying learning styles and learning needs of many students.

The purpose of this study was to identify if a relationship between teaching style and student performance exists on both Assessment Technologies Institute (ATI) proctored exams and the National Council Licensure Examination for Registered Nurses (NCLEX-RN). If a positive correlation is identified, then the increased work that faculty will need to undertake to transition from current teaching styles to a learner-centered program will be justified. Otherwise, the increased workload to transition an entire nursing program and create new courses may have no justification. If no relationship is identified, then there may be additional research needed, or it may be simply up to the faculty member to determine if they want to commit to the additional workload required to make the change or continue to use traditional teaching methods. The current study will address a gap in the literature related to the possible relationship between nursing programs implementing a learner-centered approach and student performance on ATI standardized tests and the NCLEX-RN.

This chapter will include the groundwork for the study. The gap in the literature will also be briefly identified and examined, along with the research problem statement and evidence to support the need for the current study in the field of nursing education. The research questions and their null and hypotheses will be addressed, as well as

situated learning theory, variables and methodology for the study, limitations, and definitions specific to the current study or specific to the field of nursing education. Lastly, potential future implications of the study will be explored.

## Background

The concept of learner-centered education is not a new one. Weimer (2012) and education-reimagined.org (n.d.) indicated that learner-centered education is a combination of new concepts in education, focusing primarily on the fact that the individual is made up of their previous experiences; this has imbued them with strengths and weaknesses that are uniquely their own. As such, the individual will learn and develop in their own way and on their own time, and that each individual has an inner desire to learn (education-reimagined.org (n.d.); Weimer, 2012). Weimer (2013) indicated that learner-centered education allowed students to have more control over their own education by not simply being passive learners and receiving information given to them, but by being active participants working to obtain and seek out learning opportunities. Learner-centered education has multiple influences and can be traced back to the early 1900's. Within learner-centered education, there are components of constructivist theory (Fosnot, 1996; Hein 1991; Piaget, 1936; Stage et al., 1998;), attribution theory (Heider, 1958; Weiner, 1985) self-efficacy (Bandura, 1986) radical and critical pedagogy (Fletcher & Stanford University, 1970; Mayo, 1993; McLaren 1986;), and feminist pedagogy (Moser & Johnson,1973).

Constructivism was built on different theories in the arenas of social reform, art, and education in the early 1900s. Piaget, Brunner, von Glaserfeld and Vygotsky are some

of the notable constructivists of their day. Piaget introduced this concept with his constructivist theory (Hein, 1991; Piaget, 1936). While Piaget's constructivist theory was originally applied to infants and young children, by the 1990s, it had been applied to how children and adolescents learn in a school setting. Endeavors in learner-centered education can be found in early 1990's classrooms in elementary, junior high, and high school classrooms (Tyner, 1994). While not originally created to be applied to adults and how they learn, infants, children, and adults all assimilate knowledge based on their world (Holbrook, 1992; Piaget, 1936), and what they experience within their own world.

Learner-centered education can be applied to both children and adults but determining how to assess adult learning became difficult (Graue, 1993); however, this challenge also became an opportunity as new learning assessments could be created alongside the new learning content that was being created (Graue, 1993). Despite this new learning and assessment, students still had the perception that they were not learning (Long, 1995). Previously, students had been taught to or lectured to, and despite higher test scores indicating that learning was occurring, the student's perceptions of learning did not align. Students indicated they felt they were teaching themselves as they had to do the work to come to hands-on experiences prepared whereas before, faculty had given them all the information they needed through lectures (Long, 1995). Piaget's constructivist theory stipulates that children had to be ready and willing to learn before learning could occur (Piaget, 1936). This also holds true for adults. It is not enough to have the necessary tools available; the individual must be ready to learn and desire to take the necessary steps for learning to occur.

Attribution theory is the theory of how students explain their successes and failures (Weiner, 1974 & Weiner 1985), what they did to do well or not well. For example, say a student enrolled in a nursing course and did not complete the optional study guide the instructor posted two weeks before the scheduled exam. This student did not earn a passing grade on the scheduled exam. The student could then attribute their failing grade to one of several things. The poor grades could be attributed to a lack of adequate preparation for the exam (i.e., students did not study for the exam as they did not use the study guide the instructor provided), not studying enough (i.e., they only studied for one hour when maybe they needed to study for two hours), or being distracted during the examination (i.e., maybe they had received bad news immediately before the examination and did not notify the instructor or ask to postpone/reschedule the examination).

Weimer (2013) indicates that this junction between expectation and actualization is where some of the difficulty may lie in distinguishing between internal or external focus or triggers. For example, if this was the fourth exam the student was taking from the same faculty member, and the student had previously completed study guides from this faculty member and found them to be unhelpful or difficult to navigate, they may have chosen to ignore this fourth one to focus on a different study technique that they felt would benefit them more. This would then be an external focus that they had no control over, as they could not make their faculty member produce a more useful study guide. They might be able to speak to their faculty member, but they might be uncomfortable doing so, or might not feel it was their place to do this. This would be out of their control

to change. In contrast, if it was the student's failure to prepare for the exam properly, then it was an internal focus that caused their poor performance. Through overscheduling of their time or lack of proper planning on their part, they did not have enough time to study for the exam and did poorly on the exam.

If a student can identify some of the "why" behind their success and their failure, they can begin introducing the scenario or environment that produced the success and avoid the things that allowed for failure. This would be useful in a nursing program as it would allow students to identify the areas they are successful in and areas they struggle in and strengthen their weaknesses and fortify them in order to duplicate them in future nursing courses.

Self-efficacy is another theory that is closely related to attribution theory and is a piece of learner-centered education. The basis of this theory has to do with a student's own beliefs about their capabilities. If a student believes they are unable to succeed in an area, they likely will succumb to that belief, regardless of the difficulty level of "what" they have placed their belief in.

For example, say a sophomore level student is in pediatric nursing. They have heard that the cardiac chapter is the toughest one in the entire class. Despite never having trouble with cardiac subject matter in previous courses, the sophomore student "listens" to this chatter from other students, and subsequently fails the cardiac chapter test as the student felt overwhelmed before content was given, did not seek out available help, did not understand content, and did not draw on previous positive experiences with cardiac content. Did the student self-sabotage by "listening" to other students, or did the

sophomore student not understand the content matter? Bandura (1986) was an early contributor to the foundation of this theory. Burns et al. (2021) indicates that students who have low levels of self-efficacy and have high levels of anxiety around a topic may need a two-pronged approach to lower their anxiety and increase their ability to learn the topic. Nursing courses are challenging, fast-paced and as they are science-based, they can be quite difficult for some students to do well and earn high grades. Being able to increase nursing student's self-efficacy would benefit a nursing program and contribute to learner-centered education.

One of the arguments for implementing learner-centered learning in nursing schools is the fact that lecturing at students to "give" them knowledge before placing them in the clinical setting and expecting them to be able to perform nursing skills creates a disconnect between knowledge acquisition and practical application (Bloomberg & Pitchford, 2017). While students are supervised by clinical faculty, there is traditionally one clinical faculty for approximately six-to-ten students (Philips et al., 2019). This number can fluctuate based on state guidelines, hospital requirements, nursing school requirements, instructor availability, or other variables. This is not always ideal, as one instructor must then attempt to teach all students while they are providing care for patients. Depending on where students are in their nursing program, care may be limited to skills such as obtaining vital signs and passing meals or water, but it could also include giving medications by mouth or hanging intravenous solutions, pushing intravenous solutions, changing dressings, and educating patients on medications or diseases.

The eventual goal of most nursing programs is to have students work up to an internship course where they work with a nurse and take a full patient load. If a clinical group is made up of six students and an instructor, and all students want to pass medications in a specific clinical day, these medications may not all be due at the same time. However, the instructor will have to be present with each student as medications are given. Each nursing school will have chosen a specific "Medication Rights" format that they have chosen to follow. This will be individualized to the nursing school but will at least include the "5 Rights of Medication Administration" (Hanson, et al., 2022) and can have as many as "10 Rights of Medication Administration" (Bodell, 2015).

Ultimately, the medications rights come down the student knowing what the medications are, what they do to the patient, results of any pertinent labs, vital signs, whether the patient has eaten or on an empty stomach as necessary, why the patient is taking the medication, if the medication is safe for the patient, if the dose is safe for the patient, and if it will interact with any other medication the patient is taking. They must also know how to give the medication and when to re-evaluate the patient after giving the medication. If the student is not prepared to answer these questions, the instructor will have to take the time to educate the student; otherwise, the student misses an opportunity to give medications in the clinical setting. These "steps of knowing" are both for the student to learn about the medication administration process, but also so they are protecting the patient from harm; these multiple steps are points along the way where harm can be prevented.

This experience is then repeated with every student in the clinical group who is giving medications. If you only have six students in the clinical group, and you spend 30 minutes with each student going through this process, it will take 180 minutes or 3 hours to complete the medication administration process. If there are 10 students in the clinical setting, it would take 300 minutes or 5 hours to complete the medication administration process. Additionally, most hospitals have a 1 hour +/- window (Furnish, et al., 2021). If a medication is due at 7:00 am, nurses can safely give the medication between 6:00 am and 8:00 am. Before 6:00 am, it is considered too early; after 8:00 am, it is considered late. Either clinical group of six or ten students, with 30 minutes for each student to give medications, could potentially have a student whose medications end up falling outside of the "safe medication administration window." The floor nurse assigned to the patient would likely have gone in and administered the medication instead of waiting for the student to administer the medication. There is the option of allowing the student to administer the medication with the nurse, but there is no guarantee that the nurse will ensure that the student has answered any of the medication questions mentioned above.

By using learner-centered learning, students acquire knowledge by completing learning activities before they come to the clinical setting. They are assigned a learning activity that is created specifically for whatever the topic at hand is. Then when they get to the clinical setting, they are prepared to complete hands-on tasks. For example, students would study a pretend list of patient medications and answer all the same medication questions listed above. They would identify what the medication is, any labs or vital signs they need to know before administering the medication, how it might

interact with other medications, when to reassess, and why the patient is taking the medication. Then, they come to an in-person simulation where they have a mannequin or other simulated patient, and they are given a practice scenario where they practice giving medications and answering these questions in a safe setting where they cannot harm a live patient. Finally, they enter the clinical setting where they encounter a live patient who is taking the medications they have practiced. This could speed up the medication administration process and shorten it from 30 minutes to 15 minutes. Now a group of six students will get their medications administered within that 2-hour window, and a group of ten students will get their medications administered within 150 minutes. There may still be students who must administer with their nurse to maintain the 2-hour safety window, but it is less than before.

This practice allows them to work on improving their hands-on skills before they ever encounter a live patient. The presumption is that this process will allow nursing students to enter the hospital/clinical setting with better hands-on skills that they can use. These practice settings can include a variety of experiences such as using a high-fidelity simulation, faculty or peer-reviewed performance simulations, and hands-on skills labs, for example (Onturk, et al., 2019). The simulated experiences allow students to make mistakes and cause no harm to a live patient.

In addition, the learner-centered approach would provide the student with the opportunity to gain the required knowledge needed before they had to use the knowledge in a hands-on setting. The hands-on practice then allows them to improve upon skills or confront internal issues (i.e., individual ethical standards) before entering the live patient

setting and being confronted with complicated issues. Ultimately, this practice is thought to produce safer and better student nurses in the clinical setting, and then produce safer and better registered nurses upon graduation from a nursing program.

While educating nursing students may, at the onset, seem simple (i.e., teach them knowledge and then make them put it into practice), this is an oversimplification of a complex issue. For example, the act of teaching a student to change a patient's dressing is a multifaceted concept. Students must understand aseptic technique, basic wound care, infection prevention, and so on. Each of these pieces may be taught in different courses (e.g., introductory science courses teach an understanding of principles of infection transmission, introductory nursing courses teach an understanding of proper aseptic technique and handwashing, medical-surgical nursing courses teach the fundamentals of dressing change, and advanced-medical surgical nursing teach complicated wounds). Different nursing schools have freedom in how they set up courses and what those courses include. Further, each state has different guidelines for what is required, but there is much flexibility in how that is put together. These guidelines and basic state licensing and accreditation requirements also differ from state to state.

In addition to flexibility in how a nursing program is constructed, there is also flexibility in how faculty teach content in their classroom. While administration may choose a format (e.g., topic-based courses versus concept-based courses), the faculty typically has discretion as to how they want to teach the required content. How classroom content is delivered is a source of controversy for faculty, as there is not a unified consensus on how knowledge should be delivered. There is also an additional layer of

confusion or discrepancy that is added when academic freedom is considered. Faculty have the freedom to determine what they teach, how they teach it, and how it is evaluated with minimal outside influence (American Federation of Teachers, n.d.). The content of what is taught is determined by a combination of the administration, the NCLEX-RN examination topic list, and the BSN Essentials. The administration can then determine which courses are or are not taught.

The NCLEX-RN topic list or "blueprint" is a list of themes or topics that will theoretically be covered on the NCLEX-RN (National Council of State Boards of Nursing [NCSBN], 2018). The BSN Essentials are another tool that can be used by educators to help further break down the NCLEX-RN "blueprint" and help prepare students for both clinical and to take and pass the NCLEX-RN (American Association of Colleges of Nursing [AACN], 2023). To help ensure that academic freedom does not result in a policy of "anything goes," shared governance committees are used to help ensure that standards are set to maintain boundaries for each institution. However, this means that while there may be similarities from one institution to another, there may also be many differences as well.

**Description of the Gap in Knowledge**

The concept of learner-centered learning is not a new one in education, but it has not been widely studied in the field of nursing education (Duncan & Buskirk-Cohen, 2011). Learner-centered learning has been studied in science and math courses (Kirikkaya & Vukaya, 2011). Few nursing programs have applied a leaner-centered approach to learning, however, or completed a study to determine if this is an appropriate

concept to transition an entire nursing program into. The studies of Abdallah (2008), O'Neill and McMahon (2005), and Zawacki, et al. (2016) indicated positive trends in learner-centered teaching in healthcare-based programs, but only based upon one course at a time. Additional single course-based examples include Bdair (2021), who indicated that students who were forced to transition to online learning due to the COVID-19 pandemic found that while the initial transition was not easy due to the rush, they were quickly able to thrive once they were able to adjust to the online learning environment and the virtual learning platforms being used. Lee et al. (2021) indicated that students were able to improve their therapeutic communication skills by using virtual communication training simulations. This enabled them to enter the clinical setting with higher levels of therapeutic communication proficiency than previous cohorts of students.

Learner-centered learning has resulted in positive test score data in disciplines that are not healthcare based or in nursing schools. It is possible to postulate that learner-centered learning would have a positive impact on nursing students, but there is limited data to support this. Through this study, I sought to review a total of four cohorts in two different nursing programs at a midwestern United States college, in which both a traditional teaching Bachelor of Science in nursing degree and an accelerated Bachelor of Science in nursing degree are offered. The accelerated program uses a learner-centered teaching style, and the traditional program uses a traditional classroom-lecture approach. The current study will identify if there is a positive, negative, or no relationship between teaching style and student performance on both ATI standardized tests and the NCLEX-RN.

## Rationale for Study

Transitioning an entire nursing program from a traditional classroom to a learner-centered classroom would require all faculty members to recreate their courses. This would be a large undertaking for a nursing program. Faculty would have to recreate both learning activities and assessments to meet the needs of a learner-centered learning approach. While they are recreating content, they would also have to continue to teach current courses at the same time as they would not get an entire semester off to prepare and create new content. In addition to a large burden on the faculty, students also must be prepared to learn in a different way than they are currently used to learning under the "being lectured to" or traditional approach. If learner-centered learning proves to have a positive impact on standardized testing and the NCLEX-RN pass rates, then this undertaking would be beneficial for the college and the students. This benefit would come from allowing colleges to maintain higher NCLEX-RN pass rates which is a highly sought outcome in nursing education, along with producing better prepared nursing students. In addition, students would benefit as they would be more likely to pass the NCLEX-RN and obtain their state license. However, if learner-centered learning proves to have a negative impact on standardized testing and NCLEX-RN pass rates, then having a nursing program transition to this learning style would not be worth the effort and time required and could prove harmful to both faculty and students if accreditation is lost. It would also potentially be harmful to students if the current study shows a negative link between learner-centered learning and NCLEX-RN pass rates as fewer students would be prepared to pass the NCLEX-RN first time. It is also possible that there may be no

obvious link between teaching style and student performance on standardized tests or on first time attempts on the NCLEX-RN.

## Problem Statement

Nursing faculty are encouraged to implement learner-centered learning in their courses. Many studies have been completed on this learning concept in other disciplines, but in a very limited manner in disciplines that combine intelligence and physical skill (O'Neill & McMahon, 2005). Learner-centered learning is an environment in which students prepare for class on their own time through required reading, studying, and showing up to class prepared to put the concepts they have learned into action (Biley & Smith, 1999). This would be consistent with the idea of traditional homework, but instead of a traditional lecture where the instructor gives information and the students simply take notes, learner-centered classes have an interactive component. Learner-centered instructors are ones that guide students while allowing the students to take responsibility for their own learning (Alsardary & Blumberg, 2009). This is done, in part, by replacing traditional pencil and paper tests with high fidelity simulation or real-life/real-time activities that assess both the student's mental knowledge on a subject, along with their physical skill in carrying out necessary tasks.

An example of nursing students taking responsibility for their own learning, rather than listening to a lecture and studying on their own, is as follows. Students would read content or complete a learning activity, such as watching a video, in which new information is introduced to them and then come to class. In class, the students would then be actively participating in a hands-on activity in which they utilize the knowledge

they learned. This would allow the knowledge to be solidified through physical actions. It would also allow them to see how theoretical knowledge can be turned into practical application.

