THE EFFECTS OF HIGH-STAKES ATI REMEDIATION AND TESTING PRACTICES INCLUDING THE ATI CONTENT MASTERY SERIES AND ATI PN COMPREHENSIVE PREDICTOR

by

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ABSTRACT

The purpose of this retrospective, descriptive study was to determine if any differences existed in students' test scores on the Assessment Technologies Institute (ATI) PB tests: Fundamentals, Pharmacology, Medical Surgical and the Comprehensive Predictor before and after implementing a high-stakes remediation and testing policy. The ATI computer-based standardized tests are widely used in nursing programs as a program assessment tool. Also, ATI tests provide correlational evidence of first-time NCLEX-RN passage. The ATI Remediation and tests are commonly added to nursing programs progression plans. In recent years nursing programs have applied high-stakes ATI Remediation to the ATI tests in response to the high-stakes quality of NCLEX-RN. In this study the high-stakes ATI tests were administered to associate of science nursing students in their first year of their two year program. The site where the study took place was at a small university located in the Rocky Mountain Region of the US. Group comparisons between those who had a pre-policy of no high-stakes ATI Remediation and testing practices and a post-policy with high-stakes ATI Remediation and testing practices. Descriptive and inferential statistical analysis were used to detect difference in test scores between the two groups. Statistically significant differences were found between groups of test takers on the ATI PN Fundamentals and Comprehensive Predictor tests with the post-policy group scoring higher. An explanation of these findings indicate test scores increase with the use of high-stakes ATI Remediation and testing practices. The findings from these tests can assist nurse educators in placing a clearly defined, appropriate high-stakes ATI Remediation and testing into the progression plan.

CHAPTER 1: INTRODUCTION TO THE STUDY

Introduction

The increased demand for highly educated, clinically competent, and qualified registered nurses is now a major priority for the nursing profession and community healthcare in general. The national nursing shortage has been well documented and continues to be a top priority for nursing education. The National Council of State Boards of Nursing (NCSBN) has publicized reports determining 55% of the RN workforce is age 50 or older. The Health Resources and Services Administration projects that 1 million nurses are eligible for retirement in 10-15 years (AACN, 2013). These ominous projections point to the need for 525,000 replacement RNs, according to the Bureau of Labor Statistics (AACN, 2015). The looming nursing shortage has helped focus nurse educator efforts in preparing the nursing graduate for the National Council Licensure Examination for Registered Nurses (NCLEX-RN) exam (Hinder, et al. 2014). In addition to preparing nursing students for first-time NCLEX-RN passage, there is an added responsibility for nurse educators to help students pass on their first attempt as first attempt passage is viewed as an important indicator of effective nursing programs (Snavely, 2016, p. 99). The NCSBN examines every detail and assigns standards for nursing education to adhere to when developing the nursing curriculum (Snavely, 2016). Once a year the NCLEX-RN is offered in all states by the Board of Nursing. Between April 1994 and July 2019, a total of 5.7 million candidates took the NCLEX-RN (NCSBN, 2019). The NCSBN adheres to strict benchmarks from the nursing schools to

assure the nation that nursing graduates will become safe and effective registered nurses who are ready to enter a multifaceted healthcare field.

Nursing graduates, having earned either a Bachelor of Science in Nursing (BSN) or an Associate of Science in nursing (ASN) from an accredited nursing program are eligible to take the NCLEX-RN. In addition to the university-based nursing programs, there are also three-year nursing programs affiliated with hospitals. These programs are in the minority but still prepare the nursing graduate for first-time NCLEX-RN passage. In 2019, a total of 23,920 Associate of Science nursing graduates had a first-time NCLEX-RN passage rate of 87.3 % with the minimum passage score of 75% (NCSBN, 2019). Nursing programs are evaluated yearly and if found deficient, or not reaching 85 % first-time NCLEX-RN passage rates among program graduates, then the nursing program is placed on probation or can be eliminated as a program (Pennington & Spurlock, 2010). A concern for nursing programs is how their passage rates influence their program's reputation and application rates (Beeson & Kissling, 2001). It is widely known that if the nursing program has high passage rates, then there will be better funding opportunities available for that program. Programs must maintain a history of proven success to sustain outside grant funding including state funding (Snavely, 2016, p.100). Other key stakeholders are private philanthropic contributors who know the value of first-time NCLEX-RN passage rates as key to preparedness and look for a high percentage of passing rates before donating (Lauer & Yoho, 2013).

The NCSBN requires programs that have a lower proportion of their graduates passing NCLEX-RN on the first-time, to develop and implement well-designed

remediation policies (Daley et al., 2003). One important remedial nursing intervention priority is the identification of students who require additional remediation before they sit for the NCLEX-RN. The difficulty of any remediation intervention is twofold: meeting the individual student's needs for remediation and test preparation prior to NCLEX-RN exam. Remediation policies should motivate the student in reaching program expectations at the highest level, as well as helping the student recognize their own accountability in the remediation process. Nursing administration can implement remediation program goals by developing academic policies and progression plans that accurately track program learning outcomes and remediation expectations (Koestler, 2015).

Nursing education could better meet these many requirements by providing its students with effective remediation tools. This obvious task seems simple to solve yet, due to the variation of nursing programs, an effective remediation intervention tool has not been identified. Remediation interventions can range from a face-to-face approach, requiring an assigned faculty member to meet with the student for scheduled times to student-driven online remediation interventions. A popular online remediation tool used by nursing programs across the United States, is the Assessment Technologies Institute (ATI) Remediation.

ATI Standardized Tests in Nursing Education

Assessment Technologies Institute (ATI) is a popular nursing software package that offers a well-developed online assessment tool including its own remediation. One goal for ATI is to prepare the student for NCLEX-RN. ATI has courses and proctored

standardized tests called the ATI Content Mastery (CMS) series. Each ATI CMS course is designed to work concurrently with the nursing face-to-face curriculum courses. ATI CMS courses are online courses the student works through independently. The ATI CMS courses are offered in two versions, a PN version and a RN version. The PN version is mainly used in the first year of the ASN program, and the RN version is given in the second year of the BSN program as a mid-assessment tool. The PN version can be given in an ASN, BSN or LPN program. This study addresses the PN version. The ATI Company uses a "stair step" assessment process for its ATI tests. The ATI CMS is used to help predict the passage of the ATI PN Comprehensive test. These steps move forward from the ATI PN Comprehensive test to help predict the passage of the ATI RN Comprehensive test. The ATI RN Comprehensive test provides nurse educators with information on probability of first-time NCLEX-RN passage. Most nursing school use the ATI RN Comprehensive Predictor as their only ATI assessment, and it is given to the students before they graduate from the nursing program. ATI Remediation is commonly used with the ATI CMS tests and the ATI PN Comprehensive Predictor.

The ATI CMS courses and the commensurate tests include Nursing Fundamentals, Adult Medical Surgical Nursing, Maternal-Newborn Nursing, Nursing Care of Children, Nutrition, Community Health, Nursing Pharmacology, Mental Health Nursing, and Nursing Management. The ATI CMS courses have built-in, self-guided remediation plans and tutorials based on the student's online results, but the main type of ATI Remediation used is a focused review that is developed from the ATI CMS proctored tests.

Included within the ATI package is the ATI PN and RN Comprehensive Predictor standardized test. Due to the four-year nature of the BSN program the ATI PN Comprehensive Predictor is usually not given to the students. The ATI PN Comprehensive Predictor is normally given to ASN students halfway through their program or in the nursing student's sophomore year of the two-year Associative of Science in nursing program. Generally, the ASN programs are longer than a traditional two-year degree due to the time it takes to complete pre-requisite courses. The ATI Comprehensive Predictor test is based on the ATI CMS tests including fundamentals, pharmacology, adult medical-surgical, maternal newborn care, mental health, nursing care of children nutrition, and management. If a student takes the ATI PN Comprehensive Predictor and passes with an 82.7 %, then they have a 99% predicted probability of first-time NCLEX passage. In preparation for taking the ATI PN Comprehensive Predictor test, several learning tools offer remediation including the tutorials from the ATI CMS tests or any focused review formed from the ATI CMS tests. The same process for remediation used on the ATI CMS test is used for the ATI PN Comprehensive Predictor, in that, the results are generated and put through a statistical analysis and a focused review is originated. All focused reviews can be accessed by the student and faculty for evaluation. The focused review helps the faculty to be aware of topics that may not have been addressed adequately within the curriculum (Alameida, et al., 2011). The ATI PN Comprehensive Predictor's evaluation assists the nursing program in identifying students who may be at risk for not achieving first-time NCLEX-RN passage rates.

Even though the ATI RN Comprehensive Predictor is not being studied in this dissertation, it is widely studied and is prominent in the literature. It is only mentioned here to provide clarification for the reader on ATI tests. The ATI RN Comprehensive Predictor is given in the student's senior year for both ASN and BSN programs. The ATI RN Comprehensive Predictor has a high correlational value in predicting first-time NCLEX-RN passage rates (Alameida, et al., 2011). The ATI Pulse (2016) predicts that if students pass in the ATI RN Comprehensive Predictor examination and pass with a minimum score of 84%, then the student will have a 99% predicted probability rank for first-time NCLEX-RN passage.

High-stakes Remediation and Testing Practices

Incorporating high-stakes online standardized testing and remediation practices into nursing program curricula has gained momentum. This trend has occurred in part due to online companies providing nursing faculty with successful assessment tools and remediation plans (Baker & Johnston, 2010; Langford & Young, 2013; Lauer & Yoho, 2013; Pennington & Spurlock, 2010; Spurlock, 2013). When online standardized testing was first used, the student could retake the test as many times as the testing progression plan allowed. The students used the first attempt to find out what was on the test in hopes of getting a better score on the retake. Many nursing programs opted to use high-stakes testing to curb this type of testing behavior. Some high-stakes testing consequences required passage on the first time to stay in the nursing program.

ATI Pulse (2016) suggests all ATI tests, including the ATI CMS and PN Comprehensive Predictor, be used only in a traditional standardized test and remediation

manner and not used as a high-stakes remediation test product. ATI's definition of "high-stakes" consequences are as follows: not being allowed to progress to the next semester, not being allowed to graduate, or withholding college transcripts (ATI, 2014). The trend of using high-stakes remediation and standardized testing as a course requirement has been a subject of controversy amongst nursing schools for the last ten years and is not recommended by the NCSBN as a remediation intervention (Nibert, et al., 2006, p. 306).

Several problems have been identified by nurse educators when high-stakes remediation and testing practices are part of the progression plan. One problem is the tendency for nursing faculty to teach to the ATI standardized tests rather than from the established nursing curriculum (Spurlock, 2006, p. 299). When nursing faculty solely concentrate on high-stakes remediation testing practices, less time is used with other types of remediation. Nursing faculty have found that students will not study and pass ATI tests if there is not a grade incentive tied to the ATI test (Pennington & Spurlock, 2010, p. 5). If this occurs, then the process of collecting accurate assessment data could be in question. Due to this unforeseen consequence, many schools of nursing have begun to incorporate ATI CMS tests and the ATI PN Comprehensive Predictor into the students' formal grade and have instilled a variety of high-stakes criteria into remediation (Barton, et al., 2014).

The NCSBN requires nursing programs demonstrate curriculum change and clarity in tracking the assessment and evaluation processes within their programs (Barton, 2014, Hinder, 2014). Pennington and Spurlock (2010) have noted the adoption of high-stakes ATI Remediation and testing practices may bring greater first-time NCLEX-RN

passage rates, which will ensure program accreditation. Other remediation approaches that are not always considered are: face-to-face remediation practices, remediation courses, rearrangement of clinical time, or the addition of new courses or faculty (Pennington & Spurlock, 2010, p. 491). Research has shown these remediation approaches vary on the amount of influence they have on first-time NCLEX-RN passage rates because they are mostly used with other forms of remediation and not studied as the sole remediation tool.

ATI Remediation is often used in nursing programs as the only remediation due to its online case studies, one-on-one virtual tutoring, self-paced study lay-out, and simulation scenarios. Online remediation plans are used more often because they are a reliable remediation resource that is easily accessed (Norton et al., 2005). Administrators in nursing education find the pre-written ATI remediation policies helpful as evidence of curriculum assessment and evaluation during program accreditation. The ease of an established remediation tool is less time consuming for nursing faculty than the traditional remediation interventions. Many of the traditional interventions can interfere with the curriculum since the faculty must rearrange their schedule and the student's schedule to meet the time needs of the remediation intervention. Often it is the clinical schedule that is impacted by any schedule change. Clinical schedules are typically planned several months in advance; therefore, this type of change is considered a major inconvenience and difficult for the student to make up.

Statement of the Problem

The current problem facing nursing education and integral to this study is the evolving trend of using online high-stakes remediation testing policies without the development of adequate remediation interventions to support this policy. The nursing shortage and the retiring "Baby Boomer" registered nurses have fueled the need for qualified registered nurses. This demand allows for little error from the nursing educator who must focus on preparing nurse generalists into the national population. Pressure has been placed on nursing programs to be in alignment with the accrediting bodies and the State Board of Nursing's requirement of first-time NCLEX-RN passage rates. In conjunction with these requirements, the nursing faculty must prepare the student to assimilate extensive didactic material and safely participate in the clinical area. There are times when the remediation process instituted by the nursing schools may not meet the goal of first-time NCLEX-RN passage rates. Pennington and Spurlock (2010) have indicated that nursing schools can put forth their best efforts and still have student attrition, but it is not entirely the nursing programs' burden. Nursing students need also to be accountable for their education and take the initiative to develop an individualized remediation plan, as well as accept responsibility in preparing for first-time NCLEX-RN passage rates. Nursing schools are not required by the NCSBN to follow specific remediation practices and generally make their own decisions on how they will progress forward. Some nursing schools offer the student remediation in courses they are deficient in through a capstone courses, while others use high stakes in delaying or denying graduation until remediation is complete or standardized tests are successful. This can be

successfully addressed if a detailed progression plan on remediation interventions is utilized.

Nursing education has a long history of using remediation interventions without substantive evidence of success. Current research on remediation has lacked adequate sample size, quality of research design, and effective strategies (Pennington & Spurlock, 2010, p. 491). Many in nursing education are using remediation products and processes like those available from ATI and associating high-stakes consequences to student performances. Together, remediation and high-stakes testing appears to be an efficient and easy method to achieve an effective remediation plan. Yet, high-stakes remediation is in direct opposition to what is purposed by these companies (Pennington & Spurlock, 2010). Critics of the ATI software package state that their product provides sketchy guidelines on how to achieve successful remediation and does not provide additional resources for the student's weakness, and only focuses on reiteration of the content, which has already been covered in the traditional face-to-face class (Pennington & Spurlock, 2010; Spurlock, 2006). Those that compliment ATI Remediation state that ATI Remediation can be a good choice for nursing educators since this software helps organize nursing content and provides detailed spreadsheets of each student's progression through each ATI course. Generally, ATI Remediation tools help the nursing student assimilate the vast amount of nursing content through use of modules, practice tests, proctored tests, and focused reviews. In addition to these tools ATI provides the nursing student with the added benefit of accessing the online information at anytime and anywhere for their entire professional life.

Continual improvements are required in the remediation process, including the addition of more specific NCLEX-RN content to the nursing curriculum and to ATI Remediation. Brussow and Dunham (2018) describe how a lack of faculty development on specific remedial interventions and not applying interventions in a timely manner have led to decreased remediation use in nursing programs. Compounding the decline in remediation is a marked reduction of nurse educators, the lack of time for the faculty to initiate remediation, and alignment of remediation with current evidence-based practices required for accreditation. The issues are not easily solved especially in light of nursing educators' pay relative to those of nurses in the field. Most areas of education generally pay less than that of the industries, but the gap is much larger between nurse educators and their peers in the hospital setting. This is a difficult issue to solve since the nursing shortage has driven up pay scales for nurses in the hospital setting (Dibartolo & Seldomridge, 2006).

Statement of Purpose

The purpose of this nonexperimental descriptive study is to analyze if any significant relationship exists between the outcome variables of the ATI CMS test of ATI PN Fundamentals, ATI PN Pharmacology and ATI PN Medical Surgical, and the ATI PN Comprehensive Predictor, with the predictor variable: a policy change in which ATI Remediation testing practices was implemented. The four research questions of this study examine students' scores during the years of fall 2009 through spring 2013 on the ATI CMS tests and the ATI PN Comprehensive Predicator test when there were no high stakes ATI Remediation and testing practices and compare these students' scores with the

years from fall 2013 through spring 2015 when high-stakes ATI remediation and testing practices were used on the ATI CMS tests and the ATI PN Comprehensive Predicator. Inferential statistics will be utilized and analyzed for any significance between the predictor and outcome variables.

Research Questions

This study addresses the following research questions:

1. Are there differences in scores on the ATI Content Mastery Series PN Fundamentals test between students who did and did not receive high-stakes ATI Remediation and testing practices?
    - Null Hypothesis – There are no significant differences between scores on the ATI Content Mastery Series PN Fundamentals test between students who did and did not receive high-stakes ATI Remediation and testing practices.
    - Alternative Hypothesis - There are significant differences in scores on the ATI Content Mastery Series PN Fundamentals test between students who did and did not receive high-stakes ATI Remediation and testing practices.

2. Are there differences in scores on the ATI Content Mastery Series PN Pharmacology test between students who did and did not receive ATI Remediation and high-stakes testing practices?

- Null Hypothesis – There are no significant differences in scores on the ATI Content Mastery Series PN Pharmacology test between students who did and did not receive high-stakes ATI Remediation and testing practices.
- Alternative Hypothesis - There are significant differences in scores on the ATI Content Mastery Series PN Pharmacology test between students who did and did not receive high-stakes ATI Remediation and testing practices.

3. Are there differences in scores on the ATI Content Mastery Series PN Medical/Surgical test between students who did and did not receive high-stakes ATI Remediation testing practices?
    - Null Hypothesis – There are no significant differences between scores on the ATI Content Mastery Series PN Medical/Surgical test in students who did and did not receive high-stakes ATI Remediation and testing practices.
    - Alternative Hypothesis - There are significant differences in scores on the ATI Content Mastery Series PN Medical/Surgical test between students who did and did not receive high-stakes ATI Remediation testing practices.
4. Are there differences in scores on the ATI PN Comprehensive Predictor test between students who did and did not receive high-stakes ATI Remediation and testing practices?

- Null Hypothesis – There are no significant differences in scores on the ATI PN Comprehensive Predictor test between students who did and did not receive high-stakes ATI Remediation and testing practices.
- Alternate Hypothesis – There are significant differences in scores on the ATI PN Comprehensive Predictor test between students who did and did not receive high-stakes ATI Remediation and testing practices.

Significance of the Study

This study is significant to nursing education because it will expand the knowledge base concerning high-stakes ATI Remediation and testing practices. The literature is clear on the need for identifying a successful remediation intervention. Although, this study does not examine each type of remediation, it does examine the effectiveness in respect to change of test scores when high-stakes ATI Remediation and testing practices were applied to the ATI CMS tests of ATI PN Fundamentals, ATI PN Pharmacology, ATI PN Medical Surgical and the ATI PN Comprehensive Predictor tests. ATI Remediation is an important type of remediation for investigation due to the growing numbers of nursing faculty turning to online remediation. ATI remediation provides ease of access and an extensive number of remediation tools including tutorials, case studies, practice tests, and a focused review for ATI proctored tests. Ultimately, the study's main outcome is that nursing faculty will be able to directly apply the findings to a student's progression plans and know the results will be benefit both the student and program. It is important for the faculty to identify students who may need additional remediation at an

early point in their program. ATI Remediation offers the faculty online transcripts that indicate the students' progress through ATI Remediation.

Definition of Terms

The following terms represent the definitions within this dissertation:

1. At-risk students: The students who do not reach the level specified by the institutional benchmark. The institutional benchmark for the ATI tests are a level 2 for the Content Mastery Series. The ATI PN Comprehensive Predictor does not have levels attached to scores, but the student must reach a raw score of 84.7.
2. ATI Content Mastery Series: Nine assessments tests developed by ATI as a framework for first-time NCLEX-RN passage rates. These nine assessments include Fundamentals, Pharmacology, Medical Surgical, Community Health, Nutrition, Leadership, Nursing Care of Children, Maternal Newborn, and Mental Health commonly used as an assessment in nursing programs.
3. ATI Content Specific Criteria: A reference point from which measurements are made and serve as a comparison from below level 1 through Level 3 with the level two as the national benchmark.
4. The ATI Content Mastery Series PN Fundamental test is the outcome measure for research question 1. There are several areas of nursing represented throughout this test. The areas are noted here but are not limited to the following: 1. General practices of nursing at the foundation level (communication, professional standards of care, basic health care delivery, basic care of the patient throughout the lifespan: 2. General nursing

care (medication administration, steps of following the patient through the admissions transfer and discharge process, wound care, infection control, and National Patient Safety Goals): 3. Psychosocial (support of family, community needs, public health alterations, cultural needs, spiritual needs, and end-of-life-care), 4. Basic physiological support (care of patient requiring circulation needs, oxygenation needs, fluid & electrolyte balance, neurosensory, gastrointestinal, and elimination needs); 5. Health assessment procedures (systems assessment, including vital signs).

