Factors Related to Success on the Certified Nurse Educator (CNE®) Examination

A Dissertation submitted

by

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Acknowledgement

In completing this degree, I have realized that achieving major achievements in life are predicated upon three factors: inspiration, illumination, and motivation. All of these factors must be present to achieve any vision.

Inspiration brings the power of moving the intellect or emotions so that a person achieves a vision beyond their current comfort zone to a place of greater achievement albeit with greater risk. Many individuals have provided inspiration for me, including: Dr. Ellen McGovern who first encouraged me to engage in the full scope of the academic nurse educator role long before it was ever formally identified, Dr. Janice Adkins who believed that I could lead the creation of a successful new nursing program, Dr. J. Upright who provided me the opportunity to serve in higher education administration within an inter-professional environment, and Dr. Beverly Malone who is a role model for me as well as thousands of other individuals as a compassionate leader who not only has a vision, but successfully lives her vision.

Illumination "lights the way" so that we can achieve our vision. Significant individuals who provided the illumination for completion of this dissertation included: Dr. Lois Linden who provided continued encouragement and supportive direction throughout the process, Dr. Tufano who provided enthusiasm and support in completing this process, Dr. Orduña who has been illuminating my growth in many ways for years, Dr. Larry Simmons who has always been just a "phone call away" for any technical support, and Dr. Janice Brewington who has been "lighting my professional path" for the past several years (and was correct that seventy hypothesis were too many to include in a dissertation.)

Inspiration and illumination can open your mind and show you the way, but without motivation, one is not likely to achieve their vision. My family has been the source of my

motivation. I recognize the incredible courage that was necessary for my grandmother Marie, at age 19, to seek her vision by immigrating to America from Denmark, alone, without the security of family being present on her journey. My mother, Hildur always encouraged me to do my best, and my father Clarence, taught me by example not to shy away from a challenge because you may not initially believe you know how to deal with it. My children, Laura and Chris, continue to provide motivation for me to achieve more than what I would have ever thought possible, because I want to be the person they see when they look at me.

By God's Grace, I have been given inspiration, illumination, and motivation. My wish for my children and grandchildren is that they find inspiration, illumination, and motivation to achieve the vision that exists for their lives.

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Abstract

This research sought to identify factors related to success on the NLN CNE® examination. The current research is the only CNE research based upon data collected following a change in the CNE® testing eligibility criteria, which had the effect of enlarging the potential population of academic nurse educators who would be eligible for the examination. Results of the current research indicated that performance on the CNE examination was related to employment status (full-time employees in the academic nurse educator role have a higher pass rate), total years of employment as an academic nurse educator (more years of employment in the academic nurse educator role was associated with a higher pass rate), nursing program type of employment (employment at diploma, baccalaureate, master's, and doctoral programs was associated with a higher pass rate), and years of employment with the current academic employer (more years of employment in the academic nurse educator role with the current employer was associated with a higher pass rate). This study was limited by the availability of data related to testers, and the lack of universal expectations of full-time versus part-time academic nurse educators. Future research should continue to investigate the factors that correlate with success on the CNE® examination, as well as the identification of the effect of certified educators on the effectiveness of teaching overall and the benefits of increased teaching effectiveness on student learning.

CHAPTER 1

INTRODUCTION

Background

Although the concept of nursing is centuries old, organized education for nursing is thought to have begun only one hundred and fifty years ago (Nursing, History and Health Care, n.d.a). Nursing education initially occurred in hospitals, with students providing nursing care as apprentices and attending late day lectures by physicians (Donahue, 2010). The early hospital trained nursing students were deemed graduated when the nursing supervisor determined the student was ready to assume an independent role as a nurse (Donahue, 2010). The early apprentice-like system was gradually replaced when formalized education programs were developed, initially by formal hospital diploma nursing education and later by moving nursing education programs to community colleges, comprehensive colleges, and universities (Nursing, History and Health Care, n.d.b).

The transition of nursing education brought about a change in the role of nurse educators. When nursing education was based in the apprentice-like hospital training role, the “nurse educator” was in fact a nursing supervisor who had more hospital administrative duties than teaching duties (Donahue, 2010). As nursing education moved to the formal academic setting, the nursing educator role moved from the clinical practice focus towards the traditional faculty/educator role (National League for Nursing [NLN], 2005b). This shift from the nurse educator as a nurse clinician who happened to supervise students, to the nurse educator who taught within a clinically based profession, represented the birth of a true nurse educator role. It is currently recognized that a nurse educator must be both a skilled professional nurse and a competent educator (National League for Nursing, 2012a).

Today's traditional academic nurse educator refers to the nurse educator who is employed in a formal academic setting. This academic setting may be a community college, university, or free standing hospital based nursing program. Depending upon the particular program of study, graduates of nursing programs found within the formal academic setting would be eligible to write the licensure examination for either practical nursing (vocational nursing) or registered nursing. The requirements for academic nurse educators are governed by state regulations governing nursing, college or university employment requirements, and accreditation requirements. Generally academic nurse educators must have an unencumbered, current registered nurse license, a graduate degree in nursing (either master's degree or doctoral degree), and clinical expertise as a nurse (NLN, 2005b).

The National League for Nursing (2004) visibly promoted the distinct role of a nurse educator with the development of the NLN's Hallmarks of Excellence in Nursing Education© that identified various aspects and standards of the nursing education setting. This work was further expanded when the National League for Nursing (2005b) identified eight core competencies of a nurse educator who functions in the full scope of the academic educator role. These eight core competencies were further described by the National League for Nursing by identifying 66 task statements (NLN, 2005b). The National League for Nursing activities promoted the position that a nurse educator was an advanced nursing role (American Association of Colleges of Nursing, 1996).

The identification of nursing education as an advanced role was a major step in furthering the development of nursing education, because previously defined advanced practice nursing roles were limited to clinical practice roles. The advanced practice clinical nursing roles include the nursing roles which allow the nurse an expanded practice role based upon additional

education, national certification, and additional licensure beyond the basic registered nurse level. Examples of advanced clinical practice roles would include nurse practitioners, nurse midwives, and nurse anesthetists. These advanced clinical practice roles are focused on providing care to individual clients or groups of clients in clinical settings.

The fundamental work of the National League for Nursing in identifying the nurse educator core competencies (2005b) was followed by a nationwide practice analysis including thousands of academic nurse educators. The practice analysis was based upon the identified core competencies and was instrumental to validate the perceived nurse educator role by researching the self-perceived role of thousands of nurse educators. These activities led to the development of the Certified Nurse Educator (CNE®) Examination. Eligibility criteria were determined by carefully reviewing the 2005 practice analysis, state regulatory requirements for academic nurse educators, nursing program accreditation requirements, and the NLN position statement on the preparation of nurse educators (Ortelli, 2008). The initial eligibility criteria to write the NLN CNE® examination are identified in Table 1.

Table 1

CNE® Examination Original Eligibility Criteria

Option	Licensure	Education	Experience
Option A	Current active registered nurse licensure in the United States or its territories.	Master's or doctoral degree in nursing with: a major emphasis in nursing education or nine or more credit hours of graduate-level education courses[a].	Two years or more of full-time employment[b] in the academic faculty role within the past five years.
Option B	Current active registered nurse licensure in the United States or it territories.	Master's or doctoral degree in nursing (with a major emphasis in a role other than nursing education).	Four years or more of full-time employment[b] in the academic faculty role within the past five years.

Note: [a] Graduate-level research or statistics courses do not count toward this requirement. Examples of acceptable graduate-level education courses include: Curriculum Development and Evaluation; Instructional Design; Principles of Adult Learning; Assessment/Measurement & Evaluation; Principles of Teaching and Learning, Instructional Technology
[b] Full-time employment as defined by the academic institution
(NLN, 2006)

Following extensive measures to assure validity and reliability, the NLN CNE® examination was piloted in 2005. A cut score (passing score) was determined based upon psychometric analysis and the first CNE® designations were awarded during the fall of 2005. The CNE® program further enhanced the movement to include the academic nurse educator role with the other advanced practice nursing roles. The CNE® examination is the only certification examination for academic nurse educators. Attaining the CNE® credential indicates that the academic nurse educator has demonstrated mastery of the academic nurse educator role, and is practicing within what the NLN refers to as an advanced practice nursing role (NLN, 2012b).

Significance

It is essential that nurse educators, who have advanced education and skills, be recognized as achieving equivalent status to other advanced nursing roles. Professional certification has become a recognized process for specialized practitioners to demonstrate professional competence in their area (Institute for Credentialing Excellence, 2012). Nursing organizations and health care agencies have used certification as a standard for recognizing specialty nursing practice (American Board of Nursing Specialties, 2005). Although nursing has many certifications in various practice and specialist areas, the NLN-developed Certified Nurse Educator credential is the only certification in academic nursing education (National League for Nursing, 2012a). The NLN CNE® credential promotes the nurse educator role as a specialty advanced nursing role, and promotes the nurse educator role as equivalent to other advanced specialty nursing roles. The creation of academic nurse educator certification provides academic nurse educators a way to validate knowledge in the full scope of the academic nurse educator role. Employers of nurse educators holding the CNE® credential have assurance the educator has demonstrated an acceptable level of knowledge of the nurse educator competencies practicing within the full scope of the academic nurse educator role. Attainment of the CNE® credential promotes the role of the academic nurse educator to be viewed as on par with other advanced nursing roles within the nursing profession. According to the NLN (2012b), “academic nursing education is a specialty area and an advanced practice role within professional nursing” (p. 5).

Problem Statement

Academic nurse educators perform professional employment activities based upon being a traditional college educator, as well as being a practicing professional nurse. Academic nurse educators may be employed to perform various activities, including classroom teaching only,

classroom laboratory only, clinical only (supervising students who are providing care to clients, such as in a hospital), or any combination of these activities.

The CNE® examination is based upon the NLN core competencies (2012a) of an academic nurse educator practicing in the full scope of the academic role. The NLN has identified eight competencies that an academic nurse educator would possess who practices in the full scope of the academic role. These competencies include the following.

Competency 1: Facilitate Learning

> Nurse educators are responsible for creating an environment in classroom, laboratory, and clinical settings that facilitates student learning and the achievement of desired cognitive, affective, and psychomotor outcomes. (NLN, 2012a, p. 14)

Competency 2: Facilitate Learner Development and Socialization

> Nurse educators recognize their responsibility for helping students develop as nurses and integrate the values and behaviors expected of those who fulfill that role. (NLN, 2012a, p. 16)

Competency 3: Use Assessment and Evaluation Strategies

> Nurse educators use a variety of strategies to asses and evaluate student learning in classroom, laboratory and clinical settings, as well as in all domains of learning. (NLN, 2012a, p. 17)

Competency 4: Participate in Curriculum Design and Evaluation of Program Outcomes

> Nurse educators are responsible for formulating program outcomes and designing curricula that reflect contemporary health care trends and prepares graduates to function effectively in the health care environment. (NLN, 2012a, p. 18)

Competency 5: Function as a Change Agent and Leader

> Nurse educators function as change agents and leaders to create a preferred future for nursing education and nursing practice. (NLN, 2012a, p. 19)

Competency 6: Pursue Continuous Quality Improvement in the Nurse Educator Role

> Nurse educators recognize that their role is multidimensional and that an ongoing commitment to develop and maintain competence in the role is essential. (NLN, 2012a, p. 20)

Competency 7: Engage in Scholarship

> Nurse educators acknowledge that scholarship is an integral component of the faculty role, and that teaching itself is a scholarly activity. (NLN, 2012a, p. 21)

> Competency 8: Function within the Educational Environment
>
> Nurse educators are knowledgeable about the educational environment within which they practice and recognize how political, institutional, social, and economic forces impact their role. (NLN, 2012a, p. 22)

Some academic nurse educator positions are based upon practice in all eight competency areas, which the NLN defines as practicing in the full scope of the academic nurse educator role (NLN, 2012a). An example of a full scope of practice role would be an academic nurse educator employed in a large research university where the position expectations require a wide variety of responsibilities (e.g. classroom teaching, clinical supervision, participation in curriculum development, participation in program evaluation activities, continuous participation in research, and participation on university wide faculty committees). Other academic nurse educator positions may only be based upon some of the competency areas, which would be known as practicing in a partial scope of the academic nurse educator role. An example of a partial scope of practice role would be an academic nurse educator whose position expectations are limited solely to clinical teaching (e.g. the teacher only supervises students in the clinical or hospital setting and has no other academic teaching role expectations). The employment variable of full-time or part-time employment may or may not impact whether or not the academic nurse educator practices in the full scope of the academic nurse educator role. Some part-time academic nurse educator positions have no requirements for campus-wide committee participation or theory teaching, whereas other part-time academic nurse educator positions would still include practice in the full scope of the academic nurse educator role.

Much has been assumed about the typical role of academic nurse educators and why some academic nurse educators pass the CNE® examination and others fail the CNE® examination. An early assumption about the academic nurse educator role was that all full-time

nurse educators practiced in the full scope of the academic role, and conversely, that all part-time academic nurse educators did not practice in the full scope of the academic role. As a result of this assumption, an initial eligibility requirement to take the CNE® examination was full-time employment as an academic nurse educator. A significant amount of feedback to the NLN from nurse educators disputed the original assumption and clearly noted that part-time academic nurse educators may well be practicing in the full scope of the academic nurse educator role, and that full-time academic nurse educators may not always be practicing in the full scope of the academic nurse educator role. The apparent assumption of full-time role versus part-time role was then superseded by a newer assumption that the essential element was in the actual academic practice role (full scope using all nurse educator competencies or partial scope based upon only some of the academic nurse educator competencies), rather than the inconsistent full-time/part-time employment classification systems between various academic institution. As a result of this feedback, the 2011 NLN practice analysis was expanded to include participants who were part-time nurse educators. The 2011 NLN practice analysis indicated there was no significant difference in the self-perceived role of the full-time and part-time academic nurse educator (NLN, 2012b). This finding led to a change in the eligibility criteria for the CNE® examination, and as of October 2012, the CNE® program eligibility criteria were expanded to allow part-time nurse educators to write the CNE® examination (NLN, 2012b).

A second original assumption about obtaining competency in the nurse educator role was that the academic nurse educator had to have actual practice experience in the academic nurse educator role (M. Rizzolo, personal communication, 2009). Again, the NLN received significant feedback from academic deans and program directors of graduate programs having nursing degrees focusing on the role of the academic nurse educator, as well as feedback from new

graduates of such programs having a functional nurse role focus on the academic nurse educator role (B. Malone, personal communication, 2010). In responding to this feedback, the 2011 NLN practice analysis also included new graduates of master's and doctoral programs having a role focus on the academic nurse educator role and no practice experience as an academic nurse educator, other than what may have been a practicum experience as an academic nurse educator (Applied Measurement Professionals, 2011). The results of the 2011 practice analysis indicated there was no significant difference in the self-perceived role of the new graduate with a master's or doctoral degree with a focus in academic nursing education and no academic nurse educator experience, and the academic nurse educator who had experience in the academic nurse educator role (Applied Measurement Professionals, 2011). This finding led to the second change in the eligibility criteria for the CNE® examination in October 2012, when new graduates of master's and doctoral programs having a role focus on academic nursing education, who may or may not have any practice experience as an academic nurse educator, could write the examination (NLN, 2012b).

The 2011 practice analysis resulted in specific changes to the CNE® eligibility criteria which are noted in Table 2 below (deletions to the previous criteria are noted by strike through format and revisions to the previous criteria are noted by bold font).

Table 2

CNE® Examination Revised Eligibility Criteria
(Deletions noted by strike through; change noted by bold font)

Option	Licensure	Education	Experience
Option A	Current active registered nurse licensure in the United States or its territories.	Master's or doctoral degree in nursing with: a major emphasis in nursing education or nine or more credit hours of graduate-level education courses[a].	~~Two years or more of full-time employment[b] in the academic faculty role within the past five years~~. **No academic faculty role employment required.**
Option B	Current active registered nurse licensure in the United States or it territories.	Master's or doctoral degree in nursing (with a major emphasis in a role other than nursing education).	~~Four~~ **Two** years or more of ~~full-time~~ employment[b] in the academic faculty role within the past five years.

Note: [a] Graduate-level research or statistics courses do not count toward this requirement. Examples of acceptable graduate-level education courses include: Curriculum Development and Evaluation; Instructional Design; Principles of Adult Learning; Assessment/Measurement & Evaluation; Principles of Teaching and Learning, Instructional Technology
[b] Full-time employment as defined by the academic institution
(NLN, 2012a)

The significance of these changes were that the full-time and part-time distinction was removed from the employment criteria, no academic faculty experience was required for candidates having graduate education in the academic nurse educator role, and the academic faculty experience was reduced from four years to two years within the preceding five years for those candidates who had a graduate master's or doctoral degree in nursing, but not with specific academic coursework in the academic nurse educator role. These revised eligibility criteria became effective during October 2012.

Only a limited number of research studies have been conducted focusing on the Certified Nurse Educator credential. Early published research on Certified Nurse Educators was

descriptive in nature, and focused on the characteristics of candidates who took the Certified Nurse Educator examination between 2005 and 2007 (Ortelli, 2008). Additional CNE® research has focused on beliefs of Certified Nurse Educators (Barta, 2010), nurse educators' professional development (Ramsburg, 2010), perceived levels of nurse educators' attainment of the NLN Core Competencies of Nurse Educators© (Higbie, 2010), and an analysis of first-time performance of those who have taken the CNE® examination (Ortelli, 2012). Ortelli's 2012 study only included data from full-time nurse educators having a minimum teaching experience of two years in the academic setting. Thus Ortelli's 2012 findings are not applicable to the current population of CNE® test takers. A specific finding of Ortelli's 2012 study was that faculty holding doctorates performed better than faculty who held master's degrees as their highest academic degree. Based upon that finding, Ortelli concluded that the educational level of the faculty was significant in passing the CNE® examination. However, it is possible that the employment type (research university versus smaller community college) has a greater effect on CNE® testing success than the educational preparation of the faculty (e.g. master's prepared faculty who would be more likely to teach in a community college or doctorally prepared faculty who would be more likely to teach in a research university). Additionally, Ortelli's 2012 study only examined the independent variables of educational preparation and years of full-time faculty employment, to the dependent variables of first-time performance (pass/fail) on the CNE® examination and performance in each of the six CNE® examination content areas.

