EVALUATING THE OUTCOMES OF A CONCEPT-BASED CURRICULUM IN AN ASSOCIATE DEGREE NURSING PROGRAM

A DISSERTATION
in
Nursing

Presented to the Faculty of the University of Missouri-Kansas City in partial fulfillment of the requirements for the degree

DOCTOR OF PHILOSOPHY

by

CARMEN V. HARRISON

A.D.N., Miami University, 1993
B.S.N., Miami University, 1994
M.S.N., University of Cincinnati, 1999

Kansas City, Missouri
2016
EVALUATING THE OUTCOMES OF A CONCEPT-BASED CURRICULUM IN AN ASSOCIATE DEGREE NURSING PROGRAM

Carmen V. Harrison, Candidate for the Doctor of Philosophy Degree
University of Missouri-Kansas City, 2016

ABSTRACT

A complete overhaul of nursing education has been commanded due to concerns regarding the proficiency of novice nurses and the clinical care they provide in today’s increasingly complex health care environment. Novice nurses are struggling to utilize effective critical thinking skills in order to practice at minimal competency levels. Delivering nursing education using a concept-based curriculum may provide the opportunity to prepare novice nurses to practice in a twenty-first century health care environment. However, limited literature exists examining the outcomes of a concept-based curriculum. The purpose of this study was to evaluate critical thinking scores, National Council Licensure Examination for Registered Nurses (NCLEX-RN) pass rate prediction scores, and NCLEX-RN pass rates in associate degree nursing (ADN) students completing a concept-based curriculum. The theoretical framework for this study was founded on the experiential learning theory, which postulates students learn through experience, reflection, and by actively participating in the learning process. A retrospective, descriptive, correlational design was utilized to evaluate secondary data from a convenience sample of ADN students (N = 258) from one college of nursing, located in a Midwestern state. Data analysis revealed critical thinking program exit score was significantly higher than critical thinking program entry score (p <0.001).
Statistically significant results were found in the ability of the dependent variable, first time pass success on the NCLEX-RN, to be predicted by both independent variables, critical thinking program exit score ($p = 0.009$) and probability of pass score ($p = 0.012$).

The mean probability of pass score for first time pass success on the NCLEX-RN was 73.7, which is higher than the program’s established benchmark score.
APPROVAL PAGE

The faculty listed below, approved by the Dean of the School of Nursing, have examined a dissertation titled “Evaluating the Outcomes of a Concept-Based Curriculum in an Associate Degree Nursing Program”, presented by Carmen V. Harrison, Candidate for the Doctor of Philosophy Degree, and certify that in their opinion it is worthy of acceptance.

SUPERVISORY COMMITTEE

Peggy Ward-Smith, Ph.D., R.N., Committee Chair
School of Nursing and Health Studies

Joy Dienger, Ph.D., R.N.
TriHealth

Michelle Roa, Ph.D., R.N.
Good Samaritan College of Nursing and Health Science
Cincinnati, Ohio

Karin Roberts, Ph.D., R.N.
ATI Nursing Education

Katherine Smith, Ph.D., R.N.
School of Nursing and Health Studies

Christine Zimmerman, Ph.D., R.N.
School of Nursing and Health Studies
CONTENTS

ABSTRACT ...........................................................................................................iii
LIST OF ILLUSTRATIONS ..................................................................................x
LIST OF TABLES .................................................................................................xi

Chapter

1. INTRODUCTION ............................................................................................1
   Background of the Study .............................................................................4
   Statement of the Problem ........................................................................11
   Purpose of the Study ................................................................................15
   Research Questions ..................................................................................15
   Significance of the Study ..........................................................................16
   Theoretical Framework ...........................................................................18
   Theoretical Assumptions .........................................................................25
   Definition of Terms ..................................................................................26
   Operational Definition of Terms ..............................................................27
   Nature of the Study ..................................................................................29
   Organization of the Remainder of the Study ............................................31

2. REVIEW OF LITERATURE ............................................................................33
   Historical Perspective of Nursing Education ............................................34
   Contemporary Nursing Education ............................................................36
   Critical Thinking ......................................................................................37
   NCLEX-RN ...............................................................................................43
   Predictors of NCLEX-RN Success ............................................................45
Concept-Based Curriculum ................................................................. 49
Gaps in the Literature ...................................................................... 56
Chapter 2 Summary ........................................................................ 57
3. METHODOLOGY ........................................................................... 58
   Research Questions and Hypotheses ............................................. 58
   Research Design ........................................................................... 59
   Target Population ......................................................................... 60
   Sampling Method ......................................................................... 62
   Sample Size .................................................................................. 63
   Setting .......................................................................................... 64
   Variables ....................................................................................... 65
   Instrumentation ............................................................................ 65
   Data Collection Procedures .......................................................... 71
   Data Analysis Procedures ............................................................. 72
   Assumptions and Limitations ....................................................... 77
   Ethical Issues ............................................................................... 79
   Chapter 3 Summary ..................................................................... 81
4. DATA ANALYSIS AND RESULTS ............................................... 83
   Sample Description ...................................................................... 83
   Reliability Testing ......................................................................... 89
   Hypotheses Testing ....................................................................... 95
   Chapter 4 Summary ..................................................................... 107
5. CONCLUSIONS AND DISCUSSION ............................................. 108
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purpose of the Study</td>
<td>108</td>
</tr>
<tr>
<td>Summary of the Results</td>
<td>111</td>
</tr>
<tr>
<td>Theoretical Interpretation of the Results</td>
<td>112</td>
</tr>
<tr>
<td>Discussion of the Results in Relation to the Literature</td>
<td>115</td>
</tr>
<tr>
<td>Implications of the Results for Practice</td>
<td>121</td>
</tr>
<tr>
<td>Recommendations for Further Research</td>
<td>123</td>
</tr>
<tr>
<td>Chapter 5 Summary</td>
<td>125</td>
</tr>
</tbody>
</table>

**Appendix**

A. LETTER OF PERMISSION FROM PRESIDENT                                   | 127  |
B. LETTER OF PERMISSION FROM ACADEMIC DEAN                               | 128  |
C. UMKC IRB APPROVAL                                                     | 129  |
D. TRIHEALTH IRB APPROVAL                                                | 130  |
REFERENCES                                                               | 131  |
VITA                                                                     | 154  |
## LIST OF ILLUSTRATIONS

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Age of the Sample</td>
<td>85</td>
</tr>
<tr>
<td>2.</td>
<td>CTA Program Entry Scores</td>
<td>90</td>
</tr>
<tr>
<td>3.</td>
<td>CTA Program Exit Scores</td>
<td>90</td>
</tr>
<tr>
<td>4.</td>
<td>RN Comprehensive Predictor Scores</td>
<td>91</td>
</tr>
<tr>
<td>5.</td>
<td>CTA Program Entry Score</td>
<td>96</td>
</tr>
<tr>
<td>6.</td>
<td>CTA Program Exit Score</td>
<td>97</td>
</tr>
<tr>
<td>7.</td>
<td>Scatterplot for Assumption of Linearity between Critical Thinking</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Program Exit Score and Probability of Pass Score</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>RN Comprehensive Predictor Scores</td>
<td>106</td>
</tr>
</tbody>
</table>
# LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Concept-Based Curriculum and the Experiential Learning Theory</td>
<td>23</td>
</tr>
<tr>
<td>2. Descriptive Statistics for Age</td>
<td>85</td>
</tr>
<tr>
<td>3. Descriptive Statistics for Age Based on Cohort</td>
<td>86</td>
</tr>
<tr>
<td>4. Descriptive Statistics for Gender</td>
<td>86</td>
</tr>
<tr>
<td>5. Descriptive Statistics for Gender Based on Cohort</td>
<td>87</td>
</tr>
<tr>
<td>6. Descriptive Statistics for Ethnicity</td>
<td>87</td>
</tr>
<tr>
<td>7. Descriptive Statistics for Ethnicity Based on Cohort</td>
<td>88</td>
</tr>
<tr>
<td>8. CTA Program Exit Mean Scores Based on Cohort Compared to National and Program CTA Program Exit Scores</td>
<td>92</td>
</tr>
<tr>
<td>9. RN Comprehensive Predictor Mean Scores Based on Cohort Compared to National and Program RN Comprehensive Predictor Scores</td>
<td>93</td>
</tr>
<tr>
<td>10. First Time NCLEX-RN Pass Rates Compared to National First Time NCLEX-RN Pass Rates for ADN Graduates</td>
<td>93</td>
</tr>
<tr>
<td>11. RN Comprehensive Predictor Versions Based on Cohort Administration</td>
<td>94</td>
</tr>
<tr>
<td>12. ( t )-Test Paired Sample Statistics</td>
<td>98</td>
</tr>
<tr>
<td>13. ( t )-Test Paired Samples Test</td>
<td>98</td>
</tr>
<tr>
<td>15. Collinearity Statistics for Critical Thinking Program Exit Score and Probability of Pass Score</td>
<td>100</td>
</tr>
<tr>
<td>16. Logistic Regression Analysis: Omnibus Test of Model Coefficients</td>
<td>102</td>
</tr>
<tr>
<td>17. Logistic Regression Analysis: Model Summary</td>
<td>103</td>
</tr>
<tr>
<td></td>
<td>Title</td>
</tr>
<tr>
<td>---</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>18.</td>
<td>Logistic Regression Analysis: Hosmer and Lemeshow Test</td>
</tr>
<tr>
<td>19.</td>
<td>Logistic Regression Analysis: Variables in the Equation</td>
</tr>
<tr>
<td>20.</td>
<td>Logistic Regression Analysis: Classification Table Results</td>
</tr>
<tr>
<td>21.</td>
<td>Correlation</td>
</tr>
<tr>
<td>22.</td>
<td>Descriptive Statistics for Probability of Pass Score for First Time</td>
</tr>
<tr>
<td></td>
<td>NCLEX-RN Passage</td>
</tr>
</tbody>
</table>
CHAPTER 1
INTRODUCTION

Responding to concerns regarding the proficiency of novice nurses to safely practice in today’s dynamic health care environment, a paradigm shift in nursing education has been commanded by such notable nursing organizations as the National League for Nursing (NLN, 2008) and the Accreditation Commission for Education in Nursing (ACEN, 2013). Novice nurses are overwhelmingly unable to meet basic nursing practice expectations (Berkow, Virkstis, Stewart, & Conway, 2008; Bowles & Candela, 2005; del Bueno, 2005; Etheridge, 2007; Fero, Witsberger, Wesmiller, Zullo, & Hoffman, 2009; Marshburn, Engelke, & Swanson, 2009). Consequently, a call for a systematic transformation of pre-licensure nursing education to better reflect the current state of nursing practice has been declared (ACEN, 2013; Benner, Sutphen, Leonard, & Day, 2010; Institute of Medicine [IOM], 2011; NLN, 2008). This issue has gained multidisciplinary attention since two landmark reports, apart from the nursing profession, examined contemporary nursing practice and reached similar conclusions (Benner et al., 2010; IOM, 2011).

The Institute of Medicine (2011) released the seminal publication, The Future of Nursing: Leading Change, Advancing Health after an in depth two year study conducted in collaboration with the Robert Wood Johnson Foundation. Results of the study identified pronounced deficits in pre-licensure nursing education, considered to be the cause of the unpreparedness of novice nurses to care for patients in today’s technologically innovative and complex health care environment (IOM, 2011). One recommendation noted in the report is a modification and enhancement of the teaching
approaches implemented in pre-licensure nursing curricula (IOM, 2011). In particular, the report suggested nurse educators utilize teaching strategies that actively engage learners since this is postulated to stimulate deep learning and foster the critical thinking ability of nursing students (IOM, 2011).

The Carnegie Foundation for the Advancement of Teaching also addressed concerns regarding the state of pre-licensure nursing education in the publication, *Educating Nurses: A Call for Radical Transformation* (Benner et al., 2010). An overwhelming theme presented in this report was the notable and widening dissonance that exists in nursing curricula between theoretical content and clinical application (Benner et al., 2010). Another finding was the prevailing presence of content overload, resulting in the superficial transfer and comprehension of information among nursing students (Benner et al., 2010). This report described the use of faculty led lectures as being common practice in pre-licensure nursing education, further contributing to this problem (Benner et al., 2010). Similar to the report published by the IOM (2011), the Carnegie report cited deficiencies in pre-licensure nursing education as being one reason novice nurses struggle with developing the higher order thinking skills needed to make sound clinical decisions when caring for patients with comprehensive health problems (Benner et al., 2010). Recommendations for revising pre-licensure nursing education presented in the report include focusing on real life clinical scenarios, removing extraneous information, and utilizing teaching strategies that engage students (Benner et al., 2010).

One possible solution to better prepare novice nurses for the complexities inherent in the nature of today’s nursing practice is the adoption of a concept-based curriculum
(Giddens, Caputi, & Rodgers, 2015; Hardin & Richardson, 2012). In a concept-based curriculum, essential concepts and related exemplars are identified and selected based upon current national initiatives, health care priorities, and nursing practice (Giddens et al., 2015). With a conceptual approach to teaching, the focus is on concepts, which are abstract ideas and broad generalizations rather than on memorizing facts and topics, as with traditional curricular designs (Erickson & Lanning, 2014). Exemplars provide students with a tangible example of a particular concept (Giddens et al., 2015). Within nursing education, concepts are designed to be taught throughout the curriculum, while related exemplars are assigned to individual nursing courses (Giddens & Brady, 2007; Giddens et al., 2015). Because concepts are broad, they are easily transferable to new experiences (Erickson & Lanning, 2014). It is anticipated that nursing students educated with a concept-based curriculum are able to transmit similar conceptual information taught in previous courses when applying knowledge during new courses and clinical experiences (Giddens & Brady, 2007; Giddens et al., 2015; Hardin & Richardson, 2012).

Although concept-based teaching has been utilized for over seven years in pre-licensure nursing education, little research exits regarding this curricular design. To address this gap, the current study sought to evaluate the outcomes of a concept-based curriculum in an associate degree nursing (ADN) program. Data from the Assessment Technologies Institute (ATI) Critical Thinking Assessment (CTA), ATI RN Comprehensive Predictor, and first time pass success on the National Council Licensure Examination for Registered Nurses (NCLEX-RN) were assessed. The objective for selecting these scores was because they provide valuable information regarding the critical thinking development of nursing students, their readiness to take the NCLEX-RN,
and their ability to meet the minimum competency level for entry into nursing practice. Furthermore, critical thinking ability and first time pass success on the NCLEX-RN are desired outcomes of pre-licensure nursing education programs. This study also aligns with the current research priorities set forth by the IOM and the NLN regarding the evaluation of innovative nursing curricular models (IOM, 2011; NLN, 2013).

**Background of the Study**

Traditional educational methods, such as faculty led lectures, are frequently used to educate nursing students (Benner et al., 2010; Michel & Carter, 2009; Popkess & McDaniel, 2011). While a lecture based teaching approach may have been effective in the past, presently this method is considered antiquated, ineffective for today’s learner, and inadequate in preparing novice nurses to care for patients with multifaceted health problems (Fairman & Okoye, 2011). Traditional nursing curricula contain extraneous information, leading to content overload and a reliance upon rote memorization by students (Hardin & Richardson, 2012). Traditional nursing curricular designs are also derived from a diseased-based medical model, which is inappropriate for nursing practice (Giddens & Brady, 2007). To summarize, Rubenfeld and Scheffer (2010) stated when it comes to preparing novice nurses how to effectively and safely practice in our current health care system, traditional pedagogical designs “just don’t cut it” (p. 80).

An extensive overhaul of nursing education must take place to ensure novice nurses are adequately prepared to deliver intricate nursing care in today’s rapidly changing health care environment (ACEN, 2013; Benner et al., 2010; IOM, 2011; NLN, 2008). The less than desirable outcomes of traditional nursing curricular designs necessitate an immediate intervention with the use of transformative strategies with
daring ingenuity. One solution to this problem entails the wide-spread adoption of innovative nursing curricula, capable of actively engaging students in the learning process and developing their higher order thinking skills (ACEN, 2013; Benner et al., 2010; IOM, 2011; NLN, 2008).

According to Hardin and Richardson (2012), a curriculum design capable of effectively consolidating instructional material, imitating nursing practice, and arming student nurses with the skill set needed to competently enter nursing practice is a concept-based curriculum. A conceptual teaching approach enables educators to streamline content so key information can be targeted (Erickson & Lanning, 2014). Although there is less informational material delivered in a concept-based curriculum, the depth at which the information is presented is far greater than that of traditional nursing pedagogy (Giddens et al., 2015; Hardin & Richardson, 2012).

Giddens et al. (2015) outlined an organized manner for designing a concept-based curriculum for nursing education. The first step in the process is to identify categories in which to place concepts (Giddens et al., 2015). Although the number and type of categories may vary from program to program, there are typically three categories present in most concept-based nursing curricula: attribute concepts, professional nursing practice concepts, and health and illness concepts (Giddens, Wright, & Gray, 2012). Attribute concepts are those considered inherent to individuals, such as culture and diversity (Giddens et al., 2012). Professional nursing practice concepts are germane to the nursing profession and include such concepts as health policy and collaboration (Giddens et al., 2012; Giddens et al., 2015). The health and illness concepts category contains concepts that are related to disease prevention and treatment, such as nutrition and perfusion.
(Giddens et al., 2012; Giddens et al., 2015). Because these concepts are vast, educators may opt to further categorize them into macro-concepts (Giddens et al., 2015). For example, oxygenation and homeostasis may be a macro-concept and a related concept may be perfusion (Giddens et al., 2015).

Another method for categorizing concepts is outlined by Morse (2004), who developed two categories: scientific and lay. Scientific concepts originated from quantitative research and are supported by empirical data (Hardin & Richardson, 2012; Morse, 2004). These concepts have physiological or social characteristics and are typically measured through research (Hardin & Richardson, 2012; Morse, 2004). An example of a scientific concept provided by Morse is coping. In contrast, lay concepts are derived from qualitative research and are a part of everyday language (Hardin & Richardson, 2012; Morse, 2004). Trust is identified as a lay concept (Morse, 2004). When applying these concepts to the education of student nurses, they should be delivered in the context of relating to health care and nursing practice (Hardin & Richardson, 2012).

After developing concept categories, the next action is to select the concepts for the curriculum (Giddens et al., 2015). To assure that the concepts in a concept-based curriculum are relevant and up-to-date, a review of current health care initiatives and nursing standards of practice are reviewed (Giddens et al., 2015). Nurse educators should select concepts that are practical, easily operationalized, relevant throughout the curriculum, and reflect common health care issues seen in contemporary nursing practice (Giddens et al., 2015). When transforming to a concept-based curriculum, faculty at a pre-licensure diploma registered nurse program utilized a consensus approach among
faculty to decide upon the 14 concepts they felt would best prepare their students for modern nursing practice (Lewis, 2014). Giddens et al. (2008) relied upon the direction of their curriculum committee, who selected a total of 59 concepts to be included in their concept-based curriculum.

Following the categorization and selection of concepts, defining each concept should take place (Giddens & Brady, 2007; Giddens et al., 2015). This step is crucial to assure that a mutual understanding and appropriate use of concepts are acknowledged by all faculty (Giddens & Brady, 2007). One approach which may be utilized to define the concepts is to perform a concept analysis (Giddens & Brady, 2007). Walker and Avant (2011) discussed a tactful approach to performing a concept analysis which includes describing the uses, establishing the attributes, developing a model case, constructing borderline, related, contrary, invented, and illegitimate cases, classifying antecedents and consequences, and defining empirical referents for each concept. Although effective, this approach may be time consuming. An alternative to performing a concept analysis for each concept is to define the concepts with the use of a dictionary or by referring to nursing literature (Giddens & Brady, 2007).

Identifying exemplars related to individual concepts is the next stage in developing a concept-based curriculum (Giddens et al., 2015). Exemplars are considered clinical examples that assist in making the abstract nature of concepts easier to comprehend (Giddens et al., 2015). An example of an exemplar is hypertension, which is related to the concept of perfusion. When selecting exemplars, caution should be taken to avoid content overload (Giddens et al., 2015). There may be concern regarding the limited number of concepts and related exemplars associated with a concept-based
curriculum (Giddens et al., 2015). However, emphasis must be placed on the depth of learning reflective of teaching through a conceptual lens. To avoid an inundation of unnecessary exemplars, Lewis (2014) discussed exercises faculty implemented, such as referring to NCLEX-RN preparatory resources and common health care diagnoses at local health care agencies, to determine selection of the exemplars in their curriculum. Another concern is that some exemplars may be related to multiple concepts (Giddens et al., 2015). While various nursing programs may align similar exemplars with different concepts, it is important that faculty identify the concept they feel best relates to an individual concept within their respective curriculum (Giddens et al., 2015).

The final phase of developing a concept-based curriculum is revising and/or creating courses within the curriculum (Giddens et al., 2015). It is recommended that the content focus of didactic nursing courses parallel clinical courses and site placement (Giddens et al., 2015). There is no single approach that is best for sequencing courses. However, nursing courses should contain exemplars that are only taught in the respective course while concepts are threaded throughout the entire nursing curriculum (Giddens & Brady, 2007; Giddens et al., 2015). For example, the concept of perfusion could be taught in each nursing course throughout the curriculum, but the exemplar of hypertension may be taught in an intermediate medical-surgical nursing course, preeclampsia in the obstetrical nursing course, and congestive heart failure in an advanced medical-surgical nursing course. In promoting a successful transition to a concept-based curriculum, faculty in a bachelor of science in nursing (BSN) program relied upon a team of expert faculty to determine the placement of concepts and exemplars and the sequencing of the courses within their curriculum (Brady et al., 2008).
When teaching in a concept-based curriculum, faculty should utilize a conceptual approach with the use of active teaching-learning strategies (Giddens et al., 2015). The implementation of active teaching-learning strategies assists in student engagement, thereby promoting deep learning (Giddens & Brady, 2007). It is this level of learning that contributes to the development of critical thinking among students (Erickson & Lanning, 2014; Hardin & Richardson, 2012). A variety of active teaching-learning strategies may be implemented in a concept-based curriculum, such as case studies, concept maps, problem-based learning (PBL), simulation, group work, and journaling. This pedagogical structure and mode of instruction assists students in making connections and creating relationships among informational material (Erickson & Lanning, 2014; Hardin & Richardson, 2012). Subsequently, students are able to apply and analyze similar information when faced with a new experience. By focusing on nursing concepts and nursing care, students readily transfer theoretical knowledge to the clinical setting (Hardin & Richardson, 2012). For example, using a case study as an active teaching-learning strategy, the nurse educator could focus on the concept of perfusion by describing nursing care for a patient with hypertension. Later in the semester or even in a subsequent nursing course, a student may be assigned to care for a patient on the clinical unit with congestive heart failure. A concept-based teaching approach would allow the student the ability to transfer previously learned conceptual information concerning perfusion to caring for this patient.