5. ATI Content Mastery Series ATI PN Pharmacology test is the outcome measure for research question 2. This test is given as an assessment to determine if the student can reach the national average of a level 2 for this course. The areas are noted here but not limited to the following: The principles and application of pharmacokinetics & pharmacodynamics, safe drug administration, safe administration, and evaluation of prototype drugs to treat disease processes of the blood and those of pain, inflammation, infection as well as all body systems, including cardiovascular, neuromuscular, respiratory, gastrointestinal, endocrine, immune, and reproductive.
6. ATI Content Mastery Series ATI PN Medical Surgical test is the outcome measure for research question 3. This test is given as an assessment to determine if the student can reach the national average of a level 2 for this course. Several areas of nursing are represented throughout this test and include the following: an assessment of academic generalized proficiency including areas of safe and effective care (management of care & safety including infection control), health promotion, maintenance of psychosocial care,

physiological care (basic care & comfort, medication administration & parenteral therapies, and risk reduction).

7. ATI PN Comprehensive Predictor is the outcome measure for research question. This test is given as an assessment to determine comprehension and mastery of the basic principles including CMS tests of fundamentals, pharmacology , adult medical surgical, maternal newborn car, mental health, nursing care of children, nutrition and management. A generalized proficiency is provided including areas of safe and effective care (management of care & safety including infection control), health promotion, maintenance of psychosocial care, physiological care (basic care & comfort, medication administration & parenteral therapies, and risk reduction).
8. ATI Remediation: ATI Corporation refers to their remediation as Focused Review 2.0. This test remediation plan automatically generates content for further review from ATI test results. This is a computerized individualized remediation plan that provides text, image, and video and sound content and refers the student to an e-book, which has highlighted sections concerning the areas that should be reviewed. The Focused Review 2.0 has a practice review that generates practice quiz questions for the student in their content area of need, although it is not included with the test reviews only for practice.
9. High-Stakes Testing Practices: High-stakes testing practices mark a specific criterion for students to achieve, which allows them to advance through the nursing program. If students fail to achieve the designated cut point, a number of possible consequences may arise including (but not limited to): not being assigned a grade until the test requirement is met, or not progressing to the next corresponding semester until the test requirement is

met, which may result in delaying graduation, or the student not being able to take the NCLEX-RN.

10. NCLEX-RN: A national test developed by the National Council of state Board of Nursing (NCSBN). This entry level test is required to be passed in order to work as a Registered Nurse.
11. Remediation: Any process of additional study used by the student to prepare for retesting (Morrison et al., 2002). Remediation is a process that helps the student and the faculty address barriers that have delayed success in the academic and clinical settings. Many of the interventions include the following: acquiring test taking skills, various relaxation skills, attending review sessions, the use of computerized program packages through standardized testing companies, or the use of a newly created course (Pennington & Spurlock, 2006, p. 297).
12. Progression Policy: Progression policies are derived from nursing program department mandates to progress into the subsequent course or even graduation. These policies are often determined from computerized standardized tests and the companies' prediction of a student's likelihood of achieving success of first-time passage in NCLEX-RN. Policies may be linked to high-stakes testing practices that rely on a single test score to determine students' progression (Spurlock, 2006, p. 297).
13. Undergraduate Nursing Programs: The American Nurses Association (ANA) has designed several educational pathways for nursing students to follow. Three nursing program types are recognized by ANA and they include: Diploma in Nursing, an Associate Degree in Nursing, and a Bachelor of Science in Nursing. Diploma schools are

based in the hospital rather than the university setting. The Associate of Science in Nursing (ASN) is a two-year degree offered in community college and university settings, which use hospitals for clinical settings. ASN programs prepare students for a scope of practice designed to meet the technical requirements of the Registered Nurse within the hospital settings. The Bachelor of Science in Nursing (BSN) is a four-year degree offered at colleges and universities. In addition to the technical requirements that ASN programs entail, the BSN also focuses on nursing leadership and management.

Chapter Summary

The expectation and challenge for nursing education is to prepare competent, productive nursing students for the patient and the community while maintaining an engaging and creative learning environment. Due to the impending nursing shortage, the expectation to retain each nursing student is paramount. This is especially valid in rural states such as Montana. Faculty are acutely aware of the difficulties many rural nursing students go through just to attend nursing school; therefore, retaining every student is a major priority. All these factors contribute to the need for an evidence-based remediation policy. Well thought out progression policies are necessary if nursing education is to achieve this goal. Nursing faculty are fully aware of the consequences of failure for the institution and the student. Some of the more notable consequences include decreased retention rates for nursing programs, increased student loans for retaking courses for the student, and fewer Registered Nurses in the workforce.

Development of remediation plans is not always central to nursing programs' policies. The literature has many studies on remediation in nursing education, although

there is little evidence to support what is thought to be the most effective remediation tool. This dissertation contributes to the body of literature by examining the effects of high-stakes ATI Remediation and testing practices on the ATI CMS tests of ATI PN Fundamentals, ATI PN Pharmacology, ATI PN Medical Surgical, and the ATI Comprehensive Predictor test.

Chapter one introduced ATI CMS Tests, ATI Comprehensive Predictor test and high-stakes ATI Remediation and testing practices with comments on their relationship to the curricula and accreditation. This dissertation study's data comes from Montana Tech, a small ASN nursing program in the Rocky Mountain region. Study findings may inform nurse educators who wish to improve progression policies on high-stakes ATI Remediation and testing practices. The key points of the study were addressed in this chapter and include the background, the problem, the purpose of the research, the research questions, the significance of the study, and the definition of terms of the study.

CHAPTER 2: REVIEW OF THE LITERATURE

A review of the literature was conducted using searches within the databases of Allied Health Literature, Cumulative Index to Nursing and Allied Health Literature, ProQuest Central Journals & Dissertations, and PubMed via EBSCOhost. The theoretical frameworks that support this dissertation are discussed within the literature review. The goal of this literature review is to explore and examine the multifaceted aspects of remediation strategies and high-stakes ATI Remediation and testing practices within nursing education. A gap exists within the literature regarding the effectiveness of high-stakes ATI Remediation and testing practices. Many of the studies in the literature review examines the correlation between the ATI CMS tests and the ATI RN Comprehensive Predictor tests and first-time NCLEX-RN passage. The information from these studies provide a full picture of the goal of ATI tests and remediation interventions and how they are utilized in program plans. Other studies reviewed, while not examining remediation, are included because they provide a complete picture of how the ATI tests have been used.

Theoretical and Conceptual Framework

Albert Bandura's Self-Efficacy Theory introduces the literature review and provides a picture of how this theory and competency framework form the basis for this dissertation study. Quality and Safety Education for Nurses (QSEN) is a competency model used throughout nursing education. QSEN provides required criteria for nursing education including the following core competencies: patient-centered care, teamwork

and collaboration, evidence-based practice, quality improvement, safety and informatics. Both work in conjunction with each other since each supports the process of increasing self-evaluation within the nursing student, which is essential to the remediation process. Student nurses need to continually assess their ability to face challenges and unfamiliar situations in the profession. Factors to promote self-efficacy inform how student nurses may engage in self-evaluation to accomplish these tasks associated with the competencies in QSEN. Once students finds success from learning new activities, they are more likely to approach new situations with the increased self-efficacy resulting in a new achievement. QSEN may help increase self-efficacy by providing a framework in which students learn to work with common patient safety algorithms. QSEN has developed algorithms in the areas of knowledge, skills, and attitudes (KSAs) and have applied the algorithms to the six core competencies of patient care.

The QSEN competencies provide the superstructure of the knowledge, skills, and attitudes underpinning nursing education and the preparation of nursing students for graduation and first-time NCLEX-RN passage. Each KSA competency is supported by evidenced based clinical research that promotes safe and effective care for the patient and community. One objective for all accredited nursing programs is to use the QSEN competencies KSA system in the curriculum including remediation. The following terms are assigned to QSEN:

- **Patient-Centered Care**: The patient or family/designee is the source who is in full control. A partnership is formed with the nurse/student focusing on coordinated care and

respect for the patient's preferences, needs, and values (Cronenwett et. al., 2007). These concepts are shared in teaching the student as well as patient and family.

- **Teamwork and Collaboration**: This competency fosters open communication, respect, and mutual decision-making as well as the ability to clearly communicate with colleagues to avoid health-related errors (Cronenwett et. al., 2007).
- **Evidence-Based Practice**: The competency integrates best current practice both in nursing education and in the clinical arena. These principles help to increase critical thinking and clinical judgment as well as ensuring that the care provided is based in current research (Dolansky & Moore, 2013).
- **Quality Improvement**: Data are routinely collected for nursing education to monitor outcomes of care processes. Assessments are made to improve the quality and safety of patient care and nursing education. The nursing actions that are commonly assessed and evaluated in this competency are curriculum, testing policy, and standards of patient care (Dolansky & Moore, 2013).
- **Safety:** System effectiveness is continually monitored on how risks can be minimized for patients and caregivers by focusing on individual performance. Often this information is applied to equipment, medication administration, and policy and procedure (Dolansky & Moore, 2013).
- **Informatics:** This system centers on communication to help mitigate error for areas in electronic documentation and support decisions, but also helps to identify methods for students to access content and testing procedures in the nursing curriculum (Dolansky & Moore, 2013).

The theoretical framework and competency model provide a base for students to work through their own capabilities to be able to impact the care and safety of their patients and community. The constructs of high-stakes ATI Remediation and testing practices and the ATI Content Mastery Series (CMS) tests of ATI PN Fundamentals, ATI PN Pharmacology, ATI PN Medical Surgical, and the ATI PN Comprehensive Predictor are integral to the research questions within this dissertation and are supported by these frameworks. For the theoretical frameworks to be of value to the student and faculty, these constructs should allow the student to facilitate their own learning requirements.

The following literature review describes how easy and convenient it is to use these constructs within nursing education, but it is the theoretical frameworks that helps the reader decide if high-stakes ATI remediation can be defended as an evidence-based intervention for nursing students when taking ATI tests. The ATI Company has built case studies, simulations, and tutorials into their online remediation. ATI Remediation challenges the student to go beyond memorization and apply critical thinking skills to the online content. Ideally, this type of remediation intervention promotes students' self-efficacy since it allows students the opportunity to increase their confidence via methodical remediation planning (Harlan, 2017). The nursing faculty should also consider the disadvantages of online remediation and its notable lack of immediate face-to-face human feedback. With this said, nurse educators are available at ATI who assist in ATI remediation and ATI testing and can help the student with their learning needs in this setting.

Self-Efficacy Theory

The theoretical framework examined is the Self-Efficacy Theory, developed by Albert Bandura. Bandura (1977) defines self-efficacy as: “People’s belief about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives. Self-efficacy beliefs determine how people feel, think, motivate themselves and behave (p.71). Self-efficacy is considered part of a person’s belief system and is related to how the individual will master a skill or activity based on their past successes or failures in similar situations or settings (Bandura, 1997). Bandura (1997) noted that success in situations or specific tasks helps provide the scaffolding for the individual to reach their goals. Success at testing practices may be viewed as an obstacle. To help increase self-efficacy, the student will need to develop resilience and perseverance. Self-efficacy is not built on easy successes with quick results but on a sustained effort, like engaging fully in the remediation process to develop a better understanding of difficult content, which will lead to experience in overcoming obstacles (Bandura, 1997).

Bandura (1997) explains that there are four main sources of influence associated with perceived self-efficacy. The four areas are Enactive Mastery Experience, Vicarious Experiences, Verbal Persuasion, and Physiological Responses (Bandura, 1997). All these sources of influence can be applied to remediation plans for students who do not achieve the required scores provided by the online nursing software companies, such as ATI. Self-efficacy theory can also be applied to students’ responses to other types of remediation interventions including simulated scenarios, focused remedial classes, and

face-to-face teacher/student remediation. The overall goal for all the types of remediation, and especially high-stakes ATI Remediation and testing practices, is to preserve and improve students' self-efficacy while helping increase their ability to demonstrate knowledge and proficiency of skills within the content domain.

Enactive Mastery Experience

Bandura describes enactive mastery this way: "Experiences are structured through graduated attainments. If people experience only easy successes, they come to expect quick results and are easily discouraged by failure. Hence, resilient efficacy requires experience in overcoming obstacles through perseverant effort" (Bandura, 2009 p. 185). Enactive mastery experience has several factors that can influence the student's ability and persistence in achieving with high-stakes ATI Remediation. The student must be able to accomplish an objective successfully to increase confidence in their ability. If these processes occur, it is more likely the student will develop coping strategies aiding them in future situations (Kuiper & Pesut, 2004). Due to the novice qualities of the student, it is important for the nurse educator to play an active role in identifying specific learning areas that will guide the student in the classroom, simulation, service learning, and clinical rotations. Enactive mastery experience helps focus the student on specific content enabling a deeper learning and resulting in a link between the clinical experience and didactic teaching (Souza et al., 2013). A common example of the enactive mastery experience level would be the student who successfully performs basic psychomotor skills, such as hygiene care and medication administration in a lab setting where they can practice skills and perform the skill repeatedly as remediation interventions. Once this

level is mastered and the student's self-efficacy increases, then the student can advance towards the clinical areas, which require more advanced skills like the physical assessment. Bandura (1997) describes enactive mastery experience as the most beneficial key to promoting self-efficacy due to its long-term benefits for the student.

Vicarious Experiences and Verbal Persuasion

Vicarious experiences are objective situations where it is theorized the student will be able to accomplish the task through observation of another student performing the task. Self-efficacy is increased through social comparison. Once a student observes another student being successful in high-stakes ATI Remediation then they can see themselves being successful in this type of environment. If the student distrusts their ability, or is not able to apply what they have learned to the high-stakes ATI Remediation, or if they find themselves too different from the model in which they are perceiving themselves, then the vicarious experience may not be effective. Bandura (1997) explains that if the student can accomplish the task better than the student model, then their self-efficacy will greatly improve. He also notes that this situation can negatively affect the student as well; therefore, it is important for the educator to provide experiences that can be duplicated or easily demonstrated. Vicarious experiences are enhanced if the student exhibits perseverance and a positive attitude (Bandura, 1997). The importance of the vicarious experience can be seen in improving remediation practices, since students can look to other students who have shown success in high-stakes remediation and learn that they can also be successful with these types of testing practices.

Verbal persuasion is the process where the student increases or decreases self-efficacy through the messages those around them are sending. The student may increase perceptions of self-efficacy if the message is positive. For example, at the institution of this study, the senior students who are enrolled in Nursing Leadership and Management course are assigned one junior nursing student to mentor. Their primary objective for this mentorship is to help the junior student navigate the ATI web site with focus on the ATI assignments, practice tests and ATI Remediation. It is hoped the junior student will experience positive interactions with their mentor and the ATI products. It is expected that verbal persuasion will be accomplished during the mentor/mentee interactions and then the junior student will more likely achieve success in the ATI exams within their program. The opposite may be true if the student is not able to connect with either the mentor or the ATI products during the online ATI remediation process.

Physiological Responses

A stressor is a perceived threat that is acknowledged by the body and responds in a predictable manner or a sympathetic response. Bandura (1977) describes this physiological response in relation to a testing situation. Bandura (1977) explains that not only can the stressor be identified in the testing process, but the physical reaction can be easily reproduced in every testing environment, such as in a state of anxiety. If the student places significant worth on the stress and links the intensity of the stressor to a specific cause, then the student may not be able to apply positive coping mechanisms to reach an equilibrium. If this occurs, then the student will have difficulty achieving a positive testing experience. Quite often negative coping skills impact the stressor, making

the situation much worse than initially anticipated (Bandura, 1997). Mild to moderate anxiety can be adaptive and mobilize the student into action. If anxiety escalates to the severe stage, then fear is initiated, and the physiologic stress response occurs (Bandura, 1997, Wilkinson et al., 2020). This will lead to a sympathetic release of epinephrine and the "flight-or-fight" response. If the student can engage in interventions that ease anxiety, such as meditation, deep breathing exercises, progressive muscle relaxation techniques, or positive imagery, then anxiety can be reduced before taking a test. Students who can master their physiological responses to the stressor will achieve higher self-efficacy (Bandura, 1997). There are other interventions that can be practiced over longer time periods that are helpful for stress reduction such as exercise, meditation, acupuncture, message, Reiki, or therapeutic sessions with a licensed counselor (Wilkinson et al., 2020). Each of these long-term interventions can be helpful in bringing forth a more positive reaction to the high-stakes testing environment.

Students with greater self-efficacy are more resilient and are more apt to display confidence in overcoming obstacles such as high-stakes ATI Remediation and testing practices. Students with lower self-efficacy are more likely to struggle with academic challenges, spend less time achieving goals, and may be more likely to end their educational pursuits entirely (Bandura, 1986). The strong metacognitive quality of Bandura's self-efficacy theory highlights the importance of how students select, evaluate, revise, or discontinue cognitive tasks when strategizing for individualized remediation interventions (Kuiper & Pesut, 2004). Due to the increasing high-stakes remediation testing practices in nursing education, there is a need for evidence-based remediation

strategies and policies as well as how these may be received by nursing students with varying levels of self-efficacy.

Another component in Albert Bandura's Self-Efficacy theory is self-regulated learning. Self-regulated learning involves self-reflection and can contribute to self-efficacy by increasing the student's ability to review their new skills throughout the learning phase and use this information to adapt to new behaviors and new learning environments (Paris & Paris, 2001). Self-reflection is considered an active element of self-regulation and is required by the student when preparing for remediation (Fullemann et al., 2015). Self-reflection empowers the student and helps them to develop and set academic goals. Self-reflection promotes self-management and motivational skills, which are a requirement for online learning (Zimmerman, 2002). Self-regulation is a selective process that begins with goal selection and insight into performance, and then progresses towards time management and self-evaluation (Zimmerman, 2002). These qualities are necessary in helping the student to prepare for the various types of remediation interventions required within curriculum progression plans.

Quality and Safety Education for Nurses (QSEN)

In addition to Bandura's Self-Efficacy theory, the Quality and Safety Education for Nurses (QSEN) competency model contributes to this study. QSEN supports the nursing curriculum and the nursing accreditation process through a system of detailed competencies. The QSEN framework clarifies nursing practice and patient safety through several competencies: Patient Centered Care, Teamwork and Collaboration, Evidence Based Practice, Quality Improvement, and Safety. All areas of the competencies are

required to be integrated into nursing education, curriculum, and practice (Dolansky & Moore, 2013). The competencies are taught using lecture content, service learning and online tutorials. Each competency has three components, Knowledge, Skills, and Attitudes, which are taught and modeled between faculty and students. Social constructivism supports this framework, due to the strong teaching and learning relationships that are built from following the QSEN format.

The QSEN model is built on the concepts identified with social constructivism. The ontology of social constructivism is that everything is viewed as a relationship (Gay et al., 2012.). Social constructivism's general philosophy centers on how groups use knowledge as a truth for better understanding each other's leaning experience. This is accomplished through negotiation and dialogue (Savin & Howell, 2013.). QSEN competencies are based on deductive observations and application of general principles that aid the student in transferring concepts they learned in the classroom to the clinical environment. The nurse educator must also be active in the learning process by facilitating the appropriate QSEN concept with the specific clinical learning experience (Dolansky & Moore, 2013). An example of this would be the reinforcement of safe care expectations. Even though QSEN is threaded throughout the nursing curriculum, including ATI, the challenge of using QSEN competencies as an educational tool for concept-based clinical experiences continues to be a problem for nursing education. The nursing student is introduced to QSEN in ATI. The student continues to use QSEN competencies in either the clinical setting or in laboratory simulation settings. When the

student is ready to graduate the student is more likely to transfer QSEN concepts to the NCLEX-RN questions.