There are significant gaps in CNE® research that has been completed. No research studies have been conducted with the data obtained since the eligibility criteria were expanded to include part-time faculty and new graduates of master's and doctoral programs focused in nursing education. Research conducted on the new eligibility criteria will validate the changes

made to the CNE® eligibility criteria that were made on the basis of the 2011 practice analysis. Since a practice analysis is a method to gather data about self-perception, its results can only be applied to the perceived role of the academic nurse educator. Research on the outcomes of CNE® testing with the new eligibility criteria will validate whether or not the self-perceptions of faculty are consistent with the practice analysis findings that: 1) there is no difference in the roles of part-time and full-time academic nurse educators, and 2) there is no difference in the roles of new graduates of master's and doctoral nursing education programs having a focus on the academic nurse educator role and possibly no experience as an academic nurse educator. Since no research studies have been conducted with data reflecting the new eligibility criteria, there are no research findings that have examined the dependent variable of first-time performance (pass/fail) on the CNE® examination to the following demographic independent variables: 1) academic employment status (full-time, part-time, or no academic employment experience) of academic nurse educators; 2) formal graduate-level academic coursework in the role of the academic nurse educator (has formal coursework in academic nurse educator role or does not have formal coursework in academic nurse educator role); 3) CNE® eligibility criteria option (Option A or Option B), 4) total years of employment as an academic nurse educator; 5) types of programs the academic nurse educator has taught throughout his/her career; and 6) type of program where majority of teaching has occurred. Further research regarding CNE® examination success will assist in identifying if the changes to the eligibility criteria made based upon the practice analysis in 2012 were in fact appropriate, and whether or not various demographic variables impact success on the CNE® examination.

Purpose Statement

This research study examined the characteristics of academic nurse educators' first-time performance on the NLN CNE® examination with subjects who have written the examination since the eligibility criteria were expanded in October 2012. Specifically, data were examined to determine if any differences existed between the dependent variables of first-time performance (pass/fail) on the CNE® examination to the independent demographic variables of: academic employment status (full-time, part-time, or no academic employment experience) of academic nurse educators, formal graduate-level academic coursework in the role of the academic nurse educator (has formal coursework in academic nurse educator role or does not have formal coursework in the academic nurse educator role), CNE® eligibility criteria option (Option A or Option B), total years of employment as an academic nurse educator, types of programs the academic nurse educator has taught throughout his/her career, and type of program where majority of teaching has occurred. This research builds upon the prior CNE® research and specifically focused on the new eligibility criteria (work status and work experience), along with the potential impact of academic nursing education employment setting on attainment of the CNE® credential.

Research Questions/Hypotheses

The following research questions and hypotheses provided direction for this study. They were also intended to investigate the effects of the changed eligibility criteria (including part-time faculty as well as full-time faculty, and removing the faculty practice requirements for those with specific academic preparation in the role of the academic nurse educator) and various demographic variables, on CNE® testing success.

Research Question # 1: Is there a statistically significant difference in the academic employment status (full-time, part-time, or no academic employment experience) of academic nurse educators and first-time performance (pass/fail) on the CNE® examination?

Hypothesis # 1: There is no statistically significant difference in the academic employment status (full-time, part-time, or no academic employment experience) of academic nurse educators and first-time performance (pass/fail) on the CNE® examination.

Research Question # 2: Is there a statistically significant difference between academic nurse educators having formal graduate-level academic coursework in the role of the academic nurse educator and academic nurse educators who do not have formal graduate-level academic coursework in the role of the academic nurse educator, and first-time performance (pass/fail) on the CNE® examination?

Hypothesis # 2: There is no statistically significant difference between academic nurse educators having formal graduate-level academic coursework in the role of the academic nurse educator and academic nurse educators who do not have formal graduate-level academic coursework in the role of the academic nurse educator, and first-time performance (pass/fail) on the CNE® examination.

Research Question # 3: Is there a statistically significant difference between demographic variables of academic nurse educators and first-time performance (pass/fail) on the CNE® examination?

Hypothesis # 3: There is a statistically significant difference between demographic variables of academic nurse educators and first-time performance (pass/fail) on the CNE® examination.

Definition of Terms

The following list provided definitions to key terms that were significant to the framework and understanding of this study.

Advanced practice nurse: a nurse who practices beyond the scope and role associated with initial licensure as a registered nurse. Advanced practice in nursing is typically based upon having advanced education and practice experience beyond the requirement for licensure as a registered nurse. Advanced practice nurses may or may not need an additional license beyond the registered nursing license to legally practice in the advanced practice role. Examples of advanced practice nurses include roles such as: advanced clinical practice nurses, nurse administrators, and nurse educators.

Advanced clinical practice nurses: nurses who have education and experience to practice in an expanded scope within the clinical nursing setting. The advanced clinical practice nursing roles typically require an advanced nursing license beyond the registered nurse license. Types of advanced clinical practice nurses include: nurse practitioners, nurse anesthetists, clinical nurse midwives, and clinical nurse specialists.

Academic nurse educator: an advanced practice nurse who self-identifies as having competence to teach in a school of nursing, either by education or experience, and facilitates student learning through activities such as curriculum development, teaching, assessment/evaluation, student advisement, and other related academic activities.

Academic nurse educator employment status: a classification of employment status within the formal academic setting that may include full-time, part-time, or no academic employment experience. Full-time and part-time employment is according to the academic

institution's guidelines. No academic employment experience refers to those who have not had formal employment in the academic nurse educator role.

Academic nurse educator role: refers to professional practice based upon the NLN identified competencies of the academic nurse educator and including a graduate nursing academic degree.

Academic nurse educators practicing in the full-scope of the academic practice role: refers to academic nurse educators practicing in all eight competency areas identified by the NLN core competencies of academic nurse educators.

Academic nurse educators not practicing in the full-scope of the academic practice role: refers to academic nurse educators who do not practice in all eight competency areas as identified by the NLN core competencies of academic nurse educators.

Academic nurse educator role preparation: refers to a master's or doctoral nursing degree with a focus in the role of the academic nurse educator and includes nine or more credit hours in courses such as: curriculum development and evaluation, instructional design, principles of adult learning, assessment/measurement and evaluation, principles of teaching and learning, and/or instructional technology.

Academic nurse educators having formal academic preparation in the academic nurse educator role: refers to those prepared at the master's or doctoral level who have earned nine or more credit hours in coursework considered to be within the academic nurse educator role preparation (curriculum development and evaluation, instructional design, principles of adult learning, assessment/measurement and evaluation, principles of teaching and learning, and/or instructional technology).

Academic nurse educators not having formal academic preparation in the academic nurse educator role: refers to those prepared at the master's or doctoral level who have not earned nine or more credit hours in coursework considered to be within the academic nurse educator role preparation (curriculum development and evaluation, instructional design, principles of adult learning, assessment/measurement and evaluation, principles of teaching and learning, and/or instructional technology).

Candidate: an academic nurse educator who meets the eligibility requirements to write the CNE® certification examination.

First-time candidate: an academic nurse educator who meets the eligibility requirements to write the CNE® certification examination and has not taken the examination previously.

Certified nurse educator (CNE®): an academic nurse educator who has met the eligibility requirements to sit for the CNE® examination, demonstrated an acceptable level of knowledge of the nurse educator competencies, and is eligible to use the designation "CNE®" following their name (NLN, 2012b).

CNE® examination: a specialty nursing certification examination based upon the full-scope of the academic nurse educator role, as identified by the nurse educator competencies (Ortelli, 2012; NLN, 2012b).

Demographic variables: various identifying characteristics of the CNE® candidate, collected upon registration for the examination, and including the following.

CNE eligibility criteria option: may be either Option A (with graduate credit in

academic nursing education courses and no required employment history in the academic nurse educator role) or Option B (with no graduate credit in academic nursing education courses and a minimum requirement of two years employment in the academic nurse educator role).

Total years of employment as an academic nurse educator: refers to the total number of years of employment in the academic nurse educator role.

Types of programs the academic nurse educator has taught throughout his/her career: refers to the program types of practical/vocational nursing, associate degree nursing, diploma nursing, baccalaureate degree nursing, master's degree nursing, and doctoral degree nursing, in which the academic nurse educator taught.

Type of program where majority of teaching has occurred: refers to the one academic nursing program type that the academic nurse educator would identify as where the majority of their teaching activities have occurred.

First-time performance (pass/fail): refers to the pass/fail status for testers who are writing the CNE® examination for the first-time. First-time candidates exclude all testers who have written the CNE® examination previously.

Assumptions, Delimitations/Limitations

Although outside the control of this study, various assumptions provided a significant foundation for this study. An initial assumption was that holding a current nursing license provides some assurance of professional competence as a registered nurse. The CNE® examination does not confirm competence as a practicing nurse, only competence in the full scope of the academic role. Another assumption was that a defined scope of practice for the

nurse educator role exists. A scope of practice refers to the common set of activities that are typically associated with that role (Simpson, 1995). A defined scope of practice assures that the actual practice role of a nurse educator would be similar regardless of where the nurse educator would be teaching (Briggs, Brown, Kesten, Health, 2006). Without the defined scope of practice for the nurse educator role, it would not be possible to develop certification for the role (SeDilets, 2007). Testing data to be used in this study were obtained from the testing vendor and it was assumed that this data was accurate. The vendor collected both pass/no pass data, as well as the actual test score. The NLN collected demographic data for each testing candidate. It was also assumed that the demographic data was correct. If any data from the testing vendor or the NLN was not accurate, the study results would not be accurate. A final assumption was that the CNE® examination candidates were truthful in answering demographic, employment, and education questions on the candidate questionnaire. It was possible that the candidates were not being truthful in answering the demographic data. If the data collected from individual test candidates was inaccurate, the data analysis would be inaccurate and study conclusions would be invalid.

A variety of study delimitations were significant to note. The research questions were carefully created to promote achieving the study purposes. The variables of interest were carefully selected from among the existing dependent and independent variables that were in existence to again promote achieving the study purposes. The population studied included nurse educators who wrote the NLN CNE® examination between October 7, 2012 and May 31, 2014. The start date of the study population corresponds with the implementation of new eligibility criteria and runs through the data collection period. This population consisted of nurses holding advanced academic degrees, and having graduate study in nursing education and/or experience

as a nurse educator in an academic educational setting. The population also represented educators who voluntarily sought the NLN CNE® credential and who were currently licensed US registered nurses at the time of writing the NLN CNE® examination.

A variety of limitations were also present within this study. The population being studied was limited to nurse educators who actually completed the NLN CNE® examination (as opposed to all nurse educators who are employed in an academic nurse education setting). It was possible that the sub-set of academic nurse educators who voluntarily elect to test for NLN CNE® certification did not represent the overall population of academic nurse educators. For example, nurse educators with higher academic degrees may be more likely to obtain CNE® certification which would then create a sub-set of nurse educators having doctoral degrees than the entire population of nurse educators who would be eligible to write the examination. It was also possible that there would be missing data, as the data being studied was to be provided by a third party who administered the certification examination. The time period selected for study (October 7, 2012 through May 31, 2014) did not contain examination candidates that were representative of the overall population of CNE® testers who have taken the certification examination since its implementation in 2005. Since the eligibly criteria changed in October of 2012 to allow expanded eligibility, there was a possibility that an over-proportionate representation of the newly eligible candidates were present during the designated time period under study. There are always multiple versions of the certification examination currently in use and it was possible that results from individual examinations may not have been representative of the overall certification results. If the examination versions in use at the time the eligibility criteria expanded varied significantly from those previously used, the results of this research could have been impacted by the different examination versions more than any of the identified

independent variables. Finally, the results of this study were based upon academic nurse educators holding active registered nursing licenses in the United States (US). Therefore, the results from this study would not be representative of all academic nurse educators throughout the world because it is not known whether or not the role of the academic nurse educator in the US is the same as the role of the academic nurse educator throughout the world.

Summary

Although the role of nursing has been in existence for centuries, formalized education for the nursing role is relatively new. Within the formalized education for nurses, the nurse educator role evolved from being a hospital employed nursing supervisor to an academic nurse educator employed by an academic institution. Today's nurse educator must be both a competent registered nurse as well as a proficient educator.

The distinct role of the academic nurse educator has been promoted by the National League for Nursing through various means, such as: the development of the NLN's Hallmarks of Excellence in Nursing Education© (2004), the identification of eight competencies of nurse educators who function in the full scope of the academic educator role (NLN, 2005b), and the development of the Certified Nurse Educator examination(Ortelli, 2012). Although advanced nursing roles have traditionally been viewed as those based solely in clinical roles (e.g. nurse practitioner, nurse midwife, nurse anesthetists), the NLN promotes the academic nurse educator role as an advanced practice nurse role (2005b). Certification in nursing is a method to recognize advanced knowledge in specialty roles in nursing and the implementation of the CNE® examination promotes the role of the academic nurse educator as an advanced nursing role (NLN, 2005b).

The CNE® examination is built upon the NLN's core competencies of the full scope of practice for the academic nurse educator. The core competencies form the foundation for a nation-wide practice analysis that provides data on the self-perceived role of actual academic nurse educators. The actual CNE® test plan and CNE® test eligibility criteria are based upon the competencies and the practice analysis. The original CNE® eligibility criteria required full-time employment in the academic nurse educator role. These requirements were based upon the assumptions that only full-time academic nurse educators practiced in the full-scope of the academic nurse educator role, and that academic nurse educators must have employment experience in the academic nurse educator role to have competence as an academic nurse educator. A second practice analysis conducted in 2011 did not support the eligibility requirements that actual academic nurse educator experience was required if the candidate possessed a graduate nursing degree with a focus in the nurse educator role, and that the employment requirement must be limited to full-time employment only. As a result of the second practice analysis, the eligibility criteria changed to allow part-time as well as full-time employment for any required academic nurse educator employment experience, and to eliminate any academic nurse educator practice requirement for those who hold a graduate nursing degree with a role preparation as a nurse educator. The new eligibility criteria were implemented in October of 2012.

Very little research has been conducted within the area of the Certified Nurse Educator. And all prior CNE® research has been limited to data collected prior to the eligibility criteria change in October 7, 2012. Thus, no research has been conducted to validate or dispute the changed eligibility criteria. The purpose of this research was to examine the characteristics of academic nurse educators with first-time performance on the NLN CNE® examination with

subjects who had written the examination since the eligibility criteria were expanded. The dependent variable was first-time performance (pass/fail) of academic nurse educators on the CNE® examination. Independent variables included the candidate's: academic employment status, formal graduate-level academic coursework in the role of the academic nurse educator role, CNE® eligibility criteria option, total years worked full-time as an academic nurse educator, types of programs the academic nurse educator has taught throughout his/her career, and the type of program where the majority of teaching has occurred. A variety of assumptions, delimitations and limitations for this study have been identified and are further addressed with the study conclusions. A review of the literature, presented in the next chapter, provides additional background and understanding for this proposed study.

CHAPTER 2

LITERATURE REVIEW

Organized nursing education within the US began approximately one hundred and fifty years ago when the first three nursing education programs were opened (Nursing, History and Health Care, n.d.a). These early nursing programs were located in acute care hospitals and were considered apprentice-like programs in which students obtained nursing education in exchange for their labor (Nursing, History and Health Care, n.d.a.). Today most nurses are educated in community colleges, comprehensive colleges and universities, alongside students with other majors (Nursing, History and Health Care, n.d.b.). Nursing education today is based upon the higher education academic model, with tuition charged for enrollment in academic courses and credit hours granted upon successfully meeting course requirements.

As the setting for nursing education changed, the expected characteristics of the nurse educator also changed. Within the old apprentice-like setting, the hospital employed staff or charge nurse would oversee the students in addition to primary duties of providing care for patients (Donahue, 2010). Within the formal academic setting, the academic nurse educator is employed by the educational institution with the primary focus of educating students to become nurses (National League for Nursing, 2005a). When nursing education initially moved to the formal academic setting from the hospital setting, the available faculty were skilled nurses, who may have or may not have had competence in teaching.

Beginning in the 1960s, nursing education thrived due to significant federal support of nursing education (Nursing, History and Health Care, n.d.a.). New types of nurses emerged in the 1960s who were educated to provide various types of primary care services (involving direct patient care in clinical areas), such as nurse practitioners, clinical nurse specialists, nurse

anesthetists, and nurse midwives (Nursing, History and Health Care, n.d.a.). These new nurses providing primary care services became known as advanced practice nurses. Their advanced practice nursing was based upon specialized graduate education in nursing.

Today's academic nurse educator must be both a registered professional nurse and a competent educator (NLN, 2012a). Holding licensure as a registered professional nurse is basic assurance that the individual is competent as a practicing nurse. Nursing accrediting agencies require academic nurse educators to have graduate nursing education (Accrediting Commission for Education in Nursing, 2013; Commission on Collegiate Nursing Education, 2013). Many state boards of nursing require faculty to have graduate nursing education to teach in a state approved school of nursing. Although graduate nursing education with specialization in nursing education is required for competent academic nurse educator practice, the role of the nurse educator has not always been included as an advanced practice role (APRN Consensus Work Group & the National Council of State Boards of Nursing APRN Advisory Committee, 2008).

The National League for Nursing is the oldest nursing organization in the US and the oldest nursing organization formed to promote nursing education (NLN, n.d.a.). In support of the academic nurse educator role as being viewed as an advanced practice role, the NLN embarked on a series of actions that resulted in the creation of national standards for nurse educators. The NLN developed the NLN's Hallmarks of Excellence in Nursing Education© in 2004, which identified various aspects and standards of the nursing education setting. In 2005, the NLN identified eight core competencies of a nurse educator who functions in the full scope of the academic educator role. These eight core competencies were further described by 66 task statements (NLN, 2005b). These activities by the NLN promoted nursing education as an advanced nursing role (American Association of Colleges of Nursing [AACN], 1996). This

groundwork by the NLN (2005b) led to the development of the Certified Nurse Educator Examination which was piloted in 2005. Certification as an academic nurse educator further supported the movement to place the nurse educator role alongside the other advanced practice nursing roles that had nationally recognized certification examinations.

Certification is a recognized process for practitioners to demonstrate professional competence in their area (Institute for Credentialing Excellence, 2012). Nursing organizations and health care agencies have used certification as a standard for recognizing specialty nursing practice (American Board of Nursing Specialties [ABNS], 2005). Although nursing has many certifications in various practice and specialist areas, the NLN-developed Certified Nurse Educator credential is the only certification for the academic nurse educator role (NLN, 2012a). Attainment of the Certified Nurse Educator credential represents professional competence as an academic nurse educator (NLN, 2005b).

Only a limited number of research studies have been conducted focusing on the Certified Nurse Educator credential. Early published research was descriptive in nature. Ortelli (2008) examined the characteristics of candidates who took the Certified Nurse Educator examination between 2005 and 2007. Three additional studies on the CNE® credential were published in 2010 and included Barta's review of the beliefs of Certified Nurse Educators, Ramsburg's examination of the nurse educator's professional development, and Higbie's identification of the perceived levels of nurse educators' attainment of the Core Competencies of Nurse Educators. Ortelli (2012) analyzed the performance of those who had taken the CNE® examination, and focused on CNE® examination outcomes. Specifically, Ortelli (2012) examined the relationship between the dependent variable of first-time examination pass/no pass and the independent variables of demographic data related to the test takers. The data analyzed in Ortelli's 2012 study

was obtained on former CNE® examination eligibility criteria. No studies have been completed with CNE® data obtained following major changes to the CNE® examination eligibility criteria.