A real-life application and example would be a code blue scenario in the hospital setting. Students would be introduced to the roles of a nurse in a code blue setting. Once in class, they would then participate in the different roles of a nurse in the code blue setting. In the real-life setting, a code blue is an emergency that can result in patient death, but in a simulated code blue scenario, students would have time to think through the needs of the patient without causing actual harm to a live person. These authors go on to explain that in this setting, an instructor is a guide who works to help keep students on track and to help problem solve when problems are encountered. Instructors are not primary guides who simply lecture all information to the students as is done in a traditional classroom. Learner-centered education has been used to evaluate how students performed in a medical laboratory classroom (Zawacki, et al., 2016).

Giving students the ability to take responsibility for their own learning is another way to strengthen their critical thinking skills (Billings & Halstead, 2009). This is done as students have to be able to interpret the data they have about themselves, how they learn best, and the content to be learned, before focusing on the areas of need in order of priority. This can translate into critical thinking in the clinical setting, as the student will have to interpret the patient data they have, the tasks to be accomplished, and then prioritize their time and focus on needs in order of importance. While it will not prepare

them for a specific clinical setting, it will give them the template for decision making and critical thinking that they can take into any clinical setting.

While there may be studies that have been completed in humanities-based courses, there are no studies that have reviewed an entire nursing program and how learner-centered education might impact standardized testing across all years. Accreditation for nursing schools is, in part, dependent upon the National Council Licensure Examination (NCLEX-RN)/state board exam pass rates (Spector, et al., 2020). Knowing whether the learner-centered education style has an impact upon NCLEX-RN pass rates would help to maintain accreditation. If learner-centered education has a positive impact upon NCLEX-RN pass rates, then implementing this concept throughout an entire nursing program would likely allow for a positive effect on accreditation.

A negative effect of learner-centered education on NCLEX-RN pass rates would then put accreditation in jeopardy. Maintaining accreditation requires a program to meet a minimum percentage of first time NCLEX-RN pass rates. For example, the state of Illinois requires nursing programs to maintain a pass rate of 75% or greater. Any program falling below 75% is required to develop and implement a plan. If a program is unable to pull its pass rates to back above 75%, then the program faces increasing penalties and may be forced to close its doors if pass rates are not brought back up to above the 75% minimum requirement. The state of Tennessee has a similar requirement if a school's NCLEX-RN pass rate falls below 85%.

If learner-centered education yields lower NCLEX-RN pass rates, then moving an entire nursing program to this style of learning would be detrimental to the longevity of

the program. It would be detrimental to the college, as pass rates are monitored by both the state governing boards and accreditation agencies (Spector, et al., 2020). It would also be detrimental to the students who are paying for tuition. If, after paying a large amount of money in tuition and fees to test, the student was unable to pass the NCLEX-RN, they would have to either pay more money to take additional preparation course or pay additional money to take remediation courses. One final option would be for them to simply pay to retest, but that also has a fee of up to $600 per test. The current study will seek to identify the presence of a link between learner-centered education and student performance on standardized tests and student pass rates on the first time attempts on the NCLEX-RN.

## Purpose of the Study

The purpose of this quantitative study is to explore the relationship between learner-centered learning and both ATI standardized tests and the NCLEX-RN test results. Due to the current and projected nursing shortages in both the healthcare and educational systems, nursing schools are being pressured to increase the number of students who can successfully graduate from a four-year nursing program. They are encouraged to do so without an increase in faculty to oversee the increase in students. One proposed method for increasing the number of graduated nursing students is to transition nursing schools to the learner-centered style of teaching. While it would require a large initial workload to transition, the result would be that the same current number of available faculty could manage a larger number of students without having an increase in workload that is proportionate to the increase in student number. Rather than giving

students information, students are responsible for assimilating the information themselves. Instructors are then freed up to work with them on hands-on learning activities prior to and once inside of the hospital setting.

The concept of learner-centered learning has been used in various humanities-based programs and courses, but it has not been widely studied in a healthcare focused program. In addition to the lack of evaluation, there is also a concern regarding the amount of work required when transitioning an entire nursing program to a new style of teaching. Faculty will have to continue to teach out the current program offerings while simultaneously creating new teaching content, learning activities, and evaluation methods. This would double the workload for faculty during the transition process.

If there is a positive link between learner-centered teaching styles and student performance on standardized examinations or on first time NCLEX-RN pass rates, then the additional workload for faculty will be worth the effort. If there is a negative link between learner-centered teaching styles and student performance on standardized examinations of on first time NCLEX-RN pass rates, then the additional workload is not worth the effort and could have a negative impact on nursing schools as they are required, by each state, to maintain a minimum pass rate to be allowed to enroll new students. If there is no identified link between learner-centered teaching and student performance on standardized examinations or first time NCLEX-RN pass rates, then more study would need to be done. In addition, it may be that other avenues of efficiency in education will need to be explored to help meet the demand for more nurses.

## Research Questions and Hypotheses

RQ1: Does learner-centered education result in higher standardized ATI test scores than traditional classroom lecture in nursing education?

RQ2: Does learner -centered education have a positive impact on the first-time pass rate for students taking the National Council Licensure Examination (NCLEX-RN)?

H1-A. Learner-centered education has a positive impact on ATI standardized test scores in nursing education.

H1-B. Learner-centered education does not have a positive impact on ATI standardized test scores in nursing education.

H2-A. Learner-centered education has a positive impact on first time pass rates for National Council Licensure Examination (NCLEX-RN) test scores.

H2-B. Learner-centered education does not have a positive impact on first time pass rates for National Council Licensure Examination (NCLEX-RN) test scores.

## Theoretical and Conceptual Framework

This study is founded on situated learning theory of Jean Lave and Etienne Wenger. This theory was not developed until the 1990s, but the roots of this theory can be found in Piaget's constructivist theory (Hein, 1991; Piaget, 1936). While Piaget's theory was initially focused on infants and children and their interactions in the world, by the 1990s, new theories had emerged. Situated learning theory claims that learning is deeper when it is more interactive or in a real environment (Lave & Wenger, 1991) Rather than teach about dinosaurs, taking children to a museum where they can see life-sized skeletons, touch, and interact with different displays will allow them to retain more

information about dinosaurs than a classroom lecture with pictures. The learning occurs based on the premise that learning is going to occur through a desire to be a full member of a community. In this scenario, children in school who are on a field trip to a museum have the added excitement of being out of the daily classroom and in a new environment that has a lot of things their classroom does not. This is predicated on the idea that children like dinosaurs. If a child was afraid of dinosaurs, this would be a scary experience and learning is unlikely to occur. However, the child who likes dinosaurs would be excited and want to experience all they could while on the field trip (i.e., gain knowledge).

This process of gaining knowledge is the same for any "community". In this study, the "community" is registered nurses. Student nurses are the "child on the field trip" from the previous section. The theoretical propositions are that the student nurse must first want to learn how to be a nurse for learning to occur. If this desire is not present, then the process will be difficult (e.g., someone wants to be a nurse to simply make money and does not have a desire to help others, for example.). More details regarding this theory will be covered in Chapter 2 of this study.

Identifying whether there is a link between teaching styles and student performance on ATI standardized tests and first-time pass rates on the NCLEX-RN examination will help to determine if a nursing school should transition to a learner-centered style of teaching. Faculty will need to be educated on what this style of teaching entails, they will have to reconfigure entire nursing courses, create new learning activities and assessments, and all while continuing to teach out current courses. The creation of a

new nursing course is often not quick and can require multiple semesters of time to create and then refine. If a faculty member had to both teach current courses while recreating those same courses, this could effectively double their workload. However, if students were able to score higher on standardized examinations or if a higher percentage of students was able to pass the NCLEX-RN examination on their first attempt, this increase in workload would be worth the required work. Learner-centered learning is the use of a more immersive experience in which students can put knowledge gained into hands-on scenarios where they have the time to stop and discuss questions, concerns, or issues before getting to the real-life setting where they cannot stop real-time to do the same. Using situated learning theory fits learner-centered learning focus.

The phenomenon that grounds the current study is the push to transition nursing programs from a traditional lecture-based teaching style to one of learner-centered learning (Bloomberg & Pitchford, 2017). While this push is coming from an actual and predicted nursing shortage, it has not been widely studied in nursing programs. Learner-centered learning has been studied in humanities-based courses, but not widely studied in healthcare-based courses. The transition from traditional to learner-centered teaching will have a high cost in time and effort on the part of the faculty and the students. If there is a negative link between the learner-centered approach and a student's ability to earn high scores on standardized examinations and the NCLEX-RN, then this transition would not be worth the required effort. If there is a positive link between these areas, then the work required to transition would be worth it.

## Nature of Study

Due to the combination of an increasing nursing shortage in the hospitals and the increasing shortage of qualified nursing faculty, there is a push for current nursing faculty to train more students without increasing the number of available faculty. At first glance, this does appear to be a possible solution to help meet the growing demand without also having to have additional faculty. However, there is little-to-no data on whether a flipped classroom or a learner-centered teaching approach will benefit a nursing program. Data from other disciplines (e.g., high school programs and other disciplines such as humanities-based courses, for example) does show improved outcomes both in test scores achieved and in anecdotal evidence from both students and faculty. The hypothesis that using this approach in a nursing school would benefit both the students and the faculty is built on data gleaned from other disciplines.

Nursing programs require both a theoretical foundation in some form of classroom and a hands-on application of that same data. In addition, they often require this translation of theory to hands-on action within the same semester (American Association of Colleges of Nursing, 2023). The knowledge is built upon over the course of a four-year baccalaureate program, but students are still required to gain, retain, and use knowledge quickly. Along with requiring students to hold to a rigorous pace, nursing schools maintain their state approval to remain open and accept new students based partly upon the NCLEX-RN test scores of previous graduating classes. Most states require nursing schools to maintain an NCLEX-RN pass rate of greater than 75% for first time

test takers and major accreditation bodies (i.e., the Commission on Collegiate Nursing Education [CCNE]) require pass rates of 80% or higher (Lisser, 2021).

While implementing a new teaching style may or may not be more enjoyable, if nursing colleges cannot maintain NCLEX-RN pass rates for first time test takes at or above the required 75% pass rate, the nursing school risks remaining open and risks being sanctioned. (All Nursing Schools, n.d.a). If a nursing school loses their accreditation, the loses can include having students be unable to complete a program, students may be ineligible to take state boards, students may have to retake/repeat courses at other colleges as credits will not be transferable, for example.

At first look, this combination of shortages and teaching styles does appear to have a potential solution in the learner-centered teaching approach. However, without data to support the transition (i.e., NCLEX-RN pass rates will stay at or above the required minimum of 75-80% depending on accreditation body), forcing faculty to adopt a learner-centered teaching style could prove harmful. This study will seek to identify the presence of a link, whether positive or negative, between teaching styles and first-time student performance on the NCLEX-RN.

The key variables for the study are as follows. The independent variables will be the traditional in-person courses and the online or blended courses, and the dependent variables will be both the standardized test and NCLEX-RN scores. The standardized test (i.e., proctored ATI Examinations for each nursing course with a clinical component) scores from ATI have a built in national normal average called the national normed scores. This normed score will allow the students individual scores to have a frame of

reference. Each student earns an individual score, but as both ATI and the NCLEX-RN has established national normed values for their examinations, this allows each student to know whether their individual score aligns with the established normed values. For example, if Student X takes the Mental Health proctored ATI examination and scores an 89% can then assume, according to Assessment Technologies Institute (2019), that they have learned the required content they needed from their mental health course, will be able to pass the mental health portion of the NCLEX-RN examination, and they have met proficient levels or above in this content area. ATI has established national normed scores so that any student taking any of their proctored examinations can evaluate their level of readiness to take and pass the NCLEX-RN examination based on their individual score on an individual proctored examination. These normed values also allow individual nursing schools to establish whether each student is prepared and then create an individualized plan to allow that student to strengthen areas of weakness before taking the NCLEX-RN examination.

As test scores and course information will be the primary variables for the current study, it is not necessary to create a complicated instrument to collect the information. The data is currently archived. Access to the data will be obtained when appropriate IRB approvals are granted. The data will be evaluated using a multiple regression analysis. The presence of a link between student performance on standardized tests or the NCLEX-RN and either a traditional classroom experience or learner-centered education has not been established. The current study would seek to establish the presence of a link between learning styles and student performance on these tests and examinations.

## Definitions

To provide clarity, definitions for terms related to the current study will be provided here.

*ATI- Assessment Technologies Institute:* This is one of several major companies in the United States that creates and provides, for a fee, study materials, tests, and study aids to allow students to help prepare to take the NCLEX-RN examination (Assessment Technologies Institute, 2021). This is the company that the college involved currently uses to assist and test students and compare them to other nursing schools in the United States. They provide the standardized proctored examinations for each nursing course that students must take at the completion of each nursing course at the college. In addition to proctored examinations for each nursing course, they also provide case studies, simulation, video demonstrations, quizzes, tests, textbooks, study guides, and flash cards for students and faculty to utilize. All nursing courses utilize ATI products in a variety of ways, but all clinical courses utilize the proctored examination that aligns with the given course. Each student has an individualized profile created in which they track their performance both in an individual course and over the entire nursing program. Their goal at the end of the nursing program is to be competent in every nursing course area, so they are fully prepared to take and pass the NCLEX-RN on the first attempt.

*Clinical or clinical setting:* This is the location where the hands-on portion of nursing education occurs. This can include simulation, hospital sites, doctor's offices, and community sites. The site is arranged by the nursing school. Each clinical site has a supervising clinical instructor who is a member of faculty from the nursing school. In

addition, each clinical site will have requirements regarding student attendance, dress, and performance (Yazdi, 2019). All specialties can be included, but some of the most common are medical-surgical, obstetrics, pediatrics, geriatrics, perioperative, critical care, emergency care, psychiatric care, and community health. This is where students are expected to be able to put into practice the knowledge they have gained in the classroom.

*High-fidelity simulation:* This is a simulated experience in which both the setting, patient, and tools or items used on the patient are as realistic as possible (Carey & Rossler, 2021). This can be a computerized manikin that can simulate real life issue such as bleeding wounds, birth of a child, and breathing problems as examples. It could also mean the use of a live person who pretends to have some concern so the student can interact with a live person. There can also be variation with tools or items used. For example, placebo medications can be used, dressings can be changes on wounds created with make-up and other items. The decisions regarding whether to use a computer simulated manikin or a live person area often made by the faculty member and are driven by their end goal for the student. If the desire is simply to perform a clinical skill to a set of standards, then using a manikin is likely sufficient. However, if the faculty is desiring to see how a student performs a skill while communicating with a live person, then using a live person may be more beneficial. The manikin is also used when it would be dangerous to attempt to place a live person into a simulated setting (i.e., teaching students how to manage patients who are deteriorating from a rapidly progressing breathing problem or heart attack, for example).

*Learner-centered education:* Weimer (2012) and education-reimagined.org (n.d.) indicate that learner-centered education is a combination of new concepts in education. These concepts include several aspects but focuses primarily on the fact that the individual is made up of their previous experiences and this has imbued them with strengths and weaknesses that are uniquely their own, the individual will learn and develop in their own way and their own time, and that each individual has an inner desire to learn.

*NCLEX-RN- National Council Licensure Examination:* This is the name of the state board examination that all nursing students must take and pass with an average of 75% or greater to obtain a state license to practice nursing professionally in a specific state (National Council State Boards of Nursing [NCSBN], 2021a). To take the NCLEX-RN, a student must have graduated from an approved nursing program, registered with both their selected state and the testing agency, pay the testing fee ($200 [NCSBN, 2021b]) and the state fee (from $100-$300, depending upon the state [Walker, 2018]) and then schedule the exam. The exam is in an online format at a specified testing center, unless student disability accommodations require otherwise, and is a mix of kinds of test questions that include of multiple choice, fill in the blank, matching, and prioritization. There are also roughly 15 questions on each exam taken that are pilot questions. These questions are typically in a new format but do not count for or against the students overall score on the examination.

The categories covered include safe and effective care environment, management of care, safety and infection control, health promotion and maintenance, psychosocial

integrity, physiological integrity, basic care and comfort, pharmacological and parenteral therapies, reduction of risk potential and physiological adaptation. The highest percentage of questions come from the management of care and the pharmacological and parenteral therapies section as these two areas make up roughly 29-41% of the exam. Within these categories there are concepts like communication and documentation that are woven throughout.

Students have six hours to take 75-265 questions. The goal of both the time allotment and the question range is to allow students to answer 75 questions correctly and show their competency. Students are given content questions that essentially begin at a beginner or novice level and work up to a competent level. If they answer all levels correctly, then they move on to another content area, if not, the exam is built to continue to give them questions to allow them to show their competency. Students are not given a pass or fail immediately upon conclusion of the exam. They must wait at least 48 hours before results are available and then it is approximately a six week wait for them to receive their state license after successfully passing the exam.

Students who fail the NCLEX-RN must re-register with the testing service, pay an additional the testing fee ($200) and the state fee (from $100-$300, depending upon the state), and retest. Each state has a limit on the number of times a student may sit for the NCLEX-RN before they must go back and take some sort of remedial course. However, repaying the fees to test could become quite costly. The number of allowed retakes is different from state to state, but most states do allow two-to-three attempts before remediation is necessary.