Historically, nursing has been a “task” driven occupation. The establishment of an organized curriculum and university-based education moved nursing practice into a profession. The individual states and the American Nurses Association developed the domains of nursing by providing State Boards of Nursing with suggested licensures requirements, a Code of Ethics, and Standards of Practice. QSEN is woven throughout the ATI content. Each outcome definition of QSEN; Safety, Patient-Centered Care, Evidence-Based Practice, Informatics, Quality Improvement, and Teamwork and Collaboration, are identified by specific icons and integrated into all ATI concepts and test questions. The QSEN competencies are integral to nursing education in the United States and are required of all nursing curriculum, including the ATI nursing curriculum. The accrediting bodies or faculty can easily identify the QSEN outcome definition icon for each ATI concept or question by looking at the corresponding QSEN icon. The NCLEX-RN is required to have QSEN competencies applied to each examination question. Even though ATI does not know the questions that will be on the NCLEX-RN, they provide QSEN competencies to each area of ATI in preparation for questions the student may encounter on NCLEX-RN.

Several themes from the literature are applicable to this study. Due to the large amount of literature concerning nursing remediation and standardized testing practices, this review focuses on research specific to the study’s research questions on high-stakes ATI Remediation and testing practices. Many journals present historical aspects of the

evolution in standardized testing. Several journal articles and dissertations presented within this literature review speak to the theme of general nursing remediation. Another theme is the use of ATI computerized software and its impact on nursing education progression plans. Much of the information in the literature support ATI testing in terms of first-time NCLEX-RN passage rates. The review of literature also presents information on the NCLEX-RN to clarify its importance for the reader. High-stakes ATI Remediation and testing practices is the last theme addressed.

Validation of the Existing Problem

The dramatic reduction of nurses in the workforce has led the healthcare industries and the federal government to actively pressure nursing programs to increase graduation rates as quickly as possible. Concurrently, the National Council State Board of Nursing (NCSBN) has identified deficiencies in nursing education, notably a population of nursing graduates unable to achieve first-time NCLEX-RN passage rates (Bellack, 2006; Candela & Bowles, 2008; Gidden, 2009). There are many factors identified with the decline of first-time NCLEX-RN passage rates, including faculty shortages, limited resources, and curricular issues (Mathew & Aktan, 2018). First-time NCLEX-RN passage rates have been established by the NCSBN as an indicator of program quality (Benefiel, 2011). To increase program quality and help rectify the nursing shortage, nursing faculty need to develop pedagogic strategies to help nursing students achieve first-time NCLEX-RN passage. These strategies include case studies, concept mapping, and assigned reading (Mathew & Aktan, 2018). These strategies are grounded in QSEN competencies and require targeted learning experiences, which are found in remediation

interventions (O'Neil et al., 2016). General remediation interventions have improved first-time NCLEX-RN passage rates (Koestler, 2015).

Brief History and Evolution of Standardized Testing

The initiation of standardized testing came from a need for nursing education to prove that its curriculum was accountable to industry, the community, and the student (Deerman et al., 2008; Duckworth et al., 2012; Paulson & Merchant, 2009). One major goal described in the literature is to prepare student nurses in their respective discipline as competent employees who can contribute to their field and successfully blend into the workforce (Duckworth, Quinn & Tsukayama, 2012). During the Second World War, the traditional practice of standardized testing was not enough in identifying qualified professionals in disciplines such as engineering, resulting in a need to develop a professional licensure exam (Thelin, 2004). At this time, the National League of Nursing (NLN) developed a professional nursing exam that would establish licensure standards and accountability requirements to the patient and community (NCSBN, 2016). Standardized testing has become a major component in Higher Education, yet these tests were never designed to address quality of instruction or raise the stakes on grades, but only to serve as a guide for students who needed remediation or tutoring (Kohn, 2000).

The No Child Left Behind Act created in 2002, under the George Bush administration, and Race to the Top Act established by the Obama administration in 2009, called for using standardized testing to provide accountability and improve the overall curriculum (Chomsky & Robichaud, 2014). The literature provides evidence of how standardized tests frequently provide a snapshot of the student at a given time, and

do not reflect their grades or recognize other non-cognitive factors of family or work issues (Duckworth et al., 2012; Kearns, 2011; Paulson & Marchant, 2009; Rothman & Henderson, 2011). The increased difficulty noted in the delivery of standardized testing is that the test must be developed in a fair manner to accurately reflect the type of learning that is taking place (Chomsky & Robichaud, 2014).

The literature includes several studies outlining how standardized testing, if used as a sole testing intervention, may impair critical thinking, problem solving, and an individual's creative thought process (Humphreys, 2008; Spurlock et al., 2004). Spurlock et al. (2004) explains that standardized testing is often used as an exclusive intervention throughout the curriculum. This is of primary importance in nursing since critical thinking and clinical judgment are paramount to the foundation of nursing education and clinical practice. Due to the close association of first-time NCLEX-RN passage rates and nursing accreditation the traditional standardized test given throughout the nursing curriculum has taken on an increased level of importance (Spurlock, 2006). If the nursing student does not achieve first-time NCLEX-RN passage, then they will not receive a license to practice nursing. High-stakes testing is commonly defined as a test or series of tests, both in traditional paper and pencil method and computer-based format, with outcomes that entail important consequences for both the student and the institutions providing the tests (March & Robinson, 2015). In the United States, 30% of nursing schools require students to pass high-stakes exams as a condition of graduation (March, & Robinson, 2015).

Standardized testing as a measure of accountability in nursing education is directly and indirectly managed by the educators, students, parents, taxpayers, employers, and the community in general (Baker & Johnston, 2010; Williams, 2010). Accreditors of nursing education, such as the Commission of College Nursing Education (CCNE) and State Boards of Nursing (BON), are in partnership with the states and federal government to produce highly qualified nurses. The accrediting bodies review all areas of the nursing curriculum during accreditation and view standardized tests as part of the school's accountability to its stakeholders. All healthcare disciplines are acutely aware of how the lack of qualified nurses directly relates to an increased rate in patient mortality (Institutes of Medicine, 2001). The Institutes of Medicine offer evidence that one million deaths occur every year in hospitals that are not related to disease or admitting diagnosis (Institutes of Medicine, 2001). Nursing education understands this situation and partially attributes these errors to the enormous amount of content being taught to the student without sufficient remediation interventions in place. Nurse educators are tasked with the responsibility of teaching substantial didactic and clinical information that must be retained over extended periods of time and used in an efficient manner in all types of circumstances (Baker & Johnston, 2010). If patient mortality increases due to poor nursing education, then Congress may choose to allocate funding to other disciplines. Traditionally, financial support for nursing education came from Congress through federal legislation that established programs like the Nurse Training Act of 1964, and Title Vlll of the Public Health and Service Act, which continues to support nursing education to this day (Livsey et al., 2007). Part of this legislation supports the three

major areas of federal funding including: The Nurse Education, Practice and Retention Grants; the National Nurse Corps, and the Nurse Faculty Loan programs (Gregory, 2014). If state and federal funding are to remain a source of revenue for nursing, then their graduates must be qualified to manage and ensure that their patients are safe within the facilities and the community settings. Quality and Safety Education for Nurses (QSEN) provides guidance to nursing educators through competencies, with patient safety being a priority (Armstrong & Barton, 2010; Barnsteiner et al., 2012; Cronenwett et al, 2007; Dolansky & Moore, 2013).

Explanation of the NCLEX-RN and Importance of First-time Passage in Nursing Education

The process of completing an Associate of Science Nursing (ASN) or a baccalaureate in nursing (BSN) degree presents difficulties for the student and faculty. The student must learn a tremendous amount of material in a short period of time and the faculty faces the task of helping the student transfer the didactic content into a clinical format. The scientific process is a guide for nursing procedures but is not helpful in guiding the student with the assimilation of the art of nursing or soft skills. This is an important step for the student to learn and must be achieved before graduation. Prioritization of the content and the addition of authentic learning experiences help lay the foundation of self-confidence for the student in their newly acquired abilities.

The NCSBN works in conjunction with the National League of Nurses in the development of NCLEX-RN and is reviewed every three years. NCLEX-RN is a high-stake standardized test given by the State Board of Nursing in all fifty states for graduate

nurses to gain licensure as registered nurses. The NCSBN assures the public that each graduate nurse has reached entry level competency and is able to demonstrate that they can provide their patients physiologic and psychosocial competent care as registered nurses (Mosser, Williams & Wood, Smith, 2002; Wendt & Alexander, 2007). Historically, the NCLEX-RN continued to evolve after World War II, and by 1982, the NCSBN provided a version of the NCLEX-RN that was a criterion referenced instrument (Beare, 1995; NCSBN, 2016). Accomplishing this is an immense task due to the requirement of encompassing all areas of nursing including every stage of the lifespan.

The NCLEX-RN test plan is based on QSEN and addresses patient, family, and community needs. The areas that are included in the NCLEX-RN format are: Management of Care, Safety and Infection, Health Promotion and Maintenance, Physiological Integrity, Basic Care and Comfort, Pharmacological and Parenteral Therapies, Reduction of Risk Potential, and Physiological Adaptation. The graduate nurse must answer 75 questions correctly to pass NCLEX-RN (NCSBN, 2016).

The first-time NCLEX-RN passage rate statistics are used by nursing accreditors as an evaluation tool of nursing programs. Federal financial incentives are given to institutions for high first-time passage rates (Goldstein, 2004). The nursing program students are required to meet the national benchmark of 75 % passage rate within their program, or the program can be put on probation and may eventually be discontinued. First-time NCLEX-RN passage rates can be viewed by the public via the online State Board of Nursing sites. High passage rates are a recruiting incentive for potential nursing students (Yeom, 2013). The importance of first-time NCLEX-RN passage rates is

directly related to improve teaching strategies, including assigning appropriate remediation intervention (Koestler, 2015). Newton et al. (2007) explains how the American Nurses Association (ANA) identified new graduates as lacking in two main areas of nursing: providing safe patient care, and the ability to use clinical judgment and critical thinking in a timely manner. The priority for nursing education is to rectify these problems and to address the appropriate remediation interventions that will prepare the student nurse for first-time NCLEX-RN passage (Pennington & Spurlock, 2010).

The literature has supported an increased use of online remediation plans like those provided by ATI (Alameida et al., 2011; Heroff, 2009; Pennington & Spurlock, 2010). Lauer & Yoho (2013) also found a positive correlation between high-stakes testing when applied to Health Education Systems, INC. (HESI) tests. HESI is another online testing and assessment company with similarities to ATI, and positive correlation with first-time NCLEX-RN passage rates. Each type of online program offers a host of assessment tests and predictor tests. Both HESI and ATI predictor tests have been positively correlated with first-time NCLEX-RN passage rates. The controversial trend of using high-stakes standardized testing practices without evidenced-based research to support this practice or research to support high-stakes remediation interventions is a major concern in nursing education (Harding, 2010; Spurlock & Hunt, 2008).

First-time NCLEX-RN passage rates vary every year. The 2013 to 2014 national passage rate for the two-year Associate of Science in Nursing programs was at 83% (NCSBN, 2016). Nursing programs are required to maintain a 75% first-time NCLEX-RN passage rate, and if they are not able to achieve this percentage, the program may be

placed on probation for up to two years or shut down entirely (NCSBN, 2016). NCSBN changed the NCLEX-RN in 2015-2016. For the year 2015, there were a total of 157,073 nursing graduates in the United States with an 84.57% first-time NCLEX-RN passage rate (NCSBN, 2016). The number of United States educated nursing graduates who repeated the NCLEX-RN exam in 2015 numbered 47,490 with a 46.14% passage rate. Therefore, of the approximately 16% who did, 46% passed on their second attempt (NCSBN, 2016).

If the student is not successful in passing the NCLEX-RN on their first attempt, then the reasons for this failing score may be due to multiple issues and not only the high-stakes quality of the NCLEX-RN. The following factors are described in the literature as placing the graduate nurse at risk for not achieving a first-time NCLEX-RN passage rate: low nursing course grades throughout the ASN program, a low preadmission GPA, and low grades in prerequisite science courses (Beeson & Kissling, 2001; Campbell & Dickerson, 1996; Daley et al., 2003). Other factors for first-time NCLEX-RN failure can be due to anxiety or illness or simply that the student did not prepare adequately for the exam (Norton et al., 2005). The factors that cause first-time NCLEX-RN failure are numerous, making it difficult to identify any one cause. Spurlock and Hunt (2008) raised the question of possibly placing too much emphasis on one exam as the sole measure of a student's readiness for professional nursing.

First-time NCLEX-RN passage rates remains the gold standard for assessing the student's ability as a professional registered nurse, yet many researchers also look at first-time NCLEX-RN failure rates (Spurlock, 2013). The literature clearly identifies first-time

NLCEX-RN failure rates, which are offered via the NCSBN website. There are several studies explaining that the longer a student waits to take the NCLEX-RN, the less likely they will pass (Eich & O'Neill, 2007; Spurlock, 2013; Woo, Wendt & Liu, 2009). It is important that the student takes the exam as soon as they reach eligibility for the NCLEX-RN and have a workable remediation intervention in place (Eich & O'Neill, 2007; Woo, et al., 2009). Eich & O'Neill (2007) have identified a lag event in their research called Delay Pass Rate Study, which determines lowered passage rates when students waits to retake the NCLEX-RN. The graduate nurse can take the NCLEX-RN as many times as needed to pass successfully, but in lieu of the Delay Pass Rate Study; it is recommended that the student wait 45 days before taking the next available exam. The 45-day period provides the student with time to remediate yet does not allow too much time, which may decrease passing (Yeom, 2013).

Standardized Testing Variables associated with NCLEX-RN First-time Pass Rate Success

The literature is not robust concerning high-stakes ATI Remediation and first-time NCLEX-RN passage rates. Therefore, the studies outlined within this portion of the literature review addresses ATI testing products and first-time NCLEX-RN passage. This literature review outlines the many studies on cognitive and non-cognitive influences of ATI testing and their correlation to first-time passage of NCLEX-RN. Common cognitive factors studied are the Test of Essential Academic Skills (TEAS) success, GPA, SAT, and ACT scores. Common non-cognitive factors include cultural behaviors, environmental exposure, and motivation.

Several important constructs are used by nursing admission committees to identify students who have an increased chance of first-time NCLEX-RN passage rates (Duckworth et al., 2012; Seldomridge & DiBartolo, 2004; Romeo, 2013). The four general constructs used to vet students for academic readiness are: TEAS based reading scores, core biology course grades, (including Anatomy and Physiology 1 & 2, and Microbiology), GPA and the number of times a student repeats the core prerequisite courses (Daley et al. 2003; Newton et al., 2007). Remediation interventions are commonly used to help increase success rates of those who have lower than average performance on any of these constructs. The types of traditional remediation practice used are one-on-one tutoring, ACT, SAT, and TEAS self-instruction manuals or online tutorial programs (Daley et al., 2003; Koestler, 2015; Wolkowitz & Jeffery, 2010). Even with identified variables and remediation practices, there continues to be a lack of evidence on the type of criteria that empirically identifies the best program policies for first-time NCLEX-RN passage rates (Humphreys, 2008, Spurlock, 2013).

A priority for nursing education is the identification of a variable that will adequately and accurately predict successful first-time NCLEX-RN passage rates. Some common predictor variables that influence NCLEX-RN passage on the first attempt include the number of C's in nursing courses, specifically, pathophysiology, fundamentals, pharmacology, and medical/surgical course grades (Alameida et al., 2011; Yeom, 2012). Pre-requisite science grades, prior to nursing program admission, as well as pre-admission tests including GPA, ACT, and SAT have also been identified as predictor variables with GPA being the most accurate predictor (Beeson & Kissling, 2001; Crow et

al., 2004; Duckworth et al., 2012.; Higgins, 2007; Jeffers, 2007; Percoco, 2001; Seldomridge & DiBartolo, 2004; Simon et al., 2013; Ukpabi, 2008). Several studies have provided evidence on the correlation between educational preparation and GPA and first-time NCLEX-RN passage rates (Demetriou & Schmitz-Sciborski, 2011; Fraher et al., 2010).

Newton et al. (2007) explains that the Test of Essential Academic Skills (TEAS), an admission test which is produced by ATI, is commonly used by a large percentage of nursing schools in the United States. The TEAS test assesses Reading, Mathematics, Science, English, and Language usage. The TEAS consists of a total of 170 multiple choice questions and has a time limit of 209 minutes to take the exam. Nursing schools use the TEAS as a predictor of success for the first semester of nursing school and for first-time NCLEX-RN passage rate (Newton et al., 2007; Wolkowitz & Kelley, 2010). Newton et al. (2007) report that students who enter nursing programs in the fall semester (August-December) have higher GPAs and TEAS composite scores as well as higher GPAs in the first fall semester of nursing than that of their spring (January-May) cohorts. The literature notes that if GPAs and TEAS scores are lower in the spring semester, then the student will have a weaker overall academic history, which indicates that minimally academic prepared students are the ones most likely to fail the NCLEX-RN (Wolkowitz & Kelley, 2010).

Pass rates are also affected by school size. Norton et al. (2005) identified the impact of first-time NCLEX-RN passage rates on nursing programs that graduate a small number of students and determined that the consequences of even one student failing

first-time NCLEX-RN passage, has a great impact on the program. The Norton et al. (2005) study had a first-time NCLEX-RN passage rate of 84.5%. This indicated that nearly one out of every five baccalaureate graduates in their nursing program did not have first-time NCLEX-RN passage causing concern for the nursing programs' accreditation (Norton et al., 2005). These programs are especially vulnerable when credentialing agencies calculate their percentages of unsuccessful candidates. These students are considered a loss to the smaller schools, which amplifies their scores, since the smaller schools are compared to their larger counterparts.

The ATI standardized tests in nursing education are used as assessment tools for how well the student has achieved success in the science of nursing (Spurlock & Hunt, 2008). ATI assessment tools do not study the art of nursing. With regards to this information, the literature discusses other variables that are often overlooked in relation to first-time NCLEX- RN passage rates, such as the individual student's culture, support systems, motivation, and environmental factors (Heroff, 2009; Jeffreys, 2015; Olsen, 2010; Rogers, 2010). There is one nonacademic variable that is rarely approached by faculty and that is the financial situation of the student and how this may be affecting the program's first-time NCLEX-RN passage rates (Demetriou & Schmitz-Sciborski, 2011; Hadenfeldt, 2012; Jefferys, 2015). Demetriou & Schmitz-Sciborski (2011) reported the major interference for students in maintaining quality schoolwork as the following: working during school, trying to keep up with bills, and maintaining health insurance. These life issues can play a role in impacting the student's ability to be successful on the standardized tests, which may ultimately influence first-time NCLEX-RN passage rates.

All students will have to face life events and challenges during their education. Faculty may increase student levels of self-efficacy by maintaining open communication and providing positive feedback in small increments, when addressing noncognitive challenges (Bandura, 1997, Hayden, 2011).

Studies of ATI Remediation Practices and the NCLEX-RN

The literature is extensive in describing the need for remediation at all levels of nursing education to improve first-time NCLEX-RN passage rates, yet a noticeable gap exists in association with ATI Remediation and first-time NCLEX-RN passage rates (Heroff, 2009; Morrison et al., 2002; Pennington & Spurlock, 2010). The literature is unclear on the most efficient remediation intervention to use in nursing programs concerning both online remediation and general remediation (Mee & Schreiner, 2016). Remediation interventions are similar in many program progression plans and are commonly selected based on past practice. There is a small amount of literature on high-stakes ATI Remediation; therefore, this literature review provides information on general remediation interventions. It is important to discuss the effectiveness of all types of remediation. There is a tendency for nursing faculty to rely on past practice and use remediation interventions without evaluating their effectiveness until test failure occurs (Spurlock & Hunt, 2008). There are several remediation formats to follow including using the Quality and Safety Education for Nurses (QSEN) competencies as a template for a student's remediation plan (Bryer et al., 2014).

A prominent remediation challenge for many educators is to balance the time it takes to implement remediation interventions with the time required to teach nursing

content. ATI Remediation helps to solve this problem by providing an online plan that is convenient for both the faculty and the student. The ATI Remediation plan is associated with the ATI tests and represents prominent testing items on the NCLEX-RN (ATI Pulse, 2016). ATI Remediation includes tutorials, virtual simulation, case studies, and practice tests. These interventions have built-in remediation and are completed before the proctored ATI tests. ATI also provides a remediation tool that is used after practice, and proctored tests are given called the "Focused Review." The Focused Review identifies individualized areas of content weakness after the student takes a practice or proctored test. In this dissertation the proctored tests examined are the Content Mastery Series (CMS) of ATI PN Fundamentals, ATI PN Pharmacology, ATI PN Medical Surgical and the ATI PN Comprehensive test. ATI Remediation is beneficial to educators by identifying students early in their nursing education who may be at risk for failing the NLCEX-RN (ATI Pulse, 2016; Pennington & Spurlock, 2010; Rigsby-Robison & Glisson, 2019). The research available on ATI Remediation generally involves the ATI Content Mastery Series (CMS) and the RN Comprehensive Assessment Predictor. The ATI Corporation provides statistics on ATI Remediation, but they consider this research material propriety and do not publish the method portion of the research (Newton et al., 2007; ATI Pulse, 2016.). This dissertation is one of the few studies that has examined statistical significance in test scores between students who were and were not under a high-stakes ATI Remediation and testing policy on the ATI Content Mastery Series (CMS) PN Fundamentals, PN Pharmacology & PN Medical Surgical and ATI PN Comprehensive Predictor.