All teaching-learning experiences should be formulated based upon learning outcomes (Billings & Halstead, 2012). According to Giddens et al. (2015), when operationalizing a concept-based curriculum, it is important to assess outcomes related to
individual student learning and program evaluation. Learning focus guides may be used in a concept-based curriculum to provide a description of the concept and related exemplar(s), learning outcomes, learning resources, teaching-learning activities, and student evaluation methods addressed in each class. The learning outcomes associated with individual classes lead to the course outcomes that are reflective of the curriculum, and ultimately to the program outcomes (Billings & Halstead, 2012).

Almost a quarter of a century ago, the NLN Accrediting Commission constructed a program outcome for nursing programs specifically related to critical thinking, stating that nursing programs achieving and maintaining NLN accreditation must assure graduates have the ability to critically think (NLN, 2012). Moreover, the ability to critically think is tested on the NCLEX-RN, which is a nursing proficiency test graduates must pass before being granted a license to practice nursing (National Council of State Boards of Nursing [NCSBN], 2013b). The primary purpose of the NCLEX-RN is to safeguard the public by ensuring that those who pass the exam are able to safely function within the registered nurse (RN) scope of practice (NCSBN, 2013b). In 2014, the percentage of nursing graduates who passed the NCLEX-RN on the first attempt was 81.78% (NCSBN, 2014a). Although the majority of nursing graduates are able to pass the NCLEX-RN, many enter the nursing profession labeled as incompetent practitioners (Theisen & Sandau, 2013). According to Kalisch and Begeny (2010), this may be in part due to nurse educators teaching students how to become adept at taking a test instead of how to critically think.

Nursing graduates’ first time pass success on the NCLEX-RN is also an indicator of program excellence, since high failure rates can threaten a nursing program’s
reputation, future enrollment, and accreditation status (Emory, 2013; Roa, Shipman, Hooten, & Carter, 2011; Simon, McGinniss, & Krauss, 2013). According to Simon et al. (2013), an estimated 3,000 nursing graduates fail the NCLEX-RN each year, leading to adverse emotional and financial consequences. Due to the high stakes associated with the NCLEX-RN for nursing graduates and nursing programs, many schools of nursing have adopted terminal program standardized testing, such as critical thinking and NCLEX-RN prediction tests to identify students who are at risk of failing the NCLEX-RN on the first attempt so that remediation can take place prior to taking the licensing examination (Emory, 2013; Simon et al., 2013). However, the disparity between NCLEX-RN pass rates and program graduation rates presents a problem with the outcomes currently used to assess traditional nursing curricula. Nursing programs that are able to grant degrees to its graduates, who cannot demonstrate basic entry level nursing competency by passing the NCLEX-RN on the first attempt, must question their ethical responsibility (Roa et al., 2011). Moreover, they have an obligation to evaluate the quality of their curricula to ensure the education their graduates receive adequately prepares them to pass the NCLEX-RN on the first attempt (Roa et al., 2011) and to be able to effectively critically think as novice nurses.

Statement of the Problem

In 1999, the IOM released a monumental report, To Err is Human: Building a Safer Health System, which brought a great deal of attention to health care related errors and patient safety. According to the report, each year an estimated 98,000 people die in United States’ hospitals due to preventable health care related errors (IOM, 1999). A follow-up study by James (2013), reported the number of deaths has escalated to more...
than 400,000 annually, citing the advancing complexities within the health care setting as a likely cause. The financial implication of these mistakes has been reported as costing over $17 billion (Van Den Bos et al., 2011). Patient safety remains a priority concern in all health care settings and the World Health Organization (WHO) has even discerned this as a global public health issue (2011). The health care environment withstanding the highest rates of health care related errors is the hospital setting, which is where most novice RNs, those within the first year of nursing practice (Morrow, 2009), are initially hired to work (Bowles & Candela, 2005; The Joint Commission, 2012). In fact, the NCSBN (2014b) reported that 72% of novice RNs work in hospitals. Novice nurses make up more than 10% of the nursing staff on a typical hospital unit (Berkow et al., 2008) and almost 20% of novice nurses practice in a critical care unit (NCSBN, 2014b).

A national survey supported by the National Executive Center suggested that 10% of hospital and health care agency executives perceived novice nurses as being adequately prepared to deliver safe and effective care, compared to nearly 90% of nursing education program administrators (Berkow et al., 2008). When comparing the competency levels of nurses with greater than one year of experience to those with less than and/or equal to one year of experience, Fero et al. (2009) reported a statistically significant result, whereby those nurses with fewer years of experience were less able to meet minimal proficiency expectations. In a study exploring the experiences of novice nurses, 30% of the participants resigned from their position in the first year of practice and 57% in their second year of practice, all attributing a compromised sense of patient safety as the reason for resigning (Bowles & Candela, 2005). Further exacerbating this problem are the financial implications for replacing each nurse who resigns, which is
estimated to cost the health care industry $65,000 per nurse (Wieck, Dols, & Landrum, 2010).

The notion of patient safety and the novice nurse was also explored in a survey sponsored by the NCSBN (Kenward & Zhong, 2006). Findings from this survey suggested that over half of the novice RN respondents reported involvement in some type of a health care related error (Kenward & Zhong, 2006). Moreover, the participants attributed these health care related errors to a lack of educational preparation (Kenward & Zhong, 2006).

The substantial gap between nursing education and contemporary nursing practice must be addressed expeditiously. It is essential nurse educators take swift action to prepare novice nurses for the demands inherent in today’s health care environment. Fairman and Okoye (2011) reported that while the patient population with complex health care needs is mounting, there is also an increase in the total patient population, which is thought to be the result of the number of aging Baby Boomers, those born between 1946 and 1964 (Delli Carpini, 2014). Furthermore, it is anticipated that a greater influx of patients will enter the health care system as a result of the Patient Protection and Affordable Health Care Act of 2010, allowing more individuals the opportunity to receive health care in the United States (Fairman & Okoye, 2011). Consequently, novice nurses are expected to deliver intricate nursing care, maintain an increased patient census, and utilize sound clinical judgment when providing care to patients with complex health care needs in a hurried and technology driven health care environment (Benner et al., 2010; Fero et al., 2009; Gillespie & Peterson, 2009; Kalisch & Begeny, 2010; Kanter & Alexander, 2012; Lasater, 2011; Vaismoradi, Salsali, & Marck, 2011).
An association between sound clinical decision-making and critical thinking by nurses has been established (Chang, Chang, Kuo, Yang, & Chou, 2011; Minter, 2010; Victor-Chmil, 2013). Although the proclivity to critically think is a fundamental skill for novice nurses and is even tested on the NCLEX-RN, compelling evidence suggests that novice nurses struggle with being able to effectively exercise this higher order thinking (Benner et al., 2010; Chang et al., 2011; del Bueno, 2005; Fero et al., 2009; LaMartina & Ward-Smith, 2014; Theisen & Sandau, 2013). In fact, a landmark study conducted by del Bueno (2005) found merely 35% of novice nurses were able to effectively critically think. Even novice nurses themselves, have declared an inept critical thinking ability as a staggering concern during their transition from student to practitioner (Etheridge, 2007; Marshburn et al., 2009). Inexperienced nurses often rely upon factual knowledge and task-oriented procedures to solve patient problems instead of devising and implementing a plan of care based on pertinent clinical judgment (Agbedia & Ogbe, 2014; Benner et al., 2010; Gillespie & Peterson, 2009).

In light of this quandary, a re-structuring of nursing education to an innovative curricular design is imperative (ACEN, 2013; Benner et al., 2010; IOM, 2011; NLN, 2008). A concept-based curriculum is an innovative curriculum model postulated to develop nursing students’ critical thinking skills so they are positioned to enter the nursing profession as safe and competent practitioners (Giddens et al., 2015; Hardin & Richardson, 2012). Although literature suggests that this curricular design helps students achieve a deeper level of thinking (Erickson & Lanning, 2014), little empirical evidence exists to support the widespread implementation of a concept-based curriculum in nursing education. Before nurse educators adopt a concept-based curriculum, it is
essential that further research take place to evaluate the effectiveness of this curriculum model.

**Purpose of the Study**

The purpose of this study is to evaluate critical thinking skills and NCLEX-RN pass rates in ADN students completing a concept-based curriculum. Pass rate prediction test scores for the NCLEX-RN will also be explored. While the use of a concept-based curriculum in nursing education is expanding, there is a paucity of literature regarding outcome measurements associated with a concept-based curriculum, such as ADN students’ critical thinking development, NCLEX-RN prediction scores, and NCLEX-RN first time pass success. Also lacking is data regarding a correlation between standardized NCLEX-RN prediction scores and actual NCLEX-RN pass success for ADN students in a concept-based curriculum. Appropriately evaluating the outcomes of a concept-based curriculum in this study may provide nurse educators with empirical support for the utilization of this innovative curricular model, answering the urgent call regarding the drastic need for a revamp of nursing education.

**Research Questions**

The study will address the following research questions:

1. What is the difference between critical thinking program entry score and critical thinking program exit score for ADN students in a concept-based curriculum?
2. What is the relationship between critical thinking program exit score and first time NCLEX-RN pass rates for ADN students in a concept-based curriculum?
3. What is the relationship between probability of pass score and first time NCLEX-RN pass rates for ADN students in a concept-based curriculum?
4. What is the mean probability of pass score for first time NCLEX-RN passage among ADN students in a concept-based curriculum?

**Significance of the Study**

Considering the complexities of today’s patient population and the ever changing health care environment, competency requirements for novice nurses have escalated. The current state of nursing education has been scrutinized for its inability to adequately prepare novice nurses for the intricacies reflective of the 21st century nursing practice (ACEN, 2013; Benner et al., 2010; IOM, 2011; NLN, 2008). Traditional pedagogical instruction is failing to produce nursing graduates who can safely care for patients with increasingly difficult health care conditions in a fast-paced and technologically savvy health care setting (Benner et al., 2010; Fero et al., 2009; Gillespie & Peterson, 2009; Kalisch & Begeny, 2010; Kanter & Alexander, 2012; Lasater, 2011; Vaismoradi, Salsali, & Marck, 2011). A contributing factor to this unrelenting dilemma is the significant emphasis and fundamental requirement that novice nurses are expected to utilize effective critical thinking skills now more than any time in the history of the United States (Fairman & Okoye, 2011). Sound critical thinking on the part of novice nurses is inextricably linked with improved patient safety and optimal health care outcomes (Fero et al., 2009). However, literature is abundant suggesting many novice nurses lack this ability (Benner et al., 2010; Chang et al., 2011; del Bueno, 2005; Fero et al., 2009; LaMartina & Ward-Smith, 2014; Theisen & Sandau, 2013).

Intensifying this problem is the increase in the number of novice nurses entering the nursing profession. According to the Health Resources and Service Administration (HRSA, 2013), there was a 108% surge in the number of novice nurses from 2001 and
2011. Since one-third of the current RN workforce is approaching retirement age (HRSA, 2013) and a 50% turnover is predicted based on those nurses who indicated they plan to retire between 2011 and 2020 (Dracup & Morris, 2007), the number of novice nurses is expected to escalate exponentially. In 2012, the number of practicing RNs was 2.711 million with a projected increase to 3.238 million by the year 2022 (Bureau of Labor Statistics [BLS], 2013). This calculates to a need of approximately 113,000 novice nurses per year over the 10 year span. Consequently, nurse educators can no longer ignore the question posed by Ferguson (2012): “why are nursing education programs missing the mark for competent critical thinkers” (pp. 1-2).

Although an educational re-design is a substantial endeavor, failure to address the inadequacies associated with traditional nursing curricular designs may lead to grave patient health care outcomes (Fero et al., 2009). Nurse educators have an obligation to collaborate and support recommendations for the use of innovative nursing curricular designs, such as a concept-based curriculum. It can be reasonably expected that a concept-based curriculum is able to produce graduates who are capable of exercising a proficient thought process to make appropriate clinical decisions (Hardin & Richardson, 2012). While a concept-based curriculum may be the answer to the perplexing problem facing the current state of nursing education, limited research exists regarding its use in nursing education. Furthermore, there is the paucity of empirical data evaluating the effectiveness of a concept-based curriculum to adequately prepare novice nurses to function in an encumbered contemporary health care environment. Thus, this study was designed to deliver evidence regarding the outcomes of a concept-based curriculum used to educate ADN students.
Theoretical Framework

The Experiential Learning Theory

The experiential learning theory served to guide this research study. David Kolb created the experiential learning theory as an amalgamation of the work of three theorists: John Dewey, Kurt Lewin, and Jean Piaget (Kolb, 1984). As a result, the experiential learning theory is a combination of social psychology, experiential philosophy, and cognitive development, leading to a holistic approach to guiding teaching and learning (Kolb, 1984). Literature regarding the experiential learning theory has been published for over 40 years. However, little empirical data exists regarding the utilization and incorporation of the experiential learning theory (Fowler, 2007).

Experiential learning is defined as the development of knowledge through the experiences one encounters (Kolb, 1984). The premise of the experiential learning theory is that students learn through experience and reflection by actively participating in the learning process (Kolb, 1984). Each new learning experience is built upon previous experiences (Kolb, 1984). According to Kolb (1984), the experiential learning theory can be applied to a wide audience of students since it encompasses the learning styles of students who are abstract learners and learn best through conceptualization and for students who are concrete learners and possess a more tangible learning style.

Due to the holistic nature of the experiential learning theory, faculty can utilize a variety of classroom and clinical learning experiences, such as those that assist students in exercising intellectual thought processes to those that incorporate students’ emotions and attitudes (Howard, Englert, Kameg, & Perozzi, 2011; Kolb, 1984; Laschinger, 1990). The experiential learning theory supports the utilization of teaching methods which
actively engage the learner (Kolb, 1984). Active teaching-learning strategies are postulated to assist in developing critical thinking since these help to generate sound problem solving abilities for students (Howard et al., 2011; Kolb, 1984).

**Stages of the Experiential Learning Theory**

The conceptual model for experiential learning is comprised of four stages: concrete experience, reflective observation, abstract conceptualization, and active experimentation (Kolb, 1984). During the concrete experience stage, students receive information or knowledge delivered didactically by the educator (Kolb, 1984). This stage is often regarded as the foundation for the theory, in particular for providing the basis for observation and reflection by the learner (Kolb, 1984). In a concept-based curriculum, it is during this stage that the educator provides the students with informational material regarding the concept being taught.

According to Kolb (1984), after receiving information in the concrete experience stage, a student may proceed to the reflective observation stage. It is during this stage that students reflect upon the learning experience, either newly gained knowledge or previously acquired knowledge, by becoming actively engaged in the learning process (Kolb, 1984). It is essential for the educator to use active teaching-learning activities during this stage because this practice enhances students’ abilities to reflect upon the learning experience (Kolb, 1984). Reflection is considered vital to successful student learning and is an integral component of the experiential learning theory (Kolb, 1984). Lisko and O’Dell (2010) described the reflective actions that take place during the reflective observation stage of the experiential learning theory as facilitating students’ understanding of the informational material presented during the concrete experience.
stage or with any relatable information previously learned. In a concept-based curriculum, it is during this stage that the educator engages students by utilizing active teaching-learning strategies, which are integral to a concept-based curriculum design. Additionally, the use of active teaching-learning strategies can begin to assist students in making connections with informational material, which is expanded upon in the abstract conceptualization stage of the experiential learning theory.

It is postulated that during the abstract conceptualization stage, students take the knowledge they were able to generate from learning experiences and make connections between concepts associated with the experience (Kolb, 1984). Creating relationships between concepts enables students to exercise reason in order to solve problems (Kolb, 1984). Nursing scholars have given accolades to the experiential learning theory for this outcome because it assists nursing students in developing the critical thinking skills they need to generate sound clinical decision making (An & Yoo, 2008; Lisko & O’Dell, 2010). In a concept-based curriculum, it is also during this stage that the educator would provide students with one or more exemplars to assist them in making connections between the concept and the exemplar(s).

The last stage of the experiential learning theory is the active experimentation stage (Kolb, 1984). According to Kolb (1984), this stage allows students the opportunity to implement ideas that were generated from the learning experience. This is considered a practical component of the experiential learning theory (Kolb, 1984). The active experimentation stage is especially evident in nursing education because it is during this stage that nursing students can apply theoretical knowledge when caring for patients on the clinical unit, thereby demonstrating active experimentation (Lisko & O’Dell, 2010).
In a concept-based curriculum, it is during this stage that students would exhibit behaviors reflective of nursing care by transferring theoretical knowledge to the clinical setting.

According to Kolb (1984), students are encouraged to participate in each stage of the experiential learning theory to help develop a comprehensive learning experience. Kolb posits that a learner can begin at any stage of the learning process and it is not required that a learner progress through the stages in a sequential manner. The conceptual model for the experiential learning theory is illustrated in a cyclic fashion that demonstrates the relationship between learning and experience, which serves as the basis for the experiential learning theory (Kolb, 1984).

The Experiential Learning Theory and Nursing Education

Howard et al. (2011) and St. Onge, Hodges, McBride, and Parnell (2013) described the experiential learning theory as being applicable to the education of students enrolled in any practice-based program, such as nursing. Although Kolb’s experiential learning theory was founded in the area of organizational psychology and was initially applied in the field of education, it has received positive feedback for its use within the nursing profession (Laschinger, 1990). The experiential learning theory has been proven testable, able to yield predictable outcomes, and possesses empirical adequacy (Fawcett, 2005) since a review of literature analyzing nursing research studies resulted in a collaboration of the use of the theory in nursing education (Laschinger, 1990). Other, more recently published literature, also found favorable use of Kolb’s experiential learning theory in guiding nursing education (An & Yoo, 2008; D'Amore, James, &
Mitchell, 2012; Howard et al., 2011; Lisko & O’Dell, 2010; Overstreet, 2008; Poikela, Ruokamo, & Teras, 2015), thereby ensuring it has pragmatic adequacy (Fawcett, 2005).

**Applicability of the Experiential Learning Theory to the Research Study**

The experiential learning theory was meticulously analyzed for its relevance to this research study, in particular, for assessing and measuring the study variables. The independent variables in this study are critical thinking program exit score and probability of pass score. The outcome variable is first time pass success on the NCLEX-RN.

The relationship between the experiential learning theory and a concept-based curriculum was also taken into consideration. The experiential learning theory has been postulated as being capable of serving as the foundation for a concept-based curriculum (Vezina & Salvador-Paguirigan, 2015). Characteristics specific to a concept-based curriculum were previously described with each stage of the experiential learning theory, supporting relevance to this study. Additionally, similarities between a concept-based curriculum and the experiential learning theory can be found in Table 1.1.
<table>
<thead>
<tr>
<th><strong>Concept-Based Curriculum</strong></th>
<th><strong>Experiential Learning Theory Stage and Description</strong></th>
<th><strong>Anticipated Behavior</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Students are provided informational material about the concept of perfusion and the related exemplar of hypertension.</td>
<td>Concrete Experience: Students receive information.</td>
<td>Knowledge Acquisition</td>
</tr>
<tr>
<td>Students actively participate in a group activity by completing a case study regarding a patient diagnosed with hypertension. In a previous course they participated in a simulated laboratory experience about a patient diagnosed with anemia.</td>
<td>Reflective Observation: Students are engaged in the learning process. They reflect upon the learning experience and build upon any prior related knowledge.</td>
<td>Reflection</td>
</tr>
<tr>
<td>Students make connections in their minds about the concept of perfusion.</td>
<td>Abstract Conceptualization: Students take the knowledge they have and use this to make connections between concepts and learning experiences.</td>
<td>Conceptual Development</td>
</tr>
<tr>
<td>Students appropriately care for a patient diagnosed with congestive heart failure on the clinical unit.</td>
<td>Active Experimentation: Students apply the knowledge they gained during recent and prior experiences.</td>
<td>Demonstration</td>
</tr>
</tbody>
</table>

An and Yoo (2008) and Lisko and O’Dell (2010) described the utilization of the experiential learning theory in nursing education as being capable of promoting and assessing critical thinking among students. A concept-based curriculum is also postulated to promote the development of nursing students’ critical thinking skills. It is anticipated that as study participants progress through each stage of the experiential learning theory,
their critical thinking skills will mature and learning will be achieved through a concept-based curriculum design.

Both the experiential learning theory and concept-based curriculum support the use of active teaching-learning strategies and purport that learning is achieved by creating connections between information and relating previous experiences to new ones. Since participants in this study are nursing students, this learning will be reflected in critical thinking scores, NCLEX-RN prediction scores, and NCLEX-RN results. Evaluating critical thinking skills and adequate proficiency levels for entry into nursing practice are relevant to both the experiential learning theory and a concept-based curriculum.

Literature supports objective testing as a method for assessing the outcomes of the experiential learning theory (Carrick, 2011; March & Ambrose, 2010; Mosser, Williams, and Wood, 2006). Giddens et al. (2015) described customary approaches for measuring outcomes associated with nursing education as being suitable for measuring the outcomes of a concept-based curriculum. The instruments that will be used in this study are the ATI CTA, ATI RN Comprehensive Predictor, and NCLEX-RN. These are all objective tests, providing quantitative data related to the appropriate assessment of nursing students’ learning outcomes.

The study results will describe differences between the critical thinking skills of students prior to entering the nursing program and after being educated with a concept-based curriculum. Furthermore, a relationship between critical thinking program exit score and NCLEX-RN pass results and probability of pass score and NCLEX-RN pass results will be described. The critical thinking program exit score, probability of pass score, and NCLEX-RN pass results were obtained after students were educated with a
concept-based curriculum, providing evidence for the development of critical thinking and overall learning.

In summary, a theoretical analysis concluded that the experiential learning theory was appropriate in serving as the underpinnings for this research study. The experiential learning theory provided support for addressing the research questions, operationalizing the study variables, and interpreting the study results.

**Theoretical Assumptions**

The experiential learning epistemology assumes students learn by connecting prior experiences to new experiences through active engagement in their learning (Kolb, 1984). The experiential learning theory operates under two assumptions: experience and learning.

**Experience**

An assumption of the experiential learning theory is that experience serves to shape new knowledge (Kolb, 1984). Students come to the academic arena with their own intellectual framework comprised of knowledge from prior experiences (Kolb, 1984). When faced with a new experience, students bring forward knowledge from a related experience in the past to create new knowledge (Kolb, 1984). Information encountered in a new experience is applied to an existing intellectual framework composed of a past experience by developing relationships between conceptual information (Kolb, 1984).