*NCLEX-RN first-time pass rates:* This refers to the number of students, from the same graduating class, which take and pass the NCLEX-RN examination on the first time they take the test (NCSBN, 2021a). Nursing colleges are evaluated based on their first-time pass rates. Colleges are expected to maintain a minimum pass rate in each state of at least 75%. This means that 75% of students who take the NCLEX-RN can pass it the first time they take it. If a college is unable to maintain this 75% average, then they face the possibility of eventually having to close their doors. Students also look at a colleges NCLEX-RN pass rate before they chose to enroll. A college with a low pass rate is less likely to prepare a student to be successful to take and pass the NCLEX-RN. Additionally, certain accreditation standards (e.g., Commission on Collegiate Nursing Education [CCNE]) must maintain pass rates of 80% or higher or the college faces the possibility of losing accreditation (AACN, 2021b). Loss of accreditation would not force a school to close, but it could make it less appealing to prospective students.

*National Council of State Boards of Nursing:* This is the governing body that creates and maintains the NCLEX-RN test. All 50 states in the United States are a participant in this (NCSBN, 2021c). While each state board maintains individual state licensure requirements, they do work together to maintain the NCLEX-RN and the requirements of the NCLEX-RN.

*Proctored ATI Examinations:* Each nursing course with a clinical component (i.e., pediatrics, mental health, and medical-surgical nursing, obstetric nursing, advanced medical-surgical nursing) has an examination that must be proctored by faculty members at the college. These proctored examinations are created, named, and maintained by ATI,

and ATI has established national normed scores for each course (Assessment Technologies Institute, 2021) The normed scores are available to both faculty and students before and after the exams. These exams are used to help establish how much information a student has retained about a certain course. In addition, these proctored examinations help to guide remediation requirements for students before they take the NCLEX-RN.

*Second-degree students:* These are students who have completed a bachelor's degree or equivalent in an area that is not related to nursing (Methodist College, 2020). They have typically completed all their undergraduate prerequisite requirements in all humanities-based courses and only take nursing courses through the study college. In addition, the Second-Degree Program only has in-person experiences on Saturday and Sunday, all other class experiences occur during the week are exclusively online.

*Standardized tests:* Another term used to define the Proctored ATI examinations (Assessment Technologies Institute, 2021) They are standardized by ATI and as such allow a nursing program to evaluate their students against students in similar programs around the country. It is also possible to evaluate the student's scores against programs that are larger and smaller as all BSN students using the ATI products would take the same Proctored ATI examination.

## Assumptions

In the current study, the data being used will come primarily from two main sources: ATI standardized test scores and NCLEX-RN test results. Both sources have proven testing methods, but the assumption is that the testing process was carried out

correctly and that data were collected from the origin point (e.g., when the original test was taken, graded and a student score was achieved), stored correctly, and then retrieved correctly. As these processes are electronic, there is the possibility for error. Both testing services do have multi-layer systems in place to prevent this; however, the assumption is that these systems are working as intended.

A second assumption is that the results from these tests will be able to be generalized to other nursing schools. As indicated previously, not all nursing schools are the same, not all student populations are the same, so there is some room for question; however, the assumption for the current study is that the test results from the ATI standardized tests and the NCLEX-RN tests are generalizable among nursing school as both ATI and the NCLEX-RN have national normed scores (Assessment Technologies Institute, 2019). Due to the normed scores both the individual student score and the course cohort averages can be compared to the national normed scores and from nursing school to nursing school to see how students from different nursing schools perform differently.

A final assumption is that students who are testing were maintaining integrity when taking these tests. Both ATI standardized exams and the NCLEX-RN test have very specific testing policies in place. These range from having to have a proctor on hand for the NCLEX-RN to having to be video recorded (Assessment Technologies Institute, 2021; AACN, 2021c). In addition to these measures, both ATI and the NCLEX-RN tests have additional safety measures and students who get caught cheating can face criminal charges. In addition, students caught cheating on ATI tests will end up failing the test and

would then end up not being included in the current study. The assumption for the current study is that any cheating that might be occurring on this examination is being caught by the safety measures in place, so any data gleaned is test scores students earned.

## Scope and Delimitations

The current study examined a four-year undergraduate nursing degree that has all clinical courses meet in person with a traditional lecture-based classroom model. Any online courses that students in the traditional lecture-based classroom model would be taking would be nursing courses with no clinical component (e.g., nursing research or nursing informatics for example) and would not meet the requirements to be included in the current study. These courses are typically only theory focused and have foundational information that students are expected to carry forward into future courses, but there is no hands-on clinical component to these courses. Any hands-on nursing courses for these students (e.g., maternal nursing, pediatrics, medical-surgical nursing, and mental health) will all have both an in-person classroom theory portion and then a hands-on clinical component in which they put into practice the things they have learned in the classroom. The clinical component is made up of simulation, both low and high fidelity, and hands-on patient care in a variety of healthcare settings from the elementary school nurse, the emergency room, the operating room, the intensive care unit, and the doctor's office.

The second group being included in the current study is the second-degree students. The primary difference between the undergraduate and the second-degree students is the delivery method of the nursing program. As second-degree students have already completed their prerequisite courses in their original degree program, they

typically do not have to take any courses except for the nursing clinical courses. In addition, in a desire to make this program more marketable to students, it is provided in an accelerated format. This means that the students in the second-degree program have either blended courses (e.g., courses were roughly a minimum of 50% of the course content/interaction is online) or the course content/interaction is entirely online and the only time they interact in person with their instructor or peers is for the hands-on clinical portion on the weekends (Methodist College, 2021). Students not included in the current study will be students who did not successfully pass two or more nursing courses and thus failed out of the nursing program. Student privacy will be protected and the details regarding the collection, storage, analysis, and destruction of the data will be provided in Chapter 3.

## Limitations

One limitation to consider is the student population itself. Nurse educators are being pushed to educate more students faster (Niederhauser, 2012). In addition to educating more students, there is also a push to consider non-standard students or students who might not be traditionally look like good candidates on paper (i.e., they do not have high GPA's, are coming back after an extended period of time out of school, or coming back to a second degree). These students may have life experiences that make them good candidates for nursing, but their path may not be as direct as the traditional college student's path. In addition, not all students will be capable of earning and maintaining a 4.0 grade point average while in nursing school. Math and science are difficult classes.

Nursing courses combine both theoretical knowledge with hands-on practical application and require both interpretation of data and prediction of correct actions to take next. This is difficult for some to master quickly. On top of that, not all students will be from similar backgrounds (e.g., straight from high school, single, limited family or work commitments or requirements). All these aspects will influence an individual's ability to perform and maintain their grades while in nursing school. In addition, outside factors of life (e.g., car accidents, family experiences, relationships, and financial issues) will also impact individuals and potentially affect how they perform in school. While none of these areas are being investigated by the current study, it is important to note them as they do impact the current student population and they do influence grades students earn. Additionally, different nursing schools will have different levels of impact from each of these areas. Some schools appeal more to students right out of high school, so the student body is made up of young, single, individuals who are unencumbered by the many responsibilities of caring for a family. Other schools will appeal to more mature students who may already have a family and are forced to find a balance between work, school, and daily life. Additionally, some students may be from another country and speak English as a second language. They may be drawn to a different school and will then be faced with the challenge of interacting with complicated topics in a language that is not their own. They may also have students who are from wealthy families and choose schools who have a lot of amenities or have a lot of extracurricular activities available. It would also be possible to see students who take their studies to the extreme and do not know how to function outside of the classroom. Again, these are all areas the current

study will not be seeking to identify, but these are all areas in which different nursing schools may have differing test scores for a variety of reasons. Student individuality and student capability when faced with different outside challenges are areas that may need further study.

## Significance

There is a current shortage of nurses in the United States. The number varies, but current projections are that 200,000 nursing jobs will be open each year (AACN, 2021b). Approximately 2.9 million nurses are working in the United States (U.S. Bureau of Labor Statistics, 2020). Additionally, of the 2.9 million current nurses, roughly one million are over the age of 50, which means that in the next 10-15 years roughly one-third of the current workforce will be leaving due to retirement (Haddad, et al., 2020). The creation of the 200,000 positions is not simply due to the retiring of the current workforce but is also made up of nurses who could keep working but leave due to burnout or a desire to pursue other interests. This means that, at an expected minimum of 200,000 open nursing positions will be created each year. Additionally, current COVID19 vaccine requirements have caused additional losses of healthcare staff at hospitals (Gooch, 2021; Schenker, 2021) in varying numbers. While the COVID-19 data on nurses who have left the job due may still be in the process of being collected, current figures have roughly 18% of healthcare workers leaving due to the pandemic (Gooch, 2021). If we apply 18% to the current number of 2.9 million nurses, this indicates that an additional approximate 522,000 nurses have left the profession due to the pandemic. This anomaly needs to be included as it places a larger burden on the nursing shortage. Rather than the 200,000

projected loss of nurses in 2020-2021, there is a projected 522,000, which is more than double the original projection and the pandemic has not yet concluded. There may be a continued increase in the number of nurses who leave the profession, thus placing a larger burden on nurse educators to educate nursing students.

On top of nurses leaving the profession, there is also a shortage of trained nursing faculty. There are roughly 1,827 open nursing faculty positions (AACN, 2020) in approximately 996 nursing programs. In these nursing programs, 155,000 nurses graduate each year (Salsberg, 2018). Not all graduates pass the NCLEX-RN on the first attempt. Some do not pass it at all and end up either having to go back and take remedial courses or do not pursue a career as a nurse. It is clear to see that more nurses are leaving the profession than are entering it. If more nurses are leaving healthcare than are graduating and entering healthcare, eventually, the nursing shortage will increase. Along with that, to educate nursing students, one must first be a registered nurse. If there are not enough nurses, it would follow that there would not be enough nurse educators. This becomes a circular issue that ends up with too few nurses, too few educators and ultimately not enough people to work in healthcare in either capacity.

**Positive Social Change**

At first glance, this seems overwhelming and rather frightening for the future of healthcare in the United States. There may be many solutions to try and manage the healthcare side of the nursing shortage, but the current study will focus on the educational side. One proposed solution to manage the education side of nursing is to transition the traditional classroom to a learner-centered approach. This concept has been well-studied

in many humanities-based courses and in courses that are largely didactical with little hands-on application of learned knowledge. However, it is being encouraged in nursing education.

Due to the large amount of work and time needed to transition each course from its current teaching style to the learner-centered style, combined with the standards nursing schools are held to (i.e., nursing students must be able to pass the NCLEX-RN upon completion of a nursing program, nursing schools must maintain accreditation and state permission to remain open based upon student performance on the NCLEX-RN), it would be important to know if transitioning an entire nursing program to a new style of teaching is going to be worth the required investment in time and work. If transitioning the curriculum from traditional teaching styles to a learner-centered approach causes students to perform poorly on ATI standardized tests or fail to pass the NCLEX-RN on the first time they test, then this transition would not be beneficial. Despite the initial increase in faculty workload required to transition an entire nursing curriculum from traditional classroom-based lecture to a learner-centered focus, if students can score higher on standardized ATI tests or a higher percentage of students are able to pass the NCLEX-RN on the first time they test, then this would be a positive social change.

Once a nursing curriculum has transitioned, faculty are then able to supervise a larger number of nursing students without the traditional proportionate increase in faculty workload as students are coming to in-person activities prepared to engage in hands-on learning activities having completed the independent learning assignments on their own. The positive social change would allow for the current available faculty to supervise a

larger number of nursing students, and potentially graduate a larger number of nursing students. As there is a current and a projected future nursing shortage, having the ability to educate a larger number of nurses without increasing the required faculty would help to lessen the shortage.

## Summary

There are clear shortages in the current number of available nurses to fill open positions, current shortages in current nursing faculty, and there will continue to be large number shortages in both areas in coming years. Out of many proposed solutions to solving the nursing shortage is one of transitioning nursing colleges from a traditional classroom to a learner-centered approach.

While there may be anecdotal evidence from humanities-based areas of study, pre collegiate areas of study, or areas of study that do not have the same kinds of didactic and hands-on application as is found in healthcare, there is limited study showing a positive link between learner-centered learning and student performance on standardized testing in the field of nursing education. Additionally, there would be a large quantity of work required to transition from current practice to learner-centered teaching. Faculty would have to teach out current students based on current methods they are using, while creating new course content. This would eventually lead to an overlap of teaching where one course would have to be taught in the old program and then in the new program in back-to-back semesters. This means that there is little time to prepare these new courses or that courses are having to be recreated while they are still being taught. Creating new courses while simultaneously teaching the old ones would essentially double the workload of

faculty without doubling the number of faculty or the benefits/remuneration they receive for doing their job.

Creation of a new course does happen from time to time in a regular nursing college, but in transitioning an entire nursing program, all courses would have to be reformatted and all courses would have to be redone at approximately the same time. Even if courses were redone in a rolled-out format (e.g., freshmen level courses redone first, then sophomore level, then junior level, for example) this would still be adding to the faculty workload. It might lessen the initial impact, but it has the potential to stretch it out over several years, thus increasing the faculty workload over several years. In this time, faculty may not be receiving any additional compensation for this increased workload as it may simply be just a part of their job expectation. These can lead to a potential increase in faculty burnout if the benefit does not clearly outweigh the required workload.

Another aspect to consider is how the new curriculum changes could impact standardized testing scores and student performance on the NCLEX-RN. While standardized test scores do not impact a college's ability to remain open or admit student, many colleges use these test scores as guides to help themselves and students predict how prepared they are to take and pass the NCLEX-RN upon graduation. Nursing colleges are permitted to open, allowed to become, and maintain accreditation from various accreditation bodies and state governing bodies, and continuously evaluated based on the percentage of graduates able to take and pass the NCLEX-RN examination on their first attempt. The current study seeks to identify the presence of a link between teaching style

and student performance on standardized examination and the NCLEX-RN examination. If there is a positive link between learner-centered education and student performance on standardized examination and the NCLEX-RN examination, then the work required to transition from current practice to a learner-centered model would be worth the required effort. Additionally, if positive, this could help to begin to close some of the gap in the nursing shortage. However, if there is no link or is a negative link, then the work required to transition from current practice may either not be worth the effort or it could have a negative impact on the nursing college's ability to maintain accreditation.

In Chapter 2, this paper provides an extensive literature review on the historical background of nursing education, including a discussion of relevant changes and adaptations that have led to the current state of nursing. Influential theorists and their theories will also be thoroughly examined in order to provide a comprehensive understanding of the development and evolution of nursing education. The review will draw on a range of primary and secondary sources, including books, magazines, pamphlets, textbooks, and articles, as well as electronic resources such as websites and online journals.

# Chapter 2: Literature Review

## Introduction

There is both a current and future nursing shortage in the United States (University of St. Augustine for Health Sciences, 2021). One of the proposed strategies for managing this nursing shortage has been around nursing education. Utilizing learner-centered education in the nursing school classroom could potentially allow nurse educators to educate larger number of students without having to increase the number of required nurse educators. This proposed strategy could help meet the increased demand for nurses without requiring additional trained nurse educators; however, little study has been done, to date, on how learner-centered education has impacted an entire nursing program. This chapter includes an exploration of literature surrounding this study, the key search terms used, the library databases used, the scope of the literature review, Piaget's constructivist theory as it applies to the study, and a detailed history of nursing and nursing education.

## Literature Search Strategy

### Accessed Library Databases

For this study, the Walden Library, EBSCOhost, Google, and Google Scholar were used to search key terms and combinations of terms. Key search terms used include *adult learner; alternative assessment in nursing education; army nursing; Assessment Technologies Institute (ATI); Associates Degree in Nursing; Bachelors of Science in Nursing (BSN) versus Registered Nurse (RN); Bradley University Nursing Program; characteristics of learner-centered teaching; classroom learning and motivation;*

*Commission of Collegiate Nursing education (CCNE); computer simulation; constructivism; faculty academic freedom; flipped classroom; Florence Nightingale; GPower; HESI; high-fidelity simulation; history of nursing; history of the NCLEX; Illinois Department of Financial and Professional Regulation (IDFPR) nursing licensure requirements; intravenous lines and tubes; Kaplan; learning-centered classrooms; learner-centered education; learner-centered methods; learner-centered professional development; learner-centered teaching; Licensed Practical Nurse Degree; low-fidelity simulation; National Council Licensure Examination (NCLEX); National League for Nursing ( NLN); NCLEX application; NCLEX examination statistics 2019; NCLEX fees; NCLEX pass rates; NCLEX registration; NCLEX rules; New York State Education Department (NYSED) RN application; nurse shortage; nurse licensure; nurse practitioner; nurses quit during COVID-19; nursing faculty openings; nursing faculty shortage; nursing school accreditation; nursing school clinicals; medication calculations; medication errors; Methodist College Nursing Program; online learning; Piaget; preventing medication errors; problem-based learning; reflective teaching; registered nurse; RN employment and wages; rural nurses; self-efficacy theory; simulation; situated learning; State guide to RN licensure; State of California Department of consumer Affairs RN application; statistics; STEAM courses; STEM courses; student-centered education; United States nurse faculty shortage; United States nurse shortage; University of California, Los Angeles RN degree requirements;* and *written drug dosage errors*.

The literature review began with Blumberg's (2009) text and began in 2014. Approximately eight years of research have been conducted for this study. The types of literature reviewed includes published books, journal articles, peer-reviewed journal articles, websites, interviews, government legislation websites, accreditation websites, and accreditation publications.

## Literature Review Related to the Concepts

There has been limited research on the concept of learner-centered learning within medical or healthcare education. Tracking the development of the concept of learner-centered learning and its progression historically in the review allows for a foundation to be established for the current study. Nursing students have both classroom theory and practical hands-on courses for clinical skills. Integrating the concepts of learner-centered learning has been promoted as a potential to better combine classroom theory and hands-on courses.

### The Creation of Learner-Centered Learning

Learner-centered learning refers to taking the responsibility for learning away from faculty and placing it on the students. Students are required to prepare for class times by completing different activities. Once they come to class, rather than a traditional lecture, students participate in interactive activities that allow them to put the knowledge they gained into practical application. For example, students might read about how the cardiac system works before class. Once in class, they would then work through interactive case studies that allow them to make care choices based on their reading. They would be allowed to see areas of knowledge strengths and weaknesses. This will then

help them to know where they are already strong, will allow them to spend less time studying areas of strength, and focus their study time on the areas in which they are weak. Students will also be allowed to practice new skills or knowledge in a safe way before they encounter patients.