Studies of General Remediation Intervention and NCLEX-RN

The literature may be weak on high-stakes ATI Remediation and its effect on first-time NCLEX-RN passage, but this is not the case for generalized remediation. The number of studies on general remediation in nursing are so prodigious that it is difficult to isolate commonalities among research studies (Harlan, 2017). Nursing education commonly use general remediation interventions that include group learning, case studies, and individual weekly assignment and are positively correlated with first-time NCLEX-RN passage rates (Morton, 2006; Mosser, Williams & Wood. 2006; Pabst et al., 2010; Anderson, 2007). These studies also suggested the importance of having a detailed progression plan in nursing programs for increased remediation success. Bandura (1997) discusses how a well thought out organizational plan, such as a progression plan, can help to improve the collective efficacy of the faculty. The effort made in improving remediation practices through a detailed progression plan can provide academic gains for the student and can also increase a sense of accomplishment for the faculty. The ATI Corporation advertises how they imbed critical thinking and clinical judgment into their ATI Remediation, but the clinical setting requires critical thinking that is less rote and more in accordance with the situation at hand (DiBartolo, & Seldomridge, 2004).

The Morton (2006) study is one of the few studies in nursing research that focuses on how remediation interventions can add extra hours to the faculty workload. Morton (2006) suggests placing remediation accountability on the student rather than on the faculty. Bandura (1997) describes one aspect of self-efficacy as the ability of a person to self-direct their lives to accomplish their goals. This concept supports remediation since

remediation goals are attained by students who can advance through an assigned progression plan. Extrapolating from Bandura, as the student gets used to the pace of their class and the assigned remediation tools, they will self-direct their learning process and ultimately accelerate their own self-efficacy. Lifelong learning is promoted with this process. The Morton study (2006) also notes the importance of implementing a general remediation program that is not limited to online remediation. Their study found that the faculty led remediation class given one month before the NCLEX-RN was correlated to first- time NCLEX-RN passage rates. The remediation class helped to increase first-time NLCEX-RN passage rates in their program from a 65 % to 92 % over a two-year period.

The Morton study found that a detailed progression plan positively correlated to first-time NCLEX-RN passage rates. Bandura (1997) did not speak directly about progression plans in academia and its effects on self-efficacy, but he does discuss how a well-designed organizational plan can place a positive light on the collective efficacy of the faculty. The effort made in improving remediation practices through an organized progression plan can provide academic gains for the student and can also increase a sense of purpose for the faculty. The Morton study (2006) also discussed the significance of using timely, faculty-initiated remediation interventions for increased first-time NCLEX-RN passage rates. The Firth, Sewell, and Clark (2006) study was able to reproduce these findings by positively correlating a review course and first-time NCLEX-RN passage rates.

The Mosser et al. (2006) study implemented progression policies based on progression testing with ATI throughout their nursing program. Their study examined

two groups of students. The first group had progression ATI CMS tests and review of the content through homework assignments and the second group did not have progressive ATI CMS tests and review of the content. Their findings indicated increased first-time NCLEX-RN failure rates with students who did not have progressive ATI CMS testing and did not review nursing content in a consistent fashion throughout their program. Mosser et al. (2006) found positive first-time NCLEX-RN passage rates when students had scored in the 20th percentile on their ATI Fundamental or ATI Medical Surgical tests. The 20th percentile in 2006 would correspond to "below a level one" in 2021. A "below a level one" is considered below the minimum expectations, and the student would be at risk in the content proficiency areas of the CMS ATI Fundamentals and ATI Medical Surgical tests (ATI. 2016). The Mosser et al. (2006) findings were supported by the Spurlock (2006) study where homework assignments were used as a progressive remediation intervention, and were positively correlated with first-time NLCEX-RN passage rates.

The use of homework assignments as a remediation intervention increased skill development and also indicated a noticeable effect on academic performance (Rigsby-Robinson & Glisson, 2019). Bandura (1997) explains how positive gains through homework assignments can impact the student's academic performance and lead to less anxiety when being tested. Even though ATI remediation is presented to the student in an online format, it still can help to increase the student's self-efficacy by providing progressive steps in the remediation assignments. ATI remediation increases the student's confidence and resilience in the ATI learning format (ATI Pulse, 2016).

The Eich and O'Neill (2007) study examines how first-time NCLEX-RN passage rates decrease as the time increases between each attempt at the NCLEX-RN examination. These same findings could be applied to ATI tests since the ATI tests are often part of the remediation progression plan (Heroff, 2008; Rigsby-Robinson & Glisson, 2019; Pennington & Spurlock, 2010). The Spurlock & Hunt (2008) study replicated the findings of Eich and O'Neill and found that students reported they were not satisfied with participating in multiple retests especially when the test results continued to decline. The students thought their ability to perform successfully on the tests would be jeopardized and their testing performance on the NCLEX-RN would decline. Additional information supported by the National Council of State Boards of Nursing (NCSBN) (2016) indicate that first-time NCLEX-RN passage rates decline as the time between eligibility to take the NCLEX-RN and the assigned test date increases. One aspect of self-efficacy is being able to find success in *personal mastery* of the learning experience (Fullemann et al., 2015). If the student is required to engage in multiple online testing experiences, their self-efficacy could decrease resulting in anxiety or poor test performance. Spurlock and Hunt (2008) describe the possibility of flipping the overall negative emotional consequence of remediation into an educational opportunity for the student. To help alleviate this potential problem, Spurlock and Hunt recommended incorporating a review class that would be required for all students. This action would eliminate the "punishment effect" by not singling out any one student when implementing remediation (Spurlock & Hunt, 2008).

The Pabst et al. (2010) study found first-time NCLEX-RN passage rates would increase if the faculty focused on one type of remediation. The intervention mentioned in their study was prioritizing the online remediation content. Faculty may use this intervention in their progression plan to help organize online material and help improve the students' test-taking and problem-solving abilities (Dibartolo & Seldomridge, 2005; Pabst et al., 2010). This dissertation focuses solely on ATI Remediation as the primary area of remediation for nursing education. The ATI Corporation recommends their remediation product to be used in conjunction with traditional remediation interventions in their plan (ATI Pulse, 2016).

The Anderson (2007) study emphasized the importance of individualizing the remediation plan to meet students' needs. None of the studies specifically mention online remediation plans such as ATI Remediation. The information from these studies is important for this dissertation since it narrows down remediation interventions to an individualized plan. ATI's Remediation offers one plan and provides sub goals for the student to achieve. When students learn through small steps and are provided timely feedback, they are more apt to increase their self-efficacy. The stronger the student's belief in their self-efficacy, the better the student will be at formulating new strategies or work on problems for better scholastic outcomes (Bandura, 1997).

Brief Overview of Remediation and Other Disciplines

The complexity of choosing the best nursing remediation intervention and when to implement the intervention has not been adequately defined in the literature (Nibert et al., 2006). The literature often describes remediation in conjunction with best learning

practices and learning strategies rather than stand-alone remediation interventions (Daley et al., 2003; DiBartolo & Seldomridge, 2005). The phenomenon of instituting various learning practices in place of remediation occurs in the nursing literature, but the nursing discipline is not the only discipline in education where this happens. Medical schools, acknowledging the complexity and amount of material a student is required to learn, placed a higher value on remediation than other disciplines (May et al., (2012). Medical schools have acted similarly to Education by changing their curriculum to emphasize learning interventions, including history taking, physical examination, information sharing, and patient-physician interaction, for their courses rather than rote memorization. Nursing programs are like medical programs, in that there is a large number of STEM-related prerequisite courses required in these healthcare disciplines (Wolkowitz & Kelley, 2010). May et al. (2012) defined strategic remediation interventions as those that emphasis studying, group study sessions, and time management. The medical schools within the Winn et al., study used the Approaches and Study Skills Inventory for Students (ASSIST), a tool that helps to determine learning approaches rather than learning styles via online testing and writing essays (May et al., 2012). Incorporated into the ASSIST are medical case studies that encourage the use of the critical thinking process (May et al., 2012). The ASSIST has helped to provide medical faculty with data on how the students learn the “deep approach, strategic approach and Surface approach” to learning, which ultimately helps the student achieve a better understanding of patient-physician interactions as well as clinical interactions (May et al.,2012). May et al., (2012) examined the Clinical Performance Examination (CPX) scores for patient-physician interaction and

found significance that was positively correlated with the deep approach score ($r = 0.316$, $p = 0.00$), the CPX score for patient satisfaction was positively correlated with the deep approach ($r = 0.254$, $p = 0.001$). The surface approach was significantly negatively correlated with scores for history taking ($r = -0.261$, $p = 0.001$), information sharing, ($r = -0.190$, $p = 0.016$), patient-physician interaction ($r = -0.217$, $p = 0.006$), and overall patient satisfaction($r= -0.255$, $p = 0.001$).

Pharmaceutical educators often use the Pharmacy Curriculum Outcomes Assessment (POCA) remediation tool. The POCA helps pharmacy faculty provide valuable feedback to the student on their areas of weakness in the pharmacy curriculum. The Waskiewicz (2011) study used the POCA as a tool to provide the best method for delivering the POCA exam, or if the faculty should use low stakes or high stakes. The POCA exam was not studied for remediation interventions but rather how to engage students in studying for a low-stakes exam. It was determined that the POCA had good results with low-stakes testing but with the recommendation that an assessment of motivation be done before this test is given (Waskiewicz, 2011). The Waskiewicz (2011) study correlated gender with high scores when taking the POCA in a low-stakes manner and found that there was a relationship between high scores and women when taking the POCA with a strategic approach. The strategic approach was described as an approach that included management of time and organization of skills. There were no differences between genders with the learning approaches of deep approach and surface approach.

ATI High-Stakes Testing Practices and Remediation

The NCSBN has requested that high-stakes testing practices should be avoided when using online testing and remediation products (Jacobs & Koehn, 2006 Spector & Alexander, 2006). Even with the NCSBN request, the literature reports an overall increase in the use of high-stakes testing. As many as 30% of nursing schools in the United States require students to pass high-stakes tests, such as ATI tests, as a requirement of graduation (National League for Nursing (NLN)). ATI (2014) strongly disagrees with application of high-stakes to any of their product. They describe high-stakes practices as occurring in four levels, Low Stakes, Moderate Stakes, High Stakes, and Inappropriately High Stakes. They recommend their position opposing high-stakes testing with their product be added into nursing curriculums and progression plans (ATI, 2016).

The literature has described several online nursing assessment companies. The two main companies are ATI and Health Education Systems, Inc. (HESI). HESI shares many similarities with ATI, and both are able to predict first-time NCLEX-RN passage rates. These online assessment companies are not able to predict the students who are likely to have first-time NCLEX-RN failure rates (Lavin & Rosario-Sim, 2013; Lauer & Yoho, 2013; March 2015; Spurlock, 2006; Pennington & Spurlock, 2010). Failure rates are difficult to predict due to several noncognitive variables. Lavin & Rosario (2013) state how English as a Second Language (ESL) status and low preclinical GPA were both associated with NCLEX-RN failure rates. The Baker & Johnston (2010) study did not examine first-time NCLEX-RN passage rates as Lavin & Rosario had, but did provide

information on how motivational support for (ESL) middle school students was effective in achieving increased test scores on high-stakes test with students from differing socioeconomic backgrounds.

There have been many studies in the literature correlating standardized testing practices with increased first-time NCLEX-RN passage rates, yet the literature is not quite as abundant in describing the correlation of high-stakes testing and first-time NCLX-RN passage rates. High-stakes tests are designed to help the student consider the seriousness of online assessment tests (Laurer & Yoho, 2013; March & Robinson, 2015; Yoho & Adamson, 2007). Many nursing programs have turned to high-stakes testing to help decrease the practice of taking a standardized test over and over until the student learns the testing format and achieves a passing score. Several professional journal articles mention the importance of requiring specific scores and outcomes for students who take high-stakes tests. In addition to these requirements, progression plans should provide detail on specific consequences attached to high-stakes testing practices.

The Lauer & Yoho (2013) study is one of the few studies within the literature that closely resembles this dissertation. Their study identifies a positive correlation between high-stakes HESI remediation and the HESI H2 predictor test. This dissertation examines high-stakes ATI Remediation and the ATI Comprehensive Predictor. Their study reviews online remediation at the end of the program rather than midway within the students' program.

Lauer & Yoho studied two nursing schools. One school gave the E2 exam with high stakes and the second school gave the HESI E2 exam without high stakes. The study

found a positive correlation between high-stakes testing and no high-stakes testing on the HESI E2 predictor. HESI Remediation was also examined but HESI Remediation was not high-stakes remediation but assigned HESI Remediation. A benchmark was applied to the HESI E2 test by the faculty. If the students in both schools did not reach the HESI E2 test benchmark, then HESI Remediation was assigned to one school and not assigned to the other school. The study looked at correlation between the HESI E2 test and assigned HESI Remediation and no assigned HESI Remediation. There were 3,758 participants. Out of this population, 63.15 % of the participants were from the school with high stakes on the HESI E2 test and 36.85% from the school without high stakes on the HESI E2. A *t*-test was used for the statistical analysis and the school with high stakes had a mean HSEI E2 score that showed significantly higher results ($t = 12.088$, $p = < .01$) than the school without high stakes (Lauer & Yoho, 2013). There were 71.21 % participants in the school that were assigned to complete the HESI Remediation and 29.72% of the participants were from the school that did not require assigned HESI Remediation (Lauer & Yoho, 2013). Again, the HESI H2 scores were used with both schools. The mean HESI E2 score for the students whose school used HESI Remediation had significantly higher scores ($t= 6.265$, $p = < .01$) than schools that did not require any HESI Remediation (Lauer & Yoho, 2013). This study identifies that students perform better on tests with high stakes than without high stakes. More importantly, this study also identifies the need for HESI Remediation before taking the HESI H2 predictor exam for better scores. The results of this dissertation will also examine the effects of online remediation before taking online proctored tests.

The March & Robinson (2015) study examines the effect of high-stakes testing on goal orientation, hopeful thinking, and test performance. The March and Robinson study is similar to this dissertation regarding high-stakes testing. Their research questions were based on the "Hopeful Thinking" theory and its influence on high-stakes testing scores. This dissertation used Albert Bandura's Self-Efficacy Theory as a guide for the implementation of remediation and high-stakes testing practices. Albert Bandura's Self-Efficacy Theory shares many of the same constructs as the Hopeful Thinking Theory. Both theories describe the human attribute of self-influence and how it can, through a positive environment, bring about the desired effect of showing people that they are the primary directors of their own destinies. This effect is noticeable when people understand how they can self-regulate their behavior and be motivated for success. Bandura (1997) discusses how students use self-efficacy throughout their courses. They continually build their self-efficacy into positive learning experiences, especially if the learning is systematic and applied over a period.

March and Robinson (2015) examined high-stakes testing but did not research high-stakes ATI Remediation. March and Robinson's objective was to find out if the belief in one's own abilities to achieve goals and success in nursing tests would be affected by high-stakes testing (March & Robinson, 2015). This study indicates how students with more hopeful thinking performed better on a high-stakes tests than their peers who did not have hopeful thinking. The students who had hopeful thinking performed better on the high-stakes tests than the students who did not have hopeful thinking. This study looked at improving uncertainty surrounding the test before the test

was given. The general notion surrounding the findings of this study was centered on managing uncertainty. If uncertainty could be managed, then hopeful thinking could be attained by the student when taking a test. The researchers provided general remediation practices as a study tool before the students took the high-stakes test but not ATI Remediation. They used descriptive statistics to find out if there was a correlation between hopeful thinking and high-stakes testing. A linear regression model was completed on high-stakes examination scores and hopeful thinking and performance-avoidance scores. The analysis found that this model was statistically significantly (March & Robinson, 2015). Hopeful thinking at (b = 4.9, SE = 2.0, p = 0.02) and performance-avoidance at (b = -52, SE = 2.6, p = 0.05) showed statistical significance in relation to high-stakes examination scores (March & Robinson, 2015). Reducing performance avoidance may decrease anxiety before and during a test. Bandura (1997) describes self-efficacy in similar terms, since the adoption of self-regulatory skills such as time management and accessing academic resources can increases the student's ability to manage academic stressors.

One of the earliest authors to present his ideas on high-stakes online testing practices and remediation was Darrell Spurlock. His studies analyzed several online testing products that were correlated to NCLEX-RN passage and failure. Spurlock (2008) discussed the need to establish evidenced-based remediation interventions and first-time NCLEX-RN passage rates as well as the trend towards the use of high-stakes ATI Remediation testing practices. He speculated that students would deliberately fail the

standardized test because they knew that they would be able to retake the test later and ultimately have a better test result (Spurlock, 2006).

Discussion on the AI PN and RN Comprehensive Tests

ATI offers two predictor exams, the ATI PN Comprehensive Predictor and the ATI RN Comprehensive Predictor. All ATI Comprehensive Predictor tests are administered when the ATI Content Mastery Series (CMS) tests have been completed. The ATI PN Comprehensive Predictor is the test that is examined in this dissertation. The ATI PN Comprehensive Predictor is commonly used as a mid-assessment tool in ASN and BSN programs, but was originally designed to be used as a comprehensive predictor tool in License Practical Nursing programs. Even though this dissertation will only look at the ATI PN Comprehensive predictor, it is necessary to note the ATI RN Comprehensive Predictor is a product that has been extensively studied within the literature and is a valuable tool for predicting first-time NCLEX-RN passage rates (ATI, 2014).

The Spurlock & Hunt (2008) study was based on the Health Education Systems, Incorporated (HESI). HESI is a product similar to the ATI product. The Spurlock & Hunt (2008) study examined HESI exit test scores and predicted first-time NCLEX-RN failure rates. Nursing education has adopted the use of online products with emphasis on exit exam tests, to increase first-time NCLEX-RN passage rates. The Spurlock & Hunt (2008) study finding demonstrated that students who were predicted to fail the NCLEX-RN did not fail. Spurlock & Hunt (2008) explained that those predicted to pass (n = 167), 22 failed. HESI would describe these 12 students as students who would not be predicted to

pass NCLEX-RN on first attempt. Spurlock & Hunt found that out of the 12 that failed HESI, 10 passed NCLEX-RN on their first attempt. Even though first-time NCLEX-RN failure is difficult to predict, the researchers emphasized the need for better remediation interventions. The consistent use of dedicated remediation interventions is strongly recommended and echoed throughout the literature as one variable that may increase the student's probability of first-time NCLEX-RN passage (Alameida et al., 2011; ATI, 2014; Harding, 2010; Horton et al., 2012; De Lima et al., 2011; Yeom, 2013).

Studies of ATI Content Mastery Series Tests

In order for nursing faculty to select the appropriate ATI Remediation, they need to be aware of the specific ATI CMS tests that are more likely to help the student achieve first-time NCLEX-RN passage. The nursing faculty have many ATI CMS tests to choose from when developing the progression plan, but only a few ATI CMS tests are positively correlated with first-time NCLEX-RN passage rates and these include ATI Foundations, ATI Pharmacology and ATI Medical Surgical (Emory, 2013; Spurlock, 2008, Ukpabi, 2008; Vandenhouten, 2008; Yeom, 2013). It may be difficult for the faculty to choose ATI Remediation and testing packages due to the tremendous amount of information in the literature on this subject. Nursing faculty are responsible for allocation of student resources; therefore, they need to select an appropriate package for the student.

The following studies provide information as to which ATI CMS Remediation and testing package to incorporate into the progression plan. Many of these studies share the same dependent variables as this dissertation, including ATI Fundamentals, ATI Pharmacology and ATI Medical Surgical. Ukpabi (2008) and Emory (2013) examined

CMS ATI Fundamentals and ATI Pharmacology and found that these tests were statistically significant for increased first-time NCLEX-RN passage rates. Ukpabi (2008), Yeom, (2013), and Emory (2013) examined the ATI CMS Pharmacology and Medical Surgical tests and found that these tests were statistically significant for increased first-time NCLEX-RN passage rates. Many of these studies do not address high-stakes ATI Remediation but are valuable studies to consider when selecting ATI Remediation for the progression plan. The following paragraphs discuss the findings of the Ukpabi and Emory studies.