**Learning**

Another assumption of the experiential learning theory is that by relating previous experiences to new experiences, learning is achieved (Kolb, 1984). Furthermore, the creation of conceptual relationships between similar information assists in promoting
learning (Erickson & Lanning, 2014; Kolb, 1984). Learning is also achieved by the student becoming actively engaged in the learning process and by reflecting upon new and past learning experiences (Kolb, 1984). An associated outcome of learning within the experiential learning theory is the ability to problem solve (Kolb, 1984).

**Definition of Terms**

The theory of experiential learning can be used to guide nursing education (Howard et al., 2011; St. Onge et al., 2013). The central aspect of this theory is experiential learning, which is defined as the construction of knowledge based on experiences one encounters, whereby previous experiences are linked to new experiences (Kolb, 1984). Knowledge is defined as obtaining information and building skills through education (Grant, 1992). This is applicable to nursing education since students are expected to bring forth information and skills from knowledge gained through prior nursing courses, clinical courses, and general education courses to new experiences in the classroom and clinical settings.

The experiential learning theory also supports active teaching-learning strategies, as this approach is posited as assisting students in creating relationships between conceptual information (Kolb, 1984). Moreover, active teaching-learning strategies promote student engagement in the learning process, which aids in building critical thinking skills (Erickson & Lanning, 2014; Giddens & Brady, 2007; Hardin & Richardson, 2012). Student engagement is defined as attracting the attention and interest of students to the subjects or topics being taught (Kahn, 2014).
Operational Definition of Terms

The following definitions are provided to assist in interpreting the concepts in this study.

*Active teaching-learning strategies* – Instructional methods used by the instructor to assist in generating knowledge among students by engaging them in the learning process (Greer, Pokorny, Clay, Brown, & Steele, 2010).

*Assessment Technologies Institute (ATI)* – A company offering standardized testing products designed to assess nursing students’ knowledge and provide national competency levels for nursing proficiencies (ATI, 2014).

*Associate Degree Nursing (ADN) program* – An educational pathway consisting of an average of four semesters of coursework and clinical experiences designed to prepare a graduate to practice as a registered nurse (Matthias, 2010).

*Clinical decision making* – Utilizing interpretation and analysis to select an appropriate response when providing clinical care (Gambrill, 2012; Levett-Jones et al., 2010; Sullivan, 2012).

*Concepts* – Broad, abstract ideas that, when used in a concept-based curriculum, are taught throughout the curriculum (Giddens et al., 2015). An example is perfusion.

*Concept-based curriculum* – An educational model utilizing a conceptual approach to teaching by focusing on concepts and exemplars and incorporating the use of active teaching-learning strategies (Giddens & Brady, 2007).

*Critical thinking* – “A purposeful, self-regulatory judgment which results in interpretation, analysis, evaluation, and inference, as well as explanation of the evidential,
conceptual, methodological, criteriological, or contextual considerations upon which that judgment is based” (Facione, 1990, p. 2).

**Critical Thinking Assessment (CTA)** – A 40-item test designed to be given at program entry and exit to assess a student’s ability to utilize interpretation, analysis, explanation, inference, evaluation, and self-regulation, (ATI, 2001). The critical thinking program exit score served as an independent variable in this study.

**Exemplars** – Tangible examples that, when used in a concept-based nursing curriculum, assist in making the abstract nature of concepts easier to understand (Giddens et al., 2015). An example is hypertension.

**First time NCLEX-RN pass success** – The ability of a nursing graduate to meet entry level competency on the NCLEX-RN when taking the exam for the first time (Taylor, Loftin, & Reyes, 2014). First time NCLEX-RN pass success within the first six months from graduation served as the dependent variable in this study.

**National Council Licensure Examination for Registered Nurses (NCLEX-RN)** – A multiple choice, computerized, adaptive exam aimed at measuring entry level competency for graduates of registered nurse programs across the United States for which passage is required to become a licensed registered nurse (NCSBN, 2013b).

**National Council of State Boards of Nursing (NCSBN)** – A national organization comprised of all state boards of nursing with the purpose of creating and managing licensing examinations for nurses (NCSBN, 2013b).

**Novice nurse** – A nurse who is new to the profession, with limited clinical experience and is typically in the first year of nursing practice (Morrow, 2009).
**Passive curriculum** – An educational model that is instructor focused, often utilizes lecture as the primary mode of instruction, and is considered traditional (Fairman & Okoye, 2011; Rubenfeld & Scheffer, 2010).

**Problem-solving** – Utilizing effective strategies in an attempt to resolve an issue, related to critical thinking (Alfaro-LeFevre, 2013).

**Probability of pass score** – An individualized score obtained from the ATI RN Comprehensive Predictor exam to predict an examinee’s preparedness to take the NCLEX-RN (ATI, 2014). This served as an independent variable in this study.

**RN Comprehensive Predictor** – A 180-item multiple choice test designed to assess a nursing student’s preparedness to take the NCLEX-RN (ATI, 2014). The probability of pass score served as an independent variable in this study.

**Nature of the Study**

All participants were required to take the CTA program entrance exam as a program requirement and the CTA program exit exam prior to graduation. These scores measured the critical thinking development of the study participants. The program entry score provided a baseline for critical thinking ability and the program exit score indicated the change in critical thinking following exposure to a concept-based curriculum. The difference between the CTA program entry score and CTA program exit score assisted in gaining an understanding of the impact of a concept-based curriculum on nursing students’ critical thinking development.

The relationship between CTA program exit score and first time pass success on the NCLEX-RN was examined for two reasons. First, critical thinking is tested on the NCLEX-RN (NCSBN, 2014a) and a high rate of first time pass success on the exam is a
hallmark program outcome (Emory, 2013; Roa et al., 2011; Simon et al., 2013). Therefore, it may be suggested that increased critical thinking scores may subsequently result in high NCLEX-RN pass success. Secondly, there is a vast difference in the views of administrators in the educational and health care arenas regarding the preparedness of novice nurses to safely practice in today’s health care environment (Berkow et al., 2008). Since critical thinking is considered a prerequisite for safe and competent entry into nursing practice (Kalish & Begeny, 2010; Jones & Morris, 2007), gaining an understanding of the relationship between critical thinking and NCLEX-RN pass success, which grants graduates a license to practice nursing, may assist in solving this conundrum.

Another program requirement for all participants was completion of the RN Comprehensive Predictor prior to graduation. After successfully graduating from the program and NCLEX-RN eligibility was determined, graduates were able to take the NCLEX-RN. A correlation between scores on the RN Comprehensive Predictor and first time pass success on the NCLEX-RN was assessed in an attempt to discern the ability of the prediction test to identify pass success for nursing students educated in a concept-based curriculum. The mean score on the RN Comprehensive Predictor associated with first time pass success for ADN students in a concept-based curriculum was determined. The RN Comprehensive Predictor is considered a valuable outcome measurement for nursing curricula and is a method for identifying students who are at risk for failing the NCLEX-RN. Being able to describe the correlation between probability of pass score and first time NCLEX-RN pass success for students in a concept-based curriculum can help to evaluate this innovative curricular design.
Organization of the Remainder of the Dissertation

Chapter One provided the background of the study, which discussed the relationship between the independent variables and the dependent variable with intent to evaluate the outcomes of a concept-based curriculum. The statement of the problem, purpose of the study, and significance of the research established the potential benefits of the study’s findings to nursing education. A discussion of the theoretical framework, definition of terms, theoretical assumptions, and the applicability of the theoretical framework to the research study were provided. Chapter One also included the research questions, operational definition of terms, assumptions and limitations, and nature of the study.

Chapter Two presents the review of the literature related to the study’s variables. In particular, there is a discussion regarding critical thinking, predictors of NCLEX-RN success, and NCLEX-RN outcomes. In addition, Chapter Two includes a historical and current perspective of nursing education and the application of a concept-based curriculum in nursing education. Gaps in the literature are also discussed as they relate to this research study.

Chapter Three describes the methodology utilized in this study. The target population, sampling method, and sample size is discussed as it relates to the study’s participants. The research setting is also identified in Chapter Three. Additionally, the CTA, RN Comprehensive Predictor, and NCLEX-RN instruments are described, including their reliability and validity. Chapter Three also identifies the data collection and data analysis procedures. Limitations of the research design are also included in the chapter.
Chapter Four provides a description of the sample. This chapter also reports the results of the data analyses related to the research questions and testing of each hypothesis.

Chapter Five provides a discussion of the findings, conclusions, and implications. Furthermore, recommendations for further research related to concept-based curricular designs in nursing education are also described in the final chapter.
CHAPTER 2
REVIEW OF LITERATURE

This chapter provides a historical and current perspective of nursing education. A review of the current literature regarding critical thinking, national council examination for registered nurses (NCLEX-RN) outcomes, and predictors of NCLEX-RN pass success will also be reviewed. Furthermore, this literature review presents research studies utilizing a variety of commercially prepared standardized testing instruments aimed at assessing nursing students’ critical thinking skills and preparedness for the NCLEX-RN. In addition, the incorporation of a concept-based curriculum in nursing education will be described. Gaps in the existing literature will be identified to provide support for this study.

The literature search primarily used Cumulative Index to Nursing and Allied Health Literature (CINAHL), Education Resources Information Center (ERIC), ProQuest, and PubMed. Some of the subject terms incorporated in the literature review were: “critical thinking”, “NCLEX-RN”, “NCLEX-RN predictors” “concept-based curriculum”, “nursing education”, and “education, nursing, associate” during the years of 2000-2015. The search was limited to research articles and English language which yielded over 1000 articles. After combining subject terms, such as “critical thinking” and “nursing education”, this narrowed the results to nearly 500 articles. According to Polit and Beck (2012), the purpose of a literature review is to provide the researcher with an assessment of the depth and breadth of information related to a particular topic. Therefore, the title and abstracts of the articles were reviewed and those determined
applicable to the current study purpose and research questions were retained for this literature review.

**Historical Perspective of Nursing Education**

While Florence Nightingale is most widely recognized as the founder of modern nursing, her contributions to nursing education are just as remarkable (Roberts, 1937). In 1860 she established the first school of nursing in London, transforming nursing education (Roberts, 1937; Seymer, 1960). Nightingale’s methods for educating nurses could be regarded by some as being far ahead of her time, as she recognized the need for the active involvement of students in the learning process (Caputi, 2007). Nightingale even required her students to keep a reflective journal that included patient data gathered through a systematic thought process (Roberts, 1937; Seymer, 1960).

Another notable early contributor to nursing education is Adelaide Nutting, who in 1898 published a report she conducted on nursing programs in the United States (Nutting, 1901). During her investigation of the quality of the country’s initial nursing programs, Nutting identified a common and concerning thread regarding the lack of admission requirements, grading criteria, vigor, and training for student nurses when compared to pupils of other disciplines (Nutting, 1901). In particular, Nutting (1901) found it alarming that nursing education did not emphasize the importance of relating classroom knowledge to the hospital setting or role model the decision making process exercised by practicing nurses.

Soon after the publication of Nutting’s report, the National League for Nursing (NLN) published a document in 1917, *Standard Curriculum for Schools of Nursing*, which outlined guidelines for implementing a generalized nursing program (NLN, 2003;
NLN, 2012). Since then, the NLN has served as a valuable resource to nurse educators and directors of nursing programs throughout the country with regards to nursing program development, implementation, evaluation, and revision (NLN, 2012). In 1938, the organization was established as an accrediting body to assist in monitoring the quality of nursing education (NLN, 2012).

In 1991, the NLN constructed a program outcome for nursing programs specifically related to critical thinking, stating that nursing programs achieving and maintaining NLN accreditation must ensure graduates of their programs possess the ability to critically think (NLN, 2012). The NLN was not the first to bring attention to the topic of critical thinking, as this can be traced back to the Greek philosophers, Plato and Aristotle (Burbach, Matkin, & Fritz, 2004; Cody, 2002). In fact, the date of the first educator to inspire the critical thinking process among students was in the fifth century Before Christ (B.C.) and is attributed to Socrates (Becker, 2007; Wang, Tsai, Chiang, Lai, & Lin, 2008). Although critical thinking has been a topic of interest among a variety of disciplines, including nursing, for many years, reaction to the NLN nursing program outcome for critical thinking was met with mixed reactions by nurse educators (Walsh & Seldomridge, 2006).

Twelve years after declaring critical thinking as a program outcome, the NLN responded to a continued nursing program assessment and released a position statement regarding curricula reform for nursing education (NLN, 2003). The focus of this position statement was the educational strategies practiced in nursing programs (NLN, 2003). In particular, the organization stated nursing faculty must “design new methods that meet students’ needs to learn practice that prepares graduates to thrive in today’s healthcare
environments” (NLN, 2003, p. 4). In 2008, the NLN assembled a body of experts to address issues related to nursing education. These experts recommended a revision of nursing curricula with a greater emphasis on developing students’ ability to critically think so they would be better situated to function in the role of a novice nurse (NLN, 2008).

**Contemporary Nursing Education**

Nurse educators’ approaches to implementing suggestions by the NLN have been sluggish (NLN, 2012). In light of an overdue outcry for change and a renewed sense of urgency in addressing the current state of nursing education, several influential organizations have joined the NLN in the call for an overhaul of nursing education. These organizations include the Accreditation Commission for Education in Nursing (ACEN, 2013), the Carnegie Foundation for the Advancement of Teaching (Benner, Sutphen, Leonard, & Day, 2010), and the Institute of Medicine (IOM, 2011).

The IOM (2011) partnered with the Robert Wood Johnson Foundation and Benner et al. (2010) collaborated with the Carnegie Foundation for the Advancement of Teaching, both with the similar goal of examining the status of nursing education. These reports congruently noted substantial shortcomings in contemporary nursing education with regards to preparing nursing students to practice in today’s complex health care environment (Benner et al., 2010; IOM, 2011). Results of the study performed by Benner et al. (2010) also suggested the presence of a colossal disparity between nursing education and nursing practice. Similarly, both reports suggested abandoning traditional teaching approaches and adopting teaching strategies that actively engage nursing students to promote their ability to critically think (Benner et al., 2010; IOM, 2011).
Critical Thinking

The topic of critical thinking can be traced back to Socrates in the fifth century B.C. (Wang et al., 2008). Socrates is often recognized as being the first educator to promote critical thinking among his students by asking probing questions, now referred to as “Socratic questioning” (Wang et al., 2008). The Greek philosophers, Plato and Aristotle, followed Socrates and also practiced the principles of critical thinking (Cody, 2002).

Over the years, other educators and scholars have explored the topic of critical thinking, even developing definitions for this higher order thinking. Dewey (1933) believed every American should possess the ability to critically think and that reflective thought was an attribute of critical thinking. According to Dewey, reflective thought is “active, persistent, and careful consideration of any belief or supposed form of knowledge” (p. 9). McPeck declared that critical thinking should be related to one’s discipline and identified a component of critical thinking as “the propensity and skill to engage in an activity with reflective skepticism” (1981, p. 8). While Ennis (1985) defined the action of critical thinking as “reflective and reasonable that is focused on deciding what to believe or do” (p. 45). Brookfield (1987) cited critical thinking as being “a productive, positive process of calling into question the assumptions underlying our customary, habitual ways of thinking and acting” (p. 1). Paul (1992) stated “critical thinking is the art of thinking about your thinking while you are thinking in order to make your thinking better” (p. 643).

In 1990, in response to the multitudinous definitions for critical thinking and recognizing the importance of a universal meaning for this concept, the American
Philosophical Association assembled a panel of expert scholars representing diverse disciplines to generate an agreed upon definition for critical thinking (Facione, 1990). This work was referred to as a Delphi project and assisted in developing a definition for critical thinking, which can be utilized within various fields of study (Facione, 1990). One element in the definition for critical thinking created by this group is “purposeful, self-regulatory judgment which results in interpretation, analysis, evaluation, and inference, as well as explanation of the evidential, conceptual, methodological, criteriological, or contextual considerations upon which that judgment is based” (Facione, 1990, p. 2).

Critical Thinking in Nursing

Similar meanings can be found for the definition of critical thinking relative to nursing and nursing education (Alfaro-LeFevre, 1995; Colucciello, 1997; Gordon, 2000; Miller & Babcock, 1996; Riddell, 2007; Rubenfeld & Scheffer, 2010; Scheffer & Rubenfeld, 2000; Walthew, 2004). The concept of critical thinking has been noted to be a prevalent and essential issue in the nursing profession for over a quarter of a century (Martin, 2002; Riddell, 2007). However, it is worth noting that an absolute and concise definition for this concept has yet to be construed or agreed upon by nurse scholars (Blondy, 2011; Colucciello, 1997; Gordon, 2000; Mundy & Denham, 2008; Rubenfeld & Scheffer, 2010; Walthew, 2002).

Scheffer and Rubenfeld (2000) imitated the Delphi project technique utilized by Facione (1990). In this particular study, nurse experts from Brazil, Canada, England, Iceland, Japan, Korea, the Netherlands, Thailand, and the United States were assembled in an attempt to develop a definition of critical thinking related to nursing (Scheffer &
Rubenfeld, 2000). After five rounds of questioning, this panel concluded that attributes, such as using logic to comprehensively analyze information when making clinical decisions, identifying the rationale for these decisions, and knowing when to implement other options when problem solving are essential for critical thinking germane to nursing education and nursing practice (Scheffer & Rubenfeld, 2000).

Critical thinking is considered a pre-cursor to sound clinical decision-making by nurses (Chang, Chang, Kuo, Yang, & Chou, 2011; Minter, 2010; Victor-Chmil, 2013). The conclusion can be made that the ability to critically think is an essential skill for novice nurses, yet literature is replete suggesting many are challenged in exercising this thought process (Benner et al., 2010; Chang et al., 2011; del Bueno, 2005; Fero, Witsberger, Wemiller, Zullo, & Hoffman, 2009; LaMartina & Ward-Smith, 2014; Theisen & Sandau, 2013). Instead of utilizing effective clinical judgment, novice nurses often turn to factual information and performing tasks as a means of resolving patient care issues (Agbedia & Ogbe, 2014; Benner et al., 2010; Gillespie & Peterson, 2009).

In fact, a pivotal study by del Bueno (2005) found merely 35% of the sample of 10,988 nurses with less than one year of nursing experience were able to effectively critically think. The researcher utilized a performance based evaluation to assess the ability of nurses to exercise critical thinking through the selection of appropriate interventions related to various clinical scenarios (del Bueno, 2005). Regardless of educational preparation, novice nurses consistently scored lower than experienced nurses in managing the clinical care of patients (del Bueno, 2005).

Similarly, Fero et al. (2009) reported a difference in years of experience and effective critical thinking ability, with novice nurses possessing the lowest critical
thinking skills. Nurses with less than one year of experience failed to meet basic practice expectations when exposed to clinical vignettes (Fero et al., 2009). In particular, novice nurses were not able to effectively identify problems exhibited by patients or prioritize and implement appropriate nursing interventions to manage the care of these patients (Fero et al., 2009).

Following an integrative review of literature related to the experiences of novice nurses, Morrow (2009) concluded that critical thinking deficits were the chief reason novice nurses were involved in health care errors. Further insight was gained from Saintsing, Gibson, and Pennington (2011), who performed a review of the literature, and noted the two primary causes for health care errors were related to critical thinking and years of nursing experience. The most common type of error committed by novice nurses was related to medication administration (Saintsing et al., 2011). Smith and Crawford (2003) reported nearly 75% of novice nurses in their study were directly involved in a medication error. Likewise, Ebright, Urden, Patterson, and Chalko (2004) interviewed novice nurses at the end of their first year of practice and study findings indicated that up to 88% of the participants had committed a medication error and furthermore 30% of these errors were related to a lack of critical thinking ability.

Even novice nurses themselves, have declared an inept critical thinking ability as a staggering concern during their transition from student to practitioner (Etheridge, 2007; Marshburn, Engelke, & Swanson, 2009; National Council of State Boards of Nursing [NCSBN], 2006). The relationship between critical thinking and perceived competence among novice nurses was explored in a study conducted by Wangensteen, Johansson, Björkström, and Nordström (2012). These researchers utilized an instrument to measure
the perception of novice nurses in their ability to competently implement nursing interventions, such as providing patient teaching and managing patient problems (Wangensteen et al., 2012). These data were compared to the participants’ critical thinking scores, for which an association between lower critical thinking scores and lower perceptions of competence was indicated (Wangensteen et al., 2012). In a similar study, utilizing a descriptive, longitudinal, phenomenological research design, Etheridge (2007) interviewed baccalaureate prepared novice nurses, who also reported feeling incompetent and unprepared to function as beginning practitioners. The study participants cited a lack of exposure to critical thinking development exercises in nursing school as the likely cause for these sentiments (Etheridge, 2007).

**Critical Thinking in Nursing Education**

When assessing the critical thinking development of nursing students, studies have led to contradictory findings. Jones and Morris (2007) performed a longitudinal, descriptive study with the purpose of assessing associate degree nursing (ADN) students’ critical thinking development with the use of the Assessment Technologies Institute (ATI) Critical Thinking Assessment (CTA). Results of the study indicated no change in the critical thinking skills of the study participants from program entry to program exit (Jones & Morris, 2007). While the study results were concerning, Jones and Morris scrutinized the teaching strategies implemented in the nursing program for their ability to develop nursing students’ critical thinking skills, suggesting this may have contributed to the study’s findings. Furthermore, the authors questioned the proficiency of the faculty in their ability to effectively teach and assess critical thinking among nursing students (Jones & Morris, 2007).
Similar findings were reported by Giddens and Gloeckner (2005) and Stewart and Dempsey (2005), although both studies included baccalaureate nursing students as study participants. Moreover, to measure critical thinking, Giddens and Gloeckner used the California Critical Thinking Disposition Inventory (CCTDI) and California Critical Thinking Skills Test (CCTST) while Stewart and Dempsey only utilized the CCTDI. Neither study found a statistically significant difference between program entry critical thinking scores and program exit critical thinking scores, leading the authors to recommend nurse educators implement teaching strategies that are postulated to enhance the critical thinking development of nursing students (Giddens & Gloeckner, 2005; Stewart & Dempsey, 2005).

An and Yoo (2008) and Shin, Lee, Ha, and Kim (2006) also used the CCTDI, but reported different results from the before mentioned studies. In the study conducted by An and Yoo, a statistically significant increase ($p = 0.045$) in the critical thinking development of baccalaureate nursing students was found as they progressed in nursing school. Similarly, Shin et al. reported a statistically significant increase ($p = 0.001$) in the critical thinking development of their study participants, who were also baccalaureate nursing students. Both of these studies were conducted in Korea, which makes generalizing the studies’ findings to schools of nursing in the Unites States challenging.