The idea of a learner-centered focus has a questionable origin, and historically it is possible to see this in several different topic areas. At the core, this concept is built on several different theories that gained recognition in the early to mid-1900s in the arenas of social reform, art, and education. Each of these avenues was originated by a different individual, but the central ideas remained similar. Piaget's (1936; Hein, 1991) theory of constructivism indicated that knowledge is built individually and can be influenced by experiences; for example, children must internalize information before they can begin to act on it externally (Aldridge, et al., 1994).

Constructivism indicates that humans assimilate knowledge and use it to ask and answer questions that might not have been previously possible with their knowledge base (Carey, et al., 2015); an example is learning to drive a car. The new knowledge would be related to the rules of the road, speed limits, and how to operate a vehicle. The new questions asked might relate to how fast is safe to drive and whether driverless vehicles would be a good idea. Without knowledge about how to drive a car, these questions might not even be considered; with the new knowledge, individuals have new worlds opened to them. It is possible to postulate that simply driving a vehicle might not be enough to encourage individuals to ask these new questions (Aldridge, et al., 1994; Carey, et al., 2015; Hein, 1991). The individual would need to take in information

through observation of other drivers (i.e., through watching parents and seeing other vehicles on the road), take in information through studying for a driver's license exam, and then take in information from their own experiences driving a vehicle. All these aspects would flow together and allow for the creation of new questions. For example, an individual who has a large amount of paperwork to review and a lengthy commute to work might interpret their drive time as wasted time; however, the creation of a driverless vehicle might allow them to use that commute time to work through paperwork. Thus, knowledge and individual experiences together allow for new questions and answers.

Having students prepared to come to class ready to take part in learning activities and strengthen their knowledge base does sound good at the outset. However, there is little data to indicate this is something that is happening effectively in nursing education. Without having data to prove or disprove a positive link between learner-centered learning and performance on the NCLEX-RN, it is impossible to know if the promotion of learner-centered classrooms is something that is of benefit to nurse educators.

**Learner-Centered Learning in the Classroom**

Taking Piaget's (1936) constructivist theory and applying it to the classroom has been done in a variety of settings. While not originally called "learner-centered," Piaget's constructivist theory (1936) is the foundation of this movement. There are indications that early 1990s classrooms were beginning to see Piaget's constructivist theory being utilized (Blumenfeld, 1992). These early endeavors were in elementary, junior high, and high school classrooms. The focus was often on getting students to be goal-oriented so that they would complete specific learning tasks and goals. In these early attempts,

learning was typically done through what might be considered traditional lecture methods; a teacher taught content using a lecture, and then students completed work based on the new knowledge (Tyner, 1994). An example is the use of videos to supplement classroom lectures. Rather than just telling a child or showing a picture of something, a video could be shown that included content that could not be replicated in the classroom in any other way.

For example, learning about elephants in the classroom can only be done through pictures. Adding a video of an elephant in their own environment or at the zoo allows students to see the size, the movement, hear noises they make, and watch them eat. This video experience greatly enhances their understanding of the concept of an elephant as they got to "see" it, rather than just reading about it in a book or seeing pictures.

Taking the concept of constructivist theory and using it to begin to teach children concepts that adults understand (e.g., seeing pictures of an animal in a book versus seeing it in a habitat in the zoo, etc.) also began in the early 1990s. Constructivist theory was initially applied to infants and young children (Piaget, 1936), and using these concepts with adult learners was not the initial intent. It seems that Piaget was not attempting to show how adults learn but was attempting to explain how children learn about their world, as well as how they assimilate knowledge (1936).

Despite Piaget's intent to help explain how young children learn about their world, this is a concept that can still apply to adults in trying to teach conservation tasks (Holbrook, 1992). When these tasks were introduced to children, some were able to understand, but most children were not immediately able to understand the same concepts

as adults were. Holbrook (1992) goes on to indicate children may be sidetracked through their own centration, or through their inability to focus on more than one aspect of the task. Holbrook (1992) also noted that many of the children approached the tasks in different ways than the adults typically would. This allowed the adults to broaden their way of thinking when it comes to approaching a task.

The argument can be made that while adults do not necessarily assimilate knowledge in the same way that children do, they are using their own experiences to guide their knowledge assimilation. This is in keeping with Piaget and Cook's (1952) concept of schemas. A schema, according to Piaget, is an internal concept that an individual uses to build upon or use as an internal foundation for building upon when new knowledge is created (1952). Just as a house is built with the foundation first, so too must new knowledge have a foundation set in the mind of the individual. Every past experience that an individual has had has the potential to be a place from which they can gain knowledge. Each of these experiences would then build upon others, and this is how the schema is formed (Bartlett, 1932).

While Piaget's work may not have been initially intended for adults, the concepts can be utilized by adult educators, as there is overlap. Infants, children, and adults all assimilate knowledge based on their world (Piaget, 1936; Holbrook 1992). Both authors also indicated that with each new experience an individual has, there is the possibility of gaining new knowledge and assimilation.

An example is using a model and asking a room full of individuals to recreate the model through some artistic medium. Everyone in the room would recreate that model

based on their own choices, available mediums, skill level, perception of the model, and the importance of different aspects of it. Some will likely focus on shape, some on color shading, some on picking a medium that most closely resembles the original, and some may have a more abstract approach to the recreation. So, as individuals interact with their world, they have their experiences color their perception and future choices.

One problem that was not immediately identified in learner-centered learning was how students should be evaluated. Teachers who used new models of learner-centered learning found they had to adapt the way they evaluated students (Graue, 1993). While students were able to better understand the content and answer questions using this new knowledge, the teachers had a difficult time using standard worksheets and test scores, as they were not able to show what was happening. Students could verbally work through problems but assigning grades to these interactions was difficult.

Definitive assessments were difficult to develop, but this new learning model benefited from having assessments developed along with the new instruction (Graue, 1993). Before new instruction could take place, assessment methods should be in place so that educators would be able to keep up with both the changes and the students. Being intentional about creating new learning activities and assessment methods that matched each specific learning activity allowed for a more cohesive experience rather than an "on the fly" approach, as they used the new instructional methods.

Taking this content into the classroom often initially showed student improvement, but there were barriers to this style of learning. While these concepts were more fun for students and faculty, to rely solely on this style of teaching often left the

students feeling as if they were not learning (Long, 1995). Students were used to being "taught to" through classroom lectures and this new way of learning posed several challenges. Despite being confronted with higher test scores, students' perception of the situation did not match their improved test scores due to a variety of reasons. They felt the instructor was not doing their job as they were not strictly lecturing. They felt as if they were teaching themselves as they were not sitting and listening in lecture. By having to complete assignments, complete reading, and complete other virtual interactions, they felt they were teaching themselves. Many were expecting their instructors to simply give them all the information they needed through lecture. Despite the improvement in test scores, the change in learning styles was met with conflict.

Some arguments could be made that students who complained about the learning style change were not ready to learn. In Constructivist Theory, Piaget indicated that children must be ready to learn (1936). This idea is further solidified when Piaget indicated that children must take an active part in their own learning. It is not enough to simply teach a child why or how, but the children must want to learn the concepts and need to choose to internalize the lesson (Piaget, 1957). This is also true for adults. Although adults may have a lifetime of accumulated schemas, they still need to want to learn (Bloomberg & Pitchford, 2017). While roughly 80 years separate Piaget's (1936) work and Bloomberg and Pitchford's (2017) research, the concept that students must want to internalize information remains the same.

## Student Learning Before Entering the Clinical Setting

The ability to internalize information and then use it to think critically and problem solve is something that is expected of nurses. However, if students were simply lectured at and then placed directly into the clinical setting, there is little chance for them to practice their skills (Bloomberg & Pitchford, 2017). Using a learner-centered approach allowed for students to choose to internalize knowledge, practice in a safe setting and then enter the clinical setting having a better understanding of how to use the knowledge they have obtained.

## Classroom-Based Learning

Before a student can enter the hospital setting, they must have a basic understanding of the foundations of nursing. This is achieved in a myriad of ways. Students were typically required to complete basic math and science courses before they could take the more advanced nursing courses. The specific math and science courses can vary based upon college or university preference or state board licensing guidance, but often include college algebra, statistics, biology, anatomy and physiology, microbiology, and chemistry. While there was some fluctuation, students needed to have both math and science as a foundation to both learn higher level nursing content and to work to prevent medication errors (Institute of Medicine [IOM], 2006). The need for nurses to have had a mathematical foundation was not always apparent, but the presence of poor mathematical skills and an increase in nursing medication errors led to the inclusion of nursing math classes for students (Kapborg, 1992).

Having a basic mathematical skill foundation is simply the beginning of proficient medication administration. In addition, identifying a lack of knowledge in nurses and students and requiring students take a math course would not be enough to fill in the gap between missing mathematical knowledge and proficient medication administration in the clinical setting. Students must both have had a foundation and a way to practice that knowledge before they enter the clinical setting (Weeks, et al., 2000). An additional step was needed to include math practice activities into nursing courses to help students keep their math skills fresh (Zahara-Such, 2012). These simulation methods included practice drug calculation scenarios that students must calculate during real-life simulation experiences. As they were dosing medication to high fidelity manikins, there was no actual harm being done to a live person. If medication errors were made, faculty members were on hand to observe and help students both identify the "why" behind the error and help develop plans to avoid the error in the future. Students were also able to practice the medication math calculations, so they could feel confident in their calculation skills before entering the hospital setting.

In addition to requiring math courses, colleges and universities required students to take a variety of science courses. Whereas the math courses may not be immediately linked (i.e., students are not giving medication until they are well into the program), science courses have had a more direct link to content the students begin learning immediately. To understand a disease process, a student needed to understand the disease from a cellular level out. A nurse needed to understand why a patient with pneumonia trouble may have had breathing problems and may have required oxygen or

aerosolized medications in addition to either intravenous or oral antibiotic medications. To understand these things, a nurse needed to understand what bacteria are involved, how they functioned in the body, how secretions were occurring, how oxygen was impacted, and how antibiotic therapy will work, for example (Bailey, 2004). To learn each of these processes, a student nurse must first begin with science and add additional content to that foundation.

Considering the need for student nurses to assimilate large amounts of knowledge, adapting educational strategies to maximize student learning was necessary. Classroom-based theory education is one way to give students the knowledge foundations they needed before they go into the clinical setting. Using the principles of learner-centered education to assist nursing students in assimilating knowledge has been promoted to maximize learning without lengthening the education process (Oermann, et al., 2017).

**Clinical Practice Before the Hospital Setting**

To have nursing students who are competent in the clinical setting, they needed to be able to practice the skills they had learned before entering the clinical setting. Using high-fidelity simulation in which electronic manikins are substituted as patients allowed nursing students to practice these skills without having access to live patients. In addition to being free from causing harm to live patients, students could speed up, slow down, pause, restart, or repeat programmed scenarios as needed.

High-fidelity manikins had multiple medication administration benefits to nursing students. The student could practice taking physician's orders, performing the needed mathematical calculations to determine how much medication would be administered,

preparing the medications (i.e., drawing up medications into syringes, crushing medication, and preparing topical administrations), and finally administering the medication to the manikin just as they would a live patient (White, et al., 2010). There was also the ability of the student, peers, or faculty to evaluate any of these practices in real-time and to pause, start over, make changes, or take time to dialogue through the student's decision-making process and identify any areas of strength or weakness and any changes that needed to be made (Onturk, et al., 2019). Many of these same steps were available in the live clinical setting, but the time constraints in the live clinical setting added pressure and time constraints to the medication administration process.

If new medication orders were given via phone call with a physician, there was the possibility of the orders being mis-transcribed by the nurse (Shawahna, et al., 2019). If the exact dose of medication was not available, it is possible for a medication error to occur when the nurse was preparing the medication. It was possible for the nurse to prepare the wrong format of medication (i.e., pills or tablets for an oral route versus liquid for injection) or to misunderstand differences in different medication formats (i.e., enteric coated medications cannot be crushed, oral liquid medication could not be pushed through the intravenous route, intravenous medications may need to be protected from the light, or intravenous medications require specific lengths of time to be pushed over) (White, et al., 2010). The simulation setting allowed each of these areas to be practiced individually, in parts, or as a whole process. Simulation also allowed students to make non-punitive mistakes. If a student makes a medication error in the simulation setting, no harm could come to a live patient. Whereas a medication error with a live patient could

have little-to-no consequences or a patient could die. Knowing simulation could provide for safe spaces for students to practice their skills in, setting up the simulation setting could be daunting. In addition, it was also imperative that a faculty member know how to set up the classroom theory portion of the education in a way that benefits both the live patient setting and the simulation setting.

While the simulation setting was a key component in nursing education, there was much education that must come before the student was ready for the simulation setting. This was true through the entire nursing student career. Simulation could be utilized for practical hands-on skills, and it could be used for concepts that are not physical. One such concept was that of ethics. Being able to present nursing students with ethical issues that are built into a simulation allows for them to see how their own internalized beliefs and prejudices might interfere with live patient care (Tanoubi, et al., 2020). Having a simulated patient who is pregnant and requiring medications that could either save the life of the mother or harm the life of the developing fetus was one example of an ethical dilemma. Many such dilemmas could be incorporated into the simulation setting so that students could deal with more complicated ethical issues in a safe manner and have a debrief time after to deal with potential feelings or difficulties that could arise based upon their decision making within the simulation.

## Literature Review Related to Nursing Education

When preparing the simulation setting for student interactions, it was imperative that students come into the setting with some knowledge of what they are going to be expected to do. For example, nursing students could not be expected to administer

medication in a simulation if they have never learned about the medication administration process. At first glance, this may seem obvious, and the answer would be to "teach them about medication administration", but this is a concept that most nursing students do not learn until their second year into a four-year, Bachelor's prepared nursing program. This is, in part, due to several concepts that go into learning about medication administration. As previously mentioned, nursing students are required to take both foundational science courses and foundational mathematics courses. The variation in specific courses is due to institutional choice, but the underlying concepts are similar. Mathematics may include college algebra, statistics, or medication math (i.e., math related to dosing units), and science courses may include biology, anatomy and physiology, chemistry, microbiology, and pathophysiology. With the foundational concepts so similar between colleges and universities, it is imperative to understand there are different ways to deliver the same content to students. How classroom content is delivered is a source of controversy for faculty as there is not unified consensus on how knowledge should be delivered.

Having had students enter the clinical setting with both the knowledge from theory and the physical skills to put that knowledge into place would have made the clinical setting a more effective learning environment. If a student was able to walk into the clinical setting and interpret a patient's vital signs, understand the link between disease and medication, and identify when a patient was within normal limits, any abnormalities would have been a teachable moment. Students who could not identify patients within normal limits then would not have been able to identify patients who may have been entering phases of critical illness in the real-life setting. Coming to class

prepared with the knowledge to identify within normal limits and beginning to learn how to interact with those outside the normal limits would have allowed nurse educators to use the available class and clinical time to strengthen the physical skills of the student while showing them the link between theory and real life. The current study addressed this issue.

**Historical Evolution of Nursing Education Strategies**

The current practice of educating nurses in the classroom began relatively recently. Nursing the sick originated with the church (Nutting & Dock, 1907) and their attempt to meet the needs of the sick and socially disadvantaged (Carpenter, 1986). Over time, as cultures made advancements in science and industry, these needs changed from country to country. In addition to changing physical needs, those who felt "called" to work with the sick were considered to have a special calling from their deity (Tulchinsky & Varavikova, 2014). When people were sick, they sought out the monks and nuns at churches for healing. It is important to note that early nursing was taking place in the church, and little information was recorded about early nursing practices since it was considered routine and a part of regular culture. Women were typically responsible for caring for the family and learned over time which herbs and remedies proved to be beneficial and which were harmful (Nutting & Dock, 1907).

While there was not much known about early family nursing, other than that women were responsible for it, much of the rest of early nursing was taking place in the church setting. Due to the mixing of health and religion, there were early instances of a mixing of these both. This partly resulted in, what could now be identified as, confusion

between science and “magic” (Nutting & Dock, 1907). If a treatment assisted the sick individual, but did not make sense to those around, then it could be labeled as “black magic” and as such, it was considered evil. Along with the skewed thinking process, this idea of “black magic” or “white magic” allowed the church to have sway over things that were considered acceptable versus unacceptable. Adding to the confusion were the practices of indigenous peoples. While they clearly had religious practices of their own, if they were not part of the organized church structure, they could easily be labeled “black magic” and thus off-limits to most. The practices of indigenous people also allowed for disparities in healthcare (Nutting & Dock, 1907) simply because they were misunderstood or because of the color of a person’s skin, they were written off as unimportant enough to be thought to have an understanding of a complicated concept. For example, there were tribes in Africa who knew how to inoculate against smallpox while it was killing people in other areas. These early differences and disparities were quite numerous.

Since at least the third century B.C., there were hospitals in various forms (Nutting & Dock, 1907). These early hospitals were primarily staffed by men and followed an apprenticeship model. As the organized church gained influence, it began to determine what was acceptable through the categorization of practices as "white" or "black" magic. Despite this, many cultures had written knowledge about caring for the sick that dated back to the end of the third century B.C. As the organized church expanded and labeled non-church practices as "black magic," many positive healthcare communities were pressured to align with church ideals. Early nursing was primarily

carried out in the home or in religious communities, with nursing training taking place in the home or church.