The Ukpabi (2008) study found positive correlations between ATI CMS and NCLEX-RN first-time passage but did not examine or recommend a remediation tool. Ukpabi (2008) reviewed 18 ATI CMS variables and 11 of these variables were found significant in first-time NCLEX-RN passage rates. The following ATI CMS found statistically significant in passing or failing NCLEX-RN include the following: ATI Critical Thinking, ATI TEAS, ATI Rdg, ATI Math, ATI English, ATI Adult 1, ATI Adult 2, ATI Pediatrics, ATI Mental Health, ATI Pharmacology, and ATI Fundamentals. The population mean score of the Ukpabi study was *(n=39)* participants. Ukpabi (2008) determined that there was significant test difference between the ATI CMS tests and first-time NCLEX-RN passage ($p < .05$). Out of the 39 students who sat for the NCLEX-RN 77% passed, and 23% failed the exam (Ukpabi, 2008). Seventeen percent of the population were left out of the study due to a discriminating variable of not completing all the assigned tests required by the researcher (Ukpabi, 2008). The Ukpabi (2008) analysis determined the level of significance as high due to the eigenvalue being 36.78

and the Wilk's Lambda of 0.026, $p < 0.006$. Interestingly, both ATI Pharmacology and ATI Fundamentals were positively correlated with first-time NCLEX-RN passage rates. This information would support the faculty in using both of these ATI tests in their progression plan. Since these two tests have predictive value for first-time NCLEX-RN passage rates, the nurse faculty may infer that high-stakes ATI Remediation would improve test results in ATI Pharmacology and ATI Fundamentals.

Emory's (2013) exploratory study investigated correlation of pass or fail between CMS tests of ATI Mental Health, ATI Pharmacology and ATI Fundamentals test, and NCLEX-RN first-time passage rates. Emory's study differed from this dissertation and did not directly discuss high-stakes ATI Remediation in either ATI Pharmacology or ATI Fundamentals, but recommended general remediation to be used in conjunction with the ATI CMS tests. The data Emory collected for the exploratory study included age and gender. An independent two-sample *t*- test was conducted with stepwise regression resulting in a significant relationship between the ATI CMS courses of Pharmacology, Mental Health and Fundamentals and increased NCLEX-RN passage rates (Emory, 2013). The Pharmacology statistic via stepwise regression was significant at ($p = .02$) and able to predict NCLEX-RN results 73.75% of the time (Emory, 2013). The study's findings indicate that the ATI Pharmacology test score had the most predictive value in determining first-time NLCEX-RN passage rates followed by the ATI Fundamentals test. When constructing the progression plan, the Emory study may help nursing faculty in making their final selection of Pharmacology and Fundamentals as the primary ATI Remediation.

Another study that examined ATI CMS tests and first-time NCLEX-RN passage rates is the Morahan study. The Morahan (2011) study examined six categories of the ATI CMS including: Fundamentals, Pharmacology, Maternal Child, Mental Health, and Community Health with first-time NCLX-RN passage. Morahan (2011) found no statistical significance in the CMS ATI Fundamentals, ATI Pharmacology and ATI Medical Surgical tests and first-time NCLEX-RN passage rates. These findings differed from Ukpabi and Emory which had significance between ATI CMS Fundamentals, and Pharmacology and first-time NCLEX-RN passage rates. The Morahan study also examined the correlation of the ATI RN Comprehensive Predictor first-time NCLEX-RN failure rates. A probability of (p = 0.001) or 79% who failed the ATI RN Comprehensive Predictor also failed NLCEX-RN. The Morahan (2011) study findings were in direct opposition with the Emory (2013) study findings and add to the confusion as to which ATI Remediation would best serve the student. Even though Emory (2013) and the Morahan (2011) had differing results they both recommended the need to require remediation for all students with emphasis on the at risk student.

Vandenhouten (2008) study also described a statistically significant relationship between the ATI CMS and first-time NCLEX-RN passage rates. The Vandenhouten (2008) study confirmed findings of the Ukpabi and Emory studies, indicating positive correlations between the CMS ATI Pharmacology and ATI Fundamentals test and first-time NCLEX-RN passage. The Vandenhouten study also examined the ATI CMS tests and first-time NCLEX-RN failure rates. Vandenhouten (2008) utilized five ATI CMS exams for the predictor variable including: ATI Nursing Care of Children, ATI

Leadership, ATI Mental Health, ATI Community Health, and ATI Pharmacology. The study had a total of participants (N=296). The participant's outcome variables were dichotomous in nature due to either passing or failing the NCLEX-RN on first attempt and required multiple regression analysis. The CMS ATI tests were able to predict first-time NCLEX-RN passage ($p < .05$) but the regression models were not as predictive in first-time NCLEX-RN failure rates (Vandenhouten, 2008). This study determined that the CMS ATI predicted first-time NCLEX-RN failures 30.8% of the time (Vandenhouten, 2008). Even though this is an older study, the predictive relationship between the ATI CMS tests and first-time NLCEX-RN passage rates is valid. This information supports previous studies and establishes a pattern for the progression plan to select ATI Pharmacology and ATI Fundamentals as the required ATI Remediation.

Yeom (2013) examined the ATI CMS and the ATI RN Comprehensive exam data to determine if a relationship existed between these predictor variables and first-time passage and failure of the NCLEX-RN. This study replicated the Vandenhouten study in that it explored many of the same ATI CMS tests including: Fundamentals, Pharmacology, Medical Surgical, Nursing Care of Children, Maternal-Newborn, Mental Health, and Leadership and Management. The study differed from Vandenhouten study in that it found there was no statistical significance between the group's scores on the Fundamentals or Leadership and Management, and Maternal Newborn and first-time NCLEX-RN passage rates (Yeom, 2013). The ATI CMS tests of Medical Surgical, Pharmacology, and Community Health were significant in predicting first-time NCLEX-RN passage rates but not failure rates (Yeom, 2013). The Yeom study differed from the

Ukpabi and the Emory study by showing no statistical significance between ATI Fundamentals and first-time NLCEX-RN passage rates. The Yeom study and all the studies mentioned thus far are based on ATI CMS and first-time NCLEX-RN passage rates and not on high-stakes ATI Remediation and testing practices. It is reasonable to assume that if some CMS tests were positively correlated with first-time NCLEX-RN passage, then these tests would help guide the selection of ATI Remediation.

Nonacademic Factors, At Risk Students and High-Stakes Testing

The literature has determined that the at-risk students are particularly vulnerable to high-stakes testing and require additional remediation interventions (Bettinger & Long, 2005; Morton, 2009). The literature describes the at-risk student as one who does not participate voluntarily in seeking out extra help via online ATI Remediation methods, or ask for additional help, or engage in other learning opportunities that may help them succeed (Heroff, 2009; Morton, 2009). Nurse educators are required to foster independence and confidence in nursing students by enhancing their nursing education. They do this by helping the student develop learning experiences designed to increase confidence in their academic performance, which may lead to higher occupational self-efficacy and an increased chance of staying in the profession (Alavi, 2014). Structured remedial environments have been noted as being beneficial for at-risk students, although the stigma of required remediation could also have a negative effect on these students (Heroff, 2009; Morton; Jacobs & Koehn, 2006; Poorman et al., 2010).

The Harlen (2017) study correlated structured remediation with increase scores on ATI CMS tests (Harlen, 2017). This study is very similar to this dissertation since both

studies use the same outcome variables. Harlen's study focused on generalized remediation and not high-stakes ATI Remediation. The design of this study was quasi-experimental and based on one-group of students from one school. The study used the group mean and median of all tests and found a statistically significant increase in test scores in two of the four standardized ATI CMS tests when structured remediation was used between tests. Unfortunately, the specific ATI tests were not mentioned in the journal article making it difficult to recommend generalized remediation for increased scores on specific ATI tests. The Harlen study and this dissertation emphasis the need for providing a structured remediation plan within the progression plan to meet the educational needs of nursing students.

One goal for nursing education in the development of a remediation intervention is to provide an intervention that will address curriculum objectives (Pennington & Spurlock, 2010). If nursing faculty decide to implement high-stakes ATI Remediation into their progression plan, then they should also consider providing an effective evaluation tool. Many progression plans evaluate the effectiveness of the remediation intervention but do not evaluate how the student perceived the remediation intervention. Being aware of the students' perceptions becomes important when ATI Remediation becomes high stakes and is entirely focused on the ATI Content Mastery Series (CMS) and the ATI Comprehensive Predictor test (Spurlock & Hunt, 2008; Spector & Alexander, 2006). Many nursing programs do not consider the students feelings of anxiety and dread when taking high-stakes standardized tests and how these tests interfere with learning (Deerman et al., 2008). Overall, the student must be able to

transfer positive feeling about themselves to high-stakes ATI Remediation and testing practices. To maintain self-efficacy, the student needs to feel empowered by their progress and then internalize their knowledge into a meaningful experience for themselves and their patients (Daley, 2001.; Knowles, 1988). These ideas are based in positive self-efficacy and relate back to the development of successful groundwork in the student's nursing courses. If their basic nursing courses are achieved with overall positive experiences, then the student will be more successful at transferring their cognitive knowledge to any health-care setting (Zimmerman & Phillips, 2000).

The literature does not elaborate on the non-academic factors or cultural effects surrounding high-stakes remediation and testing practices. A few journal articles have tied nursing education to a culture of decreased empathy and "fear of failing" (Alavi, 2014; Dunn, 2014; Sheehan et al., 2013). Sheehan et al. (2013) conducted a study that explored a decrease in empathy of nursing students from the time they started nursing school to when they graduated five years later though the use of an elective course on empathy and human suffering. Sheehan et al. (2013) used a pre-test and post-test design administered via an empathy scale, the Jefferson Scale of Empathy, to nursing students. The pre-test and post-test empathy scale was repeated five times over five years. The combined statistics from 2008-201, a *t* test revealed a statistically reliable difference between the mean pre-course empathy score (M =116.95, s=9.803) and the mean post-course empathy score (M =123.97, s = 7.782), t (214) = 5.755 with the data showing an average increase of empathy score by 7.04 points (Sheehan et al., 2013). The positive findings from this study were replicated over a five-year period, which was in opposition

to previous research showing a decline in empathy during nursing education. This study does not downplay the importance of high-stakes testing but does reinforces the idea that nursing education can be balanced and incorporate relaxation techniques in the progression plan such as role playing, case studies guided imagery, and therapeutic communication. This study did not involve high-stakes remediation and testing practices. While the Dunn (2014) study did not address empathy, it did explore the culture of "fear of failing" within nursing. This study's primary construct of fear showed that there may be a relationship between "fear of failure," which begins in nursing school to the Registered Nurse professional who does not report a mediation error. The tendency to hide mistakes due to maladaptive learning patterns is important to the nursing profession and can provide insight to the 30% of medical errors committed by nurses that go unreported (Dunn, 2014). This study does not link high-stakes remediation and testing practices to increased "fear of failure" but does suggest decreasing anxiety as much as possible by having the faculty provide effective remediation and maintain a clear role of teacher and less of an evaluator (Dunn, 2014).

Chapter Summary

First-time NCLEX-RN passage rates remains the gold standard for assessing the student's ability as a professional registered nurse. The importance of this fact is reiterated throughout the literature. The focus of this literature review was to highlight the many studies that have identified practical means of accomplishing first-time NCLEX-RN passage rates with specific attention aimed at ATI CMS tests, high-stakes CMS testing practices, ATI Remediation, and general remediation. The literature has requested

identification of specific types of remediation to accomplish this goal. The findings from this dissertation have identified specific ATI Remediation for nursing faculty to use in their progression plans.

In general, there is a tremendous amount of literature on the correlation between standardized tests like ATI CMS tests and with first-time NCLEX-RN passage rates (Crow et al., 2004; Seldomridge & DiBartolo, 2004; Spurlock & Hunt, 2008, Ukpabi, 2008). The findings from this dissertation study were conducted to determine if high-stakes ATI Remediation and testing practices had an effect on test scores of the ATI CMS test of ATI PN Fundamentals, ATI PN Medical Surgical, ATI PN Pharmacology, and ATI PN Comprehensive Predictor tests. There are few studies in the literature discussing high-stakes ATI Remediation, and virtually no studies on high-stakes ATI Remediation and testing practices on ATI CMS test of ATI PN Fundamentals, ATI PN Medical Surgical, ATI PN Pharmacology, and ATI PN Comprehensive Predictor tests. With a trend towards high-stakes ATI Remediation and testing practices, it is important to be aware these practices on nursing education.

The Laurer and Yoho (2013) study found increased test scores when HESI Remediation was applied to the HESI Pharmacology test. The difference between their study and this dissertation is that the Lauer and Yoho study examined the HESI Pharmacology test rather than the ATI Pharmacology test. The Lauer & Yoho (2013) study found that the pharmacology test score was significantly higher when high-stakes consequences were applied to HESI Remediation. Harlen (2017) examined group mean and median of all ATI tests when general remediation was used between tests. This study

did not look at high-stakes ATI Remediation and testing practices. The results from the Harlen (2017) study indicated increased ATI test passage rates when general remediation was applied to ATI tests.

Throughout the literature review, some studies noted how a few institutions placed substantial consequences on remediation and standardized testing. Many progression plans applied severe consequences if students did not complete remediation or failed standardized tests. The literature described variations in consequences between nursing programs, with some programs requiring the student to pass the standardized test on their first attempt or be dismissed from the program. Other schools allowed the student to re-take the test up to three times, and if they failed the third time, then they were out of the nursing program.

The literature review discussed the nursing shortage and the replacement of 1.2 million nurses by 2020. The NCSBN, ANA, and other nursing agencies have yet to reconcile the nursing shortage with nursing program attrition rates. The literature recommends the placement of remediation interventions into progression plans to help solve this problem, yet the literature is not clear on the quality of remediation intervention or which remediation intervention to add to the progression plan. The findings from this dissertation have helped close this gap and have identified specific high-stakes ATI Remediation and testing practices that may increase ATI CMS test scores.

CHAPTER 3: METHODOLOGY

Introduction

The ATI Corporation recommends the use of the ATI Remediation product in conjunction with the ATI standardized tests. Nursing curriculums commonly use ATI standardized testing formats but do not always elect to assign the ATI Remediation as part of their program plan. High-stakes ATI Remediation and testing practices are often utilized in nursing education program plans but are not recommended by the ATI Corporation. This study has been designed to gain insight into the effects of high-stakes ATI remediation on nursing students' scores for the following ATI CMS tests: ATI PN Fundamentals, ATI PN Pharmacology, ATI PN Medical Surgical, and the ATI PN Comprehensive Predicator. This chapter provides insight into Montana Tech as an institutional site. It looks at the reasons behind Montana Tech's decision for adopting high-stakes ATI Remediation and testing practices into the progression plan. Chapter three also examines the many important aspects of the study including the purpose, the population, design, data collection, and analysis of the study.

Institutional Site

Montana Tech is a small northwestern college located in the Rocky Mountain region of the United States. Montana Tech originated soon after Montana became a state through the 1889 Enabling Act established by the United States Congress. The Enabling Act required Montana to set aside 100,000 acres for a school of mines. Montana Tech traces its roots to this act, and in 1900, the Montana School of Mines opened as a public

university. The community surrounding the college is rural with a population of approximately 35,000. Montana Tech's ASN program was established in 2000 and is accredited by the Commission on Collegiate Nursing Education (CCNE). To maintain CCNE accreditation nursing faculty must have a master's in nursing. The Montana Tech faculty teach in their area of expertise. Many of the faculty carry the American Nurses Association (ANA) certification in their specialty. The ASN program retains ten full-time nurse educators.

Montana Tech nursing curriculum offers an Associate of Science in Nursing (ASN). Two main nursing program types are recognized by ANA and they include: An Associate Degree in Nursing, and a Bachelor of Science in Nursing. The Associate Degree in Nursing (ASN) is a two-year degree offered in community college and university settings, which use hospitals for clinical settings. The ASN programs prepare the students for a scope of practice designed to meet the technical requirements of the Registered Nurse within the hospital settings. The Bachelor of Science in Nursing (BSN) is a four-year degree offered at colleges and universities. In addition to the technical requirements that ASN programs entail, the BSN also focuses on nursing leadership and management.

The admission requirements for ASN nursing programs are mainly based on program requirements that have been established by the ANA, nursing accreditation organizations such as CCNE, and the State Board of Nursing. The Board of Nursing in Montana has selected ASN pre-requisite courses that meet all requirements for nursing education and can be easily transferred between other ASN nursing programs in the state.

The admission requirements for the Montana Tech Nursing Program (ASN) are based on the completion of the non-nursing pre-requisite courses, Grade Point Average (GPA), and Test of Essential Academic Skills (TEAS) scores. Until the student is ready to apply to the Montana Tech Nursing Program, the student is referred to as a pre-nursing student. The pre-nursing student must complete all the pre-requisite courses with a minimum GPA of 3.0 out of a 4.0 scale. The student must also complete a TEAS test the semester before they apply to the program. The TEAS test is similar in design to the ACT or SAT. The TEAS is a product of ATI and is commonly used by many nursing schools as one type of nursing program admission requirement. The TEAS minimum score required by Montana Tech is a 70%. Student selection criteria into Montana Tech nursing program is based on 60% GPA and 40% TEAS score, with the top 18 students selected in the fall and spring semester. Montana Tech Nursing Program accepts applications in April and November. The admission requirements remained the same throughout 2009-2015, before and after high-stakes ATI Remediation and testing policy was put into place.

The nursing student is brought into the community at the beginning of the Associate of Science in Nursing (ASN) program. Community members are assured that they will receive professional care from nursing students. When the nursing students complete the Associate of Science (ASN), they are eligible to sit for the NCLEX-RN. This is important to note since the community must be able to provide the essential patient populations for students, which is an accreditation requirement. The ASN program provides experiential learning within the community and maintains clinical

articulation agreements with several facilities, including: two rural hospitals, one state hospital, numerous clinics, and advanced health practitioners' offices.

Montana Tech Nursing Adoption of ATI into the Progression Policy

Policy changes within the progression plans are designed to help students move forward to graduation and then on to first-time NCLEX-RN passage. Nursing programs throughout the nation have incorporated online programs such as ATI into their programs to help increase first-time NCLEX-RN passage. ATI generates an individual performance profile that provides faculty and the student with information about their performance and suggests areas in ATI Remediation that would be beneficial.

Montana Tech adopted ATI for all these reasons and incorporated ATI into the curriculum but mainly they used this testing format as a diagnostic tool on how their students were performing nationally and to assess their probability of first-time NCLEX-RN passage. They incorporated ATI into their testing policy in fall 2007. They did not include specific interventions such as ATI Remediation or other ATI learning tutorials at that time. During this time, the policy for ATI included administration of ATI RN Comprehensive Predictor but not the ATI CMS tests. It was not until fall 2009 that the ATI CMS tests became part of the curriculum and included the following ATI CMS tests: ATI PN Fundamentals, ATI PN Pharmacology, ATI PN Medical Surgical, and the ATI PN Comprehensive Predictor. Montana Tech faculty did not consistently assign ATI Remediation until fall 2013.

The original intent of Montana Tech's progression policy was to have the faculty administer ATI CMS tests each semester. The test would correspond with their class. For

example, if the faculty taught Nursing Fundamentals, then they gave the ATI PN Fundamentals test at the end of the semester. The ATI tests did not factor into the students grade initially; the only requirement was for the student to take the assigned ATI test. The ATI tests are considered a national benchmark and helped the faculty assess and evaluate their students. The ATI testing data provided insight into the student test performance, which could be compared with other nursing programs in the nation. Fluctuation in staffing may have caused inconsistencies in the data available before the high-stakes remediation policy was in place.

ATI Remediation

ATI Remediation is based on nursing case studies, tutorials, and simulation scenarios. The focus of ATI Remediation is to increase the nursing student's knowledge base through learning tools and testing and to transfer online learning to the use of critical thinking in clinical situations. ATI Remediation provides a step-by-step management of nursing concepts, which helps bring the student to the correct answer. The ATI Corporation utilizes detailed information about their remediation products through the ATI Pulse Predictive Model Overview (ATI, 2016). The Pulse model discusses the entire ATI Remediation process and provides teaching tools for faculty to increase success with this product. The ATI Corporation explains that this product works in conjunction with the ATI tests to offer prediction of NCLEX-RN success in the early phases of the nursing student's education.

ATI Remediation has developed benchmarks for its tests. Once the student has completed an ATI proctored test, a focused review can be built around the content the

student missed on the test. Since there is little discussion in the literature concerning the ATI Pulse Predictive Model Overview, a concern exists that the information the model presents may have bias due to minimal studies outside of the ATI Corporation. Access to the ATI corporation statistics in the ATI Pulse Predictive Model Overview study is under trademark guardianship and the statistical analysis method is limited in its availability to the public.