When the CNE® examination was first developed, the initial eligibility criteria to write the examination required the nurse educator to have either: a graduate degree in nursing with a focus in nursing education and two years experience as a nurse educator, or a graduate degree in nursing without a focus in nursing education and a minimum of four years experience as a nurse educator. When the practice analysis was repeated in 2010 to revalidate the scope of the nurse educator practice, the sample population was expanded to include: part-time academic nurse educators, and new graduates of master's and doctoral programs having a focus in nursing education but who may not have had any work experience in the role of the nurse educator. The practice analysis did not indicate any difference between: the perceived role of full-time and part-time nurse educators, and the role of the new nurse educator (new graduate with no work experience) and the nurse educator with a minimum of two to four years experience. As a result, the CNE® examination eligibility criteria expanded in 2011, to include part-time academic nurse educators and new graduates of master's and doctoral programs having a focus in nursing education. A practice analysis is a "self-reported opinion survey" only, and no subsequent research could be identified that verified whether or not the self-reported data is, in fact, accurate in the conclusion that there is no difference in the practice role of the new nurse educator graduate and the nurse educator with experience.

The Evolution of Nursing

The act of caring for the sick has been present since the dawn of mankind. The history of nursing has been shaped by many factors, such as wars, illness, and religion (Donahue, 2010). As the role of the nurse evolved from the early caregiver role to the licensed professional nurse, the

evolution of how nursing was learned changed from a system of self-discovery, to apprentice-learner, to a formal academic program of study. Nurse educators evolved from informal nursing supervisor roles to formal academic nurse educator roles. The current academic nurse educator must be both a professional nurse and a competent educator. The creation of a certification for academic nurse educators has promoted academic nurse educators to be viewed as one of the advanced nursing practice roles.

Nursing History

The early years of Christianity promoted a nursing tradition that provided the church's outreach in caring for the sick (Wall, n.d.). The early Christian beginnings included providing care and spiritual guidance within monasteries, mostly by religious orders of men (Wall, n.d.). By the eighteenth century, centers for medical and surgical treatment were created that also included the function of teaching how to provide health care (Wall, n.d.). Florence Nightingale is given credit for establishing the modern nursing profession in the mid-1800s (Whelan, n.d.). Following Nightingale's return from providing nursing services to soldiers in the Crimean war, she established several nurse education programs within various British hospitals (Whelan, n.d.). Nursing practice has changed dramatically from the early days of providing basic nursing care, to current practice that demands nurses have the skills and knowledge, to practice in a highly technological and advanced health care setting.

Nursing Education History

Although the beginnings of nursing education can be traced back to the mid-1800s in Britain, the evolution of nursing education was predicated upon an apprentice-type model of gaining nursing skills (Wall, n.d.). Students worked long days and nights in the hospital setting, attended various lectures given by physicians, and "graduated" when the Director of Nursing

determined the student was ready to practice nursing independently. The length of nursing education varied, and the curriculum was haphazard at best. The first three nursing education programs were opened in 1873 in the US and are considered the forerunners of organized, professional nurse education (Whelan, n.d.). Instrumental in the movement towards a more standard nursing education program, the first nursing organization, known as the American Society of Superintendents of Training Schools for Nurses was created in 1893 (NLN, n.d.a.). This organization was renamed the National League for Nursing Education in 1912 and released the first standardized curriculum in 1917 (NLN, n.d.a.). Although hospital-based schools of nursing were the standard for the first 100 years of nursing education within the US, the mid-1900s brought movement of nursing education into college and university settings. In 1923, Yale University created the first autonomous school of nursing, and it was based upon university standards with a formal educational plan, rather than the nursing care needs of a hospital (Yale University, n.d.). The movement of nursing education from hospitals to collegiate settings was greatly promoted by the development of associate degree nursing programs within junior and community colleges in the early 1950s (Mahaffey, 2002). Dr. Mildred Montag conceptualized associate degree nursing as part of her dissertation to create a new “level of nurse” that would assist in meeting the post-World War II nursing shortage (Mahaffey, 2002). The associate degree project never resulted in the creating of a new worker because the new associate degree graduates obtained licensure as registered nurses (Mahaffey, 2002). By the mid-1950s, the educational pathway to become a registered nurse included the traditional hospital-based diploma nursing school (which had adopted a standard three-year curriculum), a university-based baccalaureate nursing program (which had adopted a standard four year curriculum), and the

newly created junior/community college based associate degree program (which had adopted a standard two-year curriculum).

Although permissive nursing licensure was initiated in North Carolina in 1903, mandatory nursing licensure was not implemented until New York state passed this type of legislation in 1947 (Adventures of the American Mind, n.d.). Today, all states require nursing licensure for practice as a professional nurse as a means of providing for public safety (National Council of State Boards of Nursing [NCSBN], n.d.a). A minimal amount of pre-licensure nursing curriculum standardization occurred because graduates of two-year, three-year, and four-year nursing programs all wrote the same nursing licensure examination.

Teachers of nursing in the early US nurse education programs were the physicians who provided lectures and the hospital nurse supervisors (Nursing, History and Health Care, n.d.a). The creation of professional nursing organizations promoted collaboration among nurse educators to create standards for nursing curriculums, but not standards for nurse educators. Professional nurses who had clinical expertise became the typical faculty in hospital-based diploma education programs. A number of landmark educational reports impacted nursing education in the early to mid-twentieth century, including: the Goldmark Report of 1923 (studied nursing education and recommended minimal educational standards), the Burgess Report of 1928 (studies nursing education and practice, recommended major professional changes and a more comprehensive educational philosophy), the Brown Report of 1948 (recommended registered nurse education be conducted in institutions of higher learning), the Ginzberg Report of 1949 (recommended ending the hospital based diploma nursing programs and instituting two year college-based nursing programs), and the Nursing Schools at Mid-Century Report of 1950 (indicating many diploma nursing programs were not meeting national standards) (Scheckel,

2009). These reports further supported the transition of nursing education to universities, junior colleges, and community colleges. With nursing education moving to traditional academic institutions, faculty requirements changed to comply with university/college accreditation requirements.

As nursing education moved into colleges and universities, various types of higher degrees in nursing have been developed. Graduate nursing education in the 1970s through 1980s was often focused on the functional roles of clinical nurse specialist, nurse administrator, nurse midwife, nurse anesthetist, and nurse educator. The nursing education and nursing administration graduate degrees decreased in popularity during the 1980s and 1990s, in favor of master's' education focusing on advance clinical nursing practice. National standards relating to graduate nursing education further promoted the concept that master's' education in nursing should be focused on advanced clinical nursing roles (AACN, 1996). This clinical focus trend was also applied to doctoral education in nursing when the AACN reported that doctoral education in nursing should also be focused in advanced clinical nursing roles (Adams, 2002). These positions were followed by the *AACN Position Statement on the Practice Doctorate in Nursing*, which advocated the creation of a new "doctorate" degree in nursing that solely focuses on clinical nursing practice at the exclusion of any significant research coursework or education coursework (AACN, 2004). Although AACN recognized that nurse educators should receive coursework in education pedagogy, they continued to create national reports advocating practice doctorates as the preferred nursing doctorate (AACN, 2006). As graduate nursing education shifted to clinically focused education, more advanced nurses were prepared to fill advanced practice nursing roles, but fewer graduate nurses were prepared to become nurse educators.

Nursing practice is closely regulated by individual states. Laws governing nursing practice were developed over 100 years ago to protect the public's health and regulate safe nursing practice (NCSBN, n.d.b). States also provide laws that govern the operation of nursing programs, including the required faculty credentials for teaching in professional nursing programs. In Nebraska, the State Board of Nursing regulates the operation of nursing programs and requires that faculty teaching in professional nursing programs have a minimum of a graduate degree in nursing or make annual progress toward a graduate degree in nursing (Approval of Basic Nursing Programs in Nebraska, 1996). The Nebraska faculty requirements do not mandate that nursing faculty have any education coursework within their graduate degree, which is typical of state regulations governing the operations of professional nursing programs.

The national standards encouraging graduate education in clinical roles, in addition to state regulations that do not require nurse educators to have any education background, have led to a situation where many nurse educators enter the academic role with no pedagogical preparation. The default practice of such educators is to perpetuate a system of "teaching how I was taught" which may reflect the old "hospital training model."

In response to a lack of a clearly defined nursing educator role, the NLN took a series of steps to promote the role of the nurse educator as an advanced practice role and identify the specific competencies that are inherent in that role. In 2001, the NLN released two significant position statements. The first position statement, *NLN's Role in Continuing Education in Nursing Education* (2001a), clearly identified the importance of continuing education for nurse educators. The second position statement, *Lifelong Learning for Nursing Faculty*, reiterates the importance of nursing faculty continually updating their knowledge and skills (2001b). These two position statements paved the way for the 2002 NLN position statement on *The Preparation of Nurse*

Educators, which stated the highly controversial position that nursing education is an advanced nursing role that requires advanced educational preparation and can be considered a specialty role. This position was directly controversial to the other national position statements by the AACN that advocated graduate nursing education should focus clearly on advance clinical roles. The NLN released another position statement on *Transforming Nursing Education* (2005a). This 2005 position statement re-emphasized the importance of the nurse educator role as an advanced practice role and a specialty nursing role. The NLN continued to promote nursing educators as an advanced role, with a specialty practice in their 2008 *Excellence in Nursing Education Model.* Although the NLN advocates specialized education for nursing faculty, it is still not a requirement to teach professional nursing and many nursing faculty continue to enter academic roles with no background in faculty role.

Current Shortage of Nurses and Nurse Educators

The US has experienced a shortage of professional nurses for the past several years, and this shortage is anticipated to continue as the need for health care grows and the Baby Boomer generation ages (AACN, 2012). The US Bureau of Labor Statistics' *Employment Projections 2010-2020* lists registered nursing as the top occupation through 2020 in terms of growth (US Bureau of Labor Statistics, 2012). The shortage of registered nurses is projected to spread across the entire US and continue through 2030, according to the *United States Registered Nurse Workforce Report Care and Shortage Forecast* (American Journal of Medical Quality, 2012). The landmark *Institute of Medicine Report* (IOM, 2010) reflected not only the shortage of registered nurses but identified a shortage of registered nurses prepared at the baccalaureate and higher degree levels. Various other research studies have been conducted and analyzed to

identify the extent of the current and projected nursing workforce shortage (Auerbach, Staiger, Muench, & Buerhaus, 2012).

A variety of factors have been identified as contributing to the nursing shortage. The average age of the current registered nurse workforce was projected to be 44.5 years in 2012 (AACN, 2012). More than 50% of the nursing workforce is considered to be close to retirement (ANA, 2013). Changing demographics as the Baby Boomers age is resulting in an increased need for health care (AACN, 2012). As a nursing shortage occurs, an accompanying shortage in nurse educators will occur as there will be fewer nurses available to become faculty. And fewer faculty will then lead to fewer individuals being educated to become nurse, furthering the nursing shortage. Recent statistics have identified that nursing program enrollments are being restricted due to a shortage of nursing faculty (AACN, 2012).

Actual nurse faculty shortage statistics have been reported. The NLN (2010) identified a faculty shortage of 7.9% in baccalaureate and higher degree programs and 5.6% in associate degree programs during 2006. These shortage statistics are based upon budgeted positions that nursing education programs are unable to fill. The NLN research identified various factors that contributed to the nurse educator shortage, including: high faculty workloads leading to employment burnout, the aging nurse educator workforce, lack of salary equity for nurse educators as compared to other advance practice nursing roles, and a lack of nurses overall to go into nurse faculty roles. Similar faculty shortage statistics (7.6% faculty shortage rate in 2011) have been obtained by the AACN (2012). The need to address the current faculty shortage and a call to action has been addressed in a consensus report by the Tri-Council for Nursing (2010). The cyclical nature of nursing shortages and faculty shortages impact the overall health care that can be provided. A shortage of nurses will lead to a shortage of faculty, which in turn leads to a

further shortage of nurses. During periods of nursing faculty shortage, more faculty are employed that do not have expertise as a nurse educator, which will impact the quality of nursing education and subsequently the quality of health care that is delivered. Graduate preparation as a nurse educator promotes effective education of the students they serve. Certification as a nurse educator is a method to verify competence in the advanced practice nurse educator role.

Nursing Certification

Nurses may be licensed, certified, or both. Licensure for health care professionals is a process whereby permission is granted by a governmental agency for the individual to engage in that particular professional practice following the demonstration of minimal competence (Nance, 1999). Certification differs from licensure in that it is typically voluntary and demonstrates expertise in a particular specialty (Nance, 1999). Certification is granted by a nongovernmental agency and is based upon passing certification examinations (Briggs, Brown, Kesten, & Heath, 2006). Professional specialty certification is a relatively new concept in nursing (Nance, 1999), and its origins can be traced back to the 1970s (Dybee, 2000). The value of certification has been related to the promotion of patient safety and has been demonstrated by multiple research studies (American Association of Critical-Care Nurses and AACN Certification Corporation, 2003). Although there were an estimated 3.1 million registered nurses in the US in 2008 (American Nurses Association [ANA], 2011), only about 27,000 of these nurses were certified (Leak, 2008). In 2007, the number of professional certifications available to registered nurses was estimated to be more than 135 different types (DeSilets, 2007). Although certification is often voluntary, the numbers and types of certified nurses are rapidly increasing.

There is a significant amount of support for specialty certification in nursing. Leak (2008) identified multiple personal and professional benefits to nurses of obtaining nursing certification.

Giroux (2002) stated that professional specialty certification is more than personal accomplishment; it is about commitment to nursing and the health care profession. A consumer survey identified that a health care professional's attainment of specialty certification is valued as important to health care consumers (Yoder-Wise, 2012). The seminal report from the IOM (Foster, 2012) identified that "professional nurse certification is one way to celebrate learning achievements" (p. 115), and that "certification is one way to demonstrate nurses are responsible for their practice by seeking further education" (p. 115).

The value of nursing certification has been addressed repeatedly in the literature and has been the focus of several research studies on certification. The President of the American Nephrology Nurses Association stated that nephrology nurses work in a highly technical, complex environment requiring specialty knowledge (Cary, 2009). She adds that nurses who have obtained certification in nephrology nursing have demonstrated a level of mastery in the area (Cary, 2009). Wade (2009) reviewed the literature on certification and summarized that nurse certification is viewed as bringing intrinsic rewards for nurses because nurses viewed certification as valuable to their professional role. Certification has also been correlated with self-empowerment, and has been associated with promoting quality of patient care (Wade, 2009).

Research trends in new areas typically proceeds from descriptive, to correlational, to quasi-experimental, and finally to experimental (L. Aiken, personal communication, January 27, 2012). The majority of nursing research on certification has occurred within the past decade and reflects the aforementioned research trends.

Value of Nursing Certification to Nurses

Byrne, Valentine, and Carter (2004) developed a reliable and valid research tool (the perceived value of certification tool, or PVCT) to measure the value of certification to nurses and

then used the PVCT with a group of certified nurses. The PVCT identified that internal rewards were linked to the values of personal development and increased self-concept, while external rewards were typically associated with increased credibility (Byrne, et al., 2004). The findings that obtaining certification enhances the personal accomplishment, personal satisfaction, and professional growth were later reconfirmed in major research conducted by the American Board of Nursing Specialties, which is the association that provides accreditation for certification programs (Prowant, Niebuhr, & Biel, 2007). A contrary outcome was identified by Bekemeier (2009) from a descriptive national survey conducted to identify the perceived value of certification in the community/public health specialty area. Bekemeier's research identified that community/public health nurses did not value certification in this area and stated this outcome may be due to the underutilization and lack of awareness of certification in this specialty area.

Additional studies have linked nurse certification to a variety of intrinsic rewards for nurses and enhanced employer perceptions. A survey of certification and empowerment in 2010 identified that nurses holding certification had a greater sense of empowerment and identified that they were less likely to leave their current nursing position (Fitzpatrick, Campo, Graham, & Lavandero, 2010). Certified oncology nurses identified that obtaining professional certification brought validation of specialized knowledge and enhanced confidence (Brown, Murphy, Norton, Baldwin, & Ponto, 2010). In a study with certified medical-surgical nurses, results indicated that not only did the nurses identify value in holding the specialty certification, but the supervisors also perceived a value to employing nurses holding professional certification (Haskins, Hnatiuk, & Yoder, 2011). Research with pediatric nurse certification indicated that certified pediatric nurses valued certification higher than pediatric nurses who did not hold certification (Messmer, Hill-Rodriguez, Williams, Ernst, & Tahmorressi, 2011). Certified nurses had a significantly

greater sense of empowerment than nurses who did not hold certification, according to recent research by Samedy, Griffin, Capitulo, and Fitzpatrick (2012). Overall, nurses have consistently identified certification as a valuable credential.

Specialty nurse certification has been linked to enhanced patient outcomes by some research studies, but not in all research studies with this focus. A large research study based upon over 19,000 nurses linked specialty nurse certification to enhanced patient outcomes with the finding that certified nurses identified a higher ability to detect patient signs and symptoms of complications, which improved prompt interventions (Cary, Papp, Roberts, & Sochalski, 2001). A mixed methods research study conducted within a Navy teaching hospital concluded that certified nurses had a higher number of medication errors than non-certified nurses but that the difference was not statistically significant (Bulla, 2003). In 2008, a massive study involving all registered nurses in Pennsylvania identified that nurses with higher skill levels, higher educational levels, and assignments involving fewer patients resulted in improved patient outcomes (Aiken, Clarke, Sloane, Lake, & Cheney, 2008). The Pennsylvania study tied the enhanced patient outcomes to hospitals with magnet status and noted that nurse certification is greatly encouraged for hospitals seeking to obtain magnet status (Aiken, et.al., 2008). A prospective, descriptive research study conducted to compare certified nurses to non-certified nurses with patient satisfaction variables indicated that although certified nurses were thought to have greater knowledge with which to provide care to patients, there was no difference in patient satisfaction when receiving care from either certified or non-certified nurses (Coleman, et al., 2009). An exploratory study published in the same year showed a statistically significant decrease in patient falls when the nurse caring for the patient held a specialty certification (Kendall-Gallagher & Blegen, 2009). Further research with nurse sensitive patient outcomes did

not indicate a correlation between certified nurses and enhanced patient outcomes, although the results did support a positive relationship between nurse certification and the nurses' sense of empowerment (Krapohl, Manojlovich, Redman, & Zhang, 2010). Patient safety outcomes was again researched as it related to geriatric patients receiving care from certified nurses in a 2013 retrospective descriptive study, and a statistically significant correlation of a lower incidence of falls was found with certified nurses (Boltz, Capezuti, Wagner, Rosenberg, & Secic, 2013). Although research results vary among studies that attempt to correlate patient outcomes with the certification status of nurses, the overwhelming majority of literature speaks to the value of nurse certification in the improvement of patient outcomes.

Certification Development

In presenting how a nursing informatics certification examination was developed, Simpson (1995) clearly articulated the steps in developing any certification. Simpson identified the following six steps in the development of a certification examination.

1) The specific practice or specialty area must be recognized;
2) A specific scope of practice must be identified and validated;
3) The standards of practice for the scope of practice must be identified;
4) The scope and standards provide the basis for a job/task analysis;
5) The job/task analysis provides the basis for the certification test plan; and
6) The test plan provides the structure for test item development.