From at least the third century B.C., hospitals existed in some form (Nutting & Dock, 1907). Men staffed these early hospitals, and the apprenticeship concept remained consistent in these settings. Although little is known about nursing during the medieval ages (Nutting & Dock, 1907), it is understood that women working with the sick or injured was a disrespected position and almost unheard of unless the woman had a poor reputation. Nursing in hospitals was not a role commonly held by women until 1585, when Mary Ward founded a group of women nuns to care for the sick and afflicted (Nutting & Dock, 1907). Ward's group of nuns were led by women, answered only to the Pope, and were considered heretical. Ward was imprisoned until her death, but her group continued to practice nursing until 1703, when Clement XI granted them legitimacy (Nutting & Dock, 1907). As this group of women grew and developed, they provided care for patients. When these nuns moved to the Americas, they set up hospitals to provide care for the ill, but their small numbers soon proved insufficient. To meet the needs of their patients, these nuns trained Native American women on the job, without the need for formal classroom education (Nutting & Dock, 1907). If these women could follow the directions of the nuns, there was no additional educational training required.

In 1786, William Nolan wrote about the hospital as a horrible place of suffering where the nuns prioritized payment for services over providing care (Nolan, 1786). He proposed changes, such as keeping extra clothing for patients who couldn't afford multiple changes and improving the food provided to patients. These suggestions gained

attention from women of high society who demanded to oversee the hospital settings. Their influence was significant as they were connected to wealthy husbands who could choose where to donate money (Nutting & Dock, 1907). This allowed them to participate in and oversee changes in the hospital setting.

Nolan's writings also indicated that the nurses were understaffed, overworked, and underpaid. He stated that any woman seeking the position of nurse was a "hardworking slave...and must work both day and night to actually do more than should be asked of a single person" (Nolan, 1786). According to him, the nurses were "one to every 40 patients...recruited from the ranks of uneducated, needy, timid, and submissive laboring women, and it would be a cruel injustice to regard them as anything but victims of a bad system" (Nolan, 1786). Moreover, the nurses were also underpaid for their work and often relied on the tips left to them by the patients. It is possible that this financial pressure led some nurses to turn to less than moral methods to illicit additional tips from patients (Nolan, 1786; Nutting & Dock, 1907).

While Nolan had pointed out issues within the hospital setting related to the nurses and their interactions with patients, there were also individuals like Valentine Seaman who recognized the need for nurse education. In 1798, Seaman created one of the earliest series of lectures on caring for maternity patients (Penn Nursing, n.d.). This marked a shift from the apprenticeship-based training of nurses to a more formal, lecture-based education that would develop over the next century.

Florence Nightingale was born in 1820, during a time when women made up the majority of nurses. Nightingale wrote about the numerous issues faced by both nurses,

who worked in hospital settings, and mothers who provided care for their children and homes. In hospitals, nurses were often blamed if a patient did not heal properly or developed new problems such as bed sores or wounds that refused to heal (Nightingale, 1860). Furthermore, if a child died from an illness, mothers were frequently blamed (Nightingale, 1860). Nightingale went as far as to compare the exhaustive training that girls received in subjects like astronomy with the lack of training on how to maintain good health and prevent illnesses.

Florence Nightingale explained in her writings from 1860 how little thought or care was given to the air that patients breathed in hospitals and homes. Something as simple as breathing clean air was often not provided for. In the hospital setting, air was polluted by refuse, food smells, gases used in the surgical setting, and an overall lack of air filtration (Nightingale, 1860). Similarly, in homes, unused rooms were boarded up, and then these rooms were aired out by simply removing the boards and dusting, with no additional air filtration (Nightingale, 1860). Nightingale pointed out that both areas were breeding grounds for bacteria and viruses, and without proper filtration and cleaning, the bacteria and viruses would be allowed to spread (Nightingale, 1860).

In addition to the lack of clean air, there were misconceptions and misunderstandings regarding how to keep patients safe. As there was no reliable heating system other than fireplaces, medical wards were often kept with windows closed to keep in heat. This contributed to the worsening of conditions as stagnant air could also contribute to worsening conditions (Nightingale, 1860). At that time, it was understood that while there might be some guidelines for healthcare, they were not clear or they

differed from hospital to hospital and house to house. Florence Nightingale sought to standardize basic practices so that anyone receiving healthcare could receive these practices (Nightingale, 1860).

From Nightingale's *Notes on Nursing* (1860) there were basic foundations of nursing education today leaving Nightingale to be considered the mother of modern nursing (Wildman & Hewison, 2009). While it took time, there were several different voices competing for what should be done to train nurses. For example, there were three different nursing schools opened in 1873 (Penn Nursing, n.d.). For example, three different nursing schools were opened in 1873, based on the writings of Nightingale (Penn Nursing, n.d.). However, as there was no supervising governmental body, each school was free to interpret Nightingale's work as they saw fit. With only a small number of schools, it was likely easy to keep nursing programs like each other.

However, within 27 years, there were at least 400 schools of nursing opened (Penn Nursing, n.d.). It is unlikely that all 400 schools completed nurses training in the exact same ways. This was partly due to differences in administration and partly due to the access to different illnesses, injuries, and treatment techniques that each had. For example, nursing schools in larger cities would likely have had access to more advanced treatment methods whereas rural nursing schools may not have had the same access. In addition, rural nursing schools may have had more injuries that would be found on a farm versus injuries found in cities that were related to factory work or vehicle collisions, for example. These differences would have resulted in differences in the training programs. These differences multiplied more than 400 times would have resulted in quite a few

distinctions in programs as they all worked to meet the different needs of the varied geographical communities they served. Not only did these programs differ in basic foundational training programs, there also began to be differences in the format of training programs.

These differences could be observed in the past in apprenticeship programs versus diploma programs. In the late 1800s and early 1900s there was was significant variation between the needs in both the rural and urban communities. For instance, urban communities suffered from injuries and illnesses associated with close quarters, factory accidents, and poor drainage, among others, while rural communities had injuries consistent with farming accidents. Urban communities required more care providers to meet the number of people, whereas fewer care providers were needed in rural areas due to lower population figures. These differences in society led to the development of various nursing programs designed to meet different needs. In the early 1900s, discussions concerning the licensing of nurses arose, bringing attention to these differences (Goldmark, 1923).

While the title of "registered nurse" existed, the definition of what that meant varied from town to town and state to state (Goldmark, 1923). Having the ability to determine what a registered nurse was capable of needed to establish a set of guidelines for all nurses. Any individual claiming to be a registered nurse would have been evaluated by these guidelines. In addition, this also would allowed for a license to be granted to an individual meeting the specified qualifications. These licenses would have been tracked and recorded and could be validated if needed (Goldmark, 1923).

As the federal government did not step in to develop a specific set of requirements, it was left up to the states to determine what they would do with this concept. The first states to make a distinction between those titled "bedside attendants" versus "registered nurses" were the states of New York, Missouri, Michigan, California, and Maryland (Goldmark, 1923). As the bedside attendants had not had the same training as the registered nurses, they were not allowed the same practices as the registered nurses. One early problem that persists to this day was the differences in what these minimum requirements were.

Each state was able to set their own requirements, which meant that becoming a bedside attendant in California was not the same as in New York. For instance, in New York, it was possible for a 19-year-old woman to complete a nine-month long course, while in California, a 17-year-old could complete a year-long course in the hospital and end up with the same position (Goldmark, 1923). At the time, New York required women to be at least 19 years old to be able to qualify, while California had a younger requirement of 17 years of age (Goldmark, 1923). This could lead to an 18-year-old qualifying as a nurse in California, but unable to practice in New York due to age. If a young woman was determined to become a nurse, she might leave her area and travel to a state that had more lenient guidelines.

The early discrepancies between states had set the stage for current confusion regarding how nursing programs were run. Along with potential administrative concerns, there was concern with how increasing levels of knowledge place larger and larger burdens on the shoulders of nurse educators. The desire to capitalize on the time nurse

educators had with nursing students had contributed to the push to move to learner-centered learning. Whether this move had any impact on student performance on the NCLEX-RN remained to be determined. The current study addressed this.

**Associate Program Versus Diploma Program**

A further complication of the differences in states was the presence of the practical nurse or one who had not completed the years of study or who had only completed the basic requirements to become a bedside attendant. Those with less training were called subsidiary nurses. It did not mean their care was less than, but it did mean that they were less qualified that their registered nurse counterparts (Goldmark, 1923). The term subsidiary had a negative connotation and began to be known as a "practical nurse". Difficulty in maintaining consistency with terms for different levels of trained nurses was part of what led to the creation of both Associate nursing programs (ADN) and Diploma programs (RN).

Initially, the creation of these programs in different but similar manners was the result of two differing approaches. The hospital attempted to create a basic nursing program and the diploma program was created (Goldmark, 1923). Colleges and Universities also attempted to create programs that would fill a need in science and healthcare (Coulter, 1945). The formal development of the ADN program did not occur until the 1950's when colleges and universities could not produce enough four-year program nurses to meet the demands of the healthcare field (Haase, 1990).

When looking at the primary differences between ADN and RN programs, the differences began at the beginning of the program (3 Steps to Become a Registered Nurse

in 2021[RN], 2021). ADN programs were based out of a college and include college-level courses. While an RN diploma course was often based out of a hospital or a technical/vocational school and was largely hands-on with minimal classroom time (3 Steps to Become a Registered Nurse in 2021[RN], 2021). Both programs took roughly two years to complete, and both allowed the participant to sit for the NCLEX-RN examination, also known as the state boards, at the completion of the program.

Due to the differences in classroom versus hands-on experience, some diploma program nurses were not allowed to obtain a bachelor's degree in nursing as their diploma was not recognized as collegiate level coursework. To obtain a bachelor's degree, they were often required to obtain the undergraduate courses those in an ADN program obtained (3 Steps to Become a Registered Nurse in 2021[RN], 2021). One reason for the persistence of hospital-based diploma programs was attributed to the simple fact that nursing students work for free and often paid for the experience to work in the hospital setting (Goldmark, 1923). Having a workforce of free labor has led the hospitals to work to keep the diploma program in place. However, advances in science and healthcare have led to the gradual transition of nursing programs out of the diploma and into the collegiate setting (Graue, 1993).

As each program appealed to students at different levels, so to do the concepts of learner-centered learning appeal to different nurse educators. As hospitals and nursing schools have moved away from an apprenticeship program where students lived and worked at the hospital twenty-four hours a day and seven days a week to a more current system where students are available for a limited number of hours each week (i.e., does

not typically exceed twenty-to-thirty hours a week), there was a push to get the most impact out of every educator-student interaction.

**Registered Nurse Programs**

The concept of a registered nursing program in a collegiate setting appeared to have come from multiple sources (Coulter 1945; Goldmark, 1923; Graue, 1993). In the restoration of the Southern states after the Civil War there was much upheaval due to the destruction of many of the foundations of society. Hospitals and universities were destroyed or damaged in an attempt of the North to win the war of the South to keep the North from winning (Coulter, 1945). As far back as the 1870s there was discussion on the creation of more science and healthcare programs in the collegiate and university setting (Coulter, 1945). This was in part due to the setup of colleges and universities before the Civil War, where classical studies were the focus, and all students were prepared in the same way and given the same degree upon completion (Coulter, 1945). After the end of the Civil War, there was more focus on diversity in higher education, including in healthcare programs. While this was not limited to the Southern states, it was most clearly seen in the transition after the Civil War in the Southern states.

One of the programs developed in both the North and the South was the registered nursing program. Despite the desire to develop more science and healthcare programs after the Civil War, it was not until World War II that many of the proposed changes to curriculum became a reality (Haase, 1990 & Toney, 2009). The need to supply enough nurses to both the civilian population and to send with the armed troops set the stage for the 1943 Nurse Training Act or the Bolton Act (Clark, 2006). This act allowed the

standard hospital-based training of three years to be shortened to 30 months. At the end of the war, there was much debate on whether returning the three-year hospital-based program was the way forward or if requiring a Bachelor of Science degree would be best (Haase, 1990). Even today, the question of whether a Bachelor of Science in Nursing should be required for registered nurses or if the traditional hospital-based training model is sufficient continues to be a topic of debate in the nursing education community.

The development of the two-year ADN program was the result from this debate, as well as the continuation of the four-year bachelor's degree. The differences between the two programs were mainly related to the degree itself (Nightingale College, 2019). Many colleges offering the ADN program claimed that it prepared students to sit for the NCLEX-RN examination or state board licensing examination, whereas the bachelor's degree of science in nursing was viewed as a degree and not a job title (Gwynedd Mercy University, 2020; Nightingale College, 2019). Required courses and completion time varied from state to state, and each state had the right to determine the necessary qualifications to sit for the NCLEX-RN examination (NSCBN, 2021a). Differences in program creation, program focus (i.e., urban hospital versus rural), and state-to-state differences in qualification requirements have all contributed to the variations in nursing programs today.

Just as the early differences in creation of nursing programs contributed to the development of programs that are not all the same, so too did the incorporation of different educational styles. Learner-centered learning is a concept that is not new outside of nursing education but was still relatively unstudied in the field of nursing education or

other healthcare disciplines. Determining whether learner-centered learning had an impact on NCLEX-RN test scores was one way to assess the effectiveness of this concept.

**Current Nursing Education Strategies**

Different programs arose from various sources, resulting in the development of a wide variety of nursing programs. There were programs for different kinds of students, such as students straight from high school, students seeking an associate degree, students seeking a bachelor's degree, students seeking a second graduate degree, students seeking a master's degree, or a terminal degree (N. D. A., Allnursingschools.com).Each of these degree programs had a unique list of requirements and each yeilded a different outcome for the student. Along with different degree programs, each state had different requirements for each degree. While there may have been a basic level of similarities, such as each degree program having a standardized test that needed to be taken before a license was granted, each program was built to the specifications mandated by its own board of directors (N. D. A., Allnursingschools.com).

For example, in the state of Illinois, those who wanted to obtain their state nursing license were required to graduate from an approved school, pay a fee, get their fingerprints taken, and then sit for the NCLEX-RN (NCSBN, 2021a; Illinois Department of Financial and Professional Regulation, 2021). However, in the State of New York, in addition to Illinois's requirements, there was the requirement of a specific list of classes or a specific number of hours in specified subjects, such as information regarding the treatment of AIDS and HIV. If this was not a part of their undergraduate degree, then

they had to take additional courses before being allowed to sit for the NCLEX-RN (New York State Education Department, 2021). In the state of California, the requirements again changed as they required a physical picture in addition to the basics indicated in both Illinois and New York (State of California Department of Consumer Affairs, 2021).

One other notable difference between these three states had to do with the application fee itself. In Illinois, the fee was $98, in New York the fee was $143, and in California, it was $300 (Illinois Department of Financial and Professional Regulation, 2021; New York State Education Department, 2021; State of California Department of Consumer Affairs, 2021). The differences in the cost of living in each state were a portion of this, but the fee associated with the licensing process could be different from state to state.

With each state having its own list of requirements for those seeking a state license, it was also important to note that there were also differences in what each state mandates for what qualifies as an approved program. Some states had a specific list of requirements that each school must meet, but they were not all equivalent. The absence of a standard list from state to state had also contributed to many of the differences presented in each nursing program. While the NCLEX-RN examination was consistent, how each program interprets it is unique.

Comparing nursing programs shows similarities and differences that are consistent with the similarities and differences found in each state requirements. Methodist College in Peoria, Illinois had a four-year nursing program that included courses such as Health Assessment, Dimensions of Holistic Nursing,

Pathopharmacology, Mental Health, Pediatric Nursing, Obstetric Nursing, Internship, along with requirements of humanities-based courses (Methodist College, 2020). The University of California nursing program was also a four-year program like that of Methodist College, and while they both offered courses in basic assessment, there were differences in names of courses, credit hours assigned and the required humanities courses (University of California, Los Angeles, 2017).

Having had a basic understanding of the many differences that have contributed to the creation of the modern nursing profession allowed for a better understanding of the challenges facing modern nursing programs. As each program was guided by state regulations, there was still much flexibility in identifying how information should be taught. For example, should information be divided up by system (i.e., cardiac or respiratory) and taught one system at a time or should information be taught by severity (i.e., identification of healthy individuals, identification of alterations in health status and identification of sick infant, children) and taught different severity at a time? Hospital-based programs and classroom-based programs have been the two predominant methods of educating students. In the classroom-based programs, there has been much debate on how to educate students quickly and in a way to best prepare them for the NCLEX-RN. This was where the idea of concept-based curriculums was born. By teaching an individual a whole system they could determine the different areas of problem related to an entire system. For some, this was much preferred to teaching the same system repeatedly (i.e., teaching the cardiac system in health assessment, medical-surgical nursing, critical care nursing, pediatrics, etc.) (Robinson, 2018).

The nursing shortage in the United States is a persistent problem that affects not only the number of qualified nurses available but also the capacity of nursing programs to operate at full capacity. According to the National League for Nursing (2018), there were roughly 669 open nursing faculty positions in the United States in 2018, which translates to two-thirds of the nursing programs in the country unable to work at full capacity due to a faculty shortage. This shortage is still ongoing today, as recent data shows that there are still not enough nurses to meet the growing demand for healthcare services (Bureau of Labor Statistics, 2022). As a result, many nursing programs have had to get creative in their curriculum offerings in order to maximize the use of faculty while still meeting the needs of their students. One such approach is the use of concept-based curriculums, which aim to teach students how to think critically and apply knowledge across multiple systems and contexts (National League for Nursing, 2018).