ATI Remediation is helpful to nursing programs because QSEN Competencies are built into the ATI Remediation learning modules, tutorials, case studies, and practice tests. Each competency is associated with icons in the ATI online modules. The QSEN competencies guide the student throughout their assignments and include feedback and learning rationales to support QSEN. The six QSEN competencies include the following: patient-centered care, teamwork and collaboration, evidence-based practice, quality improvement, safety, and informatics, all of which must be addressed within the nursing curriculum to meet accreditation requirements.

ATI (2019) describes their remediation product as a personalized learning experience for students. Once the student completes the ATI modules, practice tests and tutorials, an ATI eBook highlights areas of review. The review is commonly called a "focused review" and can include image, sound, and video. After the student has finished the review several test questions are specifically crafted by ATI to focus on the content that was challenging for the student. There is review available for most ATI proctored tests and the mini tests in the tutorials, but the post-study follow-up quizzes in the ATI CMS proctored test are not available. Apps are available for the eBook. All eBook

material can be tracked for total time spent on a specified area and quiz scores. Faculty can look at all the data in the review section for each student and note their progress with the focused review. They can see a dashboard that supplies all analytics which include scores and ATI projections for first-time NCLEX-RN passage rates. The ATI Corporation provides online technical support for faculty and students with real time "chats". Telephone assistance is available. All proctored tests can be taken at home through the Proctorio system.

Montana Tech's High-Stakes Testing Policy

ATI testing was part of the curriculum by fall 2007 but high-stakes ATI Remediation and testing practices were not consistently used as part of the curriculum until fall of 2013. Up until fall of 2013, ATI was not a consistent part of the student's grade and was considered an assessment and evaluation tool that supplemented the curriculum. Since there were no real grade incentives for students to pass the ATI test, the students would not study for the ATI tests. This dilemma occurred in other parts of the nation and was noted in the literature. Spurlock (2008) examined this type of student behavior in his research and discussed the growing national trend of taking online nursing standardized tests more than once. Spurlock (2008) and others (Lauer & Yoho, 2013) speculated that students would deliberately fail the standardized test because they knew that they would be able to retake the test later and ultimately have a better test result. Spurlock (2008) reported an increase in high-stakes testing practices to help alleviate this problem. The faculty at Montana Tech noticed similar testing concerns involving standardized testing where students took the tests multiple times to increase their scores.

To disincentivize this form of student test-taking behavior, the Montana Tech nursing faculty instituted a high-stakes policy for ATI. The Montana Tech Nursing department program policy carries a heavy weight for nursing students if they are unable to achieve success after taking any proctored ATI test for the third time. Two scenarios can occur depending on where the student is in the program. If the student was unsuccessful in the second semester of the ASN nursing program, then they can apply to re-enter and repeat the second semester of the ASN nursing program, space permitting. If the student is not able to pass a test after three attempts in the first semester of the ASN nursing program, then they must reapply to the nursing program and their application is placed with all incoming pre-nursing applications. Obtaining program re-entry may be difficult for the student due to the overwhelming number of applications to enter the program, and they will find that they are now in competition with many students who may have higher GPA and TEAS scores.

The faculty meet weekly to discuss curriculum changes including testing policies. In the fall of 2013, the faculty at Montana Tech changed the policy for ATI and attached high stakes to ATI tests and ATI Remediation. Any policy change at Montana Tech Nursing is communicated to the students through monthly faculty/student meetings. The student representative attends the meetings and communicates changes to the student body. The faculty reinforced the change in policy through messages in face-to-face classes.

The data generated from this study comes from the ATI Content Mastery Series (CMS) and the ATI PN Comprehensive Predictor tests. The ATI Content Mastery Series

(CMS) data has been taken from data on the following: ATI CMS tests of ATI PN Fundamentals tests, ATI PN Medical-Surgical tests, and the ATI PN Pharmacological tests. The data originated from the students who have taken the ATI CMS PN tests throughout the first year of the two-year ASN program. The ATI PN Comprehensive Predictor test data is taken at the end of the first year in the two-year ASN program. The ATI CMS tests are given throughout the first year culminating with the ATI PN Comprehensive test at the end of the first year. In general, most nursing programs consider these tests a mid-program assessment.

Once the students master the PN level of ATI tests, they then progress to the RN level of ATI tests in their second year of the two-year ASN program. The ATI RN Comprehensive Predictor was not used in this research but is mentioned here because it is an important assessment tool given at the end of their nursing program and before students' graduation. The ATI RN Comprehensive Predictor has been extensively studied for its prediction of first-time. NCLEX-RN passage (Brussow & Dunlap, 2018).

This study investigated the differences in students' test scores before and after high-stakes ATI Remediation and testing practice policy were put into place. Thus, there are two groups studied. The pre-policy change group is group A: Fall 2009-Spring 2013 took all the afore-mentioned tests, without high-stakes ATI Remediation and testing, and the post-policy change group B: Fall 2013-Spring 2015, took all the afore mentioned tests with high-stakes ATI Remediation and testing practices. Throughout this time period ATI Remediation and testing remained consistent in relation to the types of ATI Remediation assignments. The nursing program where this study was conducted represents many

nursing programs throughout the nation, in that it did not start out using high-stakes ATI Remediation and testing practices. The nursing program changed its progression plans by fall 2013 to include high-stakes ATI Remediation and practices. This decision was based on a national trend in nursing education to increase first-time NCLEX-RN passage rates with online nursing assessment software companies like ATI.

Please review Table 3-1 for a comparison of group size by test.

Table 3 - 1 Effects of Test Scores on Two Groups

MS	Year coded into Pre-Policy group A No high stakes ATI Remediation	Year coded into Post-Policy group B With high-stakes ATI Remediation
ATI PN Fundamentals	2009-Spring 2013 n=86	Fall 2013-Spring 2014 n=89
ATI PN Medical Surgical	'all 2009-Fall 2012 n=51	013-Spring 2015 n=68
ATI PN Pharmacology	2009-Spring 2013 n=53	013-Spring 2015 n=89

Confirmation and Purpose of Research Study

According to the literature a trend for using high-stakes standardized testing in nursing programs is increasing (Spurlock, 2006). The purpose of this study is to examine whether high-stakes ATI Remediation and practices used at a single institution, Montana Tech, has a significant effect on test scores on the ATI CMS tests and the ATI PN

Comprehensive Predicator. If nursing programs are going to use high-stakes ATI Remediation and testing practices attached, then it is important to outline this activity within the program progression plans. The literature is clear on the need for more research on remediation but has not been clear on high-stakes ATI Remediation and its consequences. Many progression plans have initiated penalties for not passing the ATI examinations. These penalties can lead to the dismissal of the student from the nursing program or direct the student to rejoin a lower cohort at an assigned date. If a student is dismissed and fails to graduate with a degree, then they will not be allowed to take the NCLEX-RN. The results of this penalty can lead to a lack of nursing employment for the student and the inability to repay student loans (Holstein et al., 2006). Faculty are acutely aware of how attrition rates contribute to the national nursing shortage but also understand the NCSBN's concern of graduating students who are not adequately prepared. The nursing graduates need to be prepared for all patient acuity levels and fully understand patient safety requirements of the facilities (Seldomridge & Di Bartolo, 2004). This study is important to nursing education because it offers evidence of increased tests scores when high-stakes ATI Remediation is used on the ATI PN Fundamentals test and ATI PN Comprehensive Predictor.

Research Design, Questions, and Rationale

This study utilizes a non-experimental quantitative design. The study has retrospectively examined differences among student performances on the ATI Content Mastery Series (CMS) of PN Fundamentals, PN Pharmacology and PN Medical-Surgical, and the ATI PN Comprehensive test before and after the implementation of high-stakes

ATI Remediation and testing policy. This research has been conducted to better understand the effects of high-stakes ATI Remediation and PN ATI test scores within a two-year ASN nursing program. The results of this study will contribute to the literature and provide direction for nurse educators with respect to the efficacy of high-stakes ATI Remediation and testing policies. The research questions are as follows:

1. Are there differences in scores on the ATI Content Mastery Series PN Fundamentals test between students who did and did not receive high-stakes ATI Remediation and testing practices?
    - Null Hypothesis – There are no significant differences in scores on the ATI Content mastery Series PN Fundamentals test between students who did and did not receive high-stakes ATI Remediation and testing practices.
    - Alternative Hypothesis – There are significant differences in scores on the ATI Content Mastery Series PN Fundamentals test between students who did and did not receive high-stakes ATI Remediation and testing practices.
2. Are there differences in scores on the ATI Content Mastery Series PN Pharmacology test between students who did and did not receive high-stakes ATI Remediation and testing practices?
    - Null Hypothesis – There are no significant differences in scores on the ATI Content mastery Series PN Pharmacology test between students

who did and did not receive high-stakes ATI Remediation and testing practices.

- Alternative Hypothesis – There are significant differences in scores on the ATI Content Mastery Series PN Pharmacology test between students who did and did not receive high-stakes ATI Remediation and testing practices.

3. Are there differences in scores on the ATI Content Mastery Series PN Medical/Surgical test between students who did and did not receive high-stakes ATI Remediation testing practices?
    - Null Hypothesis – There are no significant differences in scores on the ATI Content mastery Series PN Medical/Surgical test between students who did and did not receive high-stakes ATI Remediation and testing practices.
    - Alternative Hypothesis – There are significant differences in scores on the ATI Content Mastery Series PN Medical/Surgical test between students who did and did not receive high-stakes ATI Remediation testing practices.
4. Are there differences in scores on the ATI PN Comprehensive Predictor test between students who did and did not receive high-stakes ATI Remediation testing practices?

- Null Hypothesis – There are no significant differences in scores on the ATI PN Comprehensive Predictor test between students who did and did not receive high-stakes ATI Remediation and testing practices.
- Alternate Hypothesis – There are significant differences in scores on the ATI PN Comprehensive Predictor test between students who did and did not receive high-stakes ATI Remediation and testing practices.

Study Participants

There are variations in participant size from Fall 2013 to Spring 2014. During this time there was attrition of staff members and faculty some of whom were directly involved in data collection and knowledgeable on ATI testing administration practices. During this period, the nursing department was preparing for transition into a BSN program and was deeply involved in all aspects BSN accreditation, which contributed to the inconsistencies in data collection.

The table below indicates that the nursing students attending Montana Tech are not racially diverse and overwhelmingly Caucasian and female. Most of the students are between the ages of 18 and 29 years old. A small percent of the students pursuing an ASN are post baccalaureate. As evidenced in the table below, the student population is roughly similar in its characteristics before and after high-stakes ATI Remediation and testing policy was put in place. Alameida et al. (2011) studied the following and found no significant relationship between ATI predictive probability, grade point average and first-time NCLEX-RN passage, and no significant relationship between demographics and

first-time NCLEX-RN pass rates. The demographics for the academic years of this study are noted in Table 3-2.

Table 3 - 1 Demographics Breakdown

Nursing student demographics by year	2009--2010	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015
Women	88%	86%	81%	82%	84%	89%
Men	12%	14%	19%	18%	16%	11%
18-29 years of age	72%	71%	72%	74%	74%	76%
30-39 years if age	19%	19%	12%	17%	15%	16%
40-49 years of age	8%	10%	16%	9%	11%	8%
50-59 years of age	1%	0	0	0	0	0
White non-Hispanic	95%	93%	100%	97%	96%	96%
Black	0	0	0	0	2%	1%
Hispanic	0	4%	0	3%	0	2%
Identified as Other	5%	3%	0	0	2%	0
Asian/Pacific Islander	0	0	0	0	0	1%
Associate Degree	1.5%	3%	5%	12%	7%	6%
Baccalaureate Degree	1.5%	15%	5%	15%	16%	12%
Master's degree	1.5%	0	1%	0	1%	1%

Due to the retrospective quality of this research, this study did not require Institutional Board Review, although the researcher applied and has received IRB approval to complete this study. The data were supplied by the ATI Corporation and do not have any identifiable links to the participants. The mean total number of nursing students varies in relation to the research question or which dependent variable is being examined, i.e., ATI PN Comprehensive, or ATI Content Mastery series. The results

provide important information to the nursing program's use of ATI Remediation and high-stakes testing practices.

Variables

The literature has references to ATI Remediation and high-stakes testing practices but neither has been studied extensively. There are widely held views on the varying ethical positions related to high-stakes testing practices (ATI, 2016; McClenny, 2018). The literature continues to support the need for additional research that will clarify the most effective interventions for remediation in nursing education (McClenny, 2018).

ATI Test Instrumentation

The instruments utilized in this study include the ATI Mastery Series (CMS), PN Fundamentals test, PN Medical-Surgical test, PN Pharmacology test, and the ATI PN Comprehensive Predictor test. The ATI Content Mastery Series tests are designed to be given during the first academic year of the ASN program and are used concurrently with the semester courses being taught. The ATI PN Comprehensive Predictor is given at the end of the first year of the ASN nursing program and includes content from the PN Content Mastery Series of PN Fundamentals, PN Medical-Surgical, and PN Pharmacological (detailed fully in subsequent section within this chapter). Not all nursing schools use the ATI PN Comprehensive Predictor. Many ASN programs use the ATI PN Comprehensive Predictor after the first year of the program. In general, the emphasis is placed on the ATI RN Comprehensive Predictor which is given at the end of the ASN and BSN programs.

ATI Cut Scores

The ATI tests are given throughout the United States and Canada. ATI tests are considered psychometrically sound (ATI, 2016). This study measured the outcome variables of ATI PN Fundamentals proctored test, ATI PN Medical-Surgical proctored test, ATI PN Pharmacology, and the ATI PN Comprehensive Predictor test. The ATI corporation takes the raw score from each test and converts it into a percent. All raw scores are percentages on a continuous scale from 0 to 100. The score percentage range in each level changes according to the specific ATI CMS test. Each of the ATI CMS tests has been developed to provide criterion referenced cut-scores, a score range established by ATI, that the nursing school can use as a benchmark for the student's performance. The ATI PN Comprehensive Predictor test does not have levels. This test has a percentage that is correlated with NCLEX-RN passage.

The cut scores were developed to identify proficiency and are based on percentage. This study's level of measurement of the outcome variable is based on whether the overall average percent test score changes when high-stakes ATI Remediation is added to the progression plan. This study does not measure ATI test proficiency but examines if there are any increase or decrease in students' scores after the policy implementation of high-stakes ATI Remediation.

The ATI test levels and cut score ranges are described within this chapter as a reference for the reader. The ATI cut score percentages are given as a range for each ATI CMS Test. Therefore, the Foundations test cut score percentage range for a level will be different from the Medical/ Surgical test cut score range. The ATI corporation defines

these levels as follows: below level 1 or not meeting proficiency;- level 1 is considered meeting proficiency at the lowest difficulty rating, level 2 is meeting proficiency at an increased difficulty rating, and level 3 is meeting proficiency at the most difficult rating. The ATI Corporation uses the Angoff (1971) rating system for the ATI Content Mastery Series. This rating system is a standardized system method which is often used in establishing cut scores. In addition to the development of cut scores, the ATI Corporation also uses an expert panel to judge and interpret the cut score levels (ATI, 2016, p.1). The percentage of students with a level 1 are expected to pass NCLEX-RN on the first attempt at a rate consistent with the national average of 75%, and students who receive a level 3 are expected to pass on their first attempt at a much higher rate, such as 98%, as a minimum score for NCLEX-RN first-time passage rates (ATI, 2016, p. 2).

The ATI instruments are readily available and considered reliable. An instrument is considered reliable if the data used for the instrument is consistent and accurate (ATI, 2016). The ATI Corporation has documented and defined its testing instrument and includes a description of the amount of error within the test instrument. The ATI CMS tests are based in content areas that reflect the national nursing curricula. For example, the ATI PN Fundamental test is congruent with national Nursing Fundamental courses by including foundations of nursing practice, basic nursing care and safety measures, client monitoring of psychosocial needs, and health data collection. Test questions are formulated from these content areas increasing this instrument's reliability since many items in a test covering a variety of topics indicate better reliability than fewer items with fewer content areas. Test consistency has been identified within the ATI testing

instrument. ATI offers the student and faculty confidence and a trustworthiness that the tests scores will remain consistent if the test is re-administered to other students in other settings and given by other faculty. ATI confirms reliability by applying the same test algorithm to all test takers throughout the country, and the outcome scores are compared to the other students' outcome scores within the nation.

The ATI testing instrument offers content validity by clearly stating what nursing content will be measured for each test. An explanation of how the material represents the nursing domain of that test is described on the ATI website (ATI, 2016). ATI supplies the faculty and students with an interpretation of each test score. All ATI tests are computer based; therefore, there is easy access for the student and faculty to assess the student's ability to answer the questions correctly. The ATI test instrument demonstrates criterion-related validity through item test correlations using norming questions. Normative comparisons help the students, and the nursing programs compare their standing through a percentile rank. This information helps to discriminate between the nursing programs students test performance when compared with the nation's nursing students on these tests. Construct validity is demonstrated within the ATI instrument since NCLEX-RN related questions are supported as a blueprint for the ATI tests questions (Alameida, et al., 2011). There may be threats to internal validity due to the ability of some students to retain and transfer the information from the ATI Content Mastery Series to the ATI PN Comprehensive Predictor. Internal validity can be challenged when the researcher is not able to eliminate variables that are associated with the participants including mood changes, test anxiety, and fatigue. Confounding variables can cause random error and

alter a consistent effect across the sample (Gravetter & Wallnau, 2011). Fortunately, this type of error should not affect the average test result of the group but may add variability to the overall data.

The ATI PN and RN Comprehensive Predictor are used as assessment and evaluation tools to determine the student's comprehension of the nursing content at pivotal times during the student's coursework. The ATI RN Comprehensive Predictor is offered at the end of the second year of the student's curriculum and was not be included within this study but is mentioned here due to the fact that it is a common instrument used within nursing education as a predictor of NCLEX-RN first-time passage (Alameida et. al., 2011). There is evidence that an increasing number of nursing schools include the ATI PN Predicator test and ATI CMS along with the ATI RN Comprehensive Predictor as a total package for ensuring NCLEX-RN passage (Alameida et al., 2011; Yeom, 2013).

The ATI PN Comprehensive Predicator construction is like the ATI CMS construction. The ATI Corporation provides review committees who are involved in each step of item analysis and ensure the items are appropriate in number and are evenly distributed throughout the tests with attention to the test contents' levels of difficulty and cognitive complexity (ATI, 2016). The ATI test development team reviews the items for bias (ATI, 2019). The ATI team evaluates the items before they are submitted and checks them for any issues related to diversity, cultural aspects, and gender (ATI, 2016). If items are flagged, then they are assessed for additional consensus within the content specialists' division (ATI, 2016). The model used for validity measurements in the ATI

RN Comprehensive Predictor was the Rasch Model. It noted that all the assumptions were met from the data (ATI, 2016). These tests are updated approximately every three years.

The Outcome Variables: ATI CMS and ATI PN Comprehensive Predictor Tests

The ATI Content Mastery Series (CMS), ATI PN Fundamentals, ATI PN Pharmacology, ATI Medical / Surgical, and the ATI PN Comprehensive Predictor are useful testing instruments. These tests measure nursing students' knowledge performance, emphasizing critical thinking and clinical judgment, which are core concepts in nursing practice. ATI provides modules that address these areas through virtual scenarios, all of which provide consistent remediation information for the students to use before the proctored test (ATI, 2016). The ATI CMS tests, and the ATI PN Comprehensive Predicator tests act as the dependent or outcome variables for this study. All of the student's test scores are measured as continuous variables based on the number on their percentages for each test.

ATI PN Fundamentals Test

One of the three ATI PN CMS includes the ATI PN Fundamentals. The ATI PN Fundamentals test is a 60-minute, 70-item test that covers many nursing fundamental principles at the PN level or within the first year of a nursing program's curriculum. The foundational principles incorporated within this test include growth and development, scope of practice, communication and professional accountability, health promotion and disease prevention, and legal and ethical principles (ATI, 2016). Basic nursing care is addressed in this test noting basic nursing skills and client safety interventions.

Psychosocial content is a major area within this test and addresses client monitoring and safety during basic clinical procedures, end-of-life care, culturally competent care, and the stress response of the client to traumatic situations. General questions are applied to this test on monitoring vital signs and assessments of the body systems. The cut score for a level two is 66.7% (ATI, 2016). The cut score was described in detail in the preceding paragraphs.

ATI PN Pharmacology Test

The ATI PN Pharmacology test is a 60-minute, 60-item test. The major concepts within this test include basic pharmacological interventions of medication administration, dosage calculations, and medication error prevention. This test also covers administration of medications throughout the lifespan and safe administration of medications for treatment of pain, inflammation, and infections. Several topic descriptors help assess students' knowledge on the administration of medications for the following areas: the blood, immune, cardiovascular, respiratory, renal, digestive, endocrine, reproduction, and nervous system (ATI, 2016). The cut score for a level two on this test is 62.0% (ATI, 2016).