When exploring the critical thinking dilemma among novice nurses, some researchers have directed study implications toward nursing education. Li and Kenward (2006) conducted a national survey with the intent of assessing novice nurses’ ability to practice with regards to perceptions of their educational preparation. Nearly 7,500 of the registered nurses (RNs), who were primarily graduates of ADN programs, responded to
the survey (Li & Kenward, 2006). Although the majority of the respondents reported their education adequately prepared them to practice as beginning practitioners, their perceived deficits were related to a lack of critical thinking development (Li & Kenward, 2006). Utilizing a similar research design to assess the critical thinking skills of novice nurses, approximately 80% of the respondents in another study reported favorable characteristics related to critical thinking (Wangensteen, Johansson, Björkström, & Nordström, 2010). However, the authors noted the lowest critical thinking score was related to the use of traditional pedagogical approaches implemented by nurse educators and proposed the use of active teaching-learning strategies in nursing education (Wangensteen et al., 2010).

Based on the review of the literature, it can be suggested that novice nurses struggle with exercising critical thinking skills, even though this is vital to providing safe nursing care (Chang et al. 2011; Minter, 2010; Victor-Chmil, 2013). This deficit in higher order thinking may be the result of failing to develop the ability to critically think during their nursing education. As a result, further research is urgently needed to examine the critical thinking skills of nursing students so efforts can be made to remedy this problem before they transition into nursing practice.

**NCLEX-RN**

The NCLEX-RN is a computerized examination, designed to test nursing graduates’ basic competency for entry into nursing practice (NCSBN, 2013b). According to the NCSBN (2013b), the majority of the questions on the exam are written at the application or higher cognitive levels based on Bloom’s taxonomy. Every three years the blueprint for the examination is revised to reflect contemporary nursing practice.
The number of questions on the NCLEX-RN vary between 75 and 265 questions since the examination adapts to the examinee’s ability to answer each question correctly (NCSBN, 2013b). The questions on the examination are categorized into four Client Needs content areas: 1) Safe and Effective Care Environment, 2) Health Promotion and Maintenance, 3) Psychosocial Integrity, and 4) Physiological Integrity (NCSBN, 2013b). Furthermore, the questions on the examination are written to assess the examinee’s ability to use critical thinking skills to make clinical decisions (NCSBN, 2013b).

According to the NCSBN (2014a), 81.78% of nursing graduates passed the NCLEX-RN on the first attempt in 2014. Passing the examination on the first attempt is not only reflective of the examinee’s knowledge related to nursing practice, but is also a mark of excellence for nursing programs (Emory, 2013; Roa, Shipman, Hooten, & Carter, 2011; Simon, McGinniss, & Krauss, 2013). Unfortunately, it has been reported that approximately 3,000 nursing graduates fail the exam annually (Simon et al., 2013), which can cause emotional distress and negative financial implications for the examinees and threaten the reputation of the nursing programs from which they graduated (Emory, 2013; Roa et al., 2011).

Substantially adding to the negative consequences for failing the NCLEX-RN on the first attempt is the anticipated nursing shortage. According to the Bureau of Labor Statistics (BLS, 2013), there will be a projected need of approximately 113,000 new nurses per year from 2012 to 2022 to fill vacant nursing positions. Therefore, nurse educators are being tasked with providing nursing students with the skill set needed to
pass the NCLEX-RN on the first attempt so they can expeditiously transition and contribute to the nursing workforce.

**Predictors of NCLEX-RN Success**

In an attempt to avoid the detrimental consequences associated with NCLEX-RN failure and meet the demands of the nursing workforce, many nursing programs have incorporated the use of standardized testing aimed at predicting NCLEX-RN success on the first attempt. It is anticipated that early recognition of nursing students predicted to fail the NCLEX-RN can lead to swift remediation strategies to assist them in passing the examination (Emory, 2013; Simon et al., 2013). Although a variety of factors have been explored for their ability to predict NCLEX-RN pass success through the use of standardized testing, the focus of this literature review was on critical thinking skills and the ATI RN Comprehensive Predictor.

**Critical Thinking Skills**

Contradictory findings were reported regarding the ability of critical thinking skills to predict first time pass success on the NCLEX-RN. Findings from a correlational study conducted by Ukpabi (2008) indicated a positive correlation between critical thinking scores on the ATI CTA and passage of the NCLEX-RN, with an increased ability to critically think resulting in a statistically significant increase in NCLEX-RN pass success ($p = 0.008$). However, the study performed by Ukpabi included a small sample size ($N = 39$). On the other hand, a larger sample size ($N = 218$) was included in a study conducted by Giddens and Gloeckner (2005), who utilized the CCTDI and CCTST to measure study participants’ critical thinking skills. Findings from the study by Giddens and Gloeckner also suggested the presence of a statistically significant relationship
between increased critical thinking scores and higher rates of NCLEX-RN pass success \((p = 0.010)\). The authors of both studies identified a need for the continued assessment of strategies that aid in the prediction of NCLEX-RN success (Giddens & Gloeckner, 2005; Ukpabi, 2008). Another important endeavor that was suggested is further empirical assessment of predictors of NCLEX-RN success among study participants other than baccalaureate nursing students and with curricular models other than traditional nursing pedagogy (Giddens & Gloeckner, 2005; Ukpabi, 2008).

Different results were found in studies conducted by Stewart and Dempsey (2005) and Shirrell (2008), whereby no correlation between critical thinking skills and NCLEX-RN pass success was indicated. Stewart and Dempsey performed a longitudinal, descriptive study with a sample of baccalaureate nursing students, whose critical thinking skills were measured with the CCTDI. Although the initial sample size consisted of 55 participants in their sophomore level, the authors reported program attrition led to a decrease in the sample size to 34 participants by the time they reached their senior level of nursing school. A larger sample size \((N = 173)\) was included in the study conducted by Shirrell, who used a retrospective quantitative research design to assess the predictive ability of the Collegiate Assessment of Academic Proficiency (CAPP) critical thinking assessment to predict NCLEX-RN success among ADN students at a college in a Midwestern state. The author failed to provide further information regarding the sample, such as age, gender and ethnicity which makes it difficult to generalize the findings from this study (Shirrell, 2008).

This review of the literature noted contradictory study findings regarding a relationship between nursing students’ critical thinking ability and NCLEX-RN success.
These conclusions corroborate the findings reported by Romeo (2010), who performed an extensive literature review of quantitative research evaluating the ability of critical thinking skills to predict NCLEX-RN success. Furthermore, several limitations were noted to the studies in this review, such as the use of convenience samples and single research sites. Only Shirrell (2008) utilized a theoretical framework to guide the study and this was the only study to include a sample of ADN students. Moreover, the participants in each study were educated with a traditional nursing curriculum and only one study used the ATI CTA to assess the participants’ critical thinking skills. This suggests a gap in the literature regarding the inclusion of ADN students as study participants who are educated with a concept-based curriculum and whose critical thinking skills are measured with the ATI CTA.

**ATI RN Comprehensive Predictor**

There are a variety of standardized tests used to predict nursing student success on the NCLEX-RN. Since this study assessed the probability of pass score from the ATI RN Comprehensive Predictor, the literature review focused on this instrument. Alameida et al. (2011) performed a retrospective correlational study with the aim of assessing the relationship between NCLEX-RN predictor scores and first time pass success on the NCLEX-RN for nursing students in baccalaureate and master’s programs. The sample size was large (N = 589) and consisted of study participants who represented diverse ethnic and racial backgrounds (Alameida et al., 2011). Findings of the study indicated the presence of a statistically significant relationship (p <0.001) between the prediction scores and NCLEX-RN pass success (Alameida et al., 2011).
Similar findings were reported by Penprase, Harris, and Qu (2013), who also conducted a retrospective correlational design study with the aim of examining a correlation between grades in pre-nursing courses, nursing courses, and scores on the ATI RN Comprehensive Predictor with NCLEX-RN pass success (Penprase et al., 2013). The study participants consisted of a large sample of accelerated second degree seeking nursing students ($N = 363$), although little racial and ethnic diversity were noted among the sample (Penprase et al., 2013). Likewise, participants in a study conducted by Brodersen and Mills (2014) were also homogenous with regards to race and ethnicity, but were baccalaureate nursing students. These researchers also utilized a similar research design as with the before mentioned studies, but compared the ATI RN Comprehensive Predictor to the Health Education Systems, Incorporated (HESI) Exit Exam for the ability of the tests to accurately predict NCLEX-RN pass success (Brodersen & Mills, 2014). Study results revealed statistically significant findings for both the ATI RN Comprehensive Predictor ($p <0.001$) and HESI Exit Exam ($p <0.001$) in forecasting NCLEX-RN pass success (Brodersen & Mills, 2014).

A review of the literature identified studies with results indicating favorable use of the ATI RN Comprehensive Predictor in predicting NCLEX-RN success. However, there were several limitations noted to these studies, such as failing to utilize a theoretical framework, single research sites, convenience samples, and homogenous study participants. Moreover, none of the studies included traditional ADN students nor students educated in a concept-based curriculum. This review of the literature identified a paucity of literature regarding use of the ATI RN Comprehensive Predictor with this population and curricular design.
**Concept-Based Curriculum**

A possible solution for transforming the current state of nursing education and melding nursing education and practice is the utilization of a concept-based curriculum. This curriculum design is postulated to develop nursing students’ critical thinking skills by focusing on concepts that promote knowledge transferability through active teaching-learning strategies (Giddens, Caputi, & Rodgers, 2015). Moreover, nursing students educated with a concept-based curriculum are better prepared with the knowledge and skills needed to practice as competent nurses in a 21st century health care environment (Giddens et al., 2015; Hardin & Richardson, 2012). Although a concept-based curriculum is gaining popularity in nursing education, limited empirical data exists evaluating the outcomes of this innovative curriculum design. Further lacking are studies examining a relationship between predictive variables and first time NCLEX-RN pass success for students educated with a concept-based curriculum. Contrasting findings were reported from three studies, comparing the outcomes of traditional and concept-based curricula designs.

In a mixed-methods descriptive study conducted by Giddens and Morton (2010), findings indicated a lower first time NCLEX-RN pass rate in the first cohort of baccalaureate nursing graduates from the concept-based curriculum. The first time NCLEX-RN pass results of subsequent cohorts in the concept-based curriculum increased slightly and Giddens and Morton asserted an initial decline in the NCLEX-RN pass results can be expected following any radical curriculum revision. Other contributing factors may have led to the decrease in first time NCLEX-RN pass rates for the first cohort from the concept-based curriculum, such as a more ethnically diverse student
population, change to an accelerated nursing program, different mode of delivering didactic information, and revision in the NCLEX-RN blueprint (Giddens & Morton, 2010). Nonetheless, faculty reported apprehension and concern regarding the change from a traditional curriculum to a concept-based curriculum (Giddens & Morton, 2010). In addition to assessing the NCLEX-RN outcomes of the study participants, results of a standardized test aimed at predicting NCLEX-RN success was also examined (Giddens & Morton, 2010). The authors failed to provide the name of the standardized test, but did indicate this test was administered six months before graduation (Giddens & Morton, 2010). A moderate positive correlation ($r = 0.458$) was noted between the mean score of the standardized prediction test and NCLEX-RN pass success (Giddens & Morton, 2010). However, Giddens and Morton reported the test scores could not be used to predict overall NCLEX-RN performance.

Duncan and Schulz (2015) also performed a descriptive study comparing the outcomes of a traditional curriculum to a concept-based curriculum. The total sample size was 240 baccalaureate nursing students in two groups, 104 in the traditional curriculum and 136 in the concept-based curriculum (Duncan & Schulz, 2015). According to Duncan and Schulz, the majority of the study participants were female, Caucasian, and younger than 24 years of age. The outcomes examined in the study were NCLEX-RN pass rates, graduation rates, satisfaction scores, critical thinking scores, and self-efficacy scores (Duncan & Schulz, 2015). The authors did not reveal the name of the critical thinking instrument, only indicating it was a commercially prepared national assessment (Duncan & Schulz, 2015). Descriptive statistics were used to analyze these data, for which the results revealed little differences in the outcomes of both groups of participants (Duncan
& Schulz, 2015). As reported by Duncan and Schulz, changes in the class size, admission cycle, and congruency in conceptual teaching among all faculty were study limitations. Different findings were reported from a descriptive study conducted by Lewis (2014), where outcomes of the NCLEX-RN performance, retention rates, graduation rates, and program satisfaction were compared among diploma registered nurse students in a traditional nursing curriculum and concept-based nursing curriculum. The total sample size was 240, of which 126 were from the traditional curriculum and 114 were from the concept-based nursing curriculum (Lewis, 2014). The study participants’ demographic data were obtained, and revealed similarities among all students with regards to gender, race and ethnicity, previous education, and financial status (Lewis, 2014). As reported by Lewis, the majority of the study participants were female, white, with varied previous education, and recipients of financial aid. The only statistically significant finding \( (p = 0.0437) \) was an increase in program completion rates by 4% for those in the concept-based curriculum (Lewis, 2014). Even though results were not statistically significant, Lewis reported the study results indicated these students also had an increase in retention rates \( (p = 0.4342) \), graduation rates \( (p = 0.7798) \), program satisfaction \( (p = 0.1134) \), employer survey satisfaction \( (p = 0.8219) \), and NCLEX-RN pass rates \( (p = 0.9019) \). According to Lewis, a new faculty advising program was put into place following the transition to a concept-based curriculum, which may have impacted the study findings.

These three studies all present contradictory findings regarding NCLEX-RN outcomes in a concept-based curriculum. Only one study assessed the outcome of critical thinking and one study examined the ability of a standardized prediction test to forecast
NCLEX-RN success. The authors did not provide the names of the instruments used to assess critical thinking or NCLEX-RN pass prediction scores. There were also similar limitations noted to the studies, such as use of convenience samples and single research site, which reduced the generalizability of the findings. Furthermore, none of the study participants were ADN students and all three studies used a weak study design.

**Active Teaching-Learning Strategies**

A primary feature of a concept-based curriculum is the utilization of active teaching-learning strategies. This approach is postulated to assist in reflection and critical thinking (Chang et al., 2011; Fero et al., 2009). There are a variety of active teaching-learning strategies that may be incorporated in a concept-based curriculum, such as case studies, concept maps, problem-based learning (PBL), simulation, gaming, journaling, and role modeling.

**Case studies.** Patient clinical scenarios are presented within case studies and allow students the opportunity to make clinical decisions when examining imitated patient data (Popil, 2011). This instructional approach has received favorable remarks by nursing students regarding its use as an active teaching-learning strategy (DeSanto-Madeya, 2007; Malesela, 2009). A qualitative, exploratory, descriptive, and contextual study conducted by Malesela (2009) aimed to explore nursing students’ experience with using case studies as a teaching-learning strategy. The non-verbal expressions of 24 baccalaureate nursing students were observed as they completed case studies (Malesela, 2009). Themes were generated from the non-verbal expressions and placed into categories (Malesela, 2009). Ten study participants were interviewed to substantiate the themes, which were “case study usage increases critical thinking”, “case study usage
increases theory-practice integration”, and “case study usage increases growth in presentation skills of students” (Malesela, 2009, p. 3). Furthermore, 91.7% of the study participants reported the case study to be an effective teaching-learning strategy (Malesela, 2009).

**Concept maps.** A concept map can be described as providing a visual picture by depicting relationships of concepts related to patient care (Maneval, Filburn, Deringer, & Lum, 2011; Senita, 2008; Toofany, 2008). The use of concept maps and their relationship to the critical thinking ability of nursing students has also been analyzed (Chen, Liang, Lee, & Liao, 2011; Maneval et al., 2011; Sarhangi, Masumi, Ebadi, Seyyed-Mazhari, & Rahmani, 2010). Chen et al. (2011) and Sarhangi et al. (2010) compared the cognitive outcomes of nursing students who were exposed to traditional pedagogy via lecture to those exposed to teaching and learning with the use of concept maps. Results of both studies suggested the participants who were exposed to concept maps had higher meaningful learning and critical thinking skills than those students taught with a traditional pedagogical approach (Chen et al., 2011; Sarhangi et al., 2010). Different results were found in a study conducted by Maneval et al. (2011), in which a quasi-experimental research design was used to determine if a concept map or traditional care plan would lead to higher critical thinking scores. Maneval et al. reported study results indicated both groups displayed an overall ability to critically think, but the participants exposed to the traditional care plan had statistically significant higher critical thinking scores ($p = 0.012$).

**Problem-based learning (PBL).** The use of PBL as an instructional method can be traced to the late 1960’s when it was first implemented to train medical students in
Canada (DeYoung, 2009). Today, nurse educators can use PBL to present patient health care problems to students and have them analyze the information (Rochmawati & Wiechula, 2010).

Research studies assessing the impact of PBL in enhancing the critical thinking ability of nursing students have suggested an increase in the analysis of information among the participants (Gabr & Mohamed, 2011; Jones, 2008; Lyons, 2008; Ozturk, Muslu, & Dicle, 2008; Tiwari, Lai, So, & Yuen, 2006; Yuan, Kunaviktikul, Klunklin, & Williams, 2008). In particular, Jones (2008) used a quasi-experimental, pretest-posttest research design to assess the effects of clinical teaching with PBL on the critical thinking and communication skills of ADN students. Results of the study concluded that both groups demonstrated an increase in critical thinking and communication skills (Jones, 2008). However, the group exposed to PBL had significantly higher critical thinking and communication scores ($p < 0.000$) and also reported favorable use of the PBL as an effective teaching-learning strategy in developing their ability to self-assess, communicate, and critically think (Jones, 2008). Lyons (2008) also assessed the difference in the critical thinking ability of ADN students taught with a lecture format to those taught with PBL, by using an experimental, pretest-posttest, comparative research design. However, no statistically significant result ($p = 0.413$) was found since both groups failed to attain a considerably higher critical thinking score during the posttest and no differences were found between the critical thinking scores of the groups nor in their ability to pass the NCLEX-RN (Lyons, 2008). Research analyzing the impact of PBL on the critical thinking ability of nursing students outside of the United States have also been conducted (Gabr & Mohamed, 2011; Ozturk et al., 2008; Tiwari et al., 2006; Yuan et al.,
2008). Although these studies have also suggested an increase in nursing students’ critical thinking ability following a PBL activity, generalizing these study’s findings to nursing education in the United States is limited due to cultural differences (Gabr & Mohamed, 2011; Ozturk et al., 2008; Tiwari et al., 2006; Yuan et al., 2008).

**Simulation.** One of the most commonly used active teaching-learning strategies is simulation, which provides students with the opportunity to assess patient data, perform nursing interventions, and respond to patient reactions in an imitated clinical scenario (Sanford, 2010). Research studies have also been conducted analyzing nursing students’ cognitive outcomes related to the use of clinical simulation (Goodstone et al., 2013; Lewis & Ciak, 2011; Sullivan-Mann, Perron, & Fellner, 2009). In one study, Sullivan-Mann et al. (2009) performed a randomized controlled trial with a two group, two times, mixed model research design with the aim of assessing the effectiveness of simulation on the critical thinking scores of 53 ADN students. Results of the study suggested both groups showed improvement in their critical thinking scores following the simulation experience, but the simulation exposed group had higher scores (Sullivan-Mann et al., 2009). As reported by Sullivan-Man et al., students who were exposed to the simulation experience showed a statistically significant ability to answer critical thinking questions correctly ($p = <0.05$) compared to the students who were not exposed to the simulation experience ($p = >0.05$). Different findings have been reported in other studies assessing the critical thinking skills of nursing students exposed to simulation. Lewis and Ciak (2011) also assessed the effectiveness of simulation on critical thinking, but the study participants were diploma nursing students and the researchers used a quasi-experimental design. Mixed results were found regarding the critical thinking ability of
the study participants (Lewis & Ciak, 2011). Goodstone et al. (2013) also conducted a quasi-experimental study, but incorporated a two group research design to compare the critical thinking ability of ADN students exposed to a simulation experience to those taught with a case study scenario. According to Goodstone et al., results of the study suggested an increase in the critical thinking scores for both groups, but the increase for those students exposed to the simulation experience was not statistically significant ($p = 0.10$) when compared to those taught with a case study scenario ($p = 0.003$).

**Gaming, journaling, and role playing.** Playing games, such as bingo and board games, encouraging the use of journals to describe and reflect upon patient care, and imitating the role of the nurse in scenarios are also active teaching-learning strategies (Bowers, 2011; Bowles, 2006; Herrman, 2011; Langley & Brown, 2010; Riera, Cibanal, & Jesus, 2010). Gaming has been viewed more as a source of classroom fun instead of learning (Baid & Lambert, 2010; Royse & Newton, 2007) and qualitative reports have found favorable outcomes with the use of journaling (Langley & Brown, 2010; Ruthman et al., 2004) and role playing (Riera et al., 2010) in educating student nurses. However, research studies regarding the effects these active teaching-learning strategies have on the critical thinking development of nursing students is deficient (Herrman, 2011; Langley & Brown, 2010; Riera et al., 2010; Ruthman et al., 2004).

**Gaps in the Literature**

Through the review of the literature, a suggestion can be made that a concept-based curriculum is an innovative curricular model capable of assisting nursing students in developing the critical thinking skills needed to pass the NCLEX-RN on the first attempt and competently enter the nursing profession. Assessing the outcomes of a
concept-based curriculum, such as critical thinking skills, factors predicting NCLEX-RN success, and first time NCLEX-RN pass rates for ADN students is needed. However, an overwhelming gap in the literature is the number and quality of studies assessing the outcomes of a concept-based curriculum in ADN education. This research study was conducted in an attempt to fill this need.

**Chapter 2 Summary**

The review of the literature found concerns regarding the critical thinking ability of novice nurses. This higher order thinking is tested on the NCLEX-RN, for which first time failure can cause detrimental effects for those nursing graduates who fail the exam and the programs from which they graduated. These concerns, coupled with the proliferation of new nursing knowledge, complexities inherent in today’s health care environment, and anticipated nursing shortage, make formulating and assessing this higher order thinking in nursing students a priority. Consequently, nurse educators are being asked to revise the current state of nursing education with the use of innovative curricular models, such as a concept-based curriculum.