There was also the drive to maintain evidence-based practice or best practice. As healthcare changes and advances, the required amount of content to cover also increases at the same pace. Consider the premature delivery of an infant. In 1940, an infant born before 30 weeks gestation would not have had access to the same life-saving measures that are currently available today. In 1940, nursing education would not have included education on the nurse's role in these measures as they did not exist (e.g., starting an IV [intravenous catheter] in the umbilical stump of a newborn; University of Rochester Medical Center, 2020). When these measures became available, students had to be prepared in basic obstetric education to better understand what their role would be. These changes in healthcare added to the content that students had to learn. Today, evidence-

based practice and best practice continue to be important considerations in nursing education.

The desire to graduate students who could pass the NCLEX-RN on first attempt was coupled with the desire to educate enough students to begin to fill nursing shortages. Out of this need, new teaching strategies were developed or adopted from other disciplines. However, to establish a positive link between learner-centered learning and NCLEX-RN test scores, this data must be purposely studied. Nursing education was a combination of both classroom theory and physical skills and was unique in both delivery and practice. Using learner-centered studies from another discipline could help guide the introduction into nursing, but hard data will need to be studied to determine if it was a positive, negative, or no impact change.

**Learner-Centered Teaching**

Instead of having an instructor lecture regarding an entire disease process, some colleges adopted a concept called a flipped classroom or a learner-centered classroom model. Using this approach, faculty required students to read, view, or complete learning assignments before coming to the classroom. Once in the classroom, rather than sitting through a traditional lecture, students completed hands-on activities (i.e., simulation or case studies) to reinforce content learned and to improve higher levels of critical thinking (Bernard, 2015). The pre-class learning activities could be videos or pre-recorded lectures, but it preserves the in-person class time for the interactive portion of learning. There were some limitations to using this approach.

The definition of “flipped classroom” or “learner-centered” was not the same from institution to institution. There was even a lack of clarity when moving between disciplines, such as the definition of a flipped classroom in a high school setting, in a humanities-based course of study, and in nursing not all being the same (Bernard, 2015). Some of these differences arose from the nature of the discipline. For example, high school students may attend the same subject or classroom every day for a week, humanities-based courses may have little-to-no hands-on skills but may use case studies to talk through additional ideas, and nursing students may need to use both higher-level critical thinking coupled with the hands-on nursing skills that are expected in the clinical setting.

While each setting may have pushed traditional classroom lecture to virtual experiences, their needs were not the same and the needs of the students were also not the same. An additional area for confusion arose from the failure of institutions to uniformly adapt these flipped classroom approaches. This concept was new and not all faculty supported the adoption of new teaching ideas. Failure to support an administrative push toward a new teaching method could result in a lackadaisical application. One faculty member may have been in full support and used it on a regular basis, and another may have only used it for special stand-alone activities and failed to fully integrate it into the classroom (Keohane, 2013).

Nursing educators claimed academic freedom to teach students how they best saw fit as they had the knowledge level and experience in both teaching and in nursing experience to know how to best impart that knowledge. However, educators and students

do not have the same experiences or education level, and this posed problem (Parse, 2014). Educators had been molded and changed by their own educational experiences and work experiences, placing them at a fundamentally different place than that of the student who had not had the same experiences. Add to this that nurses were initially trained at different colleges and universities than they currently worked for. They may also have attended a different higher-level institution to receive their nursing education training. The result could potentially be educators with varied backgrounds working together, in the same nursing program, to try and educate students in the way each saw as best. Knowing that there is room for confusion, administrators had set guidelines and boundaries to help guide those at the same institution in ways that are in keeping with the missions and values of said institution. This was where the clash between educator freedom and administrative regulations collides.

The concept of a flipped classroom had become appealing to faculty to keep up with the growing amount of information that needed to be imparted to students while still finding a way to incorporate a link between hands-on skill and theory learning (Roehl, et al., 2013). Technology was being used to supplement classroom instruction so that educators could make the most of the limited face-to-face time they had with students. In the past, educators had students who lived at the hospital and were able to learn hands-on skills from dawn till dusk every day of the week. However, faculty now face challenges related to class and clinical hours being tied to course credit totals and clinical experiences lasting four to eight hours, where the focus is on achieving and strengthening hands-on nursing skills. There was more information to learn, more skills to begin to

master and yet there was less time for the nursing student to accomplish these tasks. This left the faculty with the challenge of maximizing both classroom and clinical time.

The incorporation of learner-centered learning was one way in which to deal with these conflicting issues. However, incorporating this new educational concept required reworking much of classroom content and activities to support this change. This was a large task for nurse educators. Before forcing a transition, it was beneficial to know if there is a link between learner-centered learning and NCLEX-RN test scores. The study addressed this issue.

**Teaching Methods and the NCLEX-RN**

There was a lack of data related to how different classroom approaches may impact NCLEX-RN test scores. Using historical data, it was possible to see how the NCLEX-RN examination has changed over time. In 1944 the State Board Test Pool Examination (SBTPE) was created by the National League of Nursing to standardize the test required for individuals to become licenses as registered nurses and to be able to test in one state for a license in another (Benefiel, 2011). The original SBTPE examination was up to 720 questions in length and required students to correctly answer at least 350 questions to pass. This examination was administered over the course of two days and routinely offered only two times a year in one location each time. In 1978 the National Council State Board of Nursing was established and took over the SBTPE (Dorsey & Showalter, 2008). In 1982 the examination received the new name of National Council Licensure Examination.

In 1994, the National Council Licensure Examination underwent a significant change with the move from paper and pencil testing to computerized testing (Dorsey & Showalter, 2008). This allowed students to take the test at specified testing centers and in a shorter format, with as few as 75 questions or as many as 265. The computerized testing also allowed students to take the test at any time as long as the testing center had availability, and test results were delivered much faster, often within 48 hours (Dorsey & Showalter, 2008). This was a significant improvement over the previous system where students had to wait for one of two testing dates, wait weeks for their tests to be graded and results sent to their homes.

While moving to computerized testing was to the benefit of the test taker, the flipped classroom concepts began to gain traction in nursing education at the same time. However, limited data exists on the impact of a flipped classroom approach on NCLEX-RN scores due to the limited way it was implemented in the classroom. Previous studies on using the flipped concept in a nursing program focus solely on one program being offered (Roehl, et al., 2013). Identifying a definition of a flipped classroom and then applying that to courses in a nursing program would be one way to accomplish this. Identifying the courses that use a flipped approach, a nursing college or university would then be able to evaluate their own NCLEX-RN results based on this definition. NCLEX-RN results for the student include whether they passed or failed the examination, but NCLEX-RN results for a nursing college or university include a different set of data. While they would be unable to see a student's specific score, they could see how students in specific cohorts performed on different content areas.

By linking this content area data with the flipped classroom data, it was possible to determine if there was any impact on a flipped classroom and NCLEX-RN performance (NCSBN, 2020). If there was a positive link, then it was possible for administration to present this data to faculty to encourage transition to flipped or learner-centered classrooms. If there was a negative link, then it would support those who do not want to move to this approach. Lastly, if there was no link identified, then it would indicate there may be a further need for study or there may be another educational concept that would better suite unique needs of nursing education.

Moving forward from the literature review, chapter three will provide a more detailed overview of the study's purpose and research questions, as well as a clear definition of independent and dependent variables. Chapter three will also examine the theoretical framework of situated learning and its relevance to the research questions, including its potential impact on missing data. In addition, this chapter will discuss the target population, sample size, and the methods used for data collection, providing a comprehensive understanding of the study's design and implementation.

# Chapter 3: Research Method

## Introduction

The purpose of the current study was to address the gap in the literature related to the possible relationship between nursing programs implementing a learner-centered learning and performance on Assessment Technologies Institute (ATI) standardized tests and the NCLEX-RN examination. Nursing programs are being urged to transition to learner-centered learning (Bloomberg & Pitchford, 2017) despite inadequate data on whether or how learner-centered learning will impact student performance on ATI standardized tests or the NCLEX-RN examination. If a positive relationship exists, then this transition will be worth the necessary increase in work to undertake. If a negative relationship exists, then the increase in work is will not be justified. If no relationship exists, then the necessity of this transition will still be in question. This chapter includes the purpose of the study, the research questions, and a definition of the independent and dependent variables. The theory of situated learning will be explained, and the correlation between this theory and the research questions will be tied to the missing data. Target population, sample size, and data collection will also be explained in detail.

## Methodology

As test scores or student performance on test scores were the primary data collected and analyzed, a quantitative study was chosen. The current study method most closely fit with what was needed to answer the research questions. The data collected were analyzed using SPSS software and a multiple regression analysis. The independent variable was student course type, and the dependent variables was the ATI standardized

test and NCLEX-RN scores. This helped determine the presence of relationships between the variables of the study (Lacey, 2016). The purpose of this strategy was to determine the presence of a presumed positive relationship among the variables. While it may be understood that all course types will have a positive relationship on ATI standardized tests and NCLEX-RN test scores, the current study sought to identify if learner-centered learning is more positive on ATI standardized tests and NCLEX-RN test scores than traditional classroom lecture. The research questions and hypotheses are as follows.

RQ1: Does learner-centered learning result in higher standardized ATI test scores than traditional classroom lecture in nursing education?

RQ2: Does learner-centered learning have a positive impact on first time pass rates for National Council Licensure Examination (NCLEX-RN) test scores?

H1-A: Learner-centered learning has a positive impact on ATI standardized test scores in nursing education.

H1-B: Learner-centered learning does not have a positive impact on ATI standardized test scores in nursing education.

H2-A: Learner-centered learning has a positive impact on first time pass rates for National Council Licensure Examination (NCLEX-RN) test scores.

H2-B: Learner-centered learning does not have a positive impact on first time pass rates for National Council Licensure Examination (NCLEX-RN) test scores.

## Research Design and Rationale

### Identification of the Research Design and Connection to Research Questions

The current study utilized Lave and Wenger's (2003) theory of situated learning. This theory was based upon the concept of learning occurring as individuals interacted with their environments. This directly applied to this research study, as the study helped identify the presence of a relationship between student learning in different classroom styles. Student learning will be established based upon the test scores of ATI standardized tests and the NCLEX-RN test scores.

Many nursing schools utilize some form of standardized testing at the end of each nursing course to ensure their students were at or working toward meeting national averages for content. While at least three standardized testing services were available, such as Kaplan, HESI, and ATI, they offered similar services and test preparation. For the current study, ATI standardized test scores were examined. In addition, the NCLEX-RN was one test that all student nurses had to take to obtain a nursing license in any of the 50 United States.

The current study included students in a traditional classroom lecture environment, and some in an online or more learner-centered learning environment. Courses that fit the definition of online study, as set by the researcher (i.e., courses with lecture content that is at least 50% online will be defined as "online" and courses with more than 50% of lecture content that is in-person will be defined as "in-person" courses) were used. As many colleges utilize online learning platforms for student submission of assignments, tests, quizzes, grade book tracking, class news, and announcements, it is

important to note that there is an online component inherent to most courses as the online learning platform is widely used. The term "online" typically denotes the provision of educational materials and interactive experiences that students engage with remotely. A better term to use would be eLearning, which denotes learning that occurs in the online environment and includes anything with digital resources (learnupon.com, 2023). Utilizing both in-person courses and online courses allowed for Lave and Wenger's (2003) theory to be used, as the theory aligned directly with this topic.

Currently two types of nursing programs exist. There is the traditional four-year baccalaureate preparation, which includes both in-person learning and online learning occurring Monday through Friday, and a non-traditional, second-degree program. The semesters follow a traditional Fall and Spring semester rotation with breaks at Winter and Summer.

The second-degree program is an accelerated program for students who have already obtained a baccalaureate degree in another field that allows them to apply their humanities courses and the standard pre-requisite courses they completed toward another degree count toward the nursing-degree requirements. Students in this program only take the required nursing courses to complete their baccalaureate nursing degree. This program is weekends only, runs in a Fall, Spring, Summer term set-up, and has most courses online.

**Variables**

The independent variables were course type with two levels, including traditional in-person learning and the online or blended learning; the dependent variables were both

the standardized test and NCLEX-RN scores. The standardized test scores from ATI are nationally normed. Each clinical course has a set national normed score. This normed score allowed the students individual scores to have a frame of reference. As test scores were the primary variables for the current study, it was not necessary to create a complicated instrument to collect the information. The data is currently archived. Access to the data was obtained upon IRB approval. The data were evaluated using a multiple regression analysis.

## Population

### *Definition of Target Population*

The target population for this course was nursing students in two different kinds of nursing programs. One is a traditional, in-person, four-year program completed on campus and ending with a BSN. After graduation from the BSN program, those nursing students sit for the NCLEX-RN examination to obtain their state nursing license. A second group is nursing students in a second-degree program. This program is 18 months in length and meets on the weekends for clinical experiences. These students also obtain a BSN upon course completion and sit for the NCLEX-RN examination to obtain their state nursing license. The students in the four-year program are 17 years of age or older, with most in their 20s to 30s. The students in the second-degree program vary in age from mid-20s to greater than 55 years. In addition to varying ages, the students vary in personal backgrounds.

### *Target Population Size or Estimate*

There were approximately 100 students in the accelerated second-degree program, and approximately 400 students in the traditional four-year program. These numbers fluctuated from semester to semester for a variety of reasons. Students may have failed out of the program, faced financial concerns that caused them to sit out for a semester at a time, or they may have been other life experiences (e.g., the birth of a new child) that prompted them to sit out for a semester. There were approximately 250 combined students who graduated from the nursing college each year. In the second-degree program, there were an average of 15 to 30 students who graduated each spring, summer, and fall terms. This means there were 45 to 90 students who were graduating from the second-degree program each year.

The remaining 100 to 155 students came from the four-year, traditional program. There is no summer term for this program, so approximately 100 graduated in the fall and spring semesters. Student groups can be evaluated based on one cohort's progression through the nursing program, one nursing course at a time, one educational year (i.e., Fall semester 2019-Summer Semester 2020), or varying combinations of these. The current study focused on a cohort's progression through the nursing program in both the four-year and the second-degree program. Two graduating classes from each nursing program (i.e., two from the undergraduate program and two from the second-degree program) were utilized, for a total of four graduating classes, for data analysis.

## Sampling and Sampling Procedures

### Archival Data

The data for the current study were drawn from archival data. These data were collected every semester on every nursing student while they were taking nursing courses. This distinction is important as students in both the four-year and second-degree nursing program had required courses that are both humanities-based and nursing-based. While many of the second-degree students did not have to complete all of the humanities-based requirements, as they completed them in their first degree program (i.e., science, math, and English requirements were completed as part of their first bachelor's degree they achieved), there were still nursing-based courses that do not have a clinical component but are required for the completion of the bachelor's degree in nursing (i.e. nursing ethics, nursing research, growth and development, etc.). The data to be included in the current study came from nursing-based courses that have a clinical component. All courses that were excluded were either non-nursing courses, or were nursing courses without a clinical component. These non-nursing courses were from the study as there is no ATI standardized testing data related to them, and these courses do not directly prepare nursing students to take the NCLEX-RN examination.

The ATI standardized testing data and the NCLEX-RN examination data are currently available only to the Dean of the Nursing program. While this data was collected, it is not freely available to every faculty member. After successful completion of the IRB process, I removed all student identifying information (e.g., name, student

number, for example) of the data provided to me by the Dean of the Nursing program. This ensured student privacy.

The data from the ATI standardized test scores can be broken down by cohort and by individual student. The NCLEX-RN data available does not include a specific grade (i.e., score of 75% out of 100%), but it does indicate whether the student passed or failed the exam on their first attempt. NCLEX-RN data were broken down at both individual and cohort level. Both individualized and cohort data from both ATI standardized testing and the NCLEX-RN were utilized in the current study. Students who did not successfully complete the required four-year or second-degree nursing program were not included in the current study.

**Instruments and Data Analysis**

Data to be analyzed includes student performance on ATI standardized test scores and NCLEX-RN examination pass/fail data. As individual student test scores on both ATI standardized examinations and NCLEX-RN test scores will be the primary data collected and analyzed, a quantitative study has been chosen. The current study method most closely fits the data being collected. The data collected will be analyzed using SPSS software and a multiple regression analysis. As indicated previously, the independent variables will be the student course types, and the dependent variables will be both the ATI standardized test and NCLEX-RN scores. Using the course types as the predictors and the ATI standardized tests as the criterion to be met, it would then be possible to determine regression. This will result in the determination of the presence of relationships between the variables of the study (Lacey, 2016). The purpose of this strategy is to

determine the presence of a relationship among the variables. The data will be evaluated using a multiple regression analysis.

### Threats to Validity

When considering the validity of the current study, there are some areas to consider as they may be unique to the chosen nursing program or to nursing school in general. First, nursing is made up of most women or female students. As such, generalizing the study would only be appropriate to other programs with similar gender distribution.

One last threat to validity could come if a different group of standardized test scores are utilized. There are several large companies that provide the standardized testing platforms (e.g., ATI, Kaplan, and HESI), but not all are replicas of each other. As such, it would be important to note the differences between these programs and identify areas of similarities and differences. The current study will use standardized test scores from the ATI Company. The exact company providing the standardized testing will need to be identified in future studies.

## Ethical Procedures

### Agreements to Gain Access to Data

I used archived data that are located at the college. The data came from two different areas. The first set of data will be from the NCLEX-RN results. These data are available publicly in a limited way as each nursing school has its own NCLEX-RN pass results available to the public. Each State Board of Nursing also has established guidelines for what standards a nursing program must meet to remain open. Each state

has autonomy on how this information is required to be disseminated. The state of Illinois publishes updated data yearly (Illinois Department of Financial and Professional Regulations, 2020). This data is freely available, but it only includes the basic information of number of candidates for testing and percentage of pass rates from that candidate pool. This data is broken down by individual school, but not by anything other than by an individual year. The individual nursing college then has data that goes deeper than this. They have NCLEX-RN pass rate information that is broken down by semester, quarter, or term that a student graduates in. For example, according to the State of Illinois, one college may have an NCLEX-RN pass rate of 83% for the year of 2019 (Illinois department of Financial and Professional Regulation, 2020). However, this college also graduated three separate senior classes in both the undergraduate and second-degree programs for a total of 6 graduating class in 2019. The data for each graduating class is typically only made available to the Dean of the nursing school, and they choose how to disseminate that information to their faculty. Breaking the NCLEX-RN pass rate data up by graduating class would then allow for the further data analysis to be done in the current study.