Briggs, Brown, Kesten, and Health (2006) included similar steps noted by Simpson, in their description of the standardized process to develop a certification program, which included: identifying the subject matter content/practice, conducting a job/practice analysis, identifying a test blueprint, development of a certification examination, implementation of the certification

examination, and at times, obtaining accreditation for the certification program. The Angoff method of determining a passing score is the standard statistical method used to set passing scores for certification examinations (Carlson, Tomkowiak, & Stilp, 2009; Lemaire, 2010; Pierre, 2010). DeSilets (2007) emphasized that all certification examinations must be based upon the scope and standards of the specialty role and validated by a practice analysis. Gomez and Allen (2011) identified issues that occur when the standard process for certification examination development are not followed. Specifically, Gomez and Allen discussed certification problems that occurred when a hemodialysis patient care technician certification examination was developed without having a clearly defined role and without having a clearly defined "educational path" to that specific role. The certification problems identified by Gomez and Allen (2011) could have been avoided by developing the certification examination by following the standardized process, which is based upon having a clearly defined role for the certification examination.

An acceptable alternative to conducting a formalized job/task analysis within the standardized process of certification examination development is that of using focus groups (Biel, Eastwood, Muenzen, & Greenberg, 1999). Although focus groups are not often used as a substitute for the job/task analysis, they provide a suitable alternative when the scope of the practice role is well-known or when eligibility criteria may be expanded to slightly different groups than were included within the job/task analysis survey (Biel et al., 1999). The CNE® examination in currently limited to academic nurse educators licensed as a nurse within the US. If the CNE® examination were to include Canadian licensed academic nurse educators, the focus group method could be employed as a suitable alternative to conducting a job/task analysis to verify the academic practice role is substantially the same in Canada as it is within the US.

The specific step of conducting a practice analysis (job/task analysis) has been reported numerous times in the literature as part of the development of certification examinations. The specific practice of a nurse diabetes educator was identified by conducting a practice analysis of nurse diabetes educators (Zrebiec, 2005). The specific tasks considered routine for clinical nurse specialists and nurse practitioners were validated by a traditional practice analysis of acute and critical care advanced practice nurses (Becker, Kaplow, Muenzen, & Hartigan, 2006). The specific practice of ambulatory care nurses was identified by conducting a practice analysis (Baghi, Panniers, & Smolenski, 2007). The practice role of the physician's assistant was reassessed with a practice analysis of currently certified physicians' assistants (Arbet, Lathrop, & Hooker, 2009). The practice analysis methodology was used to identify the core practice of acute care physical therapists (Gorman, et al., 2010).

A definite process has become standard in the development of any certification examination. A specific set of steps has been recognized as the basis for the development of a certification examination. Some of the significant steps include the identification of a specific role of practice and that standards of practice for that role have been clearly established and have been universally accepted. A practice/task analysis has been used as the basis to clearly define the activities of the role being tested, although at times focus groups may be an appropriate alternative to conducting a practice/task analysis.

The Role of the Nurse Educator

The definitive works conducted by the NLN are considered to be the only comprehensive research identifying the role of the nurse educator. The NLN conducted a Think Tank on Graduate Education Preparation for the Nurse Educator Role in December of 2001. Between 2002 and 2004, the NLN's Task Group on Nurse Educator Competencies completed an extensive

review of the literature to develop the NLN Core Competencies of Nurse Educators (Halstead, 2007). These competencies identify the scope of practice for the academic nurse educator and provide direction for graduate curriculums focused on the academic nurse educator role (Halstead, 2007). The 2005 and 2011 practice analyses of academic nurse educators further validate the competencies by the self-reporting of nurse educator activities. Although the pedagogy of nursing education has expanded between 2005 and 2011 to include computer based instruction and simulation experiences, the practice analysis results between 2005 and 2011 indicate that the role of the academic nurse educator has remained relatively the same (Applied Measurement Professionals [AMP], 2011).

Various authors and researchers have attempted to further identify the role of the nurse educator. Berent (2008) studied the characteristics of nurse educators in academe. Essential role competencies for novice nurse educators were the focus of research by Poindexter (2008). The essential preceptor preparation for precepting baccalaureate nursing students was identified by Rogan (2009). The role of a distance education nurse educator was studied by Pearsall, Hodson-Carlton, and Flowers (2012). Staykova (2012) conducted a mixed-method, modified Delphi technique study to identify the competencies needed for nurse faculty who design curriculum. These studies confirmed the basic nurse educator competencies already identified by the NLN.

The Development of the Certified Nurse Educator Credential

The CNE® credential is the only certification available for nurse educators and is one of the latest certifications to be developed for nursing specialists (Ortelli, 2008). In 1999, the NLN identified interest in the development of a nurse educator certification with a Delphi survey that identified a majority of respondents were supportive of the development of a nurse educator certification and almost half of the respondents indicated they would have interest in seeking a

nurse educator certification (Ortelli, 2012). The NLN conducted two separate needs assessment in 2003 related to the potential development of a nurse educator certification program. One needs assessment was sent to nursing education administrators, and the second needs assessment was sent to faculty. Results of the administrator survey indicated that 84% of the deans and directors viewed the role of the nurse educator as a specialty role and that having certified nurse educators would promote excellence within their nursing education program. Responses from faculty indicated that 92% considered nursing educator as a specialty role and 76% would be interested in seeking nurse education certification (NLN, 2003).

The decision to move forward with the certification examination was made by the NLN Board of Governors in May 2003. The certification was supported by the identification of *Scope of Practice for Academic Nurse Educators* (NLN, 2005b), which became the basis for the certification examination test blueprint (Halstead, 2007). This NLN document was the first published work that "described the scope and competencies of the nurse educator practice" (2005b, p. 1).

The NLN Nurse Educator Certification Program is a semi-autonomous department of the NLN. All decisions relating to certification are determined by the CNE® Commissioners, who are elected by current certified nurse educators. The mission of the NLN Certification Program is to "recognize excellence in the advanced specialty role of the academic nurse educator" (NLN, 2012b, p2). The original certification test was developed based upon the results of a nationwide practice analysis conducted by Applied Measurement Professionals in 2005, and repeated again in 2011 as a means of keeping the actual certification examination consistent with changing

CNE® Competencies

The NLN's Task Group of Nurse Educator Competencies was established in 2002 to conduct a comprehensive review of the literature, formulate the competencies of an academic nurse educator based upon the literature review, identify gaps in the relevant educator body of knowledge, and identify priorities for nursing research specifically focused on nurse educator competencies (Halstead, 2007). Eight specific competencies of the academic nurse educator functioning in the full scope of the role were identified. A review of each of the competencies provides a more thorough understanding of the full scope of the nurse educator role

Competency I.

Facilitate learning. "Nurse educators are responsible for creating an environment in classroom, laboratory and clinical settings that facilitates student learning and the achievement of desired cognitive, affective, and psychomotor outcomes" (NLN, 2012b, p.14). This competency refers to activities such as utilizing appropriate teaching strategies, using appropriate teaching methodologies, practicing appropriate communication, promoting critical thinking, and serving as a role model (NLN, 2012b). This competency, to facilitate learning, is likely the most commonly assumed task of a nurse educator and there is a substantial body of literature relating to facilitating learning. In 1987, Chickering and Gamsen identified seven principles for good teaching practice. Nick (2014) identified the importance of the academic nurse educator to have knowledge of various educational theories to assist them in providing a more effective and efficient student learning environment. It is not only important that the nurse educator know how to teach, the nurse educator must have a good understanding of the content to be taught (Halstead, 2007). Research conducted by Benor and Leviyof (1997) identified that clinical nursing competence, effective evaluation methods, teaching skills and instructor interpersonal

characteristics were the most important characteristics of a competent nurse educator. For an academic nurse educator, it is important to have clinical nursing competence as well as theoretical nursing competence (Benor & Leviyof, 1997). Effective facilitation of learning also includes the ability to establish positive relationships with students. Aspects related to establishing positive relationships with students include having realistic student expectations, the ability to be honest and direct, conveying confidence in and respect for the students, allowing students to ask for assistance and promoting freedom for students to discuss situations that arise in the clinical setting (Bergman & Gaitskill, 1990). Achieving the competency of facilitating learning is essential for effective academic nurse educator practice.

Competency II.

Facilitate learner development and socialization. The NLN defined facilitating learner development and socialization as "nurse educators recognize their responsibility for helping students develop as nurses and integrate the values and behaviors expected of those who fulfill that role" (NLN, 2012b, p. 16). A general overview of Competency II would include factors such as the ability to identify various learner styles and unique learner needs of diverse students, the provision of various resources to meet the diverse learner needs, creating learning environments that promote socialization to the role of the nurse, the promotion of self and peer evaluation, and modeling professional behaviors (NLN, 2012b). An effective academic nurse educator recognizes that different students have different needs and will be able to provide various resources to meet the students' individual needs. Various learning theories assist the academic nurse educator to identify student learning styles, such as Kolb's (1984) experiential learning model. Students bring a great deal of diversity to the classroom, and it is necessary for the effective nurse educator to meet the diverse needs of learners. Diverse students may include

those with physical disabilities, international students, adult learners, educationally disadvantaged, and at-risk students (Halstead, 2007). A variety of studies have been conducted related to how an academic nurse educator approaches various diversity situations, such as teaching ethnically diverse students (Yoder, 1996), working with multicultural populations (Yurovich, 2001), understanding the unique needs of learning disabled students (Kolanko, 2003; Maheady, 1999).

Just as important as learner development is the aspect of assisting the student to socialize into the profession of nursing. Various research studies have addressed aspects of socialization into the nursing profession, such as how nursing students develop a nursing identity (Cook, Gilmer, & Bess, 2003), the impact of a nursing program design on the socialization process for nursing students (Eckardt, 2002), and the differences in perceptions about professional nursing values between senior baccalaureate nursing students and their faculty (Eddy, Elfrink, Weise, & Schank, 1994). A competent academic nurse educator not only "teaches content" but assists the student nurse in the development of an identity as a graduate nurse, which summarizes the intent of Competency II.

Competency III.

Use assessment and evaluation strategies. The NLN defined using assessment and evaluation strategies by the following statement "nurse educators use a variety of strategies to assess and evaluate student learning in classroom, laboratory and clinical settings, as well as in all domains of learning" (NLN, 2012b, p. 17). It is obvious that the academic nurse educator must be able to assess a student's performance in the classroom, which is typically achieved by the ability to write and grade examinations, papers, and other various assignments. The academic nurse educator must also have the ability to assess and evaluate the students' performance in

laboratory and clinical situations, which has been considered a challenge throughout the history of nurse educators (Krichbaum, Rowas, Duckett, Ryden, & Savik, 1994). Assessment and evaluation issues frequently arise in the clinical setting because it is not a controlled learning environment where the faculty can assign a particular task having a particular set of assessment/evaluation criteria. In clinical settings, patient acuity varies, needed nursing care is not equivalent between student assignments, and the academic nurse faculty is overseeing multiple students simultaneously which can lead to missing key evaluation observations related to student performance. Literature notes that clinical evaluation is promoted by the use of valid instruments (Baumlein, 2014). A comprehensive approach to clinical evaluation using multiple assessment activities was developed by Woolley, Bryan, and Davis (1998) to decrease the subjectivity that is present in clinical evaluation. A variety of clinical evaluation approaches have been documented, such as evaluation by exception (similar to charting by exception where the academic nurse educator only evaluates behaviors that deviate from the acceptable standards) by Wishnia, Yancy, Silva, and Kern-Manwaring (2002), and the use of anecdotal notes to support clinical evaluation by Liberto, Roncher, and Shellenbarger (1999). Regardless of the assessment and evaluation methods used by the nurse educator, this is a significant competency that must be achieved by an effective academic nurse educator.

Competency IV

Participate in curriculum design and evaluation of program outcomes. The NLN defined Competency IV with the statement “nurse educators are responsible for formulating program outcomes and designing curricula that reflect contemporary health care trends and prepare graduates to function effectively in the health care environment” (NLN, 2012b, p. 18). Nursing programs typically develop their own nursing curricula, based upon the health needs of

the population supported by the graduates and the governing educational body's mission and purposes. The faculty develop the curriculum design, and accordingly, the program outcome evaluation plan. The academic nurse educator must have skill in curriculum development; identifying program, course, and learner outcomes; and developing curricular revisions based upon assessment data from program outcome assessment. The concept of continuous quality improvement must be integrated throughout the nursing program. The process of curriculum development is noted in literature, such as described by Arthur and Baumann (1996) in describing how quantitative and qualitative methodologies can be used to identify core content for nursing curricula development. The nursing program accreditors, Accreditation Commission on Education in Nursing (ACEN) and Commission on Collegiate Nursing Education (CCNE) have both provided direction for curriculum development through their published standards. Accreditation standards have also provided a significant focus on the importance of collecting and using program outcomes in curricular revisions. To practice in the full scope of the academic nurse educator role, the faculty must have competency in curriculum design and program evaluation.

Competency V

Function as a change agent and leader. "Nurse educators function as change agents and leaders to create a preferred future for nursing education and nursing practice" (NLN, 2012b, p. 19). The NLN identified the importance in the function of change agent and leader for academic nurse educators to promote effective health care, promote nursing as a profession, and promote innovation in education overall. A novice educator may find difficulty in acting as a change agent and leader as they may be overwhelmed by the other roles of being a nurse faculty, such as: teaching a full-time load, advising students, maintaining professional competence, and

providing service to the institution (Halstead, 2007). Grossman and Valiga (2005) identified that nursing leadership will require both personal leadership qualities as well as organizational leadership qualities. The competent academic nurse educator possesses skills as a change agent and as a leader.

Competency VI

Pursue continuous quality improvement in the nurse educator role. "Nurse educators recognize that their role is multidimensional and that an ongoing commitment to develop and maintain competence in the role is essential" (NLN, 2012b, p. 20). Continuous quality improvement can include a commitment to life-long learning, participating in professional development opportunities, incorporating feedback from others to promote self effectiveness, and mentoring faculty colleagues. Research studies have identified the effectiveness of mentoring novice educators (Adams, 2002; Siler & Kleiner, 2001). Experienced faculty maintain effectiveness through continuous quality improvement activities (Halstead, 2007). Competency VI clearly takes the position that is it not enough to gain competency as an academic nurse educator, it is imperative to maintain competency as an academic nurse educator because the expectations are continually changing (Halstead, 2007).

Competency VII

Engage in scholarship. "Nurse educators acknowledge that scholarship is an integral component of the faculty role, and that teaching itself is a scholarly activity" (NLN, 2012b, p. 21). Traditionally, scholarship for educators in higher educational settings reflected conducting research, obtaining grants, and delivering scholarly presentations. Boyer (1990) challenged this traditional model by identifying four types of scholarship: the scholarship of discovery (research, investigation), the scholarship of application (apply knowledge to problems), the scholarship of

teaching (investigating teaching and learning), and the scholarship of integration (interpreting, gaining new insight). The NLN's nurse educator Competency VII identified the importance of all types of scholarship, including that of teaching itself. Examples of scholarship include activities such as: developing evidence-based teaching and evaluation practices, disseminating nursing and teaching knowledge, developing a skill for writing various types of proposals, and demonstrating the qualities of a scholar (NLN, 2012b). Glassick, Huber, and Maeroff (1997) identified qualities of a scholar as including integrity, courage, and perseverance. Regardless of the scholarship qualities cited, or the particular scholarship model used, a competent academic nurse educator will effectively engage in scholarship (Halstead, 2007).

Competency VIII

Function within the educational environment. "Nurses are knowledgeable about the educational environment within which they practice and recognize how political, institutional, social, and economic forces impact their role" (NLN, 2012b, p. 21). Some tasks of functioning within the academic environment would include: identifying social, economic, political, and institutional forces that influence nursing education, assuming a leadership role within the institutional governance, and advocating for nursing and nursing education within the political arena (NLN, 2012b). It is important for the academic nurse educator to have congruence between professional goals and the institutional environment (Halstead, 2007). Job satisfaction of nursing faculty has been studied by numerous researchers (Moody, 1996; Snarr & Krochalk, 1996; Gormley, 2003). If the academic nurse educator does not develop competence functioning within the educational environment, the educator will likely not remain in the academic education environment (Halstead, 2007).

Overall, the eight NLN academic nurse educator competencies identify the role of the academic nurse educator who practices in the full scope of the role. It is possible that some academic nurse educator positions have assignments or job descriptions that do not include all of the identified competencies. An example of a partial scope academic nurse educator would be a faculty who only teaches in the clinical setting and has no active involvement in curricular and institutional affairs. Obtaining certification as a CNE® indicates that the individual has obtained mastery within all of the eight identified nurse educator competencies.

CNE® Test Blueprint

The CNE® test blueprint is based upon the NLN's eight competencies of the academic nurse educator. The current test blueprint is identified below.

Category 1	Facilitate Learning	22% of text questions
Category 2	Facilitate Learner Development and Socialization	14% of test questions
Category 3	Use Assessment and Evaluation Strategies	17% of test questions
Category 4	Participate in Curriculum Design and Evaluation of Program Outcomes	17% of test questions
Category 5	Pursue Continuous Quality Improvement in the Academic Nurse Educator Role	9% of test questions
Category 6	Engage in Scholarship, Service, and Leadership	21% of test questions
6A	Function as a Change Agent and Leader	
6B	Engage in Scholarship of Teaching	
6C	Function Effectively within the Institutional Environment and the Academic Community	

(NLN, 2013)

The practice analysis not only verified the validity of these competencies, but it identified the relative frequency of the various activities within each competency. These frequencies provided

a mechanism to determine what percent of the examination should be allotted to each competency. Categories one through five of the test blueprint correlates with the nurse educator competencies one through five. Test blueprint category six is composed of the nurse educator competencies six through eight. Since each category was based upon task frequencies obtained from the practice analysis, the last three competencies would have each been allocated a very small percentage of the overall test questions. The small numbers of questions in each of the final three competencies would not have yielded a statistically significant category evaluation so the decision was made to combine the final three competencies into one category. The blueprint as developed has yielded statistically significant results in the testing (Applied Measurement Professionals, 2011).

CNE® Research

Despite the need to conduct research in all areas of nurse education certification and the potential effect of certification on student outcomes (Fitzpatrick, 2012), very little research has been completed overall. Ortelli (2008) reported the results of a descriptive research study that identified the demographic variables of 917 individuals who wrote the CNE® examination between September 28, 2005 and September 28, 2007. During this initial two year time period, 773 testers passed the CNE exam, for a pass rate of 84.3 percent. Those obtaining the CNE certification represented all 50 states. This descriptive research identified that CNE® testers were evenly divided between those nurse educators holding doctoral degrees, those holding master's degrees in nursing with an education focus, and those holding a master's degree in nursing without an education focus. Specifically, 64.8 percent of testers met the Option A eligibility criteria (two years of academic nurse educator experience in the preceding five years and a graduate degree with a nurse educator role focus), and 35.2 percent of testers met the Option B

eligibility criteria (four or more years of academic nurse educator experience in the preceding five years, and a graduate degree not having a nurse educator role focus). The highest degree held by testers included 34.3 percent holding doctoral degrees, 34.4 percent holding master's degrees in nursing with an education focus, and 31.3 percent holding master's degrees in nursing without an education focus (Ortelli). Ortelli compared the study demographic data to data obtained from a faculty census survey and concluded the demographic data of CNE®s mirrored the general demographic data of nursing faculty overall (Ortelli). The research of CNE® demographic data has only been conducted on data reflecting prior CNE® eligibility criteria, so the effects of the change in eligibility criteria have not been examined.