ATI PN Medical / Surgical Test

The ATI PN Medical /Surgical test is a 90-minute, 90-item test. This test contains assessments that reflect the student's mastery of disease processes in the following areas: cardiovascular, hematological, gastrointestinal, fluids and electrolytes, neurosensory, lymph, immune, urinary, and renal, respiratory, and infectious diseases (ATI, 2016). The ATI PN Medical Surgical test requires as a prerequisite that the test taker has taken and

passed the ATI PN Fundamental and ATI PN Pharmacological tests at a level two. This test builds on the ATI PN Fundamentals test in the areas of health promotion, effective communication, and culturally competent care. The cut score for a level two is 62.2 %.

ATI PN Comprehensive Predictor Test

The ATI PN Comprehensive Predictor is a 3-hour, 180-item test. This test is given after the student finishes a year of the ASN nursing education and has completed the three ATI CMS tests within this study. The ATI PN Comprehensive Predictor test provides an assessment of the student's comprehension on several ATI CMS tests, including fundamentals, pharmacology, medical/surgical nursing, maternal newborn care, mental health nursing, nursing care of children, nutrition, and management (ATI, 2016). QSEN is assigned to several categories within the ATI PN Comprehensive test. These major categories include, Psychosocial Integrity, Safe and Effective Care Environment, Health Promotion, and Physiological Integrity.

This test is given as a predictor test, but it can also be used as a mid-program assessment tool. This test presents the student and the faculty with data of the overall individual percentage score and outlines the student's progress on specific Content Topic Categories. This information is specific to the student and helps them identify topics to review. ATI Remediation is done before this test is taken through the previous ATI CMS PN tutorial tests and practice test focused reviews, which include two ATI PN Comprehensive practice tests. All practice tests automatically formulate a focused review to be completed before the proctored test is administered to the student. This detailed test plan is a predictor test that notes the probability of passing the NCLEX-RN. This test is

different from the ATI PN CMS tests because there are no cut scores. Once the test is completed, the score is read as percent correct. The institutional average required for the student is 84.7%, which equals a percentile rank of 99% expectancy of first-time NCLEX-RN passage (ATI, 2014). The ATI PN Comprehensive Predictor national average is 68.4% which associates with an 85% likelihood of NCLEX-RN passage (ATI, 2014). Ideally, the student would earn a passing score on the first attempt. If the student does not meet the institutional expectations, then they can take the test for a second attempt, and if they fail then, they can appeal for a third test attempt.

Predictor Variables: ATI Remediation and High-Stakes Testing Practices

The predictor variables are the pre-policy group A who participated in the ATI CMS tests and the ATI PN Comprehensive Predictor with no ATI Remediation and high-stakes testing practices and the post-policy group B who participated in the ATI CMS tests and the ATI PN Comprehensive Predictor with high-stakes ATI Remediation and practices. It is important to note that the students who had ATI Remediation and high-stakes testing practices had access to ATI Remediation developed from mini tests within ATI tutorials, ATI case studies, and ATI practices tests and were completed before any proctored test was taken. Even with ample ATI Remediation available to help the student succeed at ATI tests, the element of high-stakes testing practices adds a palpable effect to the ATI tests.

Data Collection Procedures

The retrospective data were collected from the ATI Corporation. The ATI Corporation archival data includes the ATI CMS Fundamentals, ATI Pharmacology, ATI Medical Surgical, and the ATI PN Comprehensive Predictor tests. Email letters were sent to the ATI Corporation Research Department to request the data without names or student numbers. The ATI Corporation had identified the data, and any names were replaced with data line numbers. The researcher received the data after these tasks had been completed.

The Table 3-3 is for reference only and illustrates level two and percent score range for the CUT score on the three ATI CMS tests. The level two range is in a percentage established by ATI to describe students who are expected to exceed the minimum level of knowledge in the content areas of the test. The ranges are displayed here for a reference to the ATI CMS instrument, but this study is not looking at changes in proficiency; this study is looking at the differences in test scores between the cohorts. ATI CMS Fundamentals, Pharmacology, and Medical Surgical are given at the end of their semester classes during the first year of the ASN nursing education.

Table 3 - 2 Level Two and Percent Score Range

PN Content Mastery Series	Level 2 cut Score Range Established by ATI
Fundamentals for Nursing	66.7% - 84.9%

Medical Surgical Nursing	62.2% - 75.5%
Nursing Pharmacology	62.0 – 75.9%

ATI PN Comprehensive Predictor examination is given at the end of the first year of the ASN nursing education. This test is not associated with levels. The ATI PN Comprehensive Predictor test provides a percent score that offers a Predicted Probability of passing the NCLEX. The nursing institution in this study has selected a percent score at 84.7%, which offers 98% predicted probability of passing the NCLEX.

Data Analysis

Quantitative analysis was used in this study to determine if there are statistically significant test score differences between high-stakes ATI Remediation and testing practices and no high-stakes ATI Remediation and practices on the ATI Content Mastery Series (Fundamentals, Pharmacology, and Medical Surgical) and the ATI PN Comprehensive Predictor. The researcher used SPSS version 23.0 to compute ranges, means, confidence levels, variances, and standard deviations of the student sample population. An independent *t*-test is a parametric test that was applied to the four research questions and was used to determine any statistical significance between test scores of the two groups. The two groups being compared throughout this study are independent of each other and have different participants. This test was used to evaluate the mean differences between test scores of the students who had taken ATI CMS tests and the ATI PN Comprehensive with high-stakes ATI Remediation and testing practices and those

students who did not have high-stakes ATI remediation and testing practices applied to their tests. The level of statistical significance has been set at $p < .05$ to help determine if high-stakes ATI Remediation and testing practices has a significant effect to the ATI CMS tests and the ATI PN Comprehensive Predictor.

Chapter Summary

Within this chapter a detailed description of the research design, sample, data collection methods, and analysis were outlined. Chapter three provide guidelines for nursing education by providing insight into the application of high-stakes ATI Remediation and testing practices. The data analysis will be explained in chapter four along with rationale, implementation, and the evaluation process on high-stakes ATI Remediation and testing practices.

CHAPTER 4: RESULTS

Introduction

The purpose of this study was to determine if a statistical significance existed in testing scores between group A who had no high-stakes ATI Remediation and testing practices and group B who had high-stakes ATI Remediation and testing practices on the following tests: the ATI Content Mastery Series tests, PN Fundamentals, PN Pharmacology, PN Medical Surgical, and the ATI PN Comprehensive Predictor test.

Data Interpretation

A quantitative nonexperimental retrospective study was used for this dissertation. This study is comparing the test scores of the two groups: with no high-stakes ATI Remediation and testing practices with high-stakes ATI Remediation and testing practices. In this study, one sample is not related to the other sample in any systematic way. They are part of the same population of nursing students at Montana Tech but differ by the years of enrollment. The independent measures *t*-test was identified as the appropriate statistical technique and was applied to four research questions (Gay, Mills & Airasian,2012). The independent measures *t*-test requires that the dependent variables, the ATI CMS tests of PN Fundamentals, PN Pharmacology, PN Medical Surgical, and the ATI PN Comprehensive Predictor test to be measured on a continuous scale. The independent variable represented a policy change from no high-stakes ATI Remediation testing practices fall 2009-spring 2013, and high-stakes ATI Remediation and testing

practices fall 2013- spring 2015. There are no significant outliers in any of the data that are important to note since they may impact the validity of the study in a negative way.

Research question one:

1. Are there differences in scores on the ATI Content Mastery Series PN Fundamentals test between students who did and did not receive ATI Remediation and high-stakes testing practices.

The ATI PN Fundamental data (see Table 4-1) was used for the Group A of no high-stakes ATI Remediation and testing practices was collected from fall 2009-spring 2013 and had a sample size of 86 participants. The ATI PN Fundamental data was used for the Group B of high-stakes ATI Remediation and testing practices was collected from fall 2013-spring 2014 and had a sample size of 89 participants. An independent samples *t*- test was completed. The mean scores were compared between the Group A no high-stakes ATI Remediation and testing practices and Group B of high-stakes ATI Remediation and testing practices when applied to the ATI PN Fundamental test. A significant difference was found between the means of the two groups (t (153.363) = 3.124, $p < .05$) See Table 4-1a. The mean score of Group B known as high-stakes ATI Remediation and testing and the average score was 76 % (M = .767, SD = .070) when compared to the mean of the group that had no high-stakes ATI Remediation testing practices at 72% (M= .727, SD = .098). The output from this statistical analysis led to the decision to reject the null hypothesis and accept the alternative hypothesis. The independent *t*-test has provided evidence that nursing students who were under the high-

stakes ATI Remediation and testing policy scored higher on the ATI PN Fundamentals test than their peer who were not subject to the policy that did not have high stakes ATI Remediation and testing practices, Table-4-1b. The confidence interval agrees with the independent *t*-test stating that there is a statistically significant difference in the means. The Levene's test was reviewed and found to be significant at $p < .05$, therefore equal variances between groups were not assumed. Cohen's *d* was used to calculate the effect size. The researcher took the difference between the means and divided by the pooled standard deviation. A pooled standard deviation was required because there are two standard deviations, and the pooling process helps to normalize the two standard deviations to produce an output or effect size. A medium effect size was found ($d = -.475$). The

Table 4 - 1 Mean ATI PN Fundamentals Scores by Year

	N	M	SD	Std. Error Mean
Total				
Group A 2009 – 2013 – No High-stakes ATI Remediation	86	.727	.098	.011
Group B 2013 – 2014 – High-stakes ATI Remediation	89	.767	.070	.007

Table 4 – 1a Independent t-Test

	F	Sig.	t	df
Equal variances assumed	7.724	.006	-3.141	173

Equal variances not assumed	-3.124	153.363

Table 4 – 1b Independent t-Test

	Sig. (2-tailed)	M Difference	St. Error Difference	95% Confidence Lower	upper
Equal variances assumed	.002	-.040	.013	-.066	-.015
Equal variances not assumed	.002	-.040	.013	-.066	-.149

Research question two:

2. Are there differences in scores on the ATI Content Mastery Series PN Pharmacology test between students who did and did not receive high-stakes ATI Remediation testing practices.

The ATI PN Pharmacology data was used for the Group A of no high-stakes ATI Remediation and testing practices and was collected from fall 2009-spring 2013. The sample size of Group A had 53 participants. The sample size for Group B was collected from Fall 2013- Spring 2015 and had a size of 89 participants. An independent-samples-*t* test was calculated comparing the mean test score of Group A who had no high-stakes ATI Remediation and testing practices and Group B who had high-stakes ATI Remediation and testing practices on the ATI PN Pharmacology test. No significant difference was found (t (140) = .889, p > .05) Table 5-2. The mean of the group B who had high-stakes ATI Remediation testing practices had a mean of 67.53 % (M = .675, SD = .090) and was not significantly different from the mean of the group of A no high-stakes ATI Remediation and testing practices (M= .689, SD = .082).

Table 4 - 2 Mean ATI PN Pharmacology Scores by Year

	N	M	SD	Std. Error Mean
Total				
Group A fall 2009 – spring 2013 – No high - stakes ATI Remediation	53	.689	.082	.011
Group B Fall 2013 – Spring 2015 – High-stakes ATI Remediation	89	.675	.090	.009

Table 4 – 2a Independent t-test ATI PN Pharmacology

	F	Sig.	t	df
Equal variances assumed	.623	.431	.889	140
Equal variances not assumed			.909	117.119

Table 4 – 2b Independent t-test ATI PN Pharmacology

	Sig. (2-tailed)	M Difference	St. Error Difference	95% Confidence Lower	Upper
Equal variances assumed	.375	.013	.015	-.016	.043
Equal variances not assumed	.365	.013	.015	-.016	.043

Research question 3:

3. Are there differences in scores on the ATI Content Mastery Series PN Medical/Surgical test between students who did and did not receive high-stakes ATI Remediation and testing practices.

The ATI PN Medical/Surgical data was used for the Group A of no high-stakes ATI Remediation and testing practices. Group A data was collected from Fall 2009- Fall 2012 and had a sample size of 51 participants. The ATI PN Medical/Surgical data was used for Group B of high-stakes ATI Remediation and testing practices was collected from Fall 2013-spring 2015 and had a sample size of 68 participants. An independent *t* test was calculated comparing the mean score of the Group A who had no high-stakes ATI Remediation and testing practices to the mean score of the Group B who had high-stakes ATI Remediation and testing practices. No significant difference was found ($t(86.332) = -1.554$, $p > .05$). Due to violation of the assumption of equal variance the *t*-statistic for equal variance not assumed is presented. See Tables 4-3, 4-3a, and 4-43b. The mean of the group B who had high-stakes ATI Remediation and testing had a mean score of -.729% ($M = .729$, $SD = .069$) was not significantly different from the mean of the group of no ATI Remediation and no high-stakes testing ($M = .704$, $SD = .096$). The confidence interval lower limit is - .056 and the upper limit is .007, which includes 0 indicating no statistically significant difference between the groups.

Table 4 - 3 Mean ATI PN Medical/Surgical Scores by Year

	N	M	SD	Std. Error Mean
Total				
Fall 2009 – Fall 2012 – No High-	51	.704	.096	.013

stakes ATI Remediation no Stakes				
Fall 2013 – Spring 2015 – High-stakes ATI Remediation	68	.729	.069	.008

Table 4 – 3a Independent t-test ATI PN Medical/Surgical

	F	Sig.	t	df
Equal variances assumed	6.840	.010	-1.682	117
Equal variances not assumed			-1.554	86.332

Table 4 – 3b Independent t-test ATI PN Medical/Surgical

	Sig. (2-tailed)	M Difference	St. Error Difference	95% Confidence Lower	Upper
Equal variances assumed	.106	-.025	.015	-.055	.005
Equal variances not assumed	.124	-.025	.016	-.056	.007

Research question four:

4. Are there differences in scores on the ATI PN Comprehensive Predictor test between students who did and did not receive high-stakes ATI Remediation and testing practices?

The ATI PN Comprehensive Predictor data was used for the Group A of no high-stakes ATI Remediation testing practices. This data was collected from Fall 2009-Spring 2013 and had a sample size of 107 participants. The ATI PN Comprehensive Predictor data was used for Group B of high-stakes ATI Remediation and testing practices. This data was collected from Fall 2013-spring 2015 and had a sample size of 68 participants. An independent-samples *t* test comparing the scores of the Group A no high-stakes ATI Remediation and testing practices and Group B high-stakes ATI Remediation testing practices and found a statistically significant difference between the means of the two groups ($t(202) = -2.582$, $p < .05$). See Table 4-4. The mean of Group B was 78.3% ($M = .783$, $SD = .052$), statistically significantly higher than Group A whose mean test score was 76.4% ($M = .764$, $SD = .054$). The output from this statistical analysis led to the decision to reject the null hypothesis and accept the alternative hypothesis. The Levene's test was reviewed and found to be not significant $p > .05$ at $p = .794$; ,therefore, equal variances were assumed. The independent *t*-test provided evidence that a statistically significant difference in ATI PN Comprehensive Predictor test scores existed between groups who were and were not subject to ATI Remediation and testing practices. A small effect size was calculated $d = -.362$. The confidence interval's lower limit is -.034 and the upper limit is -.005, indicating there a clear difference in the means.

Table 4 - 4 Mean ATI PN Comprehensive Scores by Year

	N	M	SD	Std. Error Mean
Total				

Fall 2009 – Spring 2012 – No High-stakes ATI Remediation	107	.764	.054	.005
Fall 2013 – Spring 2015 – High-stakes ATI Remediation	68	.783	.052	.005

Table 4 – 4a Independent t-test ATI PN Comprehensive

	F	Sig.	t	df
Equal variances assumed	.068	.794	-2.582	202
Equal variances not assumed			-2.585	200.918

Table 4 – 4b Independent t-test ATI PN Comprehensive

	Sig. (2-tailed)	M Difference	St. Error Difference	95% Confidence Lower	Upper
Equal variances assumed	.011	-.019	.007	-.034	.005
Equal variances not assumed	.010	-.019	.007	-.034	.005

Chapter Summary

In summary, chapter four offers clarity into the effects of the predictor variable of high-stakes ATI Remediation and testing policy on the outcome variables of the ATI CMS tests of PN Fundamentals, PN Pharmacology, PN Medical Surgical, and the ATI PN Comprehensive Predictor test. Each research question was addressed with an

accompanying hypothesis, null hypothesis, and alternative hypothesis. The parametric model selected for each of the four research questions was the independent *t* – test as the optimal test for comparing the mean scores of the two groups. The output describing the analysis was produced from SPSS version 26 software. An interpretation of the output for research questions two and three revealed no statistically significant differences between the test scores when high-stakes ATI Remediation and testing policies were in effect with the ATI CMS PN Pharmacology, and ATI PN Medical/Surgical tests. The students were aware that the scores they received with these policies had consequences as illustrated within the testing policies. Since no statistical differences were found between the means of these two tests, the researcher failed to reject the null hypotheses.

In research question one and research question four, the results suggested a statistically significant difference between the test score means for ATI CMS PN Fundamentals and applied to the ATI PN Comprehensive Predictor test when high-stakes ATI Remediation and testing practices were in place. Knowing this information may be of value for the nurse educator when they are viewing the practicality of using high-stakes ATI remediation and testing practices on ATI PN Fundamentals and ATI PN Comprehensive Predictor test.

Currently, the priority of progression plans in nursing programs focuses on the completion of curriculum requirements rather than the timely use and follow-up of remediation interventions. The literature recommends the need to provide more research on high-stakes ATI Remediation and the testing practices environment. Due to the time required to apply high-stakes ATI Remediation and testing practices and study its

effectiveness in prompting improved student exam preparations and performance, this request is often the last item to be addressed on the nursing faculty's long list of pedagogical requirements. Generally, remediation is not addressed as a formal plan but often initiated at the end-of-program testing (Lauer & Yoho, 2013). The concern among nursing educators is to find a reliable and appropriate remediation intervention. This study has been successful in identifying two ATI tests—the ATI PN Fundamentals and the ATI PN Comprehensive Predictor tests for which test scores increased when high-stakes ATI Remediation and high-stakes testing were used.

CHAPTER 5: CONCLUSIONS

Introduction

This chapter presents a summation of the study and includes a short synopsis of the four research questions, methodology, and important areas of the literature that reflect the findings of the study. Within this chapter are the implications, limitations, and recommendations of the study, which suggest how the findings can impact nursing education. The purpose of this nonexperimental descriptive study was to analyze any statistically significant relationships existing between the outcome variables of the ATI CMS tests: ATI PN Fundamentals, ATI PN Pharmacology, ATI PN Medical Surgical, and the ATI PN Comprehensive Predictor; with the predictor variables of ATI Remediation and high-stakes testing practices.

Summary of Methodology and CMS Tests

The retrospective data collected for this study included ATI test score percentages on the ATI CMS. The data used for the study spanned the academic years between fall 2009 and spring 2015. The data were divided into two groups; pre-policy Group A, fall 2009-spring 2013, consisted of students without high-stakes ATI Remediation and testing practices, and post-policy Group B, fall 2013-spring 2015 consisted of students who received high-stakes ATI Remediation and testing practices. The ATI CMS PN tests, the ATI PN Comprehensive Predictor tests, and ATI Remediation are developed by the ATI Corporation and are valid and reliable test instruments. This study's demographics represent the nursing student population in 2014 and is consistent with other ASN

nursing programs within the State of Montana in 2014. The demographic data presents a picture of how the sample looked in 2014, where the majority of the nursing students were between the ages of 18-29 years of age, female, and of non-Hispanic white origin. The demographic information reports a lack of ethnic, gender and racial diversity within this study's sample. The students involved in the study were enrolled in a two-year ASN program at Montana Tech of the University of Montana. This university is located in a rural area in the northwestern Rocky Mountain region. In 2014 the student population at Montana Tech was 2,629 students. The students involved in this study were sophomores and had completed a year of pre-requisite courses before entering the nursing program. A small number of students were post baccalaureate.