However, the literature review identified the presence of an astounding gap in evaluating the outcomes of a concept-based curriculum, such as critical thinking skills, NCLEX-RN pass prediction scores, and NCLEX-RN pass rates among ADN students. Appropriately assessing these outcomes and the relationships among the variables in this study population may provide nurse educators with empirical support for the utilization of a concept-based curriculum. The evidence from this study may provide key information necessary in answering the call regarding the transformation of nursing education through the utilization of a concept-based curriculum.
CHAPTER 3

METHODOLOGY

This chapter focuses on the systematic methods used to obtain, organize, and analyze the research data. The research questions and hypotheses are described, as well as the research design used for this study. A discussion regarding the target population, sampling method, sample size, and setting is provided. The study variables, data collection instruments, procedures, statistical analysis, and study limitations are presented. The chapter concludes with a report of the ethical considerations taken when conducting this study.

Research Questions and Hypotheses

The purpose of this study was to evaluate critical thinking scores, pass rate prediction scores, and national council licensure examination for registered nurses (NCLEX-RN) pass rates in associate degree nursing (ADN) students completing a concept-based curriculum. The literature review, research design, and statistical analysis procedures provide support for the research questions. The research study was driven by the following research questions:

1. What is the difference between critical thinking program entry score and critical thinking program exit score for ADN students in a concept-based curriculum?
2. What is the relationship between critical thinking program exit score and first time NCLEX-RN pass success for ADN students in a concept-based curriculum?
3. What is the relationship between probability of pass score and first time NCLEX-RN pass success for ADN students in a concept-based curriculum?
4. What is the mean probability of pass score for first time NCLEX-RN passage among ADN students in a concept-based curriculum?

Hypotheses are derivatives of the research questions and can assist in describing the expected relationships between study variables (Kellar & Kelvin, 2013). Null hypotheses state relationships do not exist between the study variables while alternative hypotheses suggest relationships do exist between the study variables (Kellar & Kelvin, 2013). Directional alternative hypotheses describe the direction of the study variables and non-directional alternative hypotheses indicate that a statistically significant relationship will be present, but the direction is not described (Kellar & Kelvin, 2013). Based on the related literature, the following directional alternative hypotheses assisted in guiding the purpose of this study:

1. Critical thinking program exit score will be higher than critical thinking program entry score for ADN students in a concept-based curriculum.

2. A higher critical thinking program exit score will result in a higher first time NCLEX-RN pass success for ADN students in a concept-based curriculum.

3. A higher probability of pass score will result in a higher first time NCLEX-RN pass success for ADN students in a concept-based curriculum.

4. The mean probability of pass score for first time NCLEX-RN passage among ADN students in a concept-based curriculum will be greater than the program’s benchmark score of 72%.

**Research Design**

A research design is utilized to outline the overall plan for conducting a study, in particular for addressing the research questions (Polit & Beck, 2012). In this study,
quantitative research was conducted with the employment of a retrospective, descriptive, correlational design to evaluate critical thinking scores, pass rate prediction scores, and NCLEX-RN pass rates in ADN students who were educated with a concept-based curriculum. A retrospective approach involves assessing an outcome from the present to determine if a relationship exists with a past occurrence (Polit & Beck, 2012). The study involved examining the results of the NCLEX-RN and relating them to the critical thinking program exit score and probability of pass score, which were obtained before the study participants took the NCLEX-RN. Descriptive statistics characterized demographic data and the mean probability of pass score for first time NCLEX-RN passage. Correlational studies do not presume the presence of a cause-and-effect relationship, but that a relationship does exist between variables (Polit & Beck, 2012). This study determined if a correlation existed between critical thinking program exit score and first time pass success on the NCLEX-RN and between probability of pass score and first time pass success on the NCLEX-RN.

**Target Population**

The target population for this research study was nursing students, in particular ADN students. Polit and Beck (2012) described a target population as a group for which study results can be generalized. ADN students were selected for several reasons. First, ADN students make up approximately two thirds of all students enrolled in pre-licensure registered nurse programs (Kaufman, 2013). Secondly, ADN students comprise the greatest number of NCLEX-RN examinees (Trofino, 2013). Therefore, the study findings may assist in addressing a majority nursing student population.
Another reason this target population was chosen involves the reported characteristics of ADN students, such as being from diverse backgrounds with regards to age, gender, ethnicity, culture, marital status, and educational preparation (De Lima, London, & Manieri, 2011). Some studies have suggested age (Humphreys, 2008), gender (De Lima et al. 2011; Seago & Spetz, 2005), and race and ethnicity (De Lima et al., 2011; Lockie, Van Lanen, & Gannon, 2013; Loftus & Duty, 2010; Seago & Spetz, 2005) can impact NCLEX-RN outcomes. Therefore, it may be concluded that this population could benefit from early recognition of potential NCLEX-RN failure through an analysis of critical thinking and probability of pass scores, which may be suggested from the findings of this study.

There are additional considerations for the use of ADN students as the target population for this study. ADN programs are typically two year degree programs. Educating students in a fairly short period of time may help to solve the nursing shortage. Moreover, due to reports implying ADN students represent a diverse student body, supporting their education and transition into nursing practice would also assist in addressing the Institute of Medicine (IOM, 2011) recommendation regarding increasing diversity within the nursing profession. Associate degree prepared nurses also make up the largest percentage of professional nurses working in community agencies, such as nursing homes and extended care facilities (Starr, 2010). Since the Baby Boomer population is expected to drastically increase, ADN prepared nurses will be on the frontlines providing care for this growing population in these health care settings (Starr, 2010). While the IOM (2011) recommended increasing the number of baccalaureate prepared nurses, literature supports the use of a concept-based curriculum in ADN
education as providing a means for a seamless academic progression (Giddens et al., 2012; Goodman, 2014). Therefore, research cannot neglect the inclusion of ADN students as target populations and providing empirical support for their education would be advantageous.

**Sampling Method**

A sample is a representative subset of the population (Polit & Beck, 2012). The participants in this study consisted of a convenience sample of ADN students, in which secondary data from the students’ records were analyzed. A convenience sample is comprised of study participants who are most accessible and is economically feasible (Polit & Beck, 2012). The ramifications of using this sampling technique were taken into consideration when analyzing the study results since the external validity of a study can be threatened with its use (Polit & Beck, 2012).

The inclusion criteria were all students who made normal progression in the senior nursing clinical course, completed all nursing courses at the study site, took the NCLEX-RN within than six months from graduation, and graduated from the ADN program during 2012 through 2014. Normal progression in the senior nursing clinical course indicated that the student did not repeat the senior nursing clinical course.

The exclusion criteria consisted of those students who repeated the senior nursing clinical course, transferred from another nursing program, or took the NCLEX-RN six months or longer from the date of graduation. Any student who did not follow normal progression in the senior nursing clinical course was excluded. Students who repeated the senior nursing clinical course would have been previously exposed to the course content, which may have impacted results of the Critical Thinking Assessment (CTA) program.
exit exam, RN Comprehensive Predictor, and NCLEX-RN. Additionally, the CTA program exit exam and RN Comprehensive Predictor were administered during the senior nursing clinical course at the study site, thereby students who repeated this course may have been previously exposed to the same versions of these tests. To ensure consistency with the use of a concept-based curricular design and teaching methods, students who transferred from another nursing program were excluded. A relationship between increased lag time in taking the NCLEX-RN and a decrease in pass success has been indicated (Woo, Wendt, & Liu, 2009). Therefore, students who took the NCLEX-RN six months or longer from the date of graduation were also excluded from the study.

**Sample Size**

To assist in achieving statistical validity in a quantitative research study, a power analysis can be conducted to estimate the desired sample size (Cohen, 1987). Power analysis was determined using post-hoc statistical techniques with an estimated 240 data sets. Results of the study were treated as dichotomous (pass/not pass). An assumption is that these data reflect 80% of the potential population. With an alpha pre-set at 0.05, this provided a power of 0.8 with a beta of 0.2 and produced a moderate effect size.

Power (1-β) is the probability of rejecting a false null hypothesis and is referred to as committing a Type II error (Polit & Beck, 2012). A power of 0.8 is common, meaning there would be an 80% chance of rejecting a false null hypothesis (Cohen, 1987). The level of significance or alpha (α) is the probability of rejecting a true null hypothesis or making a Type I error (Polit & Beck, 2012). With a 0.05 significance level, a true null hypothesis would be rejected in 5% of all studies (Polit & Beck, 2012). Effect size is an estimate of how incorrect the null hypothesis was and the strength of the relationship.
between the study variables in the population (Cohen, 1987). If a strong relationship exists, this can be determined statistically significant with a small sample (Polit & Beck, 2012). However, if a relationship is modest, a larger sample size is required to avoid Type II errors (Polit and Beck). According to Cohen (1987), an effect size of 0.5 is moderate and considered ideal, but Polit and Beck stated an effect size in the range of 0.20 to 0.40 is common in nursing research. Effect size is based upon previous literature related to the study focus (Polit & Beck, 2012).

**Setting**

The setting for this study was a private, non-profit college in a Midwestern state. The college offers ADN, bachelor of science in nursing (BSN), and associate of science in health science programs. The ADN program at this college has been in existence since 2001. The program is accredited by the Higher Learning Commission and the Accreditation Commission for Education in Nursing (ACEN). In 2010, the college underwent a major curriculum revision resulting in the implementation of a concept-based curriculum.

The study participants were enrolled in the ADN program from 2010 through 2014 and graduated in 2012 through 2014. The total student body was comprised of approximately 350 students. The college does not maintain a formal record of faculty turnover. However, during this time, the reported turnover among nursing faculty members was minimal. There were also no changes made to the admission and progression policies or practices within the ADN program. The setting for the research study was chosen due to the study purpose of evaluating the critical thinking scores, pass
rate prediction scores, and NCLEX-RN pass rates in ADN students completing a concept-based curriculum.

**Variables**

Variables are considered the foundation for quantitative research studies since they assist in assessing the differences in key attributes related to the study and can also serve to describe the cause or relationship among occurrences (Kellar & Kelvin, 2013; Polit & Beck, 2012). The purpose of an independent variable in a quantitative research study is to identify the presumed cause or relationship of an occurrence and a dependent variable is recognized as the presumed effect (Kellar & Kelvin, 2013; Polit & Beck, 2012). The dependent variable is contingent upon the independent variable (Kellar & Kelvin, 2013; Polit & Beck, 2012). The independent variables in this study were critical thinking program exit score and probability of pass score. The dependent variable in this study was first time NCLEX-RN pass success.

**Instrumentation**

Three instruments were utilized for data collection. Two of the instruments were developed by Assessment Technologies Institute (ATI), for which permission to use was granted for use (Appendix A). These instruments were the CTA and the RN Comprehensive Predictor. The CTA was used to measure the students’ critical thinking skills and the RN Comprehensive Predictor was utilized to measure the students’ probability of pass scores. The other instrument utilized in the study was the NCLEX-RN, which measured the students’ NCLEX-RN pass rates.
The CTA was utilized to assess the students’ critical thinking skills. Prior to entering nursing school, all students were administered the CTA program entry exam. Students were administered the CTA program exit exam prior to completing the program, during the senior nursing clinical course. The students’ CTA scores were included in their academic records.

The CTA was developed in 2000 by a panel of nurse educators who were regarded as critical thinking experts (ATI, 2001). Each CTA is comprised of 40 questions, assessing the students’ ability to utilize interpretation, analysis, explanation, inference, evaluation, and self-regulation, which are characteristics of critical thinking skills (ATI, 2001). The students’ responses to each question are tallied to produce six separate scores based on each critical thinking characteristic (ATI, 2001). An overall critical thinking score is then generated and reported as a percentage of correct responses (ATI, 2001). Cronbach’s alpha was utilized to establish the reliability of the CTA and a comparison with a Guttman split-half coefficient was also used (ATI, 2001). For students taking the CTA for the first time, the instrument had a global alpha of 0.694 for each item (ATI, 2001). The standardized item alpha was 0.7012 (ATI, 2001).

Construct validity was established via an extensive search of the literature related to the theory of critical thinking (ATI, 2001). The development of the CTA was based upon the definition of critical thinking created by the American Philosophical Association (ATI, 2001), who assembled a panel of expert scholars representing diverse disciplines to generate an agreed upon definition for critical thinking (Facione, 1990). Furthermore, critical thinking experts from the discipline of nursing education examined
each of the 40 items on the CTA (ATI, 2001). Content validity of the CTA was established by analyzing each of the 40 items for application of their use on the construct (ATI, 2001). A sample of nursing programs was involved in the alpha and beta validation of the CTA (ATI, 2001).

**RN Comprehensive Predictor**

The RN Comprehensive Predictor was utilized to obtain the students’ probability of pass scores. This test was administered to all students prior to completing nursing school, in the senior nursing clinical course. Students were provided with three attempts to successfully achieve the program’s established benchmark score of 72% on the exam before graduating from the program. The number of times each student took the test was tracked. However, only the first time RN Comprehensive Predictor scores were included as study data. The students’ RN Comprehensive Predictor scores were part of their academic records.

The RN Comprehensive Predictor is a 180-item multiple choice exam designed to provide an assessment of student preparedness for the NCLEX-RN (ATI, 2012; 2014). Of the 180 items, 150 are true test items and the remaining 30 are pilot items (ATI, 2012; 2014). The following mastery content areas are included in the RN Comprehensive Predictor: fundamentals of nursing, pharmacology, adult medical-surgical nursing, maternal newborn care, nursing care of children, mental health nursing, nutrition, leadership, and community health nursing. The exam is blueprinted to include the same percentage of questions from the major content areas on the NCLEX-RN, which are management of care, safety and infection control, health promotion and maintenance, psychosocial integrity, basic care and comfort, pharmacological therapies and parenteral
therapies, reduction of risk potential, and physiological adaptation (ATI, 2012; 2014). Examinees are provided a probability of pass score, which can be matched to a percentage indicating the likelihood of passing the NCLEX-RN, for which ATI lists on a Probability of Passing Expectancy Table (ATI, 2012; 2014). According to the expectancy table, a higher test score on the RN Comprehensive Predictor indicates a higher probability of passing the NCLEX-RN on the first attempt (ATI, 2012; 2014). For example, a probability of pass score of 69.3% indicates the examinee has a 90% probability of passing the NCLEX-RN on the first attempt while an examinee who has a score of 72% has a 94% probability of passing the NCLEX-RN on the first attempt (ATI, 2014). In addition to providing examinees with a probability of pass score, the RN Comprehensive Predictor also produces an Individual Performance Profile and includes information such as the examinee’s percentage of correct scores related to a particular outcome (ATI, 2014). These outcomes are related to clinical topics, the nursing process, priority setting, and thinking skills, such as critical thinking (ATI, 2014). The 2013 version of the RN Comprehensive Predictor also included quality and safety education for nurses (QSEN) competencies as an outcome (ATI, 2014).

During the time of the study, four versions of the RN Comprehensive Predictor were administered: 2010 Form A, 2010 Form B, 2010 Form C, and 2013. The 2010 Form A version was in paper-pencil and online formats and the test items were in multiple choice fashion. The 2010 Form B, 2010 Form C, and 2013 versions were in online format and included five alternate test items, such as multiple response, fill in the blank, and drag and drop (ATI, 2012; 2014). The decision to include alternate test items on the RN Comprehensive Predictor was to mirror the types of alternative test items included on the
NCLEX-RN (ATI, 2014). The test plan for the three 2010 forms of the RN Comprehensive Predictor was the same but the 2013 RN Comprehensive Predictor test plan was revised to reflect the increase in passing standard on the NCLEX-RN during that year (ATI, 2014).

Although different versions of the RN Comprehensive Predictor exist, all forms were equated so that content and level of difficulty were the same and similar measures were implemented by ATI to ensure the consistent reliability and validity of each version (ATI, 2012; 2014). One action taken by the testing company involved assessing the reliability of the RN Comprehensive Predictor by examining the alpha internal reliability coefficients and item difficulty analysis of the test scores from the 2010 Form A and 2010 Form B of the RN Comprehensive Predictor (ATI, 2012; 2014). The reported alpha coefficient was 0.79 (ATI, 2012). During the final item analysis of the RN Comprehensive Predictor, a hypothesized parallel forms procedure was performed by administering the 2010 Form A and 2010 Form B versions of the RN Comprehensive Predictor to over 3,000 students (ATI, 2012). After the norming process was completed with these data, to support internal consistency of the instruments, two ATI nurse educators and a psychometrician compared first attempt scores to the initial and reset normative data from the sample of students (ATI, 2012). Experts from ATI reviewed the mean scores, standard deviations, and reliability coefficients for the total test scores and each content area on the two versions of the test (ATI, 2012). Additionally, the experts conducted an in-depth analysis of the test data by examining the item difficulty and discrimination statistics for both tests (ATI, 2012).
Content and face validity of the RN Comprehensive Predictor was established by experts who took the exam and assessed the items for appropriate content representation (ATI, 2012; 2014). The experts used the Mantel-Haenszel chi-square procedure to rate the difficulty level of each item via a comprehensive item analysis of the test results of over 3,000 students (ATI, 2012). Experts from ATI also assessed the mean scores, standard deviations, and reliability coefficients from the total tests scores and the content areas (ATI, 2012; 2014). The topics listed on the RN Comprehensive Predictor are similar to the content included in the curriculum at the study site, thereby supporting face validity of the instrument.

**NCLEX-RN**

Upon graduating from the nursing program and meeting state licensing board eligibility requirements, all students were granted permission to take the NCLEX-RN. Only first attempt scores and scores from students who took the NCLEX-RN within six months from graduation were included as study data. The students’ NCLEX-RN results were included in the school records. On April 1, 2013, the passing standard of the NCLEX-RN was revised from -0.161 logits to 0.00 logit (NCSBN, 2015a). As a result, two versions of the NCLEX-RN were included in this study. Information was tracked to note which participants took the revised NCLEX-RN.

The NCLEX examinations are designed to determine competency for entry into nursing practice with the NCLEX-RN designated for registered nurses. Since results of all of the NCLEX exams are reported as a dichotomous pass/fail, a decision consistency statistic is used to measure the reliability (NCSBN, 2015b). This result is typically between 0.87 and 0.92 (NCSBN, 2015b). To ensure content validity of the NCLEX
exams, test questions are written and reviewed by nursing experts who have varied educational and practice backgrounds (NCSBN, 2015b). Every three years the NCLEX test plans are revised to reflect contemporary nursing practice and every candidate is presented with test questions from each content area, thereby supporting sampling validity (NCSBN, 2015b). To support face validity of the NCLEX exams, expert test item writers review imitation and true test questions for their representation of nursing practice (NCSBN, 2015b). With regards to construct validity, Rasch measurement theory serves as the theoretical framework for the NCLEX exams (NCSBN, 2015b). Along with this theory, item difficulty is assessed by the inclusion of pilot questions on all exams to support scoring validity of the exams (NCSBN, 2015b). The passing standards of the exams are reviewed every three years by a group of experts to ensure that the exam is current and that it has pass/fail decision validity (NCSBN, 2015a; 2015b).

**Data Collection Procedures**

Data collection procedures are the methods researchers utilize to collect study data in an organized and logical manner (Polit & Beck, 2012). Before conducting this study, permission was granted from the President (Appendix A) and Academic Dean (Appendix B) of the study college, the Institutional Review Board (IRB) from the study site (Appendix C), and the IRB from the University of Missouri-Kansas City (Appendix D). Prior to collecting any study data, a database was created by the researcher to organize these data. This database was stored in a secure electronic password protected and encrypted computer.

Demographic data for age, gender, and ethnicity were retrieved from the students’ records via a secure electronic password protected and encrypted computer system. The
following data were also accessed: 1) ATI CTA program entry scores; 2) ATI CTA program exit scores; 3) ATI RN Comprehensive Predictor scores; and 4) NCLEX-RN results. For the students who met the study inclusion criteria, their age, gender, ethnicity, CTA program entry score, CTA program exit score, RN Comprehensive Predictor score, and first attempt NCLEX-RN result were transferred to the researcher’s secured database.

Prior to entering the nursing program, each student took the CTA program entry exam as part of the program requirement. The CTA program exit exam was administered to the students during week eight and the RN Comprehensive Predictor was administered during week 13 of the semester during the senior nursing clinical course. Students were provided three attempts to successfully achieve the program’s established benchmark score of 72% on the RN Comprehensive Predictor. The number of times each student took the test was tracked, but only the first time RN Comprehensive Predictor scores were included in the study data. Upon graduating from the nursing program and meeting state licensing board eligibility requirements, all students were permitted to take the NCLEX-RN. Only first attempt scores and scores from students who took the NCLEX-RN within six months from graduation were included as study data. The test plan and passing standard for all NCLEX-RN exams administered from April 1, 2013 through March 31, 2016 were revised in 2013 (NCSBN, 2015a). Information was tracked to indicate which participants took the revised NCLEX-RN exam.

Data Analysis Procedures

The data analysis process of a research study depicts the methods for which data are organized and synthesized and addresses the testing of hypotheses (Kellar & Kelvin, 2013; Polit & Beck, 2012). Coding was the systematic approach used to organize data for
this study. Kellar and Kelvin (2013) described coding as converting information into numerical data before it is analyzed. Statistical Package for Social Sciences (SPSS) is a software package designed to assist researchers in planning research, collecting and analyzing data, and developing reports related to statistical procedures (SPSS, n.d.). To enhance data management, empirical data were entered into a file in SPSS and this software was also used to analyze the study data.

In an attempt to prevent threats to the validity of the study, steps were taken during the data entry process to help ensure accuracy (Kellar & Kelvin, 2013). First, the researcher inspected and edited these data for coding and transfer errors. Then the scores were matched to each student’s name. Following this step, the students’ names were removed and a code number was assigned to each student. The list of student names and matching code numbers were stored in a secure file location that was separate from the research data. After these data were compiled and checked for accuracy, descriptive and inferential statistical methods were implemented to analyze the research data.

A characteristic of quantitative research is it provides the researcher with numbers that can be summarized into statistics and then the data are interpreted to reach conclusions (Kellar & Kelvin, 2013). Descriptive statistics allow a researcher to summarize and describe quantitative data (Kellar & Kelvin, 2013; Polit & Beck, 2012). To characterize demographic data in this study, descriptive statistics were utilized, in particular distribution, central tendency, and variability.

A distribution offers information regarding the range of values for a variable which can be described by developing a frequency distribution (Polit & Beck, 2012). A frequency distribution displays a range of values from lowest to highest and the number
of times each value was reported (Polit & Beck, 2012). One type of method for providing a visual representation of the values is a histogram (Polit & Beck, 2012).

The central tendency consists of providing values for the mean, median, and mode of the values (Polit & Beck, 2012). The mean is the average of all scores and is considered the most stable value of central tendency (Polit & Beck, 2012). The median is the value that reflects the point in which half of the scores fall below and above, the middle score (Polit & Beck, 2012). The mode is the score that occurs most frequently among these data (Polit & Beck, 2012). Although different, each measure of central tendency can provide information regarding symmetry and the presence of outliers among data (Polit & Beck, 2012).