Higbie (2010) conducted research on the perceived levels of core competency attainment by CNE®s. This non-experimental study included responses from 288 nurse educators within 11 Midwestern states. An online survey was used to examine several areas of interest related to nurse educator competency, including years of teaching experience, years of nursing experience college and program type, levels of education, and rank. Responses verified the importance of formal education, professional development and years of experience in competency attainment as a nurse educator. This research also identified that nurse educators who attained the CNE® credential rated their competency level higher than those who had not earned the CNE® credential (Higbie, 2010). Higbie (2010) recommended that CNE® examination preparation would increase the competency of all nurse educators who prepare for and attain the credential.

In 2012, Ortelli completed a dissertation on the performance of 2,673 nurse educators who wrote the CNE® examination, which included an examination of the correlation of various demographic variables on examination outcome (pass/no pass). This study identified there was no statistically significant relationship between educational preparation and pass/fail

performance as a first-time tester. Testers who identified they met Option B eligibility criteria (did not have focus in nurse education role within graduate education and had four years of academic nurse educator experience within preceding five years) had statistically significant higher scores in the test content sections of: using assessment and evaluation strategies; participate in curriculum design and evaluation of program outcomes; and engage in scholarship, service, and leadership. A significant finding of Ortelli's (2012) study was the identification that more years of teaching experience was correlated with a higher pass rate on the CNE® examination. Ortelli (2012) again reiterated the need for continued research with certification of nursing educators.

In summary, scant research has been conducted on the subject of certified nurse educators. Although there is research in other areas of nurse certification that indicate holding certification has intrinsic rewards for nurses (self-perceived value, empowerment, increased perception of specialty knowledge) and positive outcomes for patients, the research in the area of CNE® is still at a basic research level.

Theoretical Framework

Nursing research is often grounded in a theoretical framework. The proposed CNE® research is focused on professional certification, which is external validation of knowledge and skills acquisition. Although various theories could support research related to knowledge and skills acquisition, the theoretical framework presented by Dreyfus and Dreyfus (Dreyfus, 2004), and the application of the Dreyfus and Dreyfus framework to the acquisition of "excellence and power in clinical nursing practice" by Benner (2001, p. v)) are most appropriate for this research.

Dreyfus and Dreyfus

A five-stage model of adult skill acquisition was developed by Stewart Dreyfus and Hurbert Dreyfus (1980). This model was developed based upon studies with chess players and airline pilots. In gaining expertise, the adult learner passes through the following stages: novice, advanced beginner, competence, proficiency, and finally expertise (Dreyfus, 2004). The Dreyfus (2004) model reflects changes in three general aspects of skilled performance. The first is when the adult learner moves away from reliance on abstract principles to the use of prior concrete experiences. The second aspect is when the learner moves away from reliance on the compilation of equally relevant bits of information into a competent whole paradigm where only certain bits of information may be relevant. The third aspect is the passage of the adult from that of a detached observer to that of an involved performer. The Dreyfus model has been described as developmental, based on situated performance and experiential learning (Benner, 2001).

Lester (2005) further explained the Dreyfus model. Lester (2005) explained that the novice has little discretionary judgment and will rely rigidly upon given rules. Situational perception is still limited with an advanced beginner, and he will continue to treat all attributes separately. Competence includes being able to perform standardized and routine procedures with conscious and deliberate planning (Lester, 2005). A holistic level of performance allows the individual to view situations holistically rather than in specific terms (Lester, 2005). Lester (2005) clarified that the expert no longer relies on rules, guidelines or maximums, because he will have gained the experience to have a deep understanding of how to perform.

Benner

Benner (2001) created what is commonly known as the *Novice to Expert Theory* within nursing. This theory was created when Benner applied the Dreyfus model to the application of

clinical nursing skills. Benner (2001) conducted paired interview research with sets of novice and expert nurses, inquiring how each would react to certain common situations. Benner presented that expertise in nursing involves more than intuition and hunches, and is based upon the combined experiences of significant clinical practice. The results of her research supported the Dreyfus model, and explained how new novice nurses become expert clinicians.

Benner conducted further research studies using the Dreyfus model of skill acquisition (2001). These studies were conducted over a 21 year period, and used a combination of interviews and observations for data collection methods. The three studies were conducted in various hospitals, intensive care units, and in other critical care hospital units (Benner, 2004). The results of the combined research provided a more concrete application of skills acquisition to nursing skills acquisition. Benner identified that the nurse novice period generally applied to the first year of the student nurse's education, when the individual has no experiential background to understand clinical situations. The advanced beginner was identified by Benner as being the new graduate who has functioned as a beginning staff nurse during the final months of nursing education. The competent stage of clinical nursing practice occurs after one to two years of practice, but can vary for individual nurses depending on the variety and complexity of the new nurse's patient population (Benner, 2001). Benner's proficiency stage, or stage 4, occurs as a transition between basic competency and expertise. The nurse in the proficiency state reflects a practical grasp of clinical nursing skills, and will continue to refine their skills. Benner describes the final stage of expertise as being able to synthesize new theories into their current practice.

It can be postulated that nurses entering the specialty role of the nurse educator go through the same stages to obtain teaching expertise as theorized by Dreyfus (2004) and researched by Benner (2001). Poindexter (2008) utilized the novice to expert theory as a basis for

non-experimental cross-sectional survey designed to identify the competencies and qualifications needed by novice nurse educators to successfully transition from their role as an expert clinician to a novice educator. A qualitative phenomenological research study examined the perspectives of new nurse educators as they moved from the role of clinical nurse to nurse educator (Cangelosi, Crocker, & Sorrell, 2009). This qualitative study identified that "teaching is not a natural byproduct of clinical expertise, but requires a skill set of its own" (Cangelosi, et al., p. 369).

The Dreyfus model and Benner's *Novice to Expert Theory* can be applied to the proposed study. The dependent variable of first-time pass on the CNE® examination demonstrates competence and/or proficiency in the full scope of the academic nurse educator role, which can be associated with the higher levels of competence on the Dreyfus and Benner models (proficiency and/or expertise). The chosen theoretical framework postulates that years of experience promote higher levels of performance, which relates to this study's dependent variable of years of experience in the academic nurse educator role. The type of CNE® eligibility criteria can be related to the stage of proficiency where a transition between basic competence and expertise occurs. This study's variables of total years of employment as an academic nurse educator, type of programs where experience as an academic nurse educator occurred, and type of program where the majority of teaching occurred can be correlated with the theoretical framework postulating that experience is significant for higher levels of skills attainment.

The theories of the Dreyfus model of adult skill acquisition and the Benner model of clinical nursing skills acquisition both reflect the concept that professional proficiency is gained through a series of stages, starting with the novice level and ending with the expert level. The

CNE® examination is a measure of competence as an advanced practice nurse who is an academic nurse educator. It is postulated that failures on certification examinations reflect novice practitioners who have not yet gained the knowledge to pass the examination. The proficiency level at which the nurse educator has the knowledge to pass the CNE® examination is speculated to be within the competent to expert level. Thus, grounding this research in the Dreyfus model and Benner model will assist in identifying implications for future research.

Summary

Formal nursing education has only occurred in the US during the past 150 years, and national standards related to the role and preparation of the nurse educator has only occurred during the past ten years (Nursing, History and Health Care, n.d.a.). Although graduate education in nursing has focused on advanced clinical roles during the past 20 to 30 years, the NLN has taken a firm position that the nurse educator role is an advanced nursing role (NLN, 2002). In support of this position, the NLN identified the scope of practice for academic nurse educators, including eight specific competencies and 66 task statements (NLN, 2005b). This scope of practice was integral in conducting a practice analysis, which led to the development of a certification test plan and ultimately the CNE® examination (Ortelli, 2012). Certification as a nurse educator indicates that the individual has demonstrated having the knowledge and skills to meet all of the nurse educator competencies (NLN, 2012 b).

The numbers of practicing nurses is insufficient to meet the current population and the projected needs within the next 10-20 years (American Journal of Medical Quality, 2012). There are also an insufficient number of nurse educators (NLN, 2010). As a result, either inexperienced nurses are assuming the role of a nurse educator without having competency as an educator, or nursing students are being turned away from nursing programs as there are insufficient faculty to

teach the numbers of interested applicants (AACN, 2010). Such factors will further decrease the availability of nurses to provide care in the future.

Certification is a mechanism that verifies advanced knowledge and skill in a specialty area (Nance, 1999). Certification exists in many nursing areas and often voluntary (Nance, 1999). Certification has been correlated with intrinsic rewards for the individual nurse and enhanced patient outcomes (Wade, 2009). There is only one certification examination for academic nurse educators, which is the NLN Certified Educator Examination. The CNE® examination has only been in existence since 2005 (Ortelli, 2008).

The Dreyfus model of skills acquisition and the Benner novice to expert model of clinical nursing practice provide a theoretical basis for the proposed research. Both models identified five stages of skills acquisition, including: novice, advanced beginner, competence, proficiency, and expert (Dreyfus, 2004; Benner, 2001). A nurse moving into the nurse educator role is predicted to move through the same stages as identified in both the Dreyfus and Benner models. Certification examinations measure mastery within a subject matter area. Thus, research focused on nurse educator certification can be explored in the framework of the novice to expert theoretical models to assist in identifying hypothesis, data analysis needs, understanding of outcomes, conclusions and recommendations.

Only a few research studies have focused on the certified nurse educator credential. These studies have been mostly descriptive in nature and have identified the profile of those candidates who have passed or not passed the examination (Ortelli, 2008), identified the beliefs of CNE®s, identified perceived levels of nurse educators' attainment of the NLN Core Competencies of Nurse Educators (Higbie, 2010), and provided an analysis of the first-time performance of those who had taken the certification examination (Ortelli, 2012).

The dearth of research with the certified nurse educator credential has left much information undiscovered. Only basic descriptive research conducted on application data for testers subject to the initial eligibility criteria and data obtained from nurse educators who had obtained their certification while subject to the initial eligibility criteria have been completed. No studies have been conducted on testing applicants subject to the revised CNE criteria or data from nurse educators who have obtained their certification with the revised eligibility criteria. To have a body of knowledge that would describe and explain the impact of certification in the role of the academic nurse educator would require additional descriptive, correlational, quasi-experimental, and experimental research.

CHAPTER 3

RESEARCH METHODS

This research examined the characteristics of academic nurse educators with first-time performance on the NLN Certified Nurse Educator (CNE®) examination. This research built upon prior CNE® research, yet focused on data analysis of data for test-takers under the revised CNE® eligibility criteria implemented by the NLN in October of 2012. To provide clarity on how the proposed research was conducted, this chapter presents a discussion of the research design, participants/sample, setting, ethical considerations, data quality measures, and planned data analysis procedures.

Research Design

This quantitative research study used a retrospective, multivariate, descriptive design. The data already collected in the CNE® examination application form and corresponding CNE® testing results was examined using a secondary analysis approach. A benefit of conducting secondary analysis is that data that has already been obtained can be analyzed to provide empirical findings (Polit & Beck, 2008). A secondary analysis approach to research does not lend itself to manipulation of variables or assignment into control or experimental groups. An experimental research study would require random sampling into control and experimental treatment groups (Creswell, 2009) and thus this study was not considered an experimental design. The descriptive design was consistent with the variables being included within this study and the research methodology.

The descriptive design was appropriate for the research questions of this study. Specifically, this research sought to answer: 1) if there was a statistically significant difference in the academic employment status of academic nurse educators as either full-time, part-time, or no

academic employment experience, and first-time performance (pass/fail) on the CNE® examination; 2) if there was a statistically significant difference between academic nurse educators having formal graduate-level academic coursework in the role of the academic nurse educator and academic nurse educators who do not have formal graduate-level academic coursework in the role of the academic nurse educator, and first-time performance (pass/fail) on the CNE® examination; and 3) if there was a statistically significant difference between demographic variables of academic nurse educators and first-time performance (pass/fail) on the CNE® examination. The outcome of data analysis was focused on differences among the dependent variable of CNE® test outcome data (pass/fail) and the independent variables of CNE® eligibility type and demographic variables. A descriptive study seeks to examine a situation as it is, and to explore possible associations among various variables (Leedy & Ormond, 2013). By using existing data, this study sought to examine the situation as it existed. And the research questions were intended to identify any potential differences among variables. The selection of a retrospective, multivariate, descriptive research design was appropriate.

Participants/Sample and Setting

Participants/Sample

The participants in this research study included all nurse educators who completed the CNE® examination between October 7, 2012 and May 31, 2014 for the first-time, and had a complete data set. This number was initially anticipated to be greater than 1000 testers. This specific time period was chosen to correlate with a change in the CNE® eligibility criteria.

All research participants met the CNE® eligibility criteria in place from October 7, 2012 through May 31, 2014. The revised CNE® eligibility criteria implemented on

October 7, 2012 required all testers to meet either Option A or Option B, which are specifically described below.

Option A: Must meet both criteria 1 and 2.

Criteria 1: Must have a currently active, unencumbered registered nurse license in the US or its territories.

Criteria 2: Must meet one of the following educational requirements.

-A master's or doctoral degree in nursing with a major emphasis in nursing education or

-A master's or doctoral degree in nursing plus a post-master's certificate in nursing education or

-A master's or doctoral degree in nursing and nine or more credit hours of graduate-level education courses.

Option B: Must meet criteria 1, 2 and 3.

Criteria 1: Must have a currently active, unencumbered registered nurse license in the US or its territories.

Criteria 2: Must have a master's or doctoral degree in nursing (with a major emphasis in a role other than nursing education).

Criteria 3: Must have two years or more employment in a nursing program in an academic institution within the past five years. (NLN, 2012b)

The two options differed in that if the testing candidate does not have a graduate degree with a focus in nursing education, they must have two or more years of employment (full-time or part-time status not specified) in an academic nursing education program within the past five years. The eligibility criteria in place from the implementation of the CNE® credential prior to October

7, 2012 required all candidates to have full-time employment experience, including a minimum of two years for those with the graduate degree with a focus in nursing education and four or more years for those with a graduate degree without a focus in nursing education.

A research sample is considered to be a subset of the population being studied, and not the entire population (Leedy & Ormrod, 2013). The entire population relevant to this study was comprised of the academic nurse educators in the US and its territories that meet the current criteria to take the NLN CNE® examination. The population studied in this research was the group of academic nurse educators in the US and its territories that met the current eligibility criteria to take the NLN CNE® examination for the first-time and completed the CNE® examination during the specified time period. The study sample consisted of all academic nurse educators in the US and its territories that met the current criteria to take the NLN CNE® examination, completed the CNE® examination, and had complete data sets. The most recent statistics on the numbers of the entire population of academic nurse educators was estimated to be approximately 32,000 during the 2005-2006 academic year (NLN, 2010). The number of full-time nurse educators having master's or doctoral degrees has been estimated to be 92% of the total group of academic nurse educators (NLN, n.d.b.), but no statistics could be found that related to both full-time and part-time nurse educators. Thus, the total number of academic nurse educators that would meet the eligibility to take the CNE® examination is unknown.

Although the sample can be referred to as "convenient" because it included all available data that meet the study criteria, it does not meet the true meaning of a convenience sample. A true convenience sample, or accidental sample, uses data from a subset of the population being studied that are readily available and does not presume to represent the entire population (Leedy & Ormrod, 2013). The conclusions drawn from a true convenience sample may or may not be

able to be generalized to the entire population (Leedy & Ormrod). Since the analysis with this study was performed on the entire sample that met the study criteria, the results will accurately represent that group (the population of CNE®s who completed the examination since the implementation of the new eligibility criteria).

The inclusion criteria specifically required the CNE® candidate to be a first-time tester, meet all eligibility criteria in effect between October 7, 2012 and May 31, 2014, and have a complete data set. The exclusion criteria included CNE® testers who had previously taken the CNE® examination (retesters), CNE® testers who completed the examination prior to October 7, 2012, and CNE® testers who had incomplete datasets. Data from retesters was excluded because repeat examinees typically have pass rates lower than first-time testers (Raymond & Luciw-Dubas, 2010). The eligibility criteria prior to October 7, 2012 required the testing candidate to have the additional criteria of employment experience as an academic nurse educator and the employment status must have been classified as full-time. Incomplete data sets were eliminated so conclusions would not be skewed.

Setting

The study setting refers to the location where the study occurs and/or where the data is collected. The data used in this data was collected in two different locations. The independent variables, or demographic data, were obtained at the time the academic nurse educator registers to take the examination. The CNE® testing registration process was completed online from any computer that had online capability and thus, the candidate could have been in any setting having an internet capable computer. The independent variables, or demographic data, were stored on the NLN servers and only basic candidate identification data was forwarded to Applied Measurement Professionals, Inc. (AMP, the testing vendor that independently contracted with

the NLN to provide certification testing services). When the candidate's registration and verification process were complete, they received a notice of "eligibility to test." After receiving this notice, the candidate scheduled a testing date at any of the Applied Measurement Professional testing centers located within the US. When the candidate completed the computer based CNE® examination, the testing data (dependent variable of pass/no pass) was stored on the Applied Measurement Professional's database and also forwarded to the NLN. Demographic data obtained at the time of registration was obtained from the NLN and test score data was obtained from Applied Measurement Professionals.

Ethical Considerations

Information on the NLN CNE® registration website states that non-identifiable data obtained from CNE® testing is considered the property of the NLN and may be used for research purposes (NLN, 2012a). Thus when the CNE® testing candidate registers for the examination, they have provided inferred consent that their non-identifiable data may be used for research purposes. Study data was obtained in the form of multiple spreadsheets using case numbers. Analysis was performed on the spreadsheet without names. The resulting data would be considered blind data. Therefore the typical subject ethical concerns regarding any potential subject risks and lack of confidentiality did not exist for this study and further individual participant (tester) consent was not required.

Although traditional written consent was not required for completion of this study, consent from the NLN was necessary. The researcher had obtained permission to obtain the data from the NLN, for the specific purpose of this research study (Appendix A). Data were maintained on a password protected computer in the possession of the researcher, and data will be destroyed from the researcher's personal computer three years following the conclusion of the

study. All of these are requirements are typical to assure confidentiality of data, which is the sole property of the NLN. This researcher was given temporary access to these data for this specific research purpose.