The Montana Tech nursing program experienced several progression plan policy changes during the academic years of Fall 2009-Spring 2015. From the fall 2009 until spring of 2013 the progression policy did not have specific criteria on the administration of high-stakes ATI Remediation and testing practices. At this time, the progression policy granted the faculty permission to decide for themselves on the best way to administer ATI Remediation and ATI tests. During this time there was no mandatory ATI Remediation assignments tied to the students grade, and the ATI tests were administered without high stakes testing practices. Lastly, the policy did not require data collection for the ATI CMS tests and the ATI PN Comprehensive Predictor. From the Fall 2013 through spring 2015, high-stakes ATI Remediation and testing practices were added to the progression policy and included the ATI CMS tests and ATI PN Comprehensive Predictor. The policy required a grade to be placed on the ATI tests. If the student failed

the ATI test, then they were allowed two more attempts at the test. If the student did not achieve success on the third attempt, then the student would be removed from the nursing program. The student could reapply to the program and gain entry into the previous cohort. If a seat was available in the previous cohort then the student would be able to re-enter into that cohort. If a seat was not available, then they would have to wait and re-apply until a seat became available. The purpose of this study was to examine if differences existed in students' Ati PN test scores before and after the high stakes remediation and testing practices policy was implemented.

ATI PN Pharmacology and ATI PN Medical/Surgical

Research question number two and research question three showed no statistical significance in test scores between the pre-policy Group A test scores without high-stakes ATI Remediation and testing practices and the post-policy Group B who had high-stakes ATI Remediation and testing practices on the CMS tests of ATI PN Pharmacology and Medical Surgical. For these two research questions, the researcher failed to reject the null hypothesis.

The findings of this study are unique and will contribute to the gaps in the literature about high-stakes ATI Remediation and testing practices. The literature is extensive on ATI CMS tests and first time NCLEX-RN passage rates, but virtually no studies on high-stakes ATI Remediation. Rigsby-Robinson (2019) found an increase in ATI CMS test scores and first-time NCLEX-RN passage rates with ATI Remediation. Yeom (2013) investigated ATI CMS test scores and found a positive correlation with many of the ATI CMS tests and increased first-time NCLEX-RN passage rates. Due to

the lack of literature in the area of high-stakes ATI Remediation, this dissertation's findings may help nursing faculty consider alternative types of remediation for their progression plan.

ATI PN Fundamentals and ATI PN Comprehensive Predictor Tests

Research question number one and research question number four showed statistical significance in test scores when high-stakes ATI Remediation and testing practices were used on the ATI CMS test of ATI PN Fundamentals and ATI PN Comprehensive test. For these two research questions, the null hypothesis was rejected. The parametric model selected for each of the four research questions was the Independent *t* – test as the optimal test for comparing the means scores of the two groups. In this study there was evidence of improved test scores between the pre-policy Group A without high-stakes ATI Remediation and testing practices, and the post-policy Group B who had high-stakes ATI Remediation and testing practices on these two tests. The literature supports a positive correlation between ATI Fundamentals and ATI PN Comprehensive Predictor and first-time NCLEX-RN passage. The Laurer and Yoho (2013) study found high-stakes testing improved test scores on the HESI assessment product and first-time NCLEX-RN passage rates.

The findings from this study offer nursing faculty evidence that high-stakes ATI Remediation and testing practices on ATI Fundamentals and the ATI PN Comprehensive Predictor can improve test scores. This information can be added to the progression policy. Other studies have examined the use of high-stakes testing from a motivational rather than punitive approach. Rigsby-Robinson (2019) study examined ATI CMS

Remediation and found increased first-time NCLEX-RN passage rates and improved ATI CMS test scores when they offered the student a 2.5% increase in the student grade if they completed the assigned ATI CMS Remediation. When high-stakes ATI Remediation and testing becomes part of the progression policy it may be more beneficial to the student to use the motivational "carrot" approach for success rather than applying consequences to test failure. In either situation it is essential for nursing faculty to clearly describe all test expectations. Nursing education should continually assess remediation and testing policies and not allow one, or a small series of tests, to impact the student's continuation in the nursing program (Laure & Yoho, 2013). Nursing faculty may consider the following interventions in the progression plan: identifying students who may need additional remediation support early; allowing access to ATI's Remediation early within the semester; allowing the student access to comparable versions of the test, and initiating motivational workshops for students from differing socioeconomic backgrounds (Baker & Johnston, 2010). A loss of a nursing student during a nursing shortage is difficult to reconcile, and especially worrisome when the nation is down 1.2 million nurses.

Summary of the Literature

The nursing shortage adds additional pressure to nursing faculty to produce qualified graduates (DeLima et al., 2011; Pennington & Spurlock, 2010; Sifford & McDaniel, 2007). T1he National Council of State Boards of Nursing (NCSBN), individual State Board of Nursing (SBON) and Commission on Collegiate Nursing Education (CCNE), Accreditation Commission for Nursing Education (ACEN), and other academic accreditors are aware of the nursing shortage, yet they cannot compromise

nursing education standards with shortcuts to meet these demands. The ethical responsibility of high-stakes testing continues to be an issue in nursing education. The National League of Nursing (NLN) does not support high-stakes testing practices, although, they allow the State Boards of Nursing to make the final decision on high-stakes testing practices. Nursing education has found online software companies like ATI acceptable to the accrediting bodies and beneficial in providing remediation and testing interventions, thus increasing their use nationwide. The literature describes a new phenomenon occurring as nursing programs adopt high-stakes into their progression plans. Due to the weight of the progression plans consequences, the students are now memorizing specific content and have disregarded other material (Oermann et al., 2009). This is important to note since the nursing profession relies on nurses who focus on the full spectrum of patient care rather than incidental facts. The decision to adopt high-stakes testing into the progression plan is a large step for the faculty, but ultimately the decision to pass a high-stakes standardized test is up to the student. The student is the one who is required to demonstrate knowledge from learning the content, and it is the student is who is accountable for prioritizing their study habits to pass the test. Finally, another area that must be considered is the additional out-of-the-pocket fee for ATI products for the student. Therefore, the faculty should thoroughly assess their program's needs and be able to justify any additional expense for students.

Bandura's self-efficacy theory (1997) supports remediation interventions. ATI Remediation reinforces self-efficacy through the use of structured reviews throughout the semester. ATI Remediation allows for self-reflection and helps the student develop new

approaches for success in the testing environment, all of which are closely associated with increasing self-efficacy. All four areas of Bandura's self-efficacy theory can easily be incorporated into ATI Remediation and can produce a positive effect on the student's outlook towards high-stakes testing practices. Enactive Mastery assists in the development of the student's ability to reach an attainable objective, such as fulfilling the requirements for high-stakes ATI Remediation and testing practices. An example of Enactive Mastery is when the student completes the ATI focused review. The focused review allows students to work at their own pace in a step-by-step fashion bringing newly acquired confidence into the testing environment. Vicarious positive experiences is another area of Bandura's theory and occurs when students-feels as though they-can successfully pass high-stakes ATI Remediation and testing when they see their peers successfully pass the same tests. Bandura (2009) explains how both vicarious experiences and verbal persuasion can produce a positive or negative effect on the student's self-efficacy. ATI is only accessed through online delivery; therefore, it is important for the faculty to schedule face-to-face meetings with the student throughout the semester. During these sessions, the student will have the chance to discuss areas in the content that may need additional clarification. Verbal Persuasion is a part of Bandura's theory that promotes self-motivation. This area of Bandura's self-efficacy theory promotes positive self-talk and encourages timely feedback from nurse educators. This is an important area for the student to understand in terms of self-efficacy, especially with the online component of high-stakes ATI Remediation and testing practices. The last area of Bandura's Theory is called Physiological Response. This area helps the student recognize

and adapt to physical stressors brought on by nonacademic factors such as anxiety. The nursing faculty should initiate a partnership with the university's licensed clinical therapist and together develop a plan designed to identify ways of addressing physiological and psychological stressors. Anxiety is a major nonacademic variable associated with high-stake testing. Nonacademic factors weigh heavily in the administration of high-stakes testing and are discussed in the implications, limitations, and recommendation sections of this chapter.

QSEN competencies are based on the Institutes of Medicine (IOM) *Health Professions Education* report. The report provides a detailed outline for health care educators to follow when preparing students for the delivery of safe patient care. Until recently there has been inconsistencies in nursing curriculums on how to teach safe patient care but QSEN has resolved this problem by establishing specific learning experiences throughout the nursing curriculum. The QSEN model was formulated to include the following competencies: Patient-centered Care, Teamwork and Collaboration, Evidence-based Practice, Quality Improvement, Safety, and Informatics. All areas of QSEN competencies are within ATI Remediation with emphasis on the application of safety skills (Cronewett et al., 2007).

Implications

There are several implications identified within this study that may be used in the progression plan if nursing faculty are considering implementing high-stakes ATI Remediation and testing practices. One major intervention is the clear identification of course expectations. Transparency in this area includes instruction on consequences,

guidelines for appeals and definitions for nonacademic complications. The goal of this intervention is to decrease ambiguity in the progression plan. If this is accomplished, then the student may feel more informed about the entire testing process.

Another implication identified in this study is the structure or environment in which tests are administered. The faculty should consider the differences between the grading of high-stakes ATI Remediation and the grading of the course lecture testing. Testing practices for course lecture tests often allow the faculty to assign specific weights to each question and allows the faculty to perform analysis the lecture test. The analysis and evaluation of test questions involves discarding a test question or changing a question on a course test. This is not the case for ATI tests. Faculty do not have access for this type of analysis on ATI tests. One area of this process includes a course test review. During the review, the student can challenge the test question. If a debate occurs over the test question, then every student present can learn from this exchange. Since both types of tests are used in the course, there should be clarity on the differences between the two tests. A clear definition and specific criteria should be in the progression plan outlining the differences between high-stakes ATI Remediation and testing practices and course lecture tests, since each type of test involves different testing practices. Faculty should be allowed time to learn how to administer online standardized tests. Many online tests are given through proctored systems and are commonly used to help prevent academic dishonesty. These proctored systems often come with complicated sets of instructions and involve large amounts of technology to be learned by the faculty and student in a short amount of time.

In addition to these implications the faculty should consider instituting guidelines on how to address anxiety and how to determine if it originates from high-stakes ATI Remediation and testing practices or some other nonacademic factor. The Lauer & Yoho (2013) study has found mandatory remediation and high-stakes testing can increase anxiety. The progression plan should have well defined strategies that address stress and anxiety amongst the students before and after high-stakes ATI Remediation and testing. Anxiety is mentioned in the literature as a byproduct of high-stakes testing but there are other nonacademic factors that can add to the stress and may include the following: family stressors, increased on-the-job work hours, and mental illness (Lauer & Yoho, 2013; March & Robinson, 2015). Nursing faculty need to be able to assess and evaluate for signs of stress in their students especially when testing policies are negatively affecting their self-efficacy. Anxiety can develop in faculty, too, especially if they are not given time to learn about ATI products and proctoring tests. While this study did not focus on high-stakes ATI Remediation and testing in relation to anxiety and nonacademic factors, it is important to be aware of how difficult it can be for students to manage these areas in nursing school. If faculty provide clear, consistent interventions in the progression plan then there will be less apprehension for the students (Dunn, 2014).

Limitations

There are several limitations identified in this study. The study used a convenience sample size which was restricted to a homogenous group of nursing students in their first year of college at a two-year ASN program. Ideally, both ASN and BSN programs would contribute to the data and use the findings of this study in their

progression plans. Unfortunately, due to the divergent curriculum and timing of nursing courses in each of these types of programs, a limitation is foreseen for the BSN program to apply the findings to their progression plan and curriculum.

This sample lacked diversity in the areas of ethnicity, age, and gender. The homogeneity of the sample is a major limitation for the nursing program and ultimately the workforce. The lack of diversity could form a disconnect between the nurse and the diverse community the nurse is serving, leading to a breakdown of cultural competency and cultural humility (Abdul-Raheem, 2018; Melillo et al., 2013). Cultural competency in nursing education is designed to provide learning situations for the nursing students on diverse cultures and ethnic groups, whereas cultural humility speaks to exploring personal feelings towards other cultures through student self-reflection and self-awareness while actively participating in cultures other than their own (Abdul-Raheem, 2018). With the increased use of online standardized tests faculty should consider the impact of this type of testing on the student's ability to achieve cultural humility and cultural competency. Online testing presents a linear type of learning that can easily address facts or indications of disease but may not reflect the 'lived experience' of the patients' culture. Faculty should try to offer clinical experiences or simulation which addresses how it feels for a patient of color to be in a room with a group of non-Hispanic white healthcare workers who are providing their care. This dilemma is recognized by nursing organizations like the American Association of Colleges for Nursing (AACN), which strive to promote diversity in the student nurse population as well as promoting the

advancement of underrepresented groups in the nursing profession such as male nurses (Melillo et al., 2013).

Another limitation of this study was that retrospective data was used and the study did not investigate for any changes in the faculty or student groups. The ATI tests were administered without regard to any changes that may have occurred within the ATI products, including updates or revisions in the ATI Remediation products or the ATI Content Mastery Series of PN Fundamentals, PN Pharmacology, PN Medical Surgical, and the ATI PN Comprehensive Predictor tests. Even though the testing environment was maintained according to nursing department progression policy, the study did not take into consideration any equipment failure that may have influenced test results. Another area that was not examined that may have limited the findings of this study was how nursing students test in their first year of nursing education. Many studies note increased motivation and increased success on ATI tests at the end of program (Alameida et al., 2011; Lavandera et al., 2011; Morrison, 2005; Nibert et al., 2006; Pennington & Spurlock, 2010).

An additional limitation of this study is the effect of anxiety. Anxiety is a notable implication for students who are presented with high-stakes testing and its consequences. Anxiety can depend on intensity and duration and is often described in the following ways:

- Mild anxiety, or normal anxiety that occurs when there is a realistic danger or threat. This type of anxiety helps us survive and heightens awareness such as the testing environment (Wilkinson & Treas, 2020).

- Moderate anxiety is out of proportion to the situation and lasts much longer than the threat causing a narrowed focus of attention and moderate physical discomfort (Wilkinson & Treas, 2020).
- Sever anxiety causes a narrowing of perception where the focus is on self and the overwhelming need to relieve the anxiety (Wilkinson & Treas, 2020).
- Panic anxiety occurs when the person becomes unreasonable and irrational, and more prone to injury and hallucinations/delusions (Wilkinson & Treas, 2020).

Anxiety is common in high-stakes testing yet it is thought to be situational and of the mild type. This type of anxiety can promote motivational behaviors that increase the students desire to learn and focus their efforts on the test material resulting in increased test performance (Cheng & McCarthy, 2018). If anxiety increases to the moderate or severe level then the student may exhibit cognitive and physical negative effects and be incapable of focusing on tasks such as studying, leading to poor test performance (Cheng & McCarthy, 2018; Lauer & Yoho, 2013; March & Robinson, 2014; Spurlock, 2013).

If nursing programs elect to use testing practices in a high-stakes manner, then testing strategies to reduce anxiety or other nonacademic factors should be implemented within the progression plan and considered mandatory (March & Robinson, 2010; Pennington& Spurlock, 2010; Sifford & McDaniel, 2007; Spurlock, 2013). Future research may include the use of qualitative study that focuses on strategies to help reduce anxiety and promote eustress. One area of qualitative study described in the literarture is “mindfulness-based training”. Mindfulness-based training includes the following strategies to reduce stress related to nonacademic factors, and are as follows: physical

activities, listening to music, engaging in hobbies, or talking to family members, all of which help the student distress and gain a better sense of self (Chen & McCarthy, 2018). Another type of stress reduction strategy is the initiation of "Boot Camp". This strategy enlists students into an orientation program one week before the start of the nursing program. The new students are taught study techniques, dosage calculations, and how to access tutors and mentors (Koestler, 2015). The faculty can help to reduce stress and anxiety for the students by individualizing remediation plans and quickly incorporating feedback into their clinical skills (March & Ambrose, 2006). During this time faculty can assign the ATI Remediation introductory program for new students to begin before their overall ATI course remediation.

Recommendations

Additional research on specific types of remediation has been requested within the literature, and this request could easily be achieved through qualitative or quantitative studies. Qualitative studies may reveal barriers and issues around anxiety which can be experienced by the student who takes a high-stakes tests (Baker & Johnston, 2010). New studies may offer information on specific strategies that are effective in reducing anxiety when high-stakes testing practices are used. New research might apply and observe these strategies before high-stakes ATI Remediation and testing. The findings from this type of study could offer valuable remediation interventions to incorporate into the progression plan. Quantitative studies could examine the effects of individualized remediation plans and first time NCLEX-RN passage. The study would involve two groups where one group would get a quick feedback response on clinical skills, and the second group would

not have this intervention. This information from this research would provide increased information on specific types of remediation and first time NCLEX-RN passage rates.

Another area for future research may include the effects of high-stakes ATI Remediation and testing on students who have diverse cultural values and practices. High-stakes admissions testing is one factor that contributes to the lack of diversity within nursing schools (Ackerman-Barger & Hummel, 2015). Many students with diverse background do not pass the high-stakes admissions tests despite their high performance on pre-requisite courses. Studies involving the barriers these students must overcome in relation to high-stakes testing practices may offer more qualitative information on how these students perceive their opportunities for advancement in nursing.

To help the student wade through the large volume of ATI Remediation content, the tendency for the ATI Company is to increase the student's interactions with the ATI Remediation products. The nursing faculty have come to rely on the convenience of these products and tend to assign too much of the ATI Remediation products. The National League for Nursing (NLN) has recognized this unintentional imbalance between company, faculty, and student. They realize that the student must make an increased effort to master the ATI content, but the overreliance on these types of products has not allowed the faculty to observe the student transfer the massive content into clinical judgment when caring for a patient.

This study recommends identifying the specific types of ATI Remediation essential to the ATI PN Fundamental test and ATI PN Comprehensive Predicator test. If this recommendation is followed, the student will have a more focused ATI Remediation

experience. Since there is little discussion in the literature concerning the ATI Pulse Predictive Model Overview, a concern exists that the information the model presents may have bias due to minimal studies outside of the ATI Corporation, therefore additional studies from outside the ATI corporation would be beneficial to nursing program progression plans.

It is recommended that the faculty review their course objectives and course content to make sure that the material is in alignment with high-stakes ATI Remediation and testing and free of discrepancies from the lecture content. It is essential for the faculty to have the time to review all the ATI Remediation material before they implement any curriculum change. The faculty should also look at the amount of time a student spends on the remediation assignments. Nursing education should step outside itself and judge if the essence of nursing is evolving into a structured online format that is not intuitive enough to allow for hands-on experiences.

Chapter Summary

In summary, this study found the use of high-stakes ATI Remediation and testing practices increased test scores in the ATI PN Fundamentals and ATI PN Comprehensive Predictor for ASN students. The findings from this study can provide guidance in the area of high-stakes ATI Remediation and testing for nursing faculty when they develop the progression plan. This study provides effective remediation interventions to help nursing education retain more nursing students. The current nursing shortage predictions are by 2022 there will be 1.5 million new job openings for nurses in the US (Snavely, 2016). The nursing shortage coupled with fewer students choosing the nursing profession has

amplified the nursing shortage making this study's findings relevant to nursing education (Snavely, 2016).

This study described the balancing act nursing faculty have when they adopt curriculum software from corporations like ATI. Before placing high-stakes ATI Remediation and testing practices into the progression plan, the faculty must consider the alignment of ATI with their course objectives. Nursing education has always been the driver of its own curriculum, but there is an inherent danger of losing the essence of nursing due to the ease of using ATIs products. More and more nursing schools are adopting ATI and adapting their curriculum to meet the ATI curriculum objectives. The misalignment between the nursing curriculum and ATI products should be a warning to nursing programs. The accrediting bodies are aware of these views but have not yet set limits on nursing education in regard to the amount of content that can be used from nursing software companies (NLN, 2010). Many in nursing think that it is time to retake the reins of the progression plan back and once again allow the faculty to become the experts in nursing education.

The faculty should consider specific learning strategies in the progression plan to help reduce stress for the student and improve self-efficacy. This can be done through case studies, simulation exercises, and care planning (NLN). Even though the literature discusses increased test scores when high-stakes testing practices are used, there are precautionary warnings to heed. The NLN (2010) notes that the solitary use of high-stakes testing practices delivers nursing graduates that are not meeting their employers' needs with a widening margin between what graduates can do and cannot do in the

clinical setting. This widening gap may be due to overemphasis on test results and less emphasis on the art of nursing practice.

This study can be expanded in several ways. New research can be done to include identifying students who would benefit from additional ATI Remediation earlier in their program. New research can explore the best type of ATI Remediation and the length of time a student should spend on ATI Remediation to improve ATI test scores. Investigation should begin into when or at what point high-stakes testing practices should be introduced into the curriculum for the maximum benefit of the nursing student. More research through qualitative studies could offer further information on nonacademic factors such as fatigue, anxiety, and financial needs, when students take high-stakes tests. It is this author's hope that the findings from this study will lead future researchers to explore and address these questions for the betterment of nursing education.

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