Variability provides the researcher information regarding the dispersion of data (Polit & Beck, 2012). Furthermore, the range and standard deviation of scores can be identified (Polit & Beck, 2012). Subtracting the highest score from the lowest score is referred to as the range (Polit & Beck, 2012). The average amount of deviation from the mean is the standard deviation, though this is primarily utilized with interval or ratio measurement scale data (Polit & Beck, 2012).

Inferential statistics are utilized to make inferences from the study sample about the population (Kellar & Kelvin, 2013). It is recognized that sampling error is inherent in any research study, thereby a sample does not represent the population with exact precision (Polit & Beck, 2012). Inferential statistics can also help to support that the probability of an observed difference between groups in a study did not occur by chance and can assess the strength of the relationship between the independent and dependent variables in a study (Kellar & Kelvin, 2013). Although various inferential statistics are
available, the following approaches were selected based on their relevance to addressing the research questions.

The paired t-test was utilized to analyze the first research question: “What is the difference between critical thinking program entry score and critical thinking program exit score for ADN students in a concept-based curriculum”. The paired t-test was chosen because of its ability to compare differences in the means of two related groups on a particular topic of interest (Kellar & Kelvin, 2013). This parametric statistical test also allows for measurements to be taken either on a pair of matched participants or on the same participant at two different times (Kellar & Kelvin, 2013). The latter approach was applicable to this study since the participants’ critical thinking program entry score was compared to the critical thinking program exit score. There are certain assumptions that must be met before utilizing the paired t-test. One criterion is that the measurement scale be interval or ratio (Kellar & Kelvin, 2013). Another assumption related to the paired t-test is that data from the two measurements are normally distributed or there are a minimum of 30 pairs of measurements (Kellar & Kelvin, 2013).

Logistic regression and point-biserial correlation statistics assessed the second and third research questions: “What is the relationship between critical thinking program exit score and first time NCLEX-RN pass success for ADN students in a concept-based curriculum” and “What is the relationship between probability of pass score and first time NCLEX-RN pass success for ADN students in a concept-based curriculum”. Logistic regression is a statistical test whereby the researcher can examine the effects of more than one independent variable on a single dependent variable (Pampel, 2000). This was applicable to the study since the independent variables, critical thinking program exit
score and probability of pass score, were used to determine an effect on the dependent variable, first time NCLEX-RN pass success. The independent variables may be of any measurement scale and the dependent variable should be categorical (Pampel, 2000). Moreover, with logistic regression the dependent variable must be dichotomous (Pampel, 2000). First time NCLEX-RN pass rates were reported in one of two categories, pass or fail. Another condition related to logistic regression is the recommended inclusion of a minimum of 60 total cases (Kellar & Kelvin, 2013).

Logistic regression allows the researcher the ability to calculate an odds ratio, which can indicate the probability of an event occurring (Pampel, 2000). In this study, the statistical test allowed the researcher to calculate the odds of the participants achieving first time pass success on the NCLEX-RN based on their critical thinking program exit score and probability of pass score. A predictive equation was also computed to provide information regarding the likelihood of passing the NCLEX-RN on the first attempt based upon a specific critical thinking program exit score and probability of pass score.

Pearson’s product-moment correlation is a parametric test that can provide information regarding the relationship between two variables (Kellar & Kelvin, 2013). According to Corder and Foreman (2014) and Pace (2014), a point-biserial correlation is considered a special type of Pearson’s product-moment correlation, whereby the strength and direction of the relationship between a continuous variable and dichotomous variable can be assessed. For example, a correlation of +1 would suggest a strong, positive relationship between the two variables (Corder & Foreman, 2014). Interpretation of the research data will describe the relationship between each independent variable and the dependent variable.
As previously mentioned, descriptive statistics provide a summation and description of research data (Kellar & Kelvin, 2013). Descriptive statistics analyzed the fourth research question: “What is the mean probability of pass score for first time NCLEX-RN passage among ADN students in a concept-based curriculum”.

**Assumptions and Limitations**

Several assumptions were recognized with this study. The first assumption is that all teaching faculty at the study site operationalized the tenets related to a concept-based curriculum, such as the utilization of active teaching-learning strategies during the years of 2012 through 2014. This is of particular concern since Herrman (2011) stated nurse educators typically model the manner in which they were taught, which most often was in a passive, teacher led classroom environment. Secondly, that typical outcome measurements used in traditional curricula, such as critical thinking, NCLEX-RN predictor scores, and NCLEX-RN pass rates are applicable to evaluating a concept-based curriculum. Moreover, that a concept-based curriculum can assist in developing these outcomes. A third assumption is that none of the participants cheated on the CTA, RN Comprehensive Predictor, or NCLEX-RN. Additional assumptions regarding testing is that all of the tests were administered in a consistent manner and the participants strived to do their best with each test, in particular the CTA program exit exam, for which there were no associated consequences for achieving an established score.

In addition to the aforementioned assumptions, several study limitations were also identified. The major limitation of this study is that the findings are from a single research site, a private college in a Midwestern state, which awards an ADN degree. Additionally, the sample lacked randomization since the researcher sought participants
from a convenience sample of ADN students. Another concern regarding the study participants is that their learning outcomes were measured with instruments developed by ATI. Nurse educators who teach baccalaureate nursing students in schools of nursing that utilize a different commercially prepared testing package may be challenged in applying the results of this study to their nursing education practice.

The CTA is also a general critical thinking test and not based upon critical thinking attributes related to the nursing profession. Although the RN Comprehensive Predictor and NCLEX-RN are both blueprinted to assess critical thinking and designed for use with nurses, the broad scope of the CTA is another study limitation. There were also four versions of the RN Comprehensive Predictor and two versions of the NCLEX-RN administered to the participants. Data were tracked to identify which students took each test. While changes to both tests were deemed necessary, different forms of the RN Comprehensive Predictor and NCLEX-RN are other limitation to this study.

There are also variables related to the participants that were not controlled for in this study, such as participants who were first-generation college students or those with previous college experience. Descriptive statistics were used to characterize demographic data of the participants, which included age, gender, and ethnicity. The analysis assisted in identifying any threats to the reliability and validity of the study results based on characteristics of the participants.

Data analyzed in this study were secondary data, which Polit and Beck (2012) stated the researcher incurs a loss of control over how data were collected and organized and may be considered a study limitation. Correlation procedures were used to describe the study variables, which indicate a relationship between the study variables instead of a
cause-and-effect, another study limitation (Polit & Beck, 2012). Furthermore, with correlational research studies, there is an inability to identify a key moderator variable that may have an impact on the relationship between the independent variables and the dependent variable (Polit & Beck, 2012).

As mentioned in Chapter Two, the use of the experiential learning theory to guide this study is another limitation. While this theory posits that cognitive learning is achieved by building upon previous experiences, forming conceptual relationships between information, and engaging students in the learning process, critical thinking is not explicitly described as an outcome of the theory. However, it is suggested that approaches within the experiential learning theory can assist in developing problem solving skills, which is a related characteristic of critical thinking and previous empirical literature supports use of the experiential learning theory in promoting critical thinking among nursing students (An & Yoo, 2008; Lisko & O’Dell, 2010). Even though a concept-based curriculum was not a study variable, this curricular design was a major factor in this study. Since the experiential learning theory supports the tenants associated with a concept-based curriculum, such as active teaching-learning strategies and student engagement, this theory is appropriately related to a concept-based curriculum. While an attempt to find a theory inclusive of critical thinking and a concept-based curriculum was lacking, the experiential learning theory seemed befitting to this research study even though it is considered a study limitation.

**Ethical Issues**

The researcher was obligated to ensure that the participants’ rights were protected. IRB approval was obtained from the University of Missouri-Kansas City. IRB approval
was also secured from the study site. The research study was exempt from regulations for the protection of human research subjects because it was categorized as not involving research on human subjects (Cohen & Lynch, 2014).

**Risks and Benefits**

The risk for participating in the study was minimal, with a loss of confidentiality being the only known risk, which is inherent when manipulating any research data. Safeguards were implemented in an attempt to prevent the participants’ loss of privacy. The researcher was the sole person who collected, analyzed, reported, and stored study data. All study data were collected from the students’ records via a secure electronic password protected and encrypted computer database. Participants were de-identified through the use of code numbers that were stored separately from the study data. These were analyzed via SPSS, which contained a list of code numbers referencing each student. The computer used to operate SPSS contained a password and encryption required for access. All study data were reported as aggregate data. Information related to the study will remain in a password protected, encrypted computer in the researcher’s secured office for seven years. After seven years, all computer files and documentation related to this study will be erased and shredded by the researcher.

There are no known potential direct benefits to the participants for participating in this study. There are indirect benefits to society regarding the participants’ involvement since the results of this study may provide beneficial information regarding factors that may correlate with nursing graduates’ success on the NCLEX-RN. Passing the NCLEX-RN on the first attempt may positively influence the financial and emotional well-being of future examinees and the credibility of nursing programs. Furthermore, study results
may generate information concerning the use of a concept-based curriculum with developing nursing students’ critical thinking skills and preparedness for entry into nursing practice. As a result, novice nurses may be better equipped to care for patients in today’s complex health care environment, improving the outcomes of patients throughout our society.

Conflict of Interest

The researcher is a faculty member at the institutional study site, which does pose a potential conflict of interest. However, the researcher was never involved in the administration of any of the instruments used to gather data for this study. All of the instruments utilized in this study were also required components of the ADN curriculum plan.

Chapter 3 Summary

Approaches implemented in obtaining, organizing, and analyzing the research data were presented in a systematic fashion. The research questions served to direct the overall study. Furthermore, the research questions and literature review assisted in developing the hypotheses for the study. The research design was described, which was appropriate for the study purpose and research questions. Associate degree nursing students were identified as the target population and the rationale for choosing this group provided support for their selection. The use of a convenience sample, the inclusion and exclusion criteria, and sample size determination assisted in establishing a sample that was representative of the population. Since the setting was a college that offered an ADN program with a concept-based curriculum design, it supported the purpose of this study, which was to evaluate the critical thinking scores, pass rate prediction scores, and
NCLEX-RN pass rates in ADN students completing a concept-based curriculum. The independent variables in the study were critical thinking program exit score and probability of pass score and the dependent variable was first time NCLEX-RN pass success. The instruments used in collecting the research data appropriately assessed these study variables. Furthermore, the reliability and validity of the instruments provided additional support for their use in this study. Methods for collecting and analyzing study data were outlined and a thorough description of the statistical tests utilized in analyzing these data provided justification for their use in addressing each research question. The identification of several assumptions and limitations of this study were identified and ethical considerations were described to provide transparency for this study.
CHAPTER 4
DATA ANALYSIS AND RESULTS

This chapter focuses on the results of the data analysis. Descriptive statistics were used to demographically describe the study population. The statistical methods utilized to analyze each research question and test each hypothesis are presented, in addition to a discussion regarding the results of the analysis. The chapter concludes with a summary of the data analysis and results.

Sample Description

The purpose of the study was to evaluate critical thinking scores, National Council for Registered Nurses (NCLEX-RN) pass rate prediction scores, and NCLEX-RN pass rates in associate degree nursing (ADN) students completing a concept-based curriculum. Study data were obtained from one college of nursing, located in a Midwestern state. Convenience sampling techniques were utilized to identify 272 potential participants. Application of the inclusion criteria, which limited participation to students who graduated from the study site between 2012 and 2014, progressed through their senior nursing clinical course without complications, completed all nursing courses at the study site, and took the NCLEX-RN within six months from graduation, excluded 14 students. These exclusions were the result of students needing to repeat the senior nursing clinical course ($n = 5$), students who did not complete all courses at the study site ($n = 7$), and a delay in taking the NCLEX-RN ($n = 2$). Thus, the study population consisted of 258 individuals. Contact with these individuals, nor study consent, was not required by the Institutional Review Board (IRB) that approved this research. Personal identifiers were removed from the data set prior to receiving it, which places the study in
the exempt category, as defined by 45 CFR 46.101 (b) (1). A power analysis provided an initial estimate of 240 data sets that would provide an alpha of 0.05, a power of 0.8 with a beta of 0.2, and a moderate effect size. Thus, the total number of eligible participants \((N = 258)\) surpassed this estimation.

Study groups were formulated from the data set. Participants were placed into cohorts based on semester of graduation. Demographic data for age, gender, and ethnicity were accessed via a secure electronic password protected and encrypted college database. After these data were entered, coded, and de-identified, they were verified and inspected for errors.

The histogram for age is displayed in Figure 4.1. Since there was an appearance of outliers on the low and high ends of the distribution, those values were checked for accuracy and determined to be legitimate scores. Table 4.1 demonstrates the descriptive statistics for the total participants \((N = 258)\), and Table 4.2 for each cohort: Cohort 1 \((n = 44)\), Cohort 2 \((n = 38)\), Cohort 3 \((n = 34)\), Cohort 4 \((n = 54)\), Cohort 5 \((n = 44)\), and Cohort 6 \((n = 44)\).
Figure 4.1. Age of the Sample.

Table 4.1.

Descriptive Statistics for Age

<table>
<thead>
<tr>
<th>Age</th>
<th>$N$</th>
<th>$M$</th>
<th>$SD$</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>258</td>
<td>30.1</td>
<td>7.31</td>
<td>21-63</td>
</tr>
</tbody>
</table>
Table 4.2.

*Descriptive Statistics for Age Based on Cohort*

<table>
<thead>
<tr>
<th>Cohort</th>
<th>M</th>
<th>SD</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (n = 44)</td>
<td>32.3</td>
<td>8.98</td>
<td>24-63</td>
</tr>
<tr>
<td>2 (n = 38)</td>
<td>32.7</td>
<td>7.68</td>
<td>25-53</td>
</tr>
<tr>
<td>3 (n = 34)</td>
<td>29.7</td>
<td>7.00</td>
<td>24-51</td>
</tr>
<tr>
<td>4 (n = 54)</td>
<td>29.5</td>
<td>5.55</td>
<td>22-45</td>
</tr>
<tr>
<td>5 (n = 44)</td>
<td>29.3</td>
<td>8.11</td>
<td>22-60</td>
</tr>
<tr>
<td>6 (n = 44)</td>
<td>27.5</td>
<td>5.25</td>
<td>21-43</td>
</tr>
</tbody>
</table>

Descriptive statistics for gender are depicted in Tables 4.3 and 4.4 with Table 4.3 demonstrating gender for all participants (N = 258) and Table 4.4 based on cohort.

Table 4.3.

*Descriptive Statistics for Gender*

<table>
<thead>
<tr>
<th>Gender</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>27</td>
</tr>
<tr>
<td>Female</td>
<td>231</td>
</tr>
</tbody>
</table>

86
Table 4.4.

*Descriptive Statistics for Gender Based on Cohort*

<table>
<thead>
<tr>
<th>Gender</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cohort 1</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>3</td>
</tr>
<tr>
<td>Female</td>
<td>41</td>
</tr>
<tr>
<td>Cohort 2</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>4</td>
</tr>
<tr>
<td>Female</td>
<td>34</td>
</tr>
<tr>
<td>Cohort 3</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>5</td>
</tr>
<tr>
<td>Female</td>
<td>29</td>
</tr>
<tr>
<td>Cohort 4</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>5</td>
</tr>
<tr>
<td>Female</td>
<td>49</td>
</tr>
<tr>
<td>Cohort 5</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>5</td>
</tr>
<tr>
<td>Female</td>
<td>39</td>
</tr>
<tr>
<td>Cohort 6</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>5</td>
</tr>
<tr>
<td>Female</td>
<td>39</td>
</tr>
</tbody>
</table>

Table 4.5 demonstrates ethnicity for all participants and Table 4.5 for each cohort.

Table 4.5.

*Descriptive Statistics for Ethnicity*

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>African-American</td>
<td>10</td>
</tr>
<tr>
<td>Hispanic</td>
<td>1</td>
</tr>
<tr>
<td>Asian</td>
<td>3</td>
</tr>
<tr>
<td>Indian</td>
<td>1</td>
</tr>
<tr>
<td>Biracial</td>
<td>1</td>
</tr>
<tr>
<td>Caucasian</td>
<td>242</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>Cohort 1</td>
</tr>
<tr>
<td>-------------</td>
<td>----------</td>
</tr>
<tr>
<td>African-American</td>
<td>1</td>
</tr>
<tr>
<td>Hispanic</td>
<td>1</td>
</tr>
<tr>
<td>Asian</td>
<td>2</td>
</tr>
<tr>
<td>Indian</td>
<td>0</td>
</tr>
<tr>
<td>Biracial</td>
<td>0</td>
</tr>
<tr>
<td>Caucasian</td>
<td>40</td>
</tr>
</tbody>
</table>

Table 4.6.

Descriptive Statistics for Ethnicity Based on Cohort
Overall, the sample \((N = 258)\) may be described as primarily individuals in their late twenties to early thirties in age, female, and Caucasian. There were 90% female \((n = 231)\) and 10% male \((n = 27)\) participants. Little ethnic diversity was observed among the sample with 94% Caucasian \((n = 242)\), 4% African-American \((n = 10)\), 1% Asian \((n = 3)\), 0.4% Hispanic \((n = 1)\), 0.4% Indian \((n = 1)\), and 0.4% biracial \((n = 1)\). A description of the sample is further depicted based on cohort for which similar demographic characteristics were noted when compared to the entire sample. However with regards to ethnic diversity, all of the participants in Cohort 4 \((n = 54)\) were Caucasian.

**Reliability Testing**

The following data were retrieved from the participant’s academic records via a secure electronic password and encrypted college database: 1) Assessment Technologies Institute (ATI) Critical Thinking Assessment (CTA) program entry scores; 2) ATI CTA program exit scores; 3) ATI RN Comprehensive Predictor scores; and 4) NCLEX-RN results. After these data were entered, coded, and de-identified, they were verified and inspected for errors. Since there was an appearance of outliers on the low end of the distribution for CTA program entry scores, the low and high ends of the distribution for CTA program exit scores, and the high end of the distribution for RN Comprehensive Predictor scores, those values were checked for accuracy and determined to be legitimate scores. Figures 4.2, 4.3, and 4.4 illustrate histograms for those scores respectively.
Figure 4.2. CTA Program Entry Scores.

Figure 4.3. CTA Program Exit Scores.
Figure 4.4. RN Comprehensive Predictor Scores.

Instrument reliability was assessed to support the dependability and stability of the study results. The instruments utilized in the study were copyrighted by their respective testing companies. Copyrights for the CTA and RN Comprehensive Predictor are maintained by ATI and copyright for the NCLEX-RN are maintained by the National Council of State Boards of Nursing (NCSBN). A comparison of scores from the CTA program exit and RN Comprehensive Predictor exams was made to the national and program mean scores for both instruments, as demonstrated in Tables 4.7 and 4.8. According to ATI (2012; 2014), the national mean scores are an average of scores from all types of entry-level nursing programs and the program mean scores are an average of scores matched to the specific type of nursing program, in this study, ADN programs.
The national annual first time pass rates for graduates of ADN programs (NCSBN, 2012; 2013a; 2014a) was compared to first time NCLEX-RN pass rates for the study participants based on cohort and is illustrated in Table 4.9. In summary, the mean scores for the CTA program exit and RN Comprehensive Predictor and the national NCLEX-RN pass rate percentages provided support for the reliability of the instruments utilized in this study since the scores and pass rates were consistent.

Table 4.7.

*CTA Program Exit Mean Scores Based on Cohort Compared to National and Program CTA Program Exit Scores*

<table>
<thead>
<tr>
<th>Cohort</th>
<th>Cohort</th>
<th>National</th>
<th>Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cohort 1</td>
<td>71.1%</td>
<td>70.3%</td>
<td>72.0%</td>
</tr>
<tr>
<td>Cohort 2</td>
<td>71.8%</td>
<td>70.3%</td>
<td>72.0%</td>
</tr>
<tr>
<td>Cohort 3</td>
<td>76.8%</td>
<td>70.3%</td>
<td>72.0%</td>
</tr>
<tr>
<td>Cohort 4</td>
<td>75.4%</td>
<td>69.7%</td>
<td>70.2%</td>
</tr>
<tr>
<td>Cohort 5</td>
<td>75.6%</td>
<td>68.3%</td>
<td>68.6%</td>
</tr>
<tr>
<td>Cohort 6</td>
<td>74.6%</td>
<td>68.3%</td>
<td>68.6%</td>
</tr>
</tbody>
</table>
Table 4.8.

**RN Comprehensive Predictor Mean Scores Based on Cohort Compared to National and Program RN Comprehensive Predictor Scores**

<table>
<thead>
<tr>
<th>Cohort</th>
<th>Form</th>
<th>Group</th>
<th>National</th>
<th>Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cohort 1</td>
<td>2010 B</td>
<td>71.8%</td>
<td>69.7%</td>
<td>70.2%</td>
</tr>
<tr>
<td>Cohort 2</td>
<td>2010 A</td>
<td>74.1%</td>
<td>69.7%</td>
<td>70.2%</td>
</tr>
<tr>
<td>Cohort 3</td>
<td>2010 C</td>
<td>74.5%</td>
<td>69.7%</td>
<td>70.2%</td>
</tr>
<tr>
<td>Cohort 4</td>
<td>2010 C</td>
<td>74.7%</td>
<td>69.7%</td>
<td>70.2%</td>
</tr>
<tr>
<td>Cohort 5</td>
<td>2013 B</td>
<td>73.3%</td>
<td>68.3%</td>
<td>68.6%</td>
</tr>
<tr>
<td>Cohort 6</td>
<td>2013 B</td>
<td>71.7%</td>
<td>68.3%</td>
<td>68.6%</td>
</tr>
</tbody>
</table>

Table 4.9.

**First Time NCLEX-RN Pass Rates Compared to National First Time NCLEX-RN Pass Rates for ADN Graduates**

<table>
<thead>
<tr>
<th>Year</th>
<th>Cohort</th>
<th>Cohort Pass Rate</th>
<th>National Pass Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>1</td>
<td>100%</td>
<td>89.3%</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td>3</td>
<td>94.1%</td>
<td>81.4%</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>83.3%</td>
<td></td>
</tr>
<tr>
<td>2014</td>
<td>5</td>
<td>86.4%</td>
<td>79.3%</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>95.5%</td>
<td></td>
</tr>
</tbody>
</table>

Four different versions of the RN Comprehensive Predictor were administered to the study participants. Although students were provided three attempts to successfully
achieve the program’s established benchmark score of 72%, only first time RN Comprehensive Predictor scores were included as study data. The RN Comprehensive Predictor was revised in 2013 to reflect changes made to the NCLEX-RN blueprint implemented on April 1, 2013. As a result, 34% of the participants, those in Cohorts 5 and 6, were administered Form 2013 during the first attempt (n = 88). Table 4.10 describes which version of the RN Comprehensive Predictor was administered to each cohort during the first, second, and third attempts. Thirty two percent or all participants in Cohorts 1 and 2 (n = 82) took the former version of the NCLEX-RN and 68% or all participants in Cohorts 3, 4, 5, and 6 (n = 176) took the version that was revised in 2013.