Prior to obtaining research data, it is necessary that researchers obtain the approval of the appropriate institutional review board. The research proposal for this research was submitted to the College of St. Mary Institutional Review Board (IRB) and was determined to be "exempt." The College of St. Mary's IRB Application Guidebook (2012) identifies exempt research as "research involving the collection or study of existing data, documents, or records…if the information is recorded by the Investigator in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects" (p. 9). The data requested for this study was requested to be received in a manner in which individuals would not be identifiable. Thus, this study fit within the exempt category guidelines.

Data Collection Procedures

The data used in this research study was collected during the participant registration process and the actual CNE® examination. The independent variables, consisting of demographic data on the examination candidate, were collected during the online CNE® registration process. The registration data was collected on the NLN computer servers, and basic candidate identification data was forwarded to Applied Measurement Professionals (AMP) for processing. The dependent variable data were collected from a tool developed by the NLN and administered by AMP at one of their nation-wide testing centers. Both NLN and AMP provided the data to this researcher in the form of an excel spreadsheet to be transmitted electronically directly to the researcher.

The independent variables were self-reported by CNE® applicants. It was possible that the applicant provided inaccurate information, but a random percentage of all applicant demographic data (including the eligibility criteria) are verified by the NLN. This verification is completed according to the certification accreditation regulations of the National Commission for Certifying Agencies (NCCA), which provides national accreditation for the NLN CNE® program.

The dependent variable of test performance (pass/no pass) was collected by AMP at the time the CNE® examination was completed. Testers were provided with the examination results at the end of their testing period, although formal notice was not provided for 2-4 weeks following the examination itself. Examination responses could have been rescored at the request of any tester if there was any question of outcome accuracy.

Data Quality Measures

The validity and reliability of this examination was based upon a rigorous process overseen by both the NLN and Applied Measurement Professionals. Multiple steps have been implemented to assure examination validity. Reliability measures have been built into the data collection process by including random application verification audits and repeat scoring options.

Validity

Prior to the certification examination being developed, a group of subject matter experts met to determine the specific tasks completed by the particular profession. The NLN developed a listing of eight competencies of academic nurse educators, along with task statements for each competency (NLN, 2012a). The subject matter experts developed the competencies, as well as the task statements in 2003 (Ortelli, 2012). This work was the basis for additional subject matter experts (expert academic nurse educators) to identify current tasks of academic nurse educators.

The updated listing became the basis of a job analysis, which was developed to determine the tasks, skills, and/or abilities that needed to be assessed (Ortelli, 2012). The job analysis is a lengthy survey of the tasks, skills and abilities for that particular position that are rated on a Likert scale by those who work in that particular job. The survey for the 2011 academic nurse educator job analysis was sent to 5,134 academic nurse educators with a response rate of approximately 25% (AMP, 2011). The survey responses became the basis for the certification examination specifics, including the format of the examination, type of items, number of items, etc. A group of subject matter experts developed test items for the certification examination, according to the test blueprint. The items were then piloted by inclusion within the current examination, to obtain initial statistics for inclusion as a "graded item." An annual test item development session is held with content experts to ensure a large supply of available items for the overall CNE® test bank (L. Simmons, personal communication, 2012).

There are always a minimum of two versions of the CNE® examinations available for use at any time, which are evaluated annually according to the test item and overall examination statistics (L. Simmons, personal communication, April 25, 2014). At an annual meeting of the CNE® Test Development Committee, each test item is reviewed for continued content validity, face validity, item difficulty and item discrimination. Individual items that are not determined to have sufficient quality measures are either deleted or revised (and then piloted until the next review by the Test Development Committee). The CNE® Test Development Committee determines an estimate of the proportion of minimally competent practitioners that will select the correct answer to each item, which is a necessary step in developing an overall passing score using the Angoff method. Examination validity is ensured by the multiple steps just described in this examination process.

Reliability

There are hundreds of pre-tested questions ready to be used at any time, and there are always a minimum of two versions of the CNE® examination in use at any point in time for testers. The examinations are given names for identification purposes. The examinations in use since the change in eligibility criteria were named “Form 5” and “Form 6.” Each examination currently in use is statistically analyzed annually. This data is sent to the NLN, and submitted on an annual accreditation report to the National Commission for Certifying Agencies. The data is analyzed annually by an experienced psychometrician and by subject matter experts during an annual CNE® Test Development Committee meeting. Table 3 summarized the 2013 statistical data from Form 5 and Form 6 that were in use during the time research data was collected.

Table 3

2013 Analysis of CNE® Examination Forms

	Form 5	Form 6
Total number of candidates testing in 2013	627 (all) 539 (first-time)	606 (all) 532 (first-time)
% of candidates passed in 2013	56.30% (all) 59.55% (first-time)	53.80% (all) 56.39% (first-time)
Standard Error of Measurement	4.64	4.71
Reliability Estimate	0.84 (KR20)	0.85 (KR20)
Decision Consistency Estimate	0.83 (Subkoviak) 0.84 (Livingston)	0.83 (Subkoviak) 0.85 (Livingston)

A KR20 refers to a Kuder-Richardson 20, which is a statistical test of reliability for multiple choice examinations (Boslaugh, 2012). The CNE® examination is entirely a multiple choice

item format, so the KR20 statistical test of reliability is appropriate. The KR20 index ranges from 0.00 to 1.00 and a value of 0.60 or above was considered acceptable (Chi Tester User's Manual, n.d.). The CNE® KR20 value of 0.84 (Form 5) and 0.85 (Form 6) are within the acceptable range for establishing reliability. The statistical tests known as Subkoviak, and Livingston, are both used to estimate decision consistency in testing for mastery in pass/fail examination, with the highest reliability scores being close to 1.0 (Traub & Rowley, 1980). The CNE® Subkoviak values for both CNE® examination Forms 5 and 6 were determined to be 0.83, which was considered to be an acceptable value for determining decision consistency with the examination. The CNE® Livingston values for CNE® form 5 was determined to be 0.84, and for CNE® Form 6 was determined to be 0.85. Both Livingston values were considered acceptable for determining the decision consistency with the examination. The reliability measures for overall test reliability, as well as decision consistency reliability, were all within the acceptable ranges.

Two additional reliability measures existed that further promoted the quality of data. The random application data verification procedure was implemented as a reliability measure (L. Simmons, personal communication, 2013). And the availability of the option to rescore any examination is a procedure that was implemented to promote the reliability of examination of scoring (L. Simmons, personal communication, 2013).

An extensive set of processes to assure content validity and examination reliability were present with the NLN CNE® examination. The examination itself was based upon an extensive nation-wide practice analysis of academic nurse educators, to assure that the test blueprint reflected the current scope of practice of academic nurse educators. Overall the NLN CNE® examination reflected sufficient data quality measures.

Data Analysis Procedures

Data were analyzed using a combination of Microsoft Excel version 7 and IBM SPSS v. 20. Basic demographic data were analyzed with Excel to provide descriptive statistics and inferential statistics were obtained with SPSS. Data cleaning was completed prior to data analysis. The method used for data cleaning is described below.

Data Cleaning

Two data files were initially received for analysis. The first file was from AMP and contained test outcome data for 1109 nurse educators who wrote the examination between October 7, 2012 and May 31, 2014. The second file was from NLN and contained demographic data on all nurse educators who wrote the during the same time period. The NLN's database manager reported difficulties in obtaining a complete demographic dataset, as demographic data had been stored on various servers. After creating a database with all demographic data that could be located, it was apparent that there was no "linking variable" to merge the AMP testing dataset to the NLN demographic dataset. The NLN was able to create a third dataset that provided a linking variable so that data demographic data could be linked with the testing data. The linking process resulted in duplicate records, incomplete records, and records for repeat testers. Over 1300 records were in the linked data file.

Data cleaning occurred in multiple steps. First, duplicate records were removed from the master data file. Records were then carefully reviewed to identify datasets representing repeat testers. Next data were reviewed for missing variables within individual records. Ultimately, each individual record was reviewed for obvious "errors" such as when a tester noted several years experience teaching at their current position, but a lesser number of total years teaching.

After data cleaning was completed, 795 records remained that met study criteria. Following data cleaning, data were analyzed.

Descriptive Statistics and Hypothesis Testing Plan

The planned data analysis included the completion of both descriptive statistics and appropriate hypothesis testing inferential statistics. Demographic statistics were planned to the mean, mode, standard deviation and range for variables having continuous data. Although the anticipated sample size presented the assumption that the data would have been parametric, tests of normality were necessary to assure the appropriateness of using parametric statistical tests. Tests of normality were planned to include the use of Q-Q plots (Filliben, 2006) and the Shapiro-Wilk test (Prins, 2006).

The specific statistical tests planned for hypothesis testing varied according to the type of data to be analyzed with each hypothesis. The dependent variable of pass/no pass included the categorical variable of the actual "pass/no pass." Independent demographic variables were planned to include: academic employment status (categorical), formal graduate-level academic coursework in the role of the academic nurse educator (categorical), CNE® eligibility criteria option (categorical), total years worked full-time as an academic nurse educator (continuous), total number of types of programs the academic nurse educator has taught throughout his/her career (continuous), and type of program where majority of teaching has occurred (categorical).

Following the determination of whether the data is parametric or non-parametric, the appropriate hypothesis testing statistical tests needed to be identified according to the type of variable (Boslaugh, 2012). To compare categorical data with only one independent variable to continuous data, either the T-test for group comparisons (appropriate for parametric data) or the Mann-Whitney U (appropriate for non-parametric data) would have been used. To compare one

independent categorical variable with one categorical variable, the Chi-square test (appropriate for parametric data) or cross-tabulations, Pearson Chi-square, and the Phi coefficient (appropriate for non-parametric data) would have been used. To compare categorical data with one or more independent variables to continuous data, either the analysis of variance (appropriate for parametric data) or a Mann-Whitney U (appropriate for non-parametric data) would have been used. The specific hypothesis testing statistical tests, including both parametric and non-parametric tests, for each hypothesis were then identified.

Hypothesis 1: Is there a statistically significant difference in the academic employment status of academic nurse educators as either full-time, part-time, or no academic employment experience, and first-time performance (pass/fail) on the CNE® examination?

The dependent variable was categorical (pass/no pass) and the independent variable of employment status (full-time, part-time or no academic employment experience) was also categorical.

The appropriate test, pending the data was parametric, would have been a Chi-square test. The appropriate test, pending the data was non-parametric, would have included cross-tabulations, Pearson Chi-square, and Phi coefficient.

Hypothesis 2: Is there a statistically significant difference between academic nurse educators having formal graduate-level academic coursework in the role of the academic nurse educator and academic nurse educators who do not have formal graduate-level academic coursework in the role of the academic nurse educator, and first-time performance (pass/fail) on the CNE® examination?

The dependent variable was categorical (pass/no pass) and the independent

variable was also categorical (formal graduate-level academic coursework in the role of the academic nurse educator and academic nurse educators who do not have formal graduate-level coursework in the role of the academic nurse educator). The appropriate test, pending the data was parametric, would have been a Chi-square test. The appropriate test, pending the data was non-parametric, would have included cross-tabulations, Pearson Chi-square, and Phi coefficient.

Hypothesis 3: Is there a statistically significant difference between demographic variables of academic nurse educators and first-time performance (pass/fail) on the CNE® examination?

1) In analyzing the independent variable of type of CNE® eligibility criteria which is either Option A or Option B (categorical) with the categorical dependent variable (pass/no pass), the appropriate test with parametric data would have been a Chi-square test. The appropriate tests with non-parametric data would have included cross-tabulations, Pearson Chi-square, and Phi coefficient.

2) In analyzing the independent variable of total years worked as an academic nurse educator (continuous) with the categorical dependent variable (pass/no pass), the appropriate test with parametric data would have been a T-test and/or analysis of variance. The appropriate test with non-parametric data would have been a Mann-Whitney U.

3) In analyzing the independent variable of total number of types of programs worked full-time as an academic nurse educator with the categorical dependent variable (pass/no pass), the appropriate test would have been be a T-

test and/or analysis of variance. The appropriate test with non-parametric data would have been a Mann-Whitney U.

4) In analyzing the independent variable of current academic employment program type with the categorical dependent variable (pass/no pass), the appropriate test with parametric data would be would have been a Chi-square. The appropriate tests with non-parametric data would have included cross-tabulations, Pearson Chi-square, and Phi coefficient.

5) In analyzing the independent variable of type of program where majority of teaching occurred (categorical) with the categorical dependent variable (pass/no pass), the appropriate test with parametric data would have been Chi-square. The appropriate test, pending the data is non-parametric, would have included cross-tabulations, Pearson Chi-square, and Phi coefficient.

Following data cleansing and preliminary demographic analysis, the data set was sent to an experienced, doctorally-prepared psychometrician for review and further analysis. Based upon the determination that the data should be considered non-parametric, the planned non-parametric tests were utilized for hypothesis testing.

Summary

This chapter presented the methodology of this research study. The research design has been identified as a retrospective, multivariate descriptive design. This design was appropriate to answer the specific research questions. The participants/sample was limited to only the academic nurse educators who are wrote the CNE® examination since the new eligibility criteria were implemented (October 2012). The entire population was identified as the academic nurse educators in the US and its territories that meet the criteria to take the NLN CNE® examination

in place during the study period. Ethical considerations have been addressed. Data collection procedures have been presented and an extensive review of reliability and validity measures has been included. The actual process for data cleansing was included. And finally, the data analysis plans were identified, according to the specific type of data to be collected in relation to the specific research questions.

CHAPTER 4

RESULTS

This chapter presents the results of data collection, descriptive data analysis, and hypothesis testing for each research question. The purpose of this research study was to examine the characteristics of academic nurse educators' first-time performance (pass/fail) on the CNE® examination with subjects who have written the examination since the eligibility criteria were expanded in October 2012. This research study included 795 academic nurse educators who wrote the CNE® examination for the first-time between October 7, 2012 and May 31, 2014. The research data analysis plan was developed to include both descriptive statistics and hypothesis testing inferential statistics. Due to the anticipated large sample size, parametric hypothesis testing statistical tests had been planned. Tests to determine normalcy were planned to confirm that the data was parametric and that the planned parametric hypothesis testing statistical tests would have been appropriate. Pending validation that the data could be considered parametric, the following inferential statistical tests had been planned: Chi-square, T-test, and analysis of variance. The equivalent non-parametric inferential statistical tests were planned to be implemented if the data would have been found to be nonparametric. Descriptive data were analyzed on Microsoft Excel 2007 by this researcher and on IBM SPSS v. 20 by a psychometrician. Tests to determine normality and inferential statistics were performed on IBM SPSS v. 20 by a psychometrician.

Research Data Collected

The planned research was designed to examine if any differences existed between the dependent variables of first-time performance (pass/fail) on the CNE® examination to the independent demographic variables of: academic employment status (full-time, part-time, or not

employed), formal graduate-level academic coursework in the role of the academic nurse educator (either has formal coursework in academic nurse educator role or does not have formal coursework in the academic nurse educator role), CNE® eligibility criteria option (Option A or Option B), total years of employment as an academic nurse educator, types of nursing education programs where the tester has been employed in the academic nurse educator role, and type of nursing education program where the majority of the tester's teaching has occurred. The process of data collection included obtaining data from two different organizations. The National League for Nursing collects demographic data for all CNE® testers. Applied Measurement Professionals maintains testing outcome data for all CNE® testers. The two data files were merged into one data file for analysis. Not all data requested for the planned analysis was either received or received in a manner in which reliable analysis could be performed. The independent variable of types of programs taught at throughout career was combined into a new variable of the numbers of nursing education programs in which the tester had employment experience as an academic nurse educator. The independent variable of type of nursing education program where a majority of teaching occurred was not received. Data related to graduate-level academic coursework in the role of the academic nurse educator was largely missing and insufficient for data analysis. Data from two additional independent variables were received, including: type of nursing education program where currently employed as an academic nurse educator, and total number of years employed as an academic nurse educator with their current employer. The data received became the study variables analyzed and were sufficient to answer research questions #1 and #3 posed by this study. Data received was insufficient to answer research question #2.

Findings Related to Descriptive Data Analysis

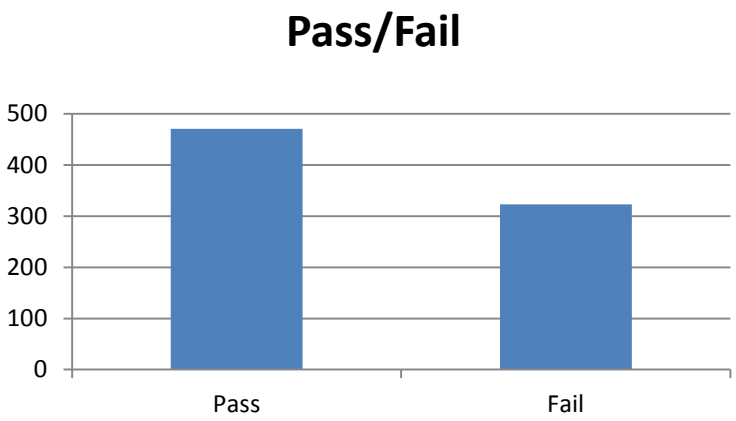
Data analyzed in this study were limited to testers who wrote the examination for the first-time (excluded repeat testers) between October 7, 2012 and May 31, 2014. These data were the first data to be analyzed after the only change in CNE® eligibility criteria, which expanded the overall eligibility to take the examination. The original eligibility criteria, which were in effect between September 28, 2005 and October 6, 2012, required 2 or more years of full-time employment as an academic nurse educator with graduate coursework in nursing education, or 4 or more years of full-time employment as an academic nurse educator without graduate coursework in nursing education. The revised eligibility criteria removed the full-time academic nurse educator employment requirement, and decreased the academic nurse educator experience to 0 years (with graduate coursework in nursing education) or 2 years (without graduate coursework in nursing education).

First-time Performance on CNE® Examination

A total of 795 academic nurse educators met the study criteria and completed the CNE® examination. Of this total, 472 academic nurse educators passed the examination. This yielded a pass rate of 59.4% for first-time testers who met study criteria. There were 323 academic nurse educators who failed the examination. This yielded a failure rate of 40.6% for first-time testers who met study criteria. The first-time performance data is presented in Figure 1.

Figure 1

First-time Performance on the CNE® Examination



Examination Scores

The examination included 130 graded items and scores could theoretically range from 0 to 130. The passing score is determined for each exam form (version) and thus could vary between different forms. Forms 5 and 6 were in use during the data collection period, and both of these forms had a passing score of 96. The mean examination score was 96.73 (standard deviation of 11.94, with a median of 98.00 and multiple modes). The examination scores ranged from 47 correct to 122 correct. These results were based upon 795 testers.