The second data set to be collected were ATI standardized test scores. At many colleges, nursing students are required to take some sort of standardized examination. At the college in question, the standardized examination used is the ATI standardized exam at the end of each nursing course that has a clinical component (i.e., medical-surgical nursing, pediatrics, obstetrics, pharmacology for nursing). This data is available to individual course instructors for the students currently in their course and immediately

after they take the ATI standardized examination. However, faculty do not have access to test data on courses they are not actively teaching. Access to the additional ATI standardized testing data will be needed to complete the data analysis for the current study.

To obtain the data necessary to complete the current study, the IRB process was completed for both the supervising university and the nursing school that donated data. The processes are very similar and there is a specific IRB form for both institutions. Once IRB approval had been granted, the data had all student identifying information removed and was able to be analyzed for the current study.

**Ethical Concerns Related to Data Collection**

The secondary data being utilized in the current study will have no student identifying information. NCLEX-RN cohort data is available for an entire graduating class, not for individual students but there is individual pass/fail on their first attempt. ATI testing data can be opened in a Microsoft Excel spreadsheet by the Dean of Nursing and then the columns with student name or student number can simply be removed before I will be allowed access. All data will be provided by the Dean of Nursing after student information has been removed. The only apparent risk would be if the Dean failed to remove student identifying information. This can be easily managed if another individual, not myself, checks to be sure this is done before the information is sent to me electronically. There are two assistant Deans in the nursing program. There is one for the undergraduate program and one for the second-degree program. Having one or both review the data before it is passed to me will ensure that all student identifying

information is removed. Again, the use of the Excel spreadsheet format will also ensure that this is a simple process as the columns with any identifying information can simply be deleted.

**Description of Treatment of Data**

The data used for the current study was collected and stored electronically. The data was originally stored either in the college's secure intranet (e.g., with the NCLEX-RN test results) or was stored originally through ATI's secure servers (e.g., with the ATI testing results). Once the original information has student identifying information removed, it was stored on the College's secure servers to be accessed and a back-up copy was stored on an encrypted USB drive. The college servers are set up to ensure there are no FERPA violations and each faculty member has access to a personal folder that they may store private information in. Lastly, data will be kept until the study is completed and published or until December 31, 2026. At this point, the data will be deleted and removed from all personal computer files. The original data will still be available to the Dean of Nursing, but under the same permissions is currently has. Individual faculty could access parts of the data, but the set would not exist without permission from the Dean.

## Summary

Having a nursing program to transition from traditional classroom-lecture based education practice to a learner-centered or flipped classroom will require much work from the faculty members as entire course content will have to be restructured, new activities and assignments will have to be created, and new evaluation techniques will

need to be developed. In addition, new course evaluation tools will need to be developed as well as current evaluation tools are structured for traditional classroom methods. This is a large work requirement as faculty will need to maintain current teaching methods while creating this new content. Students currently enrolled will need to continue to be taught in ways that they expected upon enrollment at the same time faculty will be working to recreate courses and course content. If there is a positive link between teaching style and ATI standardized test scores and NCLEX-RN examination scores, then this additional workload can be justified. If there is a negative link, then this workload is not justified. If there is no link, it is possible this concept will need additional study before recommendations can be made that will impact the field of nursing education.

In Chapter 4, the results of the data analysis will be presented and discussed in relation to the research questions and hypotheses. The findings will be presented along with appropriate statistical measures to support the conclusions drawn from the data. The analysis will be interpreted in the context of the broader nursing education landscape, with particular attention paid to the implications of the findings for future research and nursing education practices.

# Chapter 4: Data Analysis

## Introduction

The present study intended to address a research gap concerning the potential association between the implementation of a learner-centered approach in nursing programs and student performance on Assessment Technologies Institute (ATI) standardized tests and the NCLEX-RN examination. The adoption of a learner-centered education model has been proposed as a remedy to train more nursing students and address the growing nursing shortage without increasing the number of nursing faculty (Bloomberg & Pitchford, 2017). However, the impact of this transition on student outcomes is unknown. The process of transitioning from one curriculum model to another can be an extensive undertaking that requires faculty to modify, create, or re-create lesson plans, learning activities, tests, quizzes, and clinical experiences, while concurrently teaching out the previous curriculum. A positive association between the learner-centered approach and student performance on standardized tests and the NCLEX-RN examination would justify the necessary increase in work. Conversely, if a negative association exists, the increase in work would not be justified. If no significant association is found, the necessity of this transition will remain in question. The research questions and hypotheses were as follows.

RQ1: Does learner-centered learning result in higher standardized ATI test scores than traditional classroom lecture in nursing education?

RQ2: Does learner-centered learning have a positive impact on first time pass rates for National Council Licensure Examination (NCLEX-RN) test scores?

H1-A: Learner-centered learning has a positive impact on ATI standardized test scores in nursing education.

H1-B: Learner-centered learning does not have a positive impact on ATI standardized test scores in nursing education.

H2-A: Learner-centered learning has a positive impact on first time pass rates for National Council Licensure Examination (NCLEX-RN) test scores.

H2-B: Learner-centered learning does not have a positive impact on first time pass rates for National Council Licensure Examination (NCLEX-RN) test scores.

This chapter includes a detailed account of the data collection and analysis procedures employed in the current study. The research questions under investigation are explicitly stated, and the data collection methods utilized are comprehensively expounded upon. The process of data analysis is also outlined in detail, encompassing both the methods employed for data collection and the analytical techniques used. Criteria for inclusion and exclusion of student participants are delineated, with a clear exposition of the resulting sample. Furthermore, a thorough exposition of the analyzed data is provided, accompanied by a comprehensive discussion of the way the research questions are addressed. Finally, the results are presented using descriptive statistics, providing a clear and concise summary of the study's findings.

## Data Collection

### Description of Data Collection

The current study utilized archival data to examine the relationship between student performance on standardized examinations and the NCLEX-RN examination.

The data encompassed seven different ATI examinations, namely Fundamentals of Nursing, Adult Medical-Surgical Nursing, Community Health, Maternal-Newborn Nursing, Nursing Care of Children, Pharmacology of Nursing, and Mental Health, as well as NCLEX-RN data. The ATI examinations were taken by students at the conclusion of their corresponding clinical courses, as part of their prelicensure or second-degree nursing program. This study included students who completed their studies between May 2019 and December 2020, from both the four-year, prelicensure program (traditional, in-person) and the second-degree (blended and online) program.

**Discrepancies in Data Collection from Plan Presented**

A power analysis was conducted, utilizing the software G*power (Faul et al., 2007), with an alpha level of .05 and a beta level of .95, which resulted in an estimated sample size of 123 participants. However, because of the enrollment and division of students into cohorts, the total number of participants exceeded the required sample size.

**Baseline Descriptive and Demographic Characteristics of Sample**

The sample for the study was comprised of two graduating cohorts from each of the prelicensure and second-degree programs, with a minimum of 123 students included. Forty-ninne students were excluded from the analysis because they had no reported NCLEX-RN scores, which were necessary for inclusion in the study. The exclusion criteria were based on several possible reasons, including students who had not yet taken the NCLEX-RN examination, had tested under a different name, had returned to their home country after graduation, had chosen not to continue in healthcare after the

COVID-19 pandemic, and who had decided to pursue other advanced degrees instead of taking the NCLEX-RN examination.

The rationale for excluding these students was based on them not having an NCLEX-RN score, which was the primary outcome variable for the study. Without this score, it was not possible to determine the relationship between learner-centered education and student performance on the standardized tests and the NCLEX-RN examination. By excluding these students, the sample size was reduced, but the remaining sample was more representative of the population of interest and more closely aligned with the research questions. Additionally, excluding these students helped to improve the validity and reliability of the study results by ensuring that only relevant data were included in the analysis.

Table 1 compares mean ATI examination scores from the prelicensure (traditional) student cohort and the second degree (learner-center) cohort.

**Table 1**

*Group Statistics for ATI Proctored Examination Scores by Course*

| Course | PL vs. SD | N | Mean | Std. Deviation | Std. Error Mean |
|---|---|---|---|---|---|
| Fundamentals for Nursing | 1 | 193 | 72.467 | 5.5881 | .4022 |
| | 2 | 46 | 73.596 | 5.7634 | .8498 |
| Adult Medical Surgical Nursing | 1 | 193 | 72.776 | 6.5726 | .4731 |
| | 2 | 46 | 69.457 | 7.6430 | 1.1269 |
| Community Health | 1 | 193 | 77.561 | 6.6347 | .4776 |
| | 2 | 46 | 78.435 | 7.7277 | 1.1394 |
| Maternal Newborn Nursing | 1 | 193 | 72.389 | 7.3903 | .5320 |
| | 2 | 46 | 71.991 | 8.2094 | 1.2104 |
| Nursing Care of Children | 1 | 193 | 69.212 | 7.6517 | .5508 |
| | 2 | 46 | 68.293 | 8.8194 | 1.3004 |
| Pharmacology for Nursing | 1 | 193 | 71.334 | 8.0817 | .5817 |
| | 2 | 46 | 73.796 | 11.2583 | 1.6599 |
| Mental Health Nursing | 1 | 193 | 73.569 | 6.9628 | .5012 |
| | 2 | 46 | 75.083 | 9.0029 | 1.3274 |

*Note:* Course (PL = 1, SD = 2) PL = prelicensure (traditional) SD= second degree (learner-centered)

Table 2 displays the results of assigning the prelicensure cohort a value of “1” and the second-degree cohort a value of “2”. In addition, a value of “1” was assigned to students who passed the NCLEX-RN examination, and “0” to those who failed. These numerical values were utilized to calculate the mean and standard deviation for each group based on their first attempt of the NCLEX-RN, which were then determined using distinct scores from ATI proctored examinations.

**Table 2**

*Group Statistics for NCLEX-RN Pass/Fail by ATI*

| Course | SD PL | NCLEX-RN Pass/Fail | Mean | Std. Deviation | N |
|---|---|---|---|---|---|
| Fundamentals for Nursing | 1 | 1 | 72.927 | 5.4964 | 169 |
| | | 0 | 69.229 | 5.2456 | 24 |
| | 2 | 1 | 74.395 | 5.8059 | 38 |
| | | 0 | 69.800 | 3.9283 | 8 |
| Adult Medical Surgical Nursing | 1 | 1 | 73.525 | 6.1875 | 169 |
| | | 0 | 67.500 | 6.9134 | 24 |
| | 2 | 1 | 70.721 | 7.5026 | 38 |
| | | 0 | 63.450 | 5.3001 | 8 |
| Community Health | 1 | 1 | 78.126 | 6.4928 | 169 |
| | | 0 | 73.583 | 6.3787 | 24 |
| | 2 | 1 | 79.579 | 7.1910 | 38 |
| | | 0 | 73.000 | 8.3495 | 8 |
| Maternal Newborn Nursing | 1 | 1 | 73.024 | 7.1086 | 24 |
| | | 0 | 67.913 | 7.9339 | 24 |
| | 2 | 1 | 73.945 | 6.9070 | 38 |
| | | 0 | 62.713 | 7.8723 | 8 |
| Nursing Care of Children | 1 | 1 | 69.741 | 7.6269 | 169 |
| | | 0 | 65.488 | 6.8799 | 24 |
| | 2 | 1 | 69.687 | 8.6448 | 38 |
| | | 0 | 61.675 | 6.6644 | 8 |
| Pharmacology for Nursing | 1 | 1 | 72.254 | 7.6665 | 169 |
| | | 0 | 64.858 | 8.1201 | 24 |
| | 2 | 1 | 73.937 | 10.5124 | 38 |
| | | 0 | 73.125 | 15.1678 | 8 |
| Mental Health Nursing | 1 | 1 | 74.195 | 6.7291 | 169 |
| | | 0 | 69.167 | 7.1317 | 24 |
| | 2 | 1 | 76.413 | 8.4123 | 38 |
| | | 0 | 68.762 | 9.5782 | 8 |

*Note:* Course (PL = 1, SD = 2) PL = prelicensure (traditional) SD= second degree (learner-centered), NCLEX-RN Pass/Fail (Pass = 1, Fail = 0), PL = prelicensure (traditional) SD= second degree (learner-centered)

### Representativeness of Sample

Among the 239 participants included in the study, 73.3% identified as Caucasian, 14.5% as African American, 4.03% as Asian, 3.7% as Hispanic or Latino, 3.03% as Two or More Races, 0.336% as American Indian or Alaskan Native, and 0% as Native Hawaiian or Other Pacific Islander (Integrated Postsecondary Education Data System [IPEDS], 2020). By contrast, the nursing workforce was comprised of 80.6% Caucasian, 7.2% Asian, 6.7% African American, 2.3% Other, 2.1% More than one race category selected, 0.5% American Indian or Alaskan Native, 0.4% Native Hawaiian or other Pacific Islander, and 0.2% Middle Eastern/North African (Carson-Newman University Online, 2022). Comparison of the study's student sample to the nursing workforce revealed a higher proportion of African Americans and a lower proportion of Caucasians and Asians, with otherwise similar percentages.

## Results

### Evaluation of Statistical Assumptions

The present study employed Leven's test for equality of variances, as outlined in the work of van den Berg (n.d.). The assumptions underlying this test require that the variances of populations, from which different samples are drawn, are equal, which is a condition referred to as homogeneity of variance. The null hypotheses posit this equality of variances, and demand that the observations are independent and that the test variables are quantitative. Upon application of the Levene's test, two nursing courses, namely Adult Medical-Surgical Nursing and then Pharmacology for Nursing, produced significant results. To account for this, the tests assuming unequal variances were

utilized, while acknowledging that the assumption of homogeneity may be overly conservative.

## Statistical Analysis Findings

RQ1: Does learner-centered learning result in higher standardized ATI test scores than traditional classroom lecture in nursing education?

Table 3 shows the means of the two programs, along with the means of the ATI test scores for each course. This enables the determination of the mean and standard deviation for all seven ATI nursing course examinations, which are administered in each program. A chi-square test was employed to examine the association between NCLEX - RN exam pass, and the mode of instruction adopted, either traditional or student-centered learning. The obtained statistical output indicated that the test did not yield a significant outcome, as evidenced by the non-significant chi-square value of 0.787 and a corresponding p-value of .38.

**Table 3**

*Group Statistics Second-Degree (SD) versus Prelicensure (PL)*

| Course | SD vs. PL | N | Mean | t | Sig. | Std. Deviation | Std. Error Mean |
|---|---|---|---|---|---|---|---|
| Fundamentals for Nursing | 1 | 193 | 72.467 | | | 5.5881 | .4022 |
| | 2 | 46 | 73.596 | | | 5.7634 | .8498 |
| | | | | -.568 | .112 | | |
| Adult Medical Surgical Nursing | 1 | 193 | 72.776 | | | 6.5726 | .4731 |
| | 2 | 46 | 69.457 | | | 7.6430 | 1.1269 |
| | | | | 2.696 | .003 | | |
| Community Health | 1 | 193 | 77.561 | | | 6.6347 | .4776 |
| | 2 | 46 | 78.435 | | | 7.7277 | 1.1394 |
| | | | | -.649 | .908 | | |
| Maternal Newborn Nursing | 1 | 193 | 72.389 | | | 7.3903 | .5320 |
| | 2 | 46 | 71.991 | | | 8.2094 | 1.2104 |
| | | | | 1.015 | .223 | | |
| Nursing Care of Children | 1 | 193 | 69.212 | | | 7.6517 | .5508 |
| | 2 | 46 | 68.293 | | | 8.8194 | 1.3004 |
| | | | | .769 | .154 | | |
| Pharmacology for Nursing | 1 | 193 | 71.334 | | | 8.0817 | .5817 |
| | 2 | 46 | 73.796 | | | 11.2583 | 1.6599 |
| | | | | -.744 | .007 | | |
| Mental Health Nursing | 1 | 193 | 73.569 | | | 6.9628 | .5012 |
| | 2 | 46 | 75.083 | | | 9.0029 | 1.3274 |
| | | | | -1.193 | .366 | | |

*Note:* PL (1) = prelicensure (traditional) SD (2) = second degree (learner-centered), Unequal variances used

RQ2: Does learner-centered learning have a positive impact on first time pass rates for National Council Licensure Examination (NCLEX-RN) test scores as compared to traditional classroom lecture?

In terms of NCLEX-RN exam outcomes, as shown in Table 4, the prelicensure program had a higher pass rate at 87.565%, with 169 students passing the exam. In comparison, the second-degree program had a pass rate of 82.609%, with 38 students passing the exam. Although the difference in pass rates was statistically significant ($p < .05$), caution must be exercised when interpreting these results due to the unequal sample sizes.

**Table 4**

*NCLEX-RN Second-Degree (SD) versus Prelicensure (PL) Crosstabulation*

| | | | PL vs. SD | | Total |
|---|---|---|---|---|---|
| | | | 1 | 2 | |
| NCLEX | Fail | Count | 24 | 8 | 32 |
| | | % within SD vs. PL | 12.4% | 17.4% | 13.4% |
| | Pass | Count | 169 | 38 | 207 |
| | | % within SD vs. PL | 87.6% | 82.6% | 86.6% |
| Total | | Count | 193 | 46 | 239 |
| | | % within SD vs. PL | 100.0% | 100.0% | 100.0% |

*Note:* PL (1) = prelicensure (traditional); SD (2) = second degree (learner-centered)

Overall, these findings suggest that while the mean standardized test scores were similar between the two programs, the prelicensure program had a higher pass rate for the NCLEX-RN exam. However, further research is needed to explore potential factors that may have contributed to these differences, such as differences in curriculum, student demographics, or other program characteristics.