Table 4.10.

*RN Comprehensive Predictor Versions Based on Cohort Administration*

<table>
<thead>
<tr>
<th>Cohort</th>
<th>First Attempt</th>
<th>Second Attempt</th>
<th>Third Attempt</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Form</td>
<td>n</td>
<td>Form</td>
</tr>
<tr>
<td>Cohort 1</td>
<td>2010 B</td>
<td>44</td>
<td>2010 A</td>
</tr>
<tr>
<td>Cohort 2</td>
<td>2010 A</td>
<td>38</td>
<td>2010 C</td>
</tr>
<tr>
<td>Cohort 3</td>
<td>2010 C</td>
<td>34</td>
<td>2010 A</td>
</tr>
<tr>
<td>Cohort 4</td>
<td>2010 C</td>
<td>54</td>
<td>2013</td>
</tr>
<tr>
<td>Cohort 5</td>
<td>2013</td>
<td>44</td>
<td>2013</td>
</tr>
<tr>
<td>Cohort 6</td>
<td>2013</td>
<td>44</td>
<td>2013</td>
</tr>
</tbody>
</table>
Hypotheses Testing

Four research questions assisted in guiding this study and four hypotheses described the relationships between the study variables. Various approaches were utilized in addressing the research questions and testing the hypotheses.

Hypothesis One

The paired $t$-test was conducted to determine if critical thinking program exit score was significantly higher than critical thinking program entry score for ADN students in a concept-based curriculum. To warrant accurate analysis of these data, $t$-test assumptions must be met. The first assumption was met since both variables were critical thinking scores obtained from the CTA, which were interval scale measurement. The measurements were also normally distributed, as illustrated in Figures 4.5 and 4.6, meeting the second assumption of the paired $t$-test. Lastly, there were 258 pairs of measurements, which was more than the recommended 30 pairs of measurements indicated as another assumption for use of the paired $t$-test.
Figure 4.5. CTA Program Entry Score.
After verifying that these data satisfied the assumptions underlying the paired $t$-test, a paired $t$-test was calculated to compare the mean critical thinking program entry score to the mean critical thinking program exit score obtained from the CTA. Tables 4.11 and 4.12 describe the results of the paired $t$-test. The mean score on the CTA program entry exam was 71.9 ($sd = 8.76$), and the mean score on the CTA program exit exam was 74.2 ($sd = 8.21$). A significant increase from critical thinking program entry to critical thinking program exit was found ($t(257) = -5.134, p < 0.001$). These data rejected the null hypothesis, thereby supporting the alternative hypothesis which stated “Critical
thinking program exit score will be higher than critical thinking program entry score for ADN students in a concept-based curriculum.

Table 4.11.

*t-Test Paired Sample Statistics*

<table>
<thead>
<tr>
<th>Measurement</th>
<th>N</th>
<th>M</th>
<th>sd</th>
</tr>
</thead>
<tbody>
<tr>
<td>CTA Program Entry</td>
<td>258</td>
<td>71.9</td>
<td>8.76</td>
</tr>
<tr>
<td>CTA Program Exit</td>
<td>258</td>
<td>74.2</td>
<td>8.21</td>
</tr>
</tbody>
</table>

Table 4.12.

*t-Test Paired Samples Test*

<table>
<thead>
<tr>
<th>t</th>
<th>df</th>
<th>Sig. 2-tailed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pair 1</td>
<td>-5.134</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>CTA Program Entry</td>
<td>257</td>
<td></td>
</tr>
<tr>
<td>CTA Program Exit</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Hypotheses Two and Three**

Logistic regression and point-biserial correlation were utilized to answer the second and third hypotheses. The second alternative hypothesis stated that a higher critical thinking program exit score will result in a significantly higher first time NCLEX-RN pass success for ADN students in a concept-based curriculum. The third alternative hypothesis stated that a higher probability of pass score will result in a significantly higher first time NCLEX-RN pass success for ADN students in a concept-based curriculum.
Logistic regression. Before using logistic regression to address the hypotheses, these data were assessed to determine suitability with the test. These data were determined to meet the requirements for logistic regression since the dependent variable was categorical and coded as dichotomous, pass or fail. Furthermore the number of data surpassed the minimum of 60 total cases.

To help ensure accurate analysis of these data, correlations among the predictor variables were checked to determine if the predictor variables were correlated. It was determined that multicollinearity did not exist among the predictor variables since the correlation did not equal or exceeded 0.50 and the Tolerance value was close to 1, as depicted in Tables 4.13 and 4.14. Additionally, the scatterplot matrix illustrated in Figure 4.7, was examined to assess the assumption of a linear relationship among the predictor variables and it was concluded that since these data points were relatively scattered, a linear relationship existed between critical thinking program exit score and probability of pass score.

Table 4.13.

*Correlation among Critical Thinking Program Exit Score and Probability of Pass Score*

<table>
<thead>
<tr>
<th>Correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Critical Thinking Program Exit Score and Probability of Pass Score</td>
</tr>
</tbody>
</table>
| Pearson Correlation | 0.259  
| Sig. (1-tailed) | <0.001  
| N | 258  

99
Table 4.14.

Collinearity Statistics for Critical Thinking Program Exit Score and Probability of Pass Score

<table>
<thead>
<tr>
<th>Critical Thinking Program Exit Score and Probability of Pass Score</th>
<th>Tolerance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.933</td>
</tr>
</tbody>
</table>

Figure 4.7. Scatterplot for Assumption of Linearity between Critical Thinking Program Exit Score and Probability of Pass Score.

Once concluded to be a proper test, logistic regression was conducted to assess whether the two predictor variables, critical thinking program exit score, obtained from
the CTA, and probability of pass score, obtained from the RN Comprehensive Predictor, significantly predicted whether a student passed the NCLEX-RN on the first attempt. There are several tests included in logistic regression that provide support for the analysis. These tests include the Omnibus Test of Model Coefficients, Cox and Snell R Square, Nagelkerke R Square, Variables in the Equation, and Classification Table. These tests and related output data will be discussed.

The Omnibus Test of Model Coefficients indicated that the overall model was significant when both independent variables are considered together ($\chi^2 = 16.432$, $df = 2$, $p = < 0.001$). This suggests that critical thinking program exit and probability of pass scores significantly predict whether or not a student passes the NCLEX-RN on the first attempt.

According to the Cox and Snell R Square and the Nagelkerke R Square in the Model Summary, between 6.2% and 15.1% of the variance in first time NCLEX-RN pass success is accounted for by critical thinking program exit and probability of pass scores. The Hosmer and Lemeshow Test was non-significant ($p = 0.341$), which indicates the model is a good fit, meaning the model is able to predict values that are not significantly different from what was observed.

The Variables in the Equation results indicated that both predictor variables, critical thinking program exit score ($p = 0.009$) and probability of pass score ($p = 0.012$) are significant in predicting if a student passes the NCLEX-RN on the first attempt. The odds ratio for critical thinking program exit score (Exp (B) = 1.09) and probability of pass score (Exp (B) = 1.12) indicate that the odds of passing the NCLEX-RN on the first attempt are increasingly greater as critical thinking program exit and probability of pass
scores increase. Specifically, that the odds of passing the NCLEX-RN on the first attempt is 1.09 times higher with a one unit increment in critical thinking program exit score and the odds of passing the NCLEX-RN on the first attempt is 1.12 times higher with a one unit increment in probability of pass score, holding all other variables constant.

The logistic regression equations based on this model are:

\[
\frac{\text{prob (pass)}}{\text{prob (no pass)}} = e^{-11.744} \times e^{0.086 \times \text{CTAExit}} \times e^{0.114 \times \text{RNPred}}
\]

\[
\ln \frac{\text{prob (pass)}}{\text{prob (no pass)}} = -11.744 + 0.086 \times \text{CTA Exit} + 0.114 \times \text{RNPred}
\]

According to the output data in the Classification Table, it is noted that 93% of the observation is correctly classified based on the model. When critical thinking program exit scores and probability of pass scores are used as predictors, overall 93% of the participants were predicted correctly as to their ability to pass the NCLEX-RN on the first attempt. Tables 4.15, 4.16, 4.17, 4.18, and 4.19 illustrate findings from the logistic regression analysis of these data.

Table 4.15.

*Logistic Regression Analysis: Omnibus Test of Model Coefficients*

<table>
<thead>
<tr>
<th>Chi-square</th>
<th>df</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>14.432</td>
<td>2</td>
</tr>
</tbody>
</table>
Table 4.16.

*Logistic Regression Analysis: Model Summary*

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cox and Snell R Square</td>
<td>0.062</td>
</tr>
<tr>
<td>Nagelkerke R Square</td>
<td>0.151</td>
</tr>
</tbody>
</table>

Table 4.17.

*Logistic Regression Analysis: Hosmer and Lemeshow Test*

<table>
<thead>
<tr>
<th></th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hosmer and Lemeshow Test</td>
<td>0.341</td>
</tr>
</tbody>
</table>

Table 4.18.

*Logistic Regression Analysis: Variables in the Equation*

<table>
<thead>
<tr>
<th></th>
<th>Sig.</th>
<th>Exp (B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CTA Program Exit Score</td>
<td>0.009</td>
<td>1.09</td>
</tr>
<tr>
<td>Probability of Pass Score</td>
<td>0.012</td>
<td>1.12</td>
</tr>
</tbody>
</table>
Table 4.19.

*Logistic Regression Analysis: Classification Table Results*

<table>
<thead>
<tr>
<th>Predicted First Time NCLEX-RN Pass Success</th>
<th>Percentage Correct</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Percentage</td>
<td>92.6</td>
</tr>
</tbody>
</table>

**Point-biserial correlation.** The strength and direction of the relationships between critical thinking program exit score and first time NCLEX-RN pass success and probability of pass score and first time NCLEX-RN pass success were assessed via a point-biserial correlation. Although a Pearson Correlation was utilized, since the dependent variable was dichotomous this equates to a point-biserial correlation computation. Results of the analysis suggest a positive relationship between each independent variable and the dependent variable. However, the relationship was weak. Results of the correlation are listed in Table 4.20. The second and third null hypotheses were rejected based on the data analysis from the logistic regression and point-biserial correlation. Consequently, the second and third alternative hypotheses were supported which stated, “A higher critical thinking program exit score will result in a higher first time NCLEX-RN pass success for ADN students in a concept-based curriculum” and “A higher probability of pass score will result in a higher first time NCLEX-RN pass success for ADN students in a concept-based curriculum”.

104
Table 4.20.

**Correlation**

<table>
<thead>
<tr>
<th>Correlation Type</th>
<th>NCLEX-RN Pass Success</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CTA Program Exit Pearson Correlation</td>
<td>0.195</td>
<td>0.002</td>
</tr>
<tr>
<td>Probability of Pass Pearson Correlation</td>
<td>0.188</td>
<td>0.002</td>
</tr>
</tbody>
</table>

**Hypothesis Four**

Descriptive statistics were used to analyze the fourth hypothesis. The alternative hypothesis stated that the mean probability of pass score for first time NCLEX-RN passage among ADN students in a concept-based curriculum will be greater than the program’s benchmark score of 72%. A total of 19 students did not pass the NCLEX-RN on the first attempt, reducing the sample size to 239. The results of the descriptive statistics are presented in Table 4.21 and a histogram is illustrated in Figure 4.8. The mean probability of pass score for first time NCLEX-RN passage was 73.7%. These data rejected the null hypothesis, thereby supporting the alternative hypothesis.
### Table 4.21.

**Descriptive Statistics for Probability of Pass Score for First Time NCLEX-RN Passage**

<table>
<thead>
<tr>
<th>Probability of Pass Score</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>N</strong></td>
<td>239</td>
</tr>
<tr>
<td><strong>Mean</strong></td>
<td>73.7</td>
</tr>
<tr>
<td><strong>Median</strong></td>
<td>74.0</td>
</tr>
<tr>
<td><strong>Mode</strong></td>
<td>76.0</td>
</tr>
<tr>
<td><strong>Standard Deviation</strong></td>
<td>5.70</td>
</tr>
<tr>
<td><strong>Range</strong></td>
<td>32</td>
</tr>
<tr>
<td><strong>Minimum</strong></td>
<td>58</td>
</tr>
<tr>
<td><strong>Maximum</strong></td>
<td>90</td>
</tr>
</tbody>
</table>

**Figure 4.8.** RN Comprehensive Predictor Scores
Chapter 4 Summary

This study sought to evaluate critical thinking scores, NCLEX-RN pass rate prediction scores, and NCLEX-RN pass rates in ADN students completing a concept-based curriculum. A convenience sampling technique was utilized for which the ramifications were taken into consideration when analyzing the study results since the external validity of a study can be threatened with its use. Statistical procedures utilized in analyzing the study data and the results of the analysis were provided in a thorough and comprehensive manner.

Characteristics of the study population were obtained from descriptive statistics, which indicated the study population was fairly homogenous, primarily individuals in their late twenties and early thirties, female, and Caucasian. Hypothesis testing found significant results for all hypotheses. A paired t-test determined that critical thinking program exit score was significantly higher than critical thinking program entry score. Relationships between the independent variables, critical thinking program exit score and probability of pass score and the dependent variable, first time pass success on the NCLEX-RN were analyzed through logistic regression and point-biserial correlation procedures. Results suggested that both independent variables were able to predict first time pass success on the NCLEX-RN. Furthermore, a positive relationship between each independent variable and the dependent variable was noted. Descriptive statistics were utilized in obtaining the mean probability of pass score for first time NCLEX-RN passage, which was higher than the established benchmark score.
CHAPTER 5
CONCLUSIONS AND DISCUSSION

This final chapter will provide a discussion regarding the conclusions of this study. Results of this study are summarized and discussed, with a focus on the theoretical interpretation and relevance to current literature. Implications of the results of this study to the state of nursing education and recommendations for further research concludes this chapter.

Purpose of the Study

Prominent organizations, such as the Accreditation Commission for Education in Nursing (ACEN, 2013), the Carnegie Foundation for the Advancement of Teaching (Benner, Sutphen, Leonard, & Day, 2010), the Institute of Medicine (IOM, 2011), and the National League for Nursing (NLN, 2008) have brought a great deal of attention to the current state of nursing education. Graduates of nursing programs across this country are unable to meet minimum practice expectations (Berkow, Virkstis, Stewart, & Conway, 2008; Bowles & Candela, 2005; del Bueno, 2005; Etheridge, 2007; Fero, Witsberger, Wesmiller, Zullo, & Hoffman, 2009; Marshburn, Engelke, & Swanson, 2009). Novice nurses struggle with exercising an ability to critically think while executing a plan of care for their patients (Benner et al., 2010; Chang, Chang, Kuo, Yang, & Chou, 2011; del Bueno, 2005; Fero et al., 2009; LaMartina & Ward-Smith, 2014; Theisen & Sandau, 2013), many of whom suffer from comprehensive health care conditions (Fairman & Okoye, 2011; James, 2013).

The egregious outcomes associated with traditional nursing curricular designs cannot be ignored. Swift action is desperately needed to dramatically revamp the methods
utilized in the education of today’s nursing student (ACEN, 2013; Benner et al., 2010; IOM, 2011; NLN, 2008). A concept-based curriculum is an innovative educational design posited as improving the preparedness of nursing graduates to practice in today’s challenging health care environment (Hardin & Richardson, 2012). However, little empirical data exist examining the outcomes of a concept-based curriculum. Further lacking are research studies involving associate degree nursing (ADN) students, who comprise the majority nursing student population. Research is needed to provide supporting evidence regarding the outcomes of a concept-based curriculum utilized in the education of ADN students. Appropriately educating our students assures that the health care provided is precise, cost effective, and timely.

The purpose of this study was to evaluate critical thinking scores, National Council Licensure Examination for Registered Nurses (NCLEX-RN) pass rate prediction scores, and NCLEX-RN pass rates in ADN students completing a concept-based curriculum. The experiential learning theory served as the theoretical framework for this study by providing support in addressing the research questions, operationalizing the study variables, and interpreting results of this study. The experiential learning theory postulates that experience and reflection through the use of active participation in the learning process promote the overall learning of students (Kolb, 1984). Therefore, students who are exposed to a concept-based curriculum will demonstrate desirable learning outcomes, such as improved critical thinking scores and pass rate prediction scores. Furthermore, these outcomes can be used to predict first time pass success on the NCLEX-RN.
The independent variables in this study were critical thinking program exit score and probability of pass score. The dependent variable was first time pass success on the NCLEX-RN. The following research questions were addressed:

1. What is the difference between critical thinking program entry score and critical thinking program exit score for ADN students in a concept-based curriculum?
2. What is the relationship between critical thinking program exit score and first time NCLEX-RN pass success for ADN students in a concept-based curriculum?
3. What is the relationship between probability of pass score and first time NCLEX-RN pass success for ADN students in a concept-based curriculum?
4. What is the mean probability of pass score for first time NCLEX-RN passage among ADN students in a concept-based curriculum?

Four hypotheses were generated for this study:

1. Critical thinking program exit score will be higher than critical thinking program entry score for ADN students in a concept-based curriculum.
2. A higher critical thinking program exit score will result in a higher first time NCLEX-RN pass success for ADN students in a concept-based curriculum.
3. A higher probability of pass score will result in a higher first time NCLEX-RN pass success for ADN students in a concept-based curriculum.
4. The mean probability of pass score for first time NCLEX-RN passage among ADN students in a concept-based curriculum will be greater than the program’s benchmark score of 72%.
Summary of the Results

Statistical analysis utilizing Statistical Package for Social Sciences (SPSS) was conducted retrospectively by examining students’ academic records via a secure electronic password and encrypted college database. The analyses of the results of the study provided support for the utilization of a concept-based curriculum in promoting the critical thinking development of ADN students and identifying predictors of NCLEX-RN success among this population.

A total of 258 student academic records were included as study participants for which descriptive statistics characterized as being in their late twenties to early thirties in age, female, and Caucasian. Study results identified a statistically significant increase in the critical thinking development of these students after completing a concept-based curriculum ($p < 0.001$), thereby rejecting the first null hypothesis.

These data also offered substantiation to reject the second and third null hypotheses since statistically significant results were found in the ability of the dependent variable, first time pass success on the NCLEX-RN, to be predicted by both independent variables, critical thinking program exit score ($p = 0.009$) and probability of pass score ($p = 0.012$). Moreover, model building through the use of logistic regression indicated the model was a good fit, meaning the model was able to predict values that were not significantly different from what was observed. A weak relationship was suggested between critical thinking program exit score and first time pass success on the NCLEX-RN ($rpb = 0.195$) and probability of pass score and first time pass success on the NCLEX-RN ($rpb = 0.188$). Nonetheless, study results indicated that as critical thinking score and probability of pass score increase, a student’s ability to pass the NCLEX-RN
on the first attempt also increases. Specifically, the odds ratio for critical thinking score and probability of pass score were interpreted, which indicated the odds of passing the NCLEX-RN on the first attempt is 1.09 times higher with a one percentage increase in critical thinking program exit score and 1.12 times higher with a one percentage increase in probability of pass score. Logistic regression equations were also provided and may be utilized by nurse educators to predict a nursing student’s ability to pass the NCLEX-RN on the first attempt with the use of the critical thinking program exit score and probability of pass score.

Lastly, results of this study suggested the mean probability of pass score for first time NCLEX-RN passage was 73.7%. This was higher than the program’s benchmark probability of pass score of 72%. Thus, the fourth null hypothesis was also rejected.

**Theoretical Interpretation of the Results**

The experiential learning theory served as the underpinnings for this study. According to Kolb (1984), experiential learning is acquiring and developing knowledge through experience. Although critical thinking is not an explicitly stated outcome of the theory, it is posited that students learn problem solving skills through application of the theory (Kolb, 1984). When utilizing the experiential learning theory to guide their studies, An and Yoo (2008) and Lisko and O’Dell (2010) described how problem solving assisted in developing the study participants’ critical thinking skills which led to effective clinical decision making. Furthermore, it is postulated that the experiential learning theory can assist students in learning informational material and formulating new knowledge (Kolb, 1984). This was applicable to assessing and measuring the study variables, critical thinking program exit score, probability of pass score, and first time
pass success on the NCLEX-RN. Additionally, Vezina and Salvador-Paguirigan (2015) described the experiential learning theory as appropriately serving as the premise for a concept-based teaching approach. This provided support for the purpose of the study and the research questions.

As the study participants progressed through each stage of their education, which was guided by the experiential learning theory, their critical thinking skills were developed and knowledge was generated as they completed a concept-based curriculum. Furthermore, the students advanced and completed each level in the nursing program all while formulating knowledge by connecting new informational material to experiences in previous courses and clinical rotations.

Objective testing has been described as an appropriate method for assessing outcomes of the experiential learning theory (Carrick, 2011; March & Ambrose, 2010; Mosser, Williams, and Wood, 2006). The study instruments which measured the participant’s critical thinking scores, probability of pass scores, and NCLEX-RN results were all forms of objective testing, which yielded quantitative data. These data were then analyzed to assess the study participants’ development of critical thinking and learning.

These research data were analyzed to assess the difference between the participants’ critical thinking scores at program entry and program exit. Study results suggested a statistically significant increase in the critical thinking development of students after being educated in a concept-based curriculum ($p < 0.001$). Therefore, this helps to substantiate application of the experiential learning theory as promoting this skill set among nursing students.
Further substantiation for use of the theory was provided after analyzing data related to the study participants’ critical thinking program exit scores, probability of pass scores, and NCLEX-RN pass results. Both critical thinking program exit score \( p = 0.009 \) and probability of pass score \( p = 0.012 \) were found to be statistically significant in predicting first time pass success on the NCLEX-RN. The average probability of pass score for first time NCLEX-RN passage was greater than the program’s established benchmark score. Probability of pass score and NCLEX-RN success are indicators of learning specific to nursing students. The critical thinking program exit score, probability of pass score, and NCLEX-RN results were obtained after the study participants completed nursing school. These data provided evidence of generating critical thinking skills and overall learning relative to nursing students, thereby supporting the experiential learning theory as an effective theory in guiding the education of nursing students completing a concept-based curriculum.