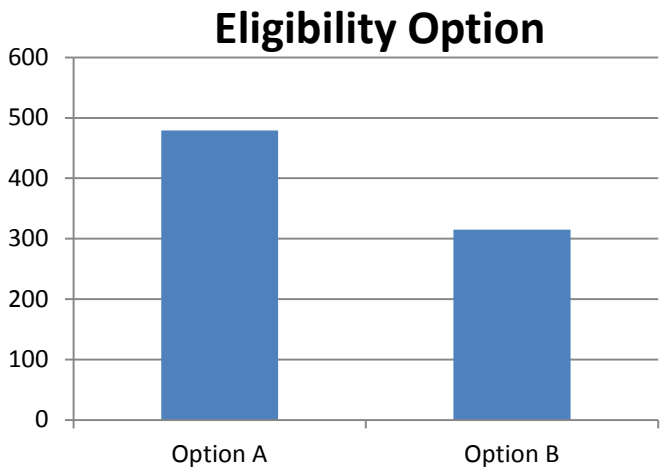
Eligibility Option

Academic nurse educators who register to write the CNE® examination must meet various eligibility criteria, which includes meeting either Option A criteria or Option B criteria. These options identify whether or not the tester has completed formal graduate-level education in the academic nurse educator role. Option A criteria required the academic nurse educator to have completed graduate credit in academic nursing education courses, but it did not require any employment experience in the academic nurse educator role. Option B criteria did not require the

academic nurse educator to have completed graduate credit in academic nursing education courses, but it did require a minimum of two years employment in the academic nurse educator role. A total of 480 testers, or 60.4%, met Criteria A indicating they had graduate credit in academic nurse educator courses but may or may not have any employment experience in the academic nurse educator role. A total of 315 testers, or 39.6%, met Criteria B indicating they did not have graduate credit in academic nurse educator courses but did have a minimum of two years employment in the academic nurse educator role. Figure 2 presents the numbers of testers according to the eligibility option.

Figure 2

Certified Nurse Educator® Eligibility Option



As noted earlier, both the original and the revised CNE® examination criteria included the requirement of meeting either Option A and an Option B. Option A for both the original and revised criteria included graduate coursework in nursing education, but the original criteria also required 2 years of academic nurse educator experience which was eliminated from the revised criteria. Option B for both the original and revised criteria did not include graduate coursework

in nursing education, but originally included 4 years of academic nurse educator experience which was decreased to 2 years of academic nurse educator experience in the revised criteria.

Total Years Employment as an Academic Nurse Educator

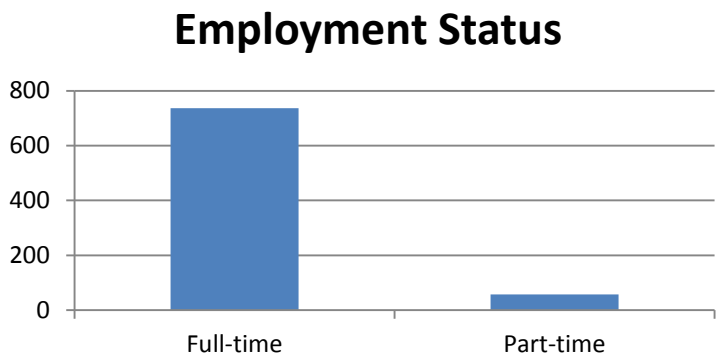
The variable of total years of employment as an academic nurse educator was collected at the time of examination registration as "full-time equivalent years." The mean full-time equivalent years of employment as an academic nurse educator was 8.76 years (standard deviation of 7.6570, with a median of 6.0 and a mode of 5.0). The full-time equivalent years ranged from 0 years experience to 40 years of full-time experience. These results were based upon 793 testers, with missing data for two testers.

Employment Status

The variable of employment status included the potential responses of full-time, part-time, and not applicable. None of the sample identified their current employment status as not applicable. Figure 3 depicts both full-time employment status (92.7%; N = 736) and part-time employment status (7.30%; N = 58).

Figure 3

Employment Status



The employment status results were based upon 794 testers, with missing data for one tester.

Number of Nursing Programs of Teaching Experience

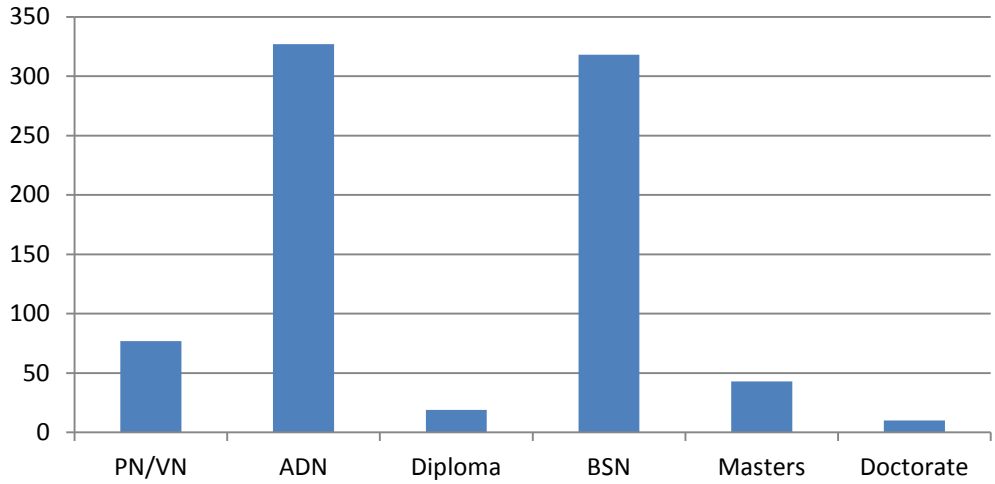
Demographic data collected at the time of CNE® examination registration included asking the tester for the number of nursing education programs in which the tester had employment experience in the academic nurse educator role. Data analysis for 794 testers (1 tester had obviously erroneous data and the data was removed from the analysis) indicated the mean number of nursing programs was 1.98 nursing programs (standard deviation of 1.646), with a median of 2.00 and a mode of 1. The data range for the number of programs of teaching experience indicated a minimum of 0 programs and a maximum of 9 programs.

Current Employment Program Type

Program type of current academic nurse educator employment could include: practical/vocational, associate degree, diploma, baccalaureate, master's, and doctorate. Although it may have been possible for the tester to be teaching in more than one type of nursing education program at the time of examination registration, they were forced to respond to the one type of program where the majority of their teaching occurred. The majority of testers were employed at either an associate degree program (n = 327 or 41.1% of total) or a baccalaureate nursing program (n = 318 or 40.0% of total). The remaining testers identified their major teaching responsibilities were at: a practical/vocational program (n = 78 or 9.8% of total), a master's degree program (n = 43 or 5.4% of total), a diploma program (n = 19 or 2.4% of total), or a doctoral program (n = 10 or 1.3% of total). The demographic data related to current employment type is presented in Figure 4.

Figure 4

Current Employment Program Type



Years Employed with Current Employer

CNE® examination registrants were asked to identify the number of years of employment with their current employer, as converted to "full-time equivalent years." Data analysis for the total sample (N = 795) indicated a mean of 5.73 years of full-time equivalent experience with their current employer (standard deviation of 5.582 years), with a median of 4 years and a mode of 2 years. The range of full-time equivalent years experience with the registrant's current employer ranged from a minimum of 0 years to a maximum of 35 years.

Summary of Descriptive Statistics

The sample in this research study included 795 academic nurse educators who wrote the CNE® examination between October 7, 2012 and May 31, 2014, who were first-time testers, and had complete data sets. This specific time frame was selected to correspond to the change in test eligibility criteria, which decreased the requirements for employment experience in the academic nurse educator role and no longer required full-time employment status. The first-time performance included a pass rate of 59.4% with a corresponding failure rate of 40.6%. The mean

examination score was 96.73, with a score range of 47 to 122. The percentage of first-time testers who met Option A was 60.4% and the percentage of first-time testers who met Option B was 39.6%. A mean of 8.76 years of employment as an academic nurse educator was identified with this study sample. A total of 92.7% of testers indicated they were employed as an academic nurse educator on a full-time basis, while only 7.30% of testers indicated they were employed as an academic nurse educator on a part-time basis. The current sample had a mean number of nursing programs the tester had taught in as 1.98 nursing programs. The variable of current employment type indicated that the majority of CNE® testers were currently employed at either associate degree programs (41.1%) or baccalaureate degree programs (40.0%). The sample had a mean of 5.73 years of full-time equivalent teaching experience with their current employer, with a range of 0 to 35 years.

Findings Related to Research Questions and Hypotheses

The study data were tested in relationship to the research questions and specific hypotheses. Prior to conducting inferential statistical tests, data were analyzed to verify whether they met criteria to be classified as parametric data or non-parametric data. A normal distribution of data would have been necessary to utilize parametric statistical techniques. Due to the large sample size and the findings of prior studies on CNE® testing data, it was originally thought that these data would have met the criteria to be considered normally distributed.

Normal Q-Q plots were created for each of the continuous variables in this study to confirm or reject whether the data from these variables met the statistical criteria to be considered parametric. Figure 5 consists of the Q-Q plot of the score (first-time test performance) and indicated a nonlinear pattern. The nonlinear pattern suggested that the data for the continuous variable, CNE® test score, was nonparametric.

Figure 5

Q-Q Plot of Score

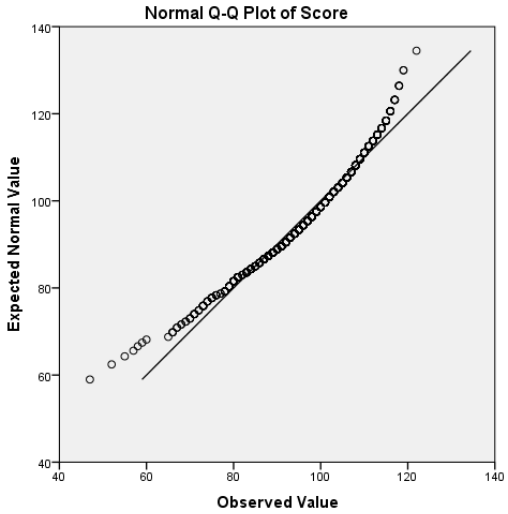


Figure 6 presents the Q-Q plot of the total years of employment as an academic nurse educator (as reported in full time equivalent years) and strongly indicated a nonlinear pattern. This nonlinear pattern suggested the data for this variable was nonparametric.

Figure 6

Q-Q Plot of Total Years of Employment as an Academic Nurse Educator

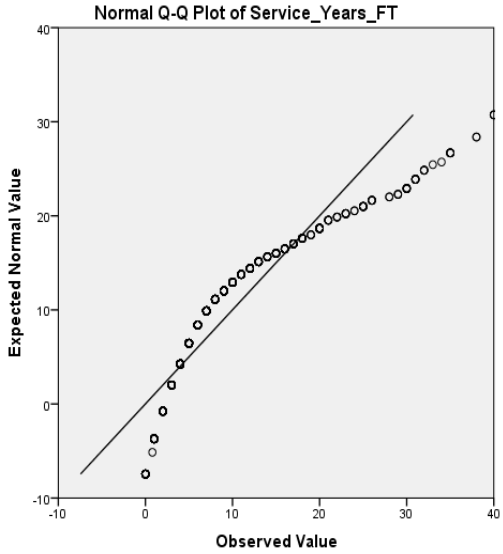
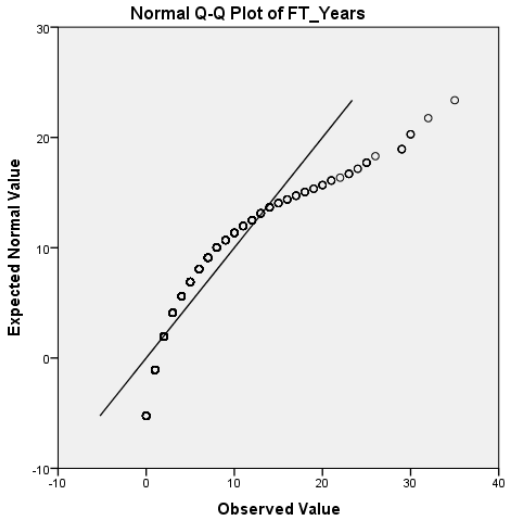


Figure 7 presents the Q-Q plot of the years of employment as an academic nurse educator with their current employer and strongly indicated a nonlinear pattern. This nonlinear pattern suggested the data for this variable was nonparametric.

Figure 7

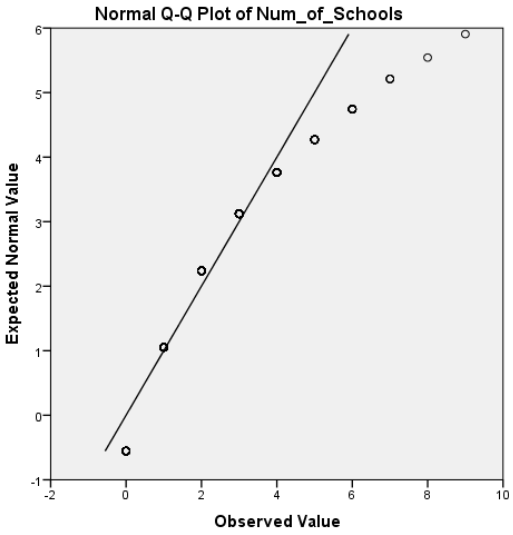
Q-Q Plot of Years of Employment as Academic Nurse Educator with Current Employer



The Q-Q plot of the number of nursing programs of teaching experience as an academic nurse educator with their current employer (Figure 8) indicated a nonlinear pattern. This nonlinear pattern suggested the data for this variable was nonparametric.

Figure 8

Q-Q Plot of Number of Nursing Programs of Teaching Experience



In addition to the Q-Q plots, a Shapiro-Wilk test of normality was conducted for each continuous variable. The Shapiro-Wilk test uses a null hypothesis principle to test whether the sample population came from a normally distributed population. If the *p*-value is less than the chosen alpha level (e.g. 0.05), the null hypothesis should be rejected and the data is presumed not to be from a normally distributed population. The p values for all continuous variables were less than .000 and therefore this sample was not considered to be normally distributed. Table 4 presents the specific findings of the Shapiro-Wilk Test of Normality for all continuous variables.

Table 4

Shapiro-Wilk Test of Normality

Variable	Statistic	df	Sig. (*p*-value)
Test score	.969	792	.000
Total Years of Employment	.830	792	.000
Years at Current Employer	.795	792	.000
Number of Schools Taught At	.844	792	.000

*p<0.05

The findings of the Q-Q plots and Shapiro-Wilk test of normality for each continuous variable concluded that none of the variables satisfied the assumptions of normality. As a result, nonparametric statistics were used to test all study hypotheses.

Research Question # 1 and Hypothesis # 1

Research Question # 1 asked if there was a statistically significant difference in the academic employment status (full-time, part-time, or no academic employment experience) of academic nurse educators and first-time performance (pass/fail) on the CNE® examination. This research question led to the following hypothesis.

> Hypothesis # 1: There is no statistically significant difference in the academic employment status (full-time, part-time, or no academic employment experience) of academic nurse educators and first-time performance (pass/fail) on the CNE® examination.

Since the data had been determined to be non-parametric, and hypothesis # 1 contained a categorical dependent variable and a categorical independent variable, the hypothesis testing

included the development of a cross-tabulation table, performing a Pearson Chi-square test, and performing a Phi coefficient.

A cross-tabulation table, or contingency table, is a matrix-style table that displays the actual frequencies for each variable and the expected frequencies for each variable (Morgan & Griego, 1998). Table 5 contains the cross-tabulation for the dependent variable of first-time examination performance (pass/fail) with the independent variable of employment status (full-time or part-time employment). Although there was an option for a registrant to indicate that they were not currently employed, all subjects in this study indicated either full-time or part-time employment. An examination of a cross-tabulation table found that among those who passed the examination, the observed count of full-time employment status was higher (450) than what would have been expected by chance (437.5). With part-time employment status among those who passed the examination, the opposite was true, with an observed count (22) being lower than what would be expected by chance (34.4). Among those who failed the examination, the observed count of full-time employment status was lower (287) than what would have been expected by chance (299.4). With part-time employment status among those who failed the examination, the opposite was true, with an observed count (36) higher than what would have been expected by chance (23.6).

Table 5

Cross-Tabulation Table:
First-time Performance on CNE® Examination
and Employment Status (Full-time/Part-time) Cross Tabulation

			Employment Status		Total
			Full-time	Part-time	
	Pass	Count	**450**	**22**	472
		Expected Count	**437.6**	**34.4**	472.0
		% within PFA	95.3%	4.7%	100.0%
		% within Employment Status	61.1%	37.9%	59.4%
		% of Total	56.6%	2.8%	59.4%
	Fail	Count	**287**	**36**	323
		Expected Count	**299.4**	**23.6**	323.0
		% within PFA	88.9%	11.1%	100.0%
		% within Employment Status	38.9%	62.1%	40.6%
		% of Total	36.1%	4.5%	40.6%
Total		Count	737	58	795
		Expected Count	737.0	58.0	795.0
		% within PFA	92.7%	7.3%	100.0%
		% within Employment Status	100.0%	100.0%	100.0%
		% of Total	92.7%	7.3%	100.0%

Note: PFA refers to pass, fail, absent. There were no subjects identified as absent.
Bold font denotes actual counts and expected counts in each category.

A Pearson's Chi-Square test was then performed to test the significance of the difference between the two proportions identified within the cross-tabulation. Table 6 presents the finding from the Pearson Chi-Square test (X^2= 11.923, p = .001), which was considered significant at the 0.05 probability level. This finding indicated that the differences between the observed counts and the expected counts of first-time examination performance categorized by employment status were not likely to have occurred by chance.

Table 6

Pearson's Chi-Square Test:
First-time Performance on CNE® Examination
and Employment Status (Full-time/Part-time) Cross Tabulation

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	11.923[a]	1	.001*		
Continuity Correction[b]	10.983	1	.001		
Likelihood Ratio	11.671	1	.001		
Fisher's Exact Test				.001	.001
Linear-by-Linear Association	11.908	1	.001		
N of Valid Cases	795				

Note: a. 0 cells have expected count less than 5. The minimum expected count is 23.56;
b. Computed only for a 2 x 2 table.
*p< .05

The Phi coefficient (also known as the mean square contingency coefficient) was next calculated as a measure of the strength of the association for the two categorical variables, specifically, the examination outcome and employment status. Table 7 presents the results of the Phi coefficient test. The strength of the association between the academic employment status and the first-time performance on the CNE® examination was determined to be statistically significant (phi = .122, p = .001). These data indicate that there was a positive association between working full time and passing the CNE® examination.

Table 7

Phi Coefficient Test:
First-time Performance on CNE® Examination
and Employment Status (Full-time/Part-time) Cross Tabulation

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
	Phi	.122			.001*
Nominal by Nominal	Cramer's V	.122			.001
	Contingency Coefficient	.122			.001
	Kendall's tau-b	.122	.036	3.236	.001
Ordinal by Ordinal	Kendall's tau-c	.063	.019	3.236	.001
	Gamma	.439	.113	3.236	.001
N of Valid Cases		795			

Note: a. Not assuming the null hypothesis; b. Using the asymptotic standard error assuming the null hypothesis.
*p<.05

Given the results of the cross tabulations, the Pearson Chi-Square test, and the Phi Coefficient test, it was appropriate to reject the null hypothesis. These data confirmed that there was a statistically significant difference between those academic nurse educators who were employed full-time versus those who were employed part-time with the outcome of passing or failing the CNE® examination. Academic nurse educators in this study who worked full-time passed the CNE® examination at a higher rate than those academic nurse educators who worked part-time.