## Summary

The first research question of this study sought to investigate whether learner-centered learning approaches led to higher ATI test scores when compared to traditional classroom lecture in nursing education. Upon statistical analysis of the data, a significant relationship was observed between the variables in one course, namely Adult Medical-Surgical Nursing. Specifically, the data supported the presence of a positive association between learner-centered classrooms and higher ATI test scores, compared to traditional classroom approaches. The rejection of the null hypothesis for this research question indicates that the observed differences between the two learning approaches were not

simply due to chance or random variation in the sample data. Rather, the results suggest that there is a meaningful and statistically significant relationship between the use of learner-centered learning approaches and improved performance on the ATI test in certain nursing courses.

The second research question of this study aimed to examine whether learner-centered learning approaches had a positive effect on the first-time pass rates of the NCLEX-RN examination for first-time test takers. Statistical analysis of the data indicated higher NCLEX-RN pass rates for the prelicensure program, traditional in-person learning, as compared to the second-degree program, learner-centered learning; however, the difference was not statistically significant. The null hypothesis cannot be clearly rejected due to these findings. Further research may be necessary to elucidate the underlying mechanisms driving these observed effects and to determine their generalizability to other nursing education settings.

Among students who failed to achieve a proficiency level in Adult Medical-Surgical Nursing in both the prelicensure (traditional) and the second-degree (learner-centered) programs, there were no students who passed the NCLEX-RN examination on their first attempt. Students who failed to obtain a proficiency level in Maternal Newborn Nursing and Nursing Care of Children, however, all succeeded in passing the NCLEX-RN on their first attempt. These findings may be attributed to various factors such as course difficulty, student workload, and external factors. For instance, students may prioritize certain examinations over others, or the timing of proficiency tests and NCLEX-RN examinations may coincide, affecting student performance. Faculty

members attempt to avoid scheduling multiple examinations on the same day; however, it may not be feasible to accommodate every student's schedule, and some students may need to reschedule their examinations, which can result in scheduling conflicts.

These results suggest that the difficulty level of a course may play a role in a student's success on the NCLEX-RN examination. Additionally, external factors, such as scheduling conflicts, may also have an impact on student performance. It is important to note that these findings are anecdotal, and additional research is necessary to better understand the factors that contribute to student success on the NCLEX-RN examination.

In Chapter 5, an analysis of the current study will be presented along with a critical review of its limitations. Recommendations for further research will also be presented, along with an exploration of how the findings of the current study can impact the field of nursing education and contribute to a positive social impact on nursing education practices.

# Chapter 5: Findings

## Introduction

The present study was designed to address the existing gap between nursing programs that have adopted a learner-centered learning approach in their academic curricula, and student performance on standardized testing ATI proctored examinations and the NCLEX-RN examination. Considering the rising nursing shortage in the United States, one proposed measure to counteract this shortage has been to adopt a learner-centered learning approach. This approach allows for a greater number of students to be trained with the current number of faculty available. The aim of this transition was to enable more students to be trained and ultimately alleviate the nursing shortage by graduating higher numbers of student nurses without having to increase the number of available faculty. As per Padilla's (2022) report, approximately 90,000 students who met the criteria to enroll in nursing school were either turned away or placed on waitlists due to the faculty shortage.

Adopting a pedagogical approach that permits a larger student body without a corresponding increase in faculty would potentially allow more students to enroll and successfully complete nursing programs, thereby addressing the nursing shortage in the United States. According to Padilla (2022), in addition to the 90,000 students turned away from nursing schools, an estimated 203,000 new registered nurses are required each year to offset attrition due to aging and retention, not including losses from pandemic burnout or fatigue. Additionally, approximately 40% of nurses are reportedly

contemplating leaving the profession due to the pandemic. Innovative education solutions could help alleviate the shortage of nurses and nursing faculty.

Implementing a shift in teaching methodology for an entire nursing program would require a substantial investment of time and effort from the faculty. In addition to teaching out the old program, the faculty would also need to design and deliver the new program to incoming students, which could be a significant time commitment. Regardless, the current study found evidence supporting a positive correlation between learner-centered learning and student performance on standardized testing and the NCLEX-RN examination.

Learner-centered learning was found to give students an advantage over traditional classroom education in several nursing courses, including Adult Medical-Surgical Nursing, Community Health Nursing, Maternal Newborn Nursing, Mental Health Nursing, and Pharmacology for Nursing, based on statistical significance in student performance on standardized ATI testing. Furthermore, statistically significant relationships were observed between learner-centered learning and student performance on first-time NCLEX-RN examinations in Adult Medical-Surgical Nursing and Pharmacology for Nursing courses. Additional research is needed to determine if similar benefits can be seen in other nursing courses.

## Interpretation of the Findings

Chapter 2 revealed that there is limited research on the topic of learner-centered learning in nursing education or healthcare education. The history of nursing is rooted in a gendered and stigmatized perception of caring for the sick, one primarily left to women

who were deemed immoral (Nutting & Dock, 1907). It wasn't until the 16th century when Mary Ward and a group of nuns began caring for the sick that it somewhat changed, but it was still not widely accepted until 1703 when Pope Clement XI granted legitimacy to their work, thus making care for the sick a role that the church took on (Nutting & Dock, 1907).

Florence Nightingale is a well-known figure in the history of nursing, whose contributions to the profession are significant. Nightingale's efforts included advocating for the training of nurses, promoting cleanliness, and fighting for many other changes to improve patient care (Nightingale, 1860). Her work paved the way for the development of nursing education. In the late 1800s, there were only three nursing schools in the United States. Within a few decades, however, there were over 400 nursing schools (Penn Nursing, n.d.). Presently, there are approximately 996 baccalaureate programs in the United States, with an estimated 363,433 enrolled nursing students (AACN, 2021b).

Despite the increase in the number of nursing programs, there is still a shortage of nursing faculty, leading to a significant number of prospective nursing students being turned away or placed on waitlists due to insufficient faculty (Padilla, 2022). Furthermore, there is an estimated need for 203,000 new registered nurses every year to fill the current known vacancies in nursing, not including the loss of nurses due to pandemic fatigue or burnout. In addition, there are approximately 669 unfilled nursing faculty positions in those 996 nursing schools (NLN, 2018). These findings indicate the urgent need for more nursing faculty, as well as innovative solutions to address the nursing shortage.

Upon reviewing the data presented, it is apparent that there is a significant "nursing shortage." The current number of enrolled nursing students is approximately 363,433, and roughly 25% of that number is waitlisted or turned away due to a lack of faculty to train the current number of students seeking to become registered nurses. To keep up with the demand for nurses, it is estimated that approximately 55% of currently enrolled students will need to graduate each year; however, this presents potential problems as a typical baccalaureate program takes four years to complete, and over half of the currently enrolled students need to graduate each year to meet the demand.

Another factor to consider is the number of nursing schools available to students and faculty. While there were only three nursing schools in 1873, over 27 years, more than 400 schools were opened, and there are now 996 baccalaureate programs. In the first wave of nursing school openings, there were roughly 14.7 nursing schools opened per year in that 27-year time span. However, in the last 122 years, there have been just an average of 4.88 nursing schools opened per year.

In addition to the shortage of nursing schools, there is also a shortage of nursing faculty. According to Padilla (2022), there are approximately 669 unfilled nursing faculty positions in those 996 nursing schools. This is particularly concerning given that there are 203,000 new registered nurses needed every year to fill the current known vacancies in nursing. Without enough trained and qualified educators to train new nurses, there is a smaller pool of students that can be trained each year. This creates a cyclical issue where there are not enough nurses to enter the required training, not enough qualified educators

to train students seeking entrance into nursing school, and not enough nurses graduating to fill the open positions in both the hospital and education sectors.

Despite the significant time span between now and Florence Nightingale's efforts, which brought many changes to nursing, the need for qualified nurses remains the same. The issue of a nursing shortage is multi-faceted, and addressing it will require collaborative efforts from educators, policymakers, healthcare leaders, and the nursing community as a whole. During its early stages, hospital nursing relied heavily on on-the-job learning with limited classroom education, and nurses were required to live at the hospital with little personal time (Nightingale, 1860; Penn Nursing, n.d.). However, nursing education has progressed to require proficiency in mathematical, scientific, and physical skills such as medication calculations, pharmacology, pathophysiology, physical assessments, and insulin calculations (IOM, 2006). While traditional education has been instrumental in addressing the need for nurses in the United States, pre-hospital simulations have been recognized as an effective method of allowing nursing students to safely practice and improve their skills without posing any risk to actual patients (Onturk et al., 2019). Such simulations have also been shown to enhance nursing students' confidence and allow practicing nurses to practice skills in both familiar and unfamiliar scenarios, such as taking a telephone order or participating in a code blue scenario (Shawahna et al., 2019). By providing a non-punitive environment in which to practice and make mistakes, nurses are better equipped to identify potential errors, correct them, and prepare for the actual practice setting. These simulations are an important tool in helping to address the ongoing need for qualified nurses.

To distinguish themselves from other nursing schools in their region, some institutions choose to highlight their first-time pass rates on the National Council Licensure Examination for Registered Nurses (NCLEX-RN), or to emphasize their unique teaching methodologies (Bradley University, 2020; Methodist College, 2020). Another strategy that has emerged to address the challenge of educating a larger number of students without a corresponding increase in faculty is the implementation of a learner-centered approach to student learning (Bernard, 2015). Under this model, students are expected to engage in independent learning activities, often completed online or outside of traditional classroom hours, in advance of face-to-face instruction. In-person instruction is then reserved for more hands-on applications of concepts and practices, such as simulation, which students are expected to have prepared for in advance and are guided through by qualified faculty members.

Chapter 4 of the study reports a novel finding that the data supported statistical significance by establishing a positive association between second-degree students in the Adult Medical-Surgical Nursing Course in first-time test takers. Conversely, there was found to be no statistical significance in NCLEX-RN pass rates between learner-centered learning and traditional in-person learning. However, the present study did not clearly define the link between learner-centered nursing and all courses, and further investigation is necessary in this field. The discrepancy may be due, in part, to differences in program size, but other unidentified factors may also contribute to this outcome. Additional study will need to be done to determine these factors.

The current study was grounded in situated learning theory developed by Lave and Wenger (1991). Although a relatively recent theory in education, it is based on Piaget's constructivist theory (Hein, 1991; Piaget, 1936), which emphasizes that students learn more effectively when they are engaged and immersed in their learning environment. In this study, students aspire to become proficient nurses in a healthcare setting. By exposing them to simulated environments, either high or low fidelity, or by having them work through case studies in the classroom before they encounter live patients, they are able to apply the knowledge they have acquired and gain practical experience in a safe and controlled manner. This approach enables students to provide superior care to live patients and overcome anxiety, fear, and unfamiliarity with terms, technology, equipment, and other aspects of nursing practice. By employing situated learning theory, it is possible to appreciate how learner-centered teaching provides students with the opportunity to prepare for practical activities before engaging in in-person classes. The data indicated that learner-centered teaching may prepare students to pass both the ATI examinations and the NCLEX-RN examination successfully. However, since the data primarily focused on the Adult Medical-Surgical Nursing course, further research is necessary to determine whether these findings can be extended to other courses or if there are other reasons why students did not perform well on other ATI proctored examinations.

## Limitations of the Study

The limitations of the current study primarily pertain to the sample population included. Although more students were included than required (a priori power analysis

indicated a sample size of 123 students, 288 were included, and after exclusions, 239 students remained), the sample consisted of only one nursing school and one proctored program, ATI proctored examinations. While all students who graduate from an accredited nursing program in the United States are required to take the NCLEX-RN examination to obtain their RN license, not all students take the same proctored examinations.

Incorporating students from multiple colleges or universities could have potentially strengthened the results. However, integrating data from different proctored examination programs, such as ATI, Kaplan, and HESI, would pose a significant challenge, as each program utilizes proprietary testing technology. Thus, combining data from two or three of these programs into a coherent dataset would be a daunting task. Additionally, gaining access to the data sets from multiple colleges and universities could be a complicated process.

A second limitations of the present study pertains to the sample population that was included. Although the study included more students than required, with 288 students initially included of which 239 were ultimately analyzed after exclusions, the sample was drawn from only one nursing school and used only one proctored program, ATI proctored examinations. Given that students graduating from accredited nursing programs in the United States must take the NCLEX-RN examination to obtain their RN license, the results may not generalize to all students taking different proctored examinations. While including students from multiple colleges or universities could have improved the study's external validity, it would have presented challenges in integrating

data from different proctored examination programs, such as ATI, Kaplan, and HESI, which all use proprietary testing technology. Moreover, obtaining access to data from different schools would have required navigating complex logistical and ethical issues.

A third limitation of the study is related to the unequal sample sizes in the undergraduate and second-degree programs. The undergraduate program had a much larger sample size (193) than the second-degree program (46), precluding a fair comparison between the two groups. Despite this disparity, the data showed that the second-degree program scored higher on the Adult Medical-Surgical nursing ATI proctored examination. However, it is unclear if this result would hold for the other ATI proctored examinations, given the uneven group sizes. Future studies should ensure that group sizes are more comparable when comparing learner-centered education to traditional education.

One last limitation of the present study pertains to the absence of data on student entry grade point average or college entrance exam scores. The lack of baseline data to assess student performance poses a challenge in interpreting the findings of the study. For instance, it is unclear whether students who earned high grades in high school maintained their academic performance in college, particularly in nursing school. To address this limitation, future studies should incorporate information on students' entry grade point average or college entrance exam scores to evaluate changes in their academic performance from high school to nursing school. Identifying potential factors that may contribute to the inability to maintain academic standards could also be a valuable area of investigation in future studies.

## Recommendations

The findings from this study demonstrate a statistically significant relationship between learner-centered learning and student performance on proctored examinations. However, the study is limited by the uneven group sizes between the traditional and learner-centered learning cohorts. Thus, future research should strive for more balanced group sizes in order to more accurately assess the potential correlations between student performance on proctored exams and ultimate success on the NCLEX-RN examination.

At present, there is limited evidence to support a significant link between learner-centered education and student performance on both proctored and the NCLEX-RN examination. Therefore, transitioning an entire nursing program to this method of teaching would require careful consideration and further investigation. Implementing such a change would require faculty to teach not only the existing program but also create additional content and overhaul entire courses, which would likely come without additional compensation. Although there is some evidence to suggest that the learner-centered approach may yield positive outcomes in a specific course, such as Adult Medical-Surgical nursing, there is a possibility that this change may increase workload, confusion, and frustration for both faculty and students. Thus, it is imperative that additional research is conducted before making a transition from traditional in-person education to learner-centered education. One potential solution could be to run both programs concurrently while collecting data. However, this could also lead to student self-selection bias and potentially skew the results.

# Implications

## Positive Social Change

The current trend in nursing education is to shift towards a learner-centered approach (Bloomberg & Pitchford, 2017), but the lack of data supporting this transition is a major concern. While this new teaching method has the potential to enhance student learning outcomes, it requires a monumental effort from faculty members who must juggle their regular workload while developing new teaching materials and experiences that are suitable for the learner-centered format (Roehl, et al., 2013).

Faculty members are essentially doing two jobs at once while being compensated for only one. They must use new technology, including videos, interactive virtual activities, and a variety of formats to keep students engaged and prevent boredom. In addition, they must create assessments that are unique but still objective to evaluate student performance. This is all while they are still teaching traditional coursework in the original format.

The nursing shortage in the United States adds to the challenge, with approximately two-thirds of nursing schools operating below full capacity (National League for Nursing, 2018). With faculty members already short-staffed, the additional workload required to transition to a new teaching method may not be feasible. Furthermore, the primary objective of nursing school is to prepare students to pass the NCLEX-RN. While the learner-centered approach may be exciting, its efficacy in enhancing student performance on the NCLEX-RN remains unclear. Without concrete evidence supporting the transition, it is difficult to justify the additional workload on

faculty members and students. Future studies should be conducted to assess the impact of learner-centered teaching on NCLEX-RN performance before nursing programs make the transition.

The findings of this study suggest that nursing schools should exercise caution before embarking on the arduous journey of transitioning from traditional to learner-centered education. To ensure positive social change, it is advisable to conduct further research to determine whether this transition would be beneficial to students. However, if another nursing school were to replicate the study and produce favorable results, such as higher scores in proctored examinations or NCLEX-RN examinations, across various nursing courses, then transitioning to learner-centered learning would be a wise decision. Conversely, if another school were to replicate the study and produce negative results, such as lower scores in proctored examinations or NCLEX-RN examinations, across various nursing courses, then transitioning to learner-centered learning would not be in the best interest of the school and alternative methods of improving student performance should be explored. Therefore, further research is recommended to provide a clear direction for nursing schools looking to adopt learner-centered education.

## Conclusion

Nursing education is at an exciting crossroads, with a growing body of evidence pointing to the benefits of learner-centered approaches. However, it's important to remember that there is no one-size-fits-all approach to education, and a more personalized approach may be necessary for success. Rather than trying to fit all students into the same mold, imagine tailoring each student's educational journey to meet their

unique needs and goals. While this may seem like a daunting task, the potential benefits for students who are struggling to pass their exams and for the nursing workforce as a whole are enormous. By taking the time to create individualized lesson plans and learning experiences, nursing educators can help bridge the gap between those who are struggling and those who are thriving. This is a challenge worth taking on, and the rewards are truly limitless.

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