In summary, a theoretical analysis of the study results indicated that the experiential learning theory appropriately served to guide this study. After assessing the study data and relating the results to the experiential learning theory, the interpretation of these data were possible. Figure 5.1 illustrates application of the experiential learning theory in interpreting the results of this study.
Figure 5.1. Application of the Experiential Learning Theory (created by C. Harrison, 2016)

Discussion of the Results in Relation to the Literature

Another literature search was performed in an attempt to discover related research published since the onset of this study. However, the results of this literature search were void. Therefore, the discussion of the results of this study will be in relation to the literature review conducted a priori.

Similarities and differences between the results of this study and those presented in the literature review were discovered regarding nursing students’ critical thinking development. Although a commonality was found between the results of this study and those presented in the literature concerning the ability of a NCLEX-RN predictor test to forecast NCLEX-RN pass success, an incongruence was noted when assessing critical thinking skills for this capability. A paucity of studies were found evaluating the outcomes of a concept-based curriculum. Of those studies reviewed, all compared a
concept-based curriculum to a traditional nursing curriculum and there were consistencies and disparities when comparing the results of those studies to this study. Additionally, there were several limitations noted to this current study, such as use of a single research site, convenience sampling technique, homogenous sample, secondary data, and a weak study design. It is recognized that these limitations may have contributed to the contrast in findings from this current study with the results of other studies.

**Critical Thinking Development**

In the study conducted by Jones and Morris (2007), results suggested no change in the critical thinking skills of ADN students after completing a traditional nursing program of study. Jones and Morris utilized the Critical Thinking Assessment (CTA) by Assessment Technologies Institute (ATI), which is the same instrument used in this current study. Although the same instrument was utilized and ADN students were participants in both studies, a different curriculum design was operationalized. Moreover, the results of these two studies were not comparable since the results of this current study suggested a statistically significant increase in the critical thinking scores of nursing students following exposure to a concept-based curriculum ($p < 0.001$).

The results are also different from those presented by Giddens and Gloeckner (2005) and Stewart and Dempsey (2005), who assessed the critical thinking development of baccalaureate nursing students and reported a lack of critical thinking development among the study participants. In addition to including a different sample of nursing students in their studies, these researchers also utilized different critical thinking instruments (Giddens & Gloeckner, 2005; Stewart & Dempsey, 2005) than what was used in this current study. The results of their studies suggested a lack of critical thinking development.
development among the students (Giddens & Gloeckner, 2005; Stewart & Dempsey, 2005).

Duncan and Schulz (2015) utilized a different approach with their study by comparing a traditional curriculum to a concept-based curriculum. However, there was no reported difference between the critical thinking ability of students educated with a traditional nursing curriculum (mean = 79.7%) versus a concept-based curriculum (mean = 78.7%). Although this current study did not compare different curricular designs, the study results did suggest an increase in the critical thinking scores of nursing students who were educated with a concept-based curriculum ($p < 0.001$), thereby contributing to this body of knowledge. Furthermore, this current study adds to the paucity of literature found assessing the outcomes of a concept-based curriculum.

The results of this current study do support those presented by An and Yoo (2008) and Shin, Lee, Ha, and Kim (2006), who reported study results indicating an increase in the critical thinking skills of baccalaureate students after completing nursing school. However, consideration for the fact that both of these studies were conducted in Korea must be taken into account when generalizing these results of the studies.

Since literature overwhelmingly suggests novice nurses struggle with exercising adept critical thinking skills (Benner et al., 2010; Chang et al., 2011; del Bueno, 2005; Fero et al., 2009; LaMartina & Ward-Smith, 2014; Theisen & Sandau, 2013), results of this current study may contribute to the body of knowledge regarding effective methods to mature and enhance this higher order thinking ability among ADN students. Consequently, they will be better prepared at transitioning to the role of a safe and competent practitioner. In particular, the results of this current study may be used to assist
in addressing the relationship between critical thinking deficits of novice nurses and the reported health care related errors committed by these new nursing graduates (Ebright, Urden, Patterson, & Chalko, 2004; Morrow, 2009; Saintsing, Gibson, and Pennington, 2011), which may improve the health outcomes of patients on a societal and global level.

Furthermore, literature suggests novice nurses are concerned with their preparedness to competently enter the nursing profession (Etheridge, 2007; Marshburn, Engelke, & Swanson, 2009; National Council of State Boards of Nursing [NCSBN], 2006). Previous study results have suggested that novice nurses who have low critical thinking scores also possess feelings of incompetence (Etheridge, 2007; Wangensteen, Johansson, Björkström, & Nordström, 2012). Nurse educators may incorporate the results of this current study into their nursing education practice to assist in developing the critical thinking skills of nursing students, which may assist them in feeling proficient and self-assured as novice nurses entering today’s health care environment.

**Predictors of NCLEX-RN Success**

The results of this study suggested first time pass success on the NCLEX-RN could be predicted by critical thinking score \((p = 0.009)\) and probability of pass score \((p = 0.012)\). These findings corroborate those reported by Ukpabi (2008), who also reported a positive correlation between critical thinking score and passage on the NCLEX-RN. Ukpabi also utilized the CTA, which was the instrument used in this current study to measure the critical thinking scores of the study participants. Even though Giddens and Gloeckner (2005) utilized a different critical thinking instrument in their study, similar results were described.
On the other hand, different results were reported in the studies conducted by Stewart and Dempsey (2005) and Shirrell (2008) who all utilized different critical thinking instruments in their respective studies. The results of these studies found no correlation between critical thinking skills and NCLEX-RN pass success.

It is worth noting that of the before mentioned studies exploring a relationship between critical thinking ability and pass success on the NCLEX-RN, Shirrell (2008) was the only researcher to include ADN students as study participants. Unfortunately, Shirrell did not provide demographic data regarding the sample, which makes it difficult to generalize the study results and to compare these results to those found in the current study. The study participants in this current study were fairly homogenous with regards to age, gender, and ethnicity. The mean age of the study participants was 30.1 years, with most being in their late twenties to early thirties in age. The majority of the study participants were female (90%) and Caucasian (94%). This is vastly different from current literature, which characterize ADN students as being a diverse population (De Lima, London, & Manieri, 2011).

Another limitation found in the literature was empirical support for the utilization of critical thinking scores to predict NCLEX-RN success for ADN students educated in a concept-based curriculum. Duncan and Schulz (2015) did evaluate this correlation, but implemented a different research approach than this current study and included baccalaureate nursing students. These researchers compared the critical thinking scores of students educated in a traditional nursing curriculum to students educated in a concept-based nursing curriculum, for which no statistically significant difference was found between the groups (Duncan & Schulz, 2015). Although this current study did not
compare different curriculum models, critical thinking score was statistically significant ($p = 0.009$) in predicting first time pass success on the NCLEX-RN for ADN students exposed to a concept-based curriculum. This contributes to the limited body of literature evaluating the use of a concept-based curriculum in ADN education and serves to address this gap in the literature.

This current study also adds to the literature providing overwhelming support for use of the RN Comprehensive Predictor in predicting pass success on the NCLEX-RN (Alameida et al., 2011; Brodersen & Mills, 2014; Giddens & Gloeckner, 2005; Penprase Harris & Qu, 2013). Of the literature reviewed, none of the studies evaluated the predictive ability of the RN Comprehensive Predictor to forecast NCLEX-RN pass success among ADN students and only Giddens and Gloeckner (2005) assessed this relationship for students completing a concept-based curriculum. The results of this current study align with those presented by Giddens and Gloeckner, who also reported a positive relationship between pass rate prediction scores and NCLEX-RN pass success. Although the results of this current study indicated the existence of a weak relationship ($rpb = 0.188$) and results of the study by Giddens and Gloeckner suggested a moderate correlation between pass rate prediction scores and NCLEX-RN pass success ($r = 0.458$), similar conclusions can be made. Evidence supporting a relationship between pass rate prediction scores and NCLEX-RN pass success can be utilized by nurse educators to identify students who may benefit from early remediation in order to pass the NCLEX-RN on the first attempt.

Moreover, results of this current study indicated the mean probability of pass score from the RN Comprehensive Predictor for students completing a concept-based
curriculum was 74%, which was higher than the program’s established benchmark score of 72%. This result may offer promise for the use of a concept-based curriculum in assisting students in achieving a higher probability of pass score and ultimately a greater chance of passing the NCLEX-RN on the first attempt.

Although the purpose of this current study did not include assessing NCLEX-RN pass rates for students in a concept-based curriculum, data analysis suggested the participants in the study achieved higher NCLEX-RN pass rates when compared to the national pass rates. For example, study participants who graduated in 2012 had a 100% first time NCLEX-RN pass rate, while the national pass rate during this year was 89.3% (NCSBN, 2012). These results do not align with those reported by Giddens and Morton (2010), whereby study findings indicated a lower first time NCLEX-RN pass rate among the first cohort of students who were educated with a concept-based curriculum. On the contrary, results of a study conducted by Lewis (2014) suggested an increase in the NCLEX-RN pass rates for students who completed a concept-based curriculum. However, the increase was not statistically significant (Lewis, 2014).

**Implication of the Results for Practice**

The state of nursing education must be swiftly addressed. Traditional pedagogical methods, such as lecture-based teaching are failing to equip novice nurses with the knowledge and skills needed to safely care for patients in today’s increasingly complex health care environment (Benner et al., 2010; Fero et al., 2009; Gillespie & Peterson, 2009; Kalisch & Begeny, 2010; Kanter & Alexander, 2012; Lasater, 2011; Vaismoradi, Salsali, & Marck, 2011). As the requirements for critical thinking among nurses increase (Fairman & Okoye, 2011), many novice nurses are entering the nursing profession
demonstrating deficits in their ability to exercise this skill set (Benner et al., 2010; Chang et al., 2011; del Bueno, 2005; Fero et al., 2009; LaMartina & Ward-Smith, 2014; Theisen & Sandau, 2013). Further compounding this problem, is the vast increase in the number of novice nurses saturating the nursing profession (Bureau of Labor Statistics [BLS], Dracup & Morris, 2007; Health Resources and Service Administration [HRSA], 2013). Consequently, nurse educators cannot afford to take a wait and see approach since a remedy to this dilemma is urgently needed.

Results of this study suggest the implementation of a concept-based curriculum may be the solution for solving the challenges related to the current state of nursing education. Study results indicated a statistically significant increase in students’ critical thinking scores after they were educated with a concept-based curriculum (p <0.001). This may suggest that a concept-based curriculum is able assist in the development of nursing students’ critical thinking skills, thereby preparing them to practice in today’s challenging health care arena.

The results of this study also contribute to the evidence regarding predictors of NCLEX-RN success. The mean probability of pass score for first time NCLEX-RN success was higher than the program’s established benchmark score, suggesting that students who are educated with a concept-based curriculum are able to achieve a higher probability of pass score and subsequently, a greater likelihood of passing the NCLEX-RN on the first attempt. Furthermore, results indicated positive correlations between critical thinking program exit score and first time pass success on the NCLEX-RN and between probability of pass score and first time pass success on the NCLEX-RN. Since the NCLEX-RN is considered a valuable measurement of a nursing graduate’s
knowledge and serves as a marker for entry level competency, identifying factors related to first time NCLEX-RN pass success is beneficial. Moreover, results of this study may serve to provide nurse educators with information needed to provide early remediation to students who are at risk for failing the NCLEX-RN on the first attempt through an analysis of their critical thinking scores and probability of pass scores.

**Recommendations for Further Research**

The utilization of a concept-based curriculum is gaining popularity in nursing education. While this study provided valuable information regarding outcomes related to a concept-based curriculum, continued enhancement of nursing education through sound research is needed. It is imperative that further empirical assessment regarding the evaluation of a concept-based curriculum take place. One recommendation for further research is to replicate this current study, utilizing multiple study sites with the inclusion of larger, diverse samples.

Due to the negative effects of NCLEX-RN failure, further research regarding this topic is recommended. Expanding this current study to include evaluating the predictive ability of other data, such as SAT and ACT scores and GPA for nursing and science courses to forecast NCLEX-RN pass success could be beneficial. Additionally, other standardized testing, such as the Adult Medical-Surgical and Fundamentals modules offered by ATI are typically administered early in a nursing student’s program of study. Data from the scores obtained from these instruments could be analyzed for their ability to predict NCLEX-RN pass success. Assessing these additional data may provide valuable information that could be used for the early identification of students who are in jeopardy of failing the NCLEX-RN on the first attempt. Consequently, more students
would be able to receive remediation earlier in their nursing program of study and hopefully lead to successfully passing the NCLEX-RN on the first attempt.

Empirical studies utilizing strong research designs, multiple study sites, and large, diverse study populations can assist in enhancing the generalizability of the studies’ findings. Comparing outcomes, such as critical thinking skills, probability of pass scores, and NCLEX-RN pass success of different degree-seeking nursing students enrolled in concept-based curricula is being proposed. Specifically, the recommendation for further research is to compare the outcomes of ADN and baccalaureate students in various nursing programs located in different regions of the country. Implementing a program of research at nursing schools throughout the United States may help to attract study participants who represent diverse backgrounds. Furthermore, comparing different types of degree-seeking students may help to increase the generalizability of the study’s findings.

Since the results of this study suggest critical thinking score and probability of pass score are predictors for first time NCLEX-RN pass success for students in a concept-based curriculum, providing early remediation strategies to students based on their critical thinking and probability of pass scores should be implemented. A specific research study could be designed to measure the effectiveness of these remediation strategies. Students, who are identified early during their program of study as being at risk for failing the NCLEX-RN on the first attempt could be provided with information regarding the potential benefits of remediation. These students would have the option of participating in remediation strategies, such as simulated clinical scenarios and receiving tutoring on nursing content followed by taking an exam. While the exam would not
contribute to their course grade, the exam scores could be used to guide further remediation strategies. The NCLEX-RN pass success of students who chose to participate in the remediation program could be compared to those students who opted not to participate. This may lead to empirical support for the use of specific remediation strategies to assist nursing students in achieving first time NCLEX-RN pass success.

Further research could also include nurse educators and health care administrators as study participants. Berkow et al. (2008) reported a disparity between the views of hospital administrators and nurse educators regarding the competency of novice nurses. Designing a qualitative study by interviewing nurse educators and health care administrators regarding their perceptions of critical thinking and the competency of novice nurses should be explored. The interviews could be one-on-one, last approximately 30 minutes, and guided by open-ended questions. After analyzing the participants’ responses and creating themes, the responses of the nurse educators and health care administrators could be compared. These results may assist in providing clarity regarding the reported difference in perception of novice nurse competency among these two groups and may also aid in decreasing the education to practice gap.

**Chapter Summary**

Several organizations, such as the ACEN (2013), Carnegie Foundation for the Advancement of Teaching (Benner et al., 2010), IOM (2011), and NLN (2008) have called for a transformation of the current state of nursing education. Specific recommendations have included the use of innovative curricular designs, such as a concept-based curriculum. While this curriculum is postulated to develop nursing students’ critical thinking skills, little evidence was found evaluating the effectiveness of
a concept-based curriculum in nursing education. In an effort to address this gap in the literature, this quantitative, retrospective, descriptive, correlational design was designed to evaluate secondary data from a convenience sample of ADN students from one college of nursing.

The results of this study offer promise that a concept-based curriculum may be able to assist in the development of nursing students’ critical thinking skills, thereby adequately preparing them to transition into contemporary nursing practice. Nurse educators can utilize the results of this study to provide remediation to students who are identified as being at risk for failing the NCLEX-RN on the first attempt. Due to the high stakes associated with the NCLEX-RN, nurse educators have an obligation to do all they can to assist nursing students in achieving first time pass success on this exam.
March 17, 2015

Mr. Andrew Kay
VP of Assessments & Curriculum Support
Assessment Technologies Institute
11161 Overbrook Road
Lanswood, KS 66211

Mr. Kay:
In reference to Carmen Harrison, I want to express my highest regard for her professionally and on a personal basis. Carmen has been a faculty member of our college since 2003. She is an outstanding teacher and role model for our students. She has the highest of integrity and expectations for herself, and others, and I cannot express more the value she brings to our institution and our students.

I fully support Carmen’s research, “Evaluating the Outcomes of a Concept-Based Curriculum in an Associate Degree Nursing Program”. A few years ago our nursing program revised the curriculum, and I am looking forward to the findings. I have no doubt they will help lead us forward in educating our students.

Our institution will be providing resources and release time as we can for Carmen to complete her project. I fully support Carmen’s work and grant you permission to assist her in accessing the ATI data needed for her study.

Sincerely,

Morris Cohen
President
APPENDIX B

LETTER OF PERMISSION FROM ACADEMIC DEAN

March 10, 2015

Dear Reviewers,

As an Institution of Higher Learning, research in pedagogy is highly valued. Use of a concept-based approach is not new to education but there is limited research regarding its effectiveness in Nursing Education. As more nursing programs across the country adopt the concept-based approach to nursing education, it is critical to investigate the effectiveness of this approach on critical thinking and board pass rates.

I strongly support Carmen Harrison’s research study entitled “Evaluating the Outcomes of a Concept-Based Curriculum in an Associate Degree Nursing Program”. The purpose of the study is to evaluate critical thinking skills and board pass rates in ADN students completing a concept-based curriculum. This study will contribute to the body of knowledge related to critical thinking, board pass rates, and a concept-based curriculum approach. In addition, this study should give us a better understanding of the outcomes of a concept-based curriculum. Carmen has experience and expertise in teaching in a concept-based curriculum in an associate degree program. She also has a passion for promoting evidence-based approaches to learning.

I am excited to support research that will improve the education of our students at Good Samaritan College of Nursing and Health Science and support our commitment to assessment of student learning.

Sincerely,

Pat McMahon, RN, MSN, CNP
Dean of Academic Affairs
APPENDIX C

UMKC IRB APPROVAL

NOT HUMAN SUBJECTS RESEARCH DETERMINATION

Principal Investigator: Peggy Ward-Smith
School of Nursing
Kansas City, MO 64108

Protocol Number: 15-340
Protocol Title: Evaluating the Outcomes of a Concept-Based Curriculum in an Associate Degree Nursing Program
Type of Review: Not Human Subjects Determination

Date of Determination: 07/13/2015

Dear Dr. Ward-Smith,

The above referenced study, and your participation as a principal investigator, was reviewed and determined to be Not Human Subjects Research (NHSR). As such, your activity falls outside the parameters of IRB review. You may conduct your study, without additional obligation to the IRB, as described in your application.

The NHSR Determination is based upon the following Federally provided definitions:

"Research" is defined by these regulations as "a systematic investigation, including research development, testing and evaluation, designed to develop or contribute to generalizable knowledge."

The regulations define a "Human Subject" as "a living individual about whom an investigator (whether professional or student) conducting research obtains data through intervention or interaction with the individual, or identifiable private information."

All Human Subjects Research must be submitted to the IRB. If your study changes in such a way that it becomes Human Subjects Research please contact the Research Compliance office immediately for the appropriate course of action.

Please contact the Research Compliance Office (email: research@umkc.edu; phone: (816) 235-5927) if you have questions or require further information.

Thank you,
UMKC IRB
UMKC IRB Administrative Office
September 25, 2015

Carmen V. Harrison
Good Samaritan College of Nursing and Health Science
775 Dixmyth Avenue
Cincinnati, OH 45220

IRB Study #: 15-072
Study Title: Evaluating the Outcomes of a Concept-Based Curriculum in an Associate Degree Nursing Program

Dear Ms. Harrison,

It was determined that this research is EXEMPT from IRB review in accordance with 45 CFR 46.101(b)(1)(a) on 9/23/2015. Ongoing IRB oversight is not required.

Please note the following requirements: The principal investigator is responsible for notifying the IRB of any changes in the protocol, participating investigators, procedures, consent forms, or conflicts of interest. Approval is based on the information as submitted. New procedures cannot be initiated until IRB approval has been given. If you wish to change any aspect of this study, please submit an Amendment to the IRB, providing a justification for each requested change.

Sincerely,

[Signature]

Yury R. Gonzales, MD, FACF
Chairman
TriHealth Institutional Review Board
PWA 00003444 - IRB000002744

Institutional Review Board
10448 Montgomery Road, Suite A
Cincinnati, OH 45242
Phone: 610.866.0248
Fax: 610.866.3995
Email: irb@trihealth.com
REFERENCES


doi:10.1097/01.NNE.0000343405.90362.15


doi:10.1177/0193945910381596


Carrick J. (2011). Student achievement and NCLEX-RN success: Problems that persist. *Nursing Education Perspectives, 32*(2), 78-83. doi:10.5480/1536-5026-32.2.78


https://www.iom.edu/~/media/Files/Report%20Files/1999/To-Err-is-Human/To%20Err%20is%20Human%201999%20Report%20brief.pdf

Retrieved from

doi:10.1097/PTS.0b013e3182948a69

doi:10.1016/j.teln.2007.07.006


doi:10.1177/0193945909335052


Trofino, R.M. (2013). Relationship of associate degree nursing program criteria with NCLEX-RN success: What are the best predictors in a nursing program of passing the NCLEX-RN the first time? *Teaching and Learning in Nursing, 8*(1), 4-12. doi:10.1016/j.teln.2012.08.001


VITA

Carmen V. Harrison was born in Hamilton, Ohio. She attended public schools in the Hamilton City School District, graduating from Hamilton High School in 1990. Ms. Harrison attended Miami University, where she earned an Associate Degree in Nursing in 1993 and a Bachelor of Science in Nursing degree in 1994. She began her nursing career working on a Medical-Surgical unit. When Ms. Harrison transferred to an Obstetrical unit, she found her passion for women’s health and decided to further her education by specializing in this area of nursing. In 1999, she earned a certificate as a Women’s Health Care Nurse Practitioner and a Master of Science in Nursing degree from the University of Cincinnati. Ms. Harrison has practiced as a Women’s Health Care Nurse Practitioner in a clinic and private office setting, and remains involved with a community health nursing program. While serving as a preceptor for nursing students, Ms. Harrison discovered a love for teaching. She began working as a faculty member at Good Samaritan College of Nursing and Health Science in 2003, where she maintains an Associate Professor position. In 2010, Ms. Harrison was the recipient of the DAISY Faculty award. Ms. Harrison has presented at regional and national nursing education conferences, disseminating her knowledge regarding innovative teaching methods and diversity within nursing education. In 2012, Ms. Harrison enrolled in the Doctor of Philosophy in Nursing program at the University of Missouri-Kansas City. She was selected as a Jonas Nurse Leader Scholar in 2014. Ms. Harrison has published an article on the subject of concept-based teaching-learning strategies. She is a member of the Association of Women’s Health, Obstetric and Neonatal Nurses, National League for Nursing, and Sigma Theta Tau International.