Research Question # 2 and Hypothesis # 2

Research question # 2 asked if there was a statistically significant difference between academic nurse educators having formal graduate-level academic coursework in the role of the academic nurse educator and academic nurse educators who did not have formal graduate-level academic coursework in the role of the academic nurse educator, and first-time performance (pass/fail) on the CNE® examination. This research question led to the following hypothesis.

> Hypothesis # 2: There is no statistically significant difference between academic nurse educators having formal graduate-level academic coursework in the role of the academic nurse educator and academic nurse educators who do not have formal graduate-level academic coursework in the role of the academic nurse educator, and first-time performance (pass/fail) on the CNE® examination.

As noted earlier, the CNE examination registration included the separate and distinct demographic variable of whether or not the CNE® tester had graduate-level coursework in the academic nurse educator role. This registration item was not a required item and data sufficient for analysis did not exist. Thus research question # 2 could not be addressed by the data received for this study.

Research Question #3 and Hypothesis # 3

Research question # 3 asked if there was a statistically significant difference between demographic variables of academic nurse educators and first-time performance (pass/fail) on the CNE® examination. This research question led to the following hypothesis.

> Hypothesis # 3: There is a statistically significant difference between demographic variables of academic nurse educators and first-time performance (pass/fail) on the CNE® examination.

Although not specified in the research question, the planned demographic variables that were planned to be examined as part of research question #3 had been identified as: eligibility criteria (Option A or Option B), total years of employment as an academic nurse educator, types of programs the academic nurse educator has taught through his/her career, and the type of program where the majority of teaching has occurred. As noted earlier, not all data requested for analysis were either received or received in a manner in which reliable analysis could be performed. The

data related to eligibility criteria (Option A or Option B) were received intact. The data related to total years of employment as an academic nurse educator were also received intact. The data related to the types of programs the academic nurse educator has taught through his/her career was combined into a new variable of numbers of programs the academic nurse educator had taught at throughout their career. The variable of type of program where a majority of teaching occurred was not received. Data from two additional independent variables was received, including: the type of nursing program where the tester was currently employed and the total number of years employed with the current nursing education program. Although the independent variables that were planned for analysis to answer research question # 3 were not all available, the planned independent variables that were available, as well as the additional independent variables were analyzed and considered sufficient to answer research question # 3.

Eligibility Criteria. One of the CNE® examination eligibility criteria requires the tester to identify whether they have met Option A (with graduate-level coursework in the academic nurse educator role with no experience in the academic nurse educator role required) or Option B (without graduate-level coursework in the academic nurse educator role and with a minimum of two years of experience in the academic nurse educator role).

Since, the data had been determined to be non-parametric and containing two categorical variables, the same hypothesis testing methods used with hypothesis # 1 were used to examine the independent variable of eligibility criteria and examination performance. These included the development of a cross-tabulation table, performing a Pearson Chi-square test, and performing a Phi coefficient.

A cross-tabulation table, or contingency table, was used to display the actual frequencies for each variable and the expected frequencies for each variable. Table 8 contains the actual and

expected frequencies for the dependent variable of first-time examination performance (pass/fail) with the independent variable of eligibility option (Option A with graduate education courses; Option B without graduation education courses but with additional requirement of 2 years experience in the academic nurse educator role). An examination of a cross tabulation table indicated that among those who passed the examination, the observed count of those with graduate-level course work in the role of the academic nurse educator (276) was close to the expected count that would have been expected by chance (285). The observed count for those who passed the examination and did not have graduate-level coursework in the academic nurse educator role (196) was also close to the expected count that would have occurred by chance (187). Among those who failed the examination, the observed count of those with graduate-level coursework in the role of the academic nurse educator (204) was close to the expected count that would have been expected by chance (195). Among those who failed the examination and had graduate-level courses in the role of the academic nurse educator the observed count (204) was close to the expected count that would have been expected by chance (195). Among those who failed the examination, the observed count of those with graduate-level course work in the role of the academic nurse educator (119) was close to the expected count that would have occurred by chance (128).

Table 8

Cross-Tabulation Table
First-time Performance on CNE® Examination
and Academic Coursework in the Role of the Academic Nurse Educator

			Eligibility Option		Total
			Option A: With Nursing Ed Courses	Option B: Without Nursing Ed Courses	
	Pass	Count	**276**	**196**	472
		Expected Count	**285.0**	**187.0**	472.0
		% within PFA	58.5%	41.5%	100.0%
		% within ELIG_Option	57.5%	62.2%	59.4%
		% of Total	34.7%	24.7%	59.4%
	Fail	Count	**204**	**119**	323
		Expected Count	**195.0**	**128.0**	323.0
		% within PFA	63.2%	36.8%	100.0%
		% within ELIG_Option	42.5%	37.8%	40.6%
		% of Total	25.7%	15.0%	40.6%
Total		Count	480	315	795
		Expected Count	480.0	315.0	795.0
		% within PFA	60.4%	39.6%	100.0%
		% within ELIG_Option	100.0%	100.0%	100.0%
		% of Total	60.4%	39.6%	100.0%

Note: PFA refers to pass, fail, absent. There were no subjects identified as absent.
ELIG_Option refers to the eligibility option.
Bold font denotes actual counts and expected counts in each category.

A Pearson's Chi-Square test was then performed to test the significance of the difference between the two proportions identified within the cross-tabulation. Table 9 presents the statistical analysis, which indicated the finding was not statistically significant at the 0.05 probability level ($X^2 = 1.758$, $p = .185$).

Table 9

Pearson's Chi-Square Test:
First-time Performance on CNE® Examination
and Eligibility Option (Option A/Option B)

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	1.758[a]	1	.185		
Continuity Correction[b]	1.568	1	.211		
Likelihood Ratio	1.764	1	.184		
Fisher's Exact Test				.209	.105
Linear-by-Linear Association	1.756	1	.185		
N of Valid Cases	795				

Note: a. 0 cells have expected court less than 5. The minimum expected court is 127.98; b. computed only for a 2 x 2 table.

This finding indicated that the differences between the observed count and the expected count of pass/fail numbers according to the eligibility option could have occurred by chance.

The Phi coefficient was next calculated as a measure of the strength of the association for the two categorical variables within hypothesis #2. As noted in Table 10, the strength of the association between academic nurse educators meeting eligibility Option A and academic nurse educators meeting eligibility Option B and first-time performance on the CNE® examination (pass/fail) was found not to be statistically significant (phi = -.047, p = .185).

Table 10

Phi Coefficient test:
First-time Performance on CNE® Examination
and Academic Coursework in the Role of the Academic Nurse Educator

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
	Phi	-.047			.185
Nominal by Nominal	Cramer's V	.047			.185
	Contingency Coefficient	.047			.185
	Kendall's tau-b	-.047	.035	-1.333	.183
Ordinal by Ordinal	Kendall's tau-c	-.045	.034	-1.333	.183
	Gamma	-.098	.074	-1.333	.183
N of Valid Cases		795			

Note: a. Not assuming the null hypothesis; b. Using the asymptotic standard error assuming the null hypothesis.

Given the results of the cross tabulations, the Pearson Chi-square test, and the Phi Coefficient test, it was inappropriate to reject the null hypothesis. These data confirmed that there was no statistically significant difference between those who had graduate-level course work in the role of the academic nurse educator but with no required work experience, and those who did not have graduate-level course work in the role of the academic nurse educator but did have a minimum of two years employment in the role, with the outcome of passing or failing the CNE® examination.

Total years of employment as an academic nurse educator. Testers were asked for the total number of years, converted to full-time equivalent years, they have worked in the role of the academic nurse educator. The nonparametric Mann-Whitney U test was conducted to determine if there was a statistically significant difference between the total years worked in the role of the academic nurse educator and first-time performance on the CNE® examination. The assumption of normality was not present with the total years of employment as an academic nurse educator

variable, so the Mann-Whitney U was used as the nonparametric equivalent of the independent t-test which would have been used if the data would have been determined to be parametric. The results of the Mann-Whitney U found that the difference between the mean rank of those who passed the examination (426.3) and those who failed (354.37), on the variable of total years worked in the role of the academic nurse educator, was statistically significant at the .05 probability level ($U = 62134$, $p = .000$). The results of the Mann-Whitney U supported rejecting the null hypothesis. The academic nurse educators who passed the examination had, on ranked average, more years experience as an academic nurse educator than those who failed the exam.

Number of nursing programs of teaching experience as an academic nurse educator. The nonparametric Mann-Whitney U test was conducted to determine whether there was a statistically significant difference in the mean ranks of the number of programs that academic nurse educator had taught at during their career and first-time performance on the CNE® examination. The Mann-Whitney U test found that the difference between those who passed the examination (404.5) and those who did not pass the examination (388.5) was not statically significant at the .05 probability level ($U = 73160$, $p = .311$). Given the results of the Mann-Whitney U, it was inappropriate to reject the null hypothesis. The number of programs the academic nurse educator had taught at during their career could not be related to the tester's performance on the CNE® examination.

Current employment program type. A cross-tabulation table and nonparametric measures of association were calculated to test the relationship between the current employment program type (practical/vocational, associate, diploma, baccalaureate, master's, or doctorate), and first-time performance (pass/fail) on the CNE® Examination. A review of the cross-tabulation table indicated that among those who passed the examination, the observed counts in the program

teaching categories of diploma (15), baccalaureate (209), master's (31) and doctorate (9) were higher than what would have occurred by chance (diploma, 11.3; baccalaureate 188.8; master's 25.5; and doctorate 5.9). The opposite was true for the categories of practical/vocational (34) and associate (174), in which the observed counts were lower than what would be expected by chance (practical/vocational 46.3; associate 194.1). Among those who failed the examination, the observed counts in the program teaching categories of diploma (4), baccalaureate (109), master's (12), and doctorate (1) were lower than what would be expected by chance (diploma 7.7; baccalaureate 129.2; master's17.5; doctorate 4.1). The observed counts within the teaching categories of practical/vocational (44) and associate (153) were higher than what would have been expected by chance (practical/vocational 31.7; associate 132.9). Tables 11 and 12 present the differences between observed and expected frequencies are for the different nursing program levels.

Table 11

Cross-Tabulation Table:
First-time Performance on CNE® Examination
and Current Employment Program
Practical/Vocational, Diploma, Associate, and Bachelor Programs

			Program Teaching			
			Practical/ Vocational	Associate	Diploma	Bacca-laureate
PFA	Pass	Count	**34**	**174**	**15**	**209**
		Expected Count	**46.3**	**194.1**	**11.3**	**188.8**
		% within PFA	7.2%	36.9%	3.2%	44.3%
		% within Program Teaching	43.6%	53.2%	78.9%	65.7%
		% of Total	4.3%	21.9%	1.9%	26.3%
	Fail	Count	**44**	**153**	**4**	**109**
		Expected Count	**31.7**	**132.9**	**7.7**	**129.2**
		% within PFA	13.6%	47.4%	1.2%	33.7%
		% within Program Teaching	56.4%	46.8%	21.1%	34.3%
		% of Total	5.5%	19.2%	0.5%	13.7%
Total		Count	78	327	19	318
		Expected Count	78.0	327.0	19.0	318.0
		% within PFA	9.8%	41.1%	2.4%	40.0%
		% within Program Teaching	100.0%	100.0%	100.0%	100.0%
		% of Total	9.8%	41.1%	2.4%	40.0%

Note: Bold font denotes actual counts and expected counts in each category.

Table 12

Cross-Tabulation Table:
First-time Performance on CNE® Examination
and Current Employment Program
Master's, Doctorate Programs, and Total Counts

			Program Teaching		Total
			Master's	Doctorate	
PFA	Pass	Count	**31**	**9**	472
		Expected Count	**25.5**	**5.9**	472.0
		% within PFA	6.6%	1.9%	100.0%
		% within Program Teaching	72.1%	90.0%	59.4%
		% of Total	3.9%	1.1%	59.4%
	Fail	Count	**12**	**1**	323
		Expected Count	**17.5**	**4.1**	323.0
		% within PFA	3.7%	0.3%	100.0%
		% within Program Teaching	27.9%	10.0%	40.6%
		% of Total	1.5%	0.1%	40.6%
Total		Count	43	10	795
		Expected Count	43.0	10.0	795.0
		% within PFA	5.4%	1.3%	100.0%
		% within Program Teaching	100.0%	100.0%	100.0%
		% of Total	5.4%	1.3%	100.0%

Note: Bold font denotes actual counts and expected counts in each category.

A Pearson Chi-Square test was then performed to test the significance of the difference between the two proportions (observed and expected) identified within the cross-tabulations. The Pearson Chi Square finding was significant at the .05 probability level ($X^2 = 28.31$, $p = .000$). Table 13 presents the Pearson Chi-Square analysis outcome.

Table 13

Pearson's Chi-Square Test:
First-time Performance on CNE® Examination
and Current Employment Program Type

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	**28.310[a]**	**5**	**.000***
Likelihood Ratio	29.366	5	.000
Linear-by-Linear Association	24.654	1	.000
N of Valid Cases	795		

*p<.05

The Phi coefficient was next calculated as a measure of the strength of the association between the dependent variable of examination outcome (pass/fail) and the current employment program type. The strength of the association was determined to be statically significant (phi = .189, p = .000) and is noted in Table 14.

Table 14

Phi Coefficient Test:
First-time Performance on CNE® Examination
and Current Employment Program Type

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
	Phi	**.189**			**.000***
Nominal by Nominal	Cramer's V	.189			.000
	Contingency Coefficient	.185			.000
	Kendall's tau-b	-.164	.032	-5.037	.000
Ordinal by Ordinal	Kendall's tau-c	-.184	.037	-5.037	.000
	Gamma	-.288	.055	-5.037	.000
N of Valid Cases		795			

Note: a. Not assuming the null hypothesis; b. Using the asymptotic standard error assuming the null hypothesis.
*p<.05

Given the results of the cross tabulations, the Pearson Chi-Square test, and the Phi Coefficient test, it was appropriate to reject the null hypothesis. There was a statistically

significant difference in first-time CNE examination performance (pass/fail) and current employment program type. The findings indicated that academic nurse educators employed in practical/vocational and associate degree nursing programs failed the CNE® examination at a rate higher than would have been expected, while academic nurse educators employed at diploma, baccalaureate, master's and doctorate programs passed the CNE® examination at a rate higher than would have been expected.

Years of employment as an academic nurse educator with current employer. The independent variable of years of employment as an academic nurse educator with their current employer was calculated as full-time year equivalents. As this data was determined to be nonparametric, the Mann-Whitney U test was conducted to determine whether there was a statistically significant difference in the mean ranks of the full-time years employed with the current employer and first-time performance on the CNE® examination. The Mann-Whitney U test found that the difference between the mean rank of those who passed the CNE® examination (413.36) and those who failed the CNE® examination (375.55), on the variable of total number of full-time years employed with their current employer, was statistically significant at the .05 probability level ($U = 68977.5$, $p = .022$). The null hypothesis was rejected on the basis of these findings. Thus, CNE® testers who passed the CNE® examination had, on ranked average, more years experience as an academic nurse educator with their current employer than those who failed the examination.

Research question # 3 involved the statistical analysis of five demographic variables. These demographic variables included: CNE® eligibility criteria, total years of employment as an academic nurse educator, total number of nursing programs of teaching experience as an academic nurse educator, current academic employment program type, and total years of

employment with current employer. Some, but not all, of the demographic variables analyzed were associated with first time performance on the CNE examination. Table # 15 summarizes the findings related to research question # 3.

Table # 15:

Summary of First-time CNE® Examination Performance and Demographic Variables

Demographic Variable	*Statistical Test Performed and Results*	*Outcome of Testing*
CNE® Eligibility Criteria Option A (with graduate level coursework and no experience required in the role) Option B (without graduate level coursework and a minimum of two years experience in the role)	Cross Tabulation Results not significant Pearson Chi-Square ($X^2 = 1.758$, $p = .185$) Inappropriate to reject the null hypothesis that there is no difference between testers identified as Option A or Option B and performance on the CNE® examination.	No difference was identified between Option A and Option B testers and performance on the CNE® examination.
Total years of employment as an academic nurse educator	Mann-Whitney U ($U = 62134$, $p = .000$) Appropriate to reject the null hypothesis that there is no difference between years of experience as an academic nurse educator and performance on the CNE® examination.	A difference was found that those with more years of experience in the academic nurse educator role passed the CNE examination at a statistically significant higher rate.
Number of nursing programs of teaching experience as academic nurse educator	Mann-Whitney U ($U = 73160$, $p = .311$) Inappropriate to reject the null hypothesis.	The number of programs the academic nurse educator has taught at during their career is not related to the tester's performance on the CNE® examination.
Current academic employment program type LPN/LVN; ADN; Diploma; BSN; MSN; Doctorate	Cross Tabulation Testers from diploma, BSN, MSN, and doctorate programs passed the examination at a higher rate than statistically expected. Testers from LPN/LVN and ADN Programs passed the examination at a lower rate than statistically expected. Pearson Chi-Square ($X^2 = 28.31$, $p = .000$) Cramer's V ($V = .189$, $p = .000$ Appropriate to reject the null hypothesis	Current program type of employment was associated with different pass rates on the CNE® examination.
Total years of employment as an academic nurse educator with current employer	Mann-Whitney U ($U = 687977$, $p = .022$) Reject null hypothesis	Testers with more years of experience at current employer performed statistically better on the CNE® examination.

Summary of Results

Data from 795 academic nurse educators who wrote the NLN CNE® examination for the first-time between October 7, 2012 and May 31, 2014 were analyzed in relationship to this study's research questions and hypotheses. The data indicated a 59.4% pass rate for the first-time testers (or conversely, a 40.6% failure rate). Examination scores ranged from 47 to 122, with a mean score of 96.73. The sample included 480 testers (60.4%) who identified meeting the Option A eligibility criteria (having graduate-level course work in the role of the academic nurse educator role, without any work experience requirement), and 315 testers (39.6%) who identified as meeting the Option B eligibility criteria (not having graduate-level course work in the role of the academic nurse educator role but with a required work experience of two or more years as in the academic nurse educator role). A total of 92.7% of testers indicated they were employed as an academic nurse educator on a full-time basis, while only 7.30% of testers indicated they were employed as an academic nurse educator on a part-time basis. The mean years of employment (recorded as full-time work equivalent years) was identified as 8.76 years, with a range of 0 to 40 years of full-time equivalent work experience in the academic nurse educator role. The sample had a mean number of 1.98 nursing programs of teaching experience as an academic nurse educator, with the range being 0 to 9 programs. The sample identified their current program type of nursing education employment, which resulted the following analysis: 9.8% taught at practical/vocational programs, 41.1% taught at associate degree programs, 2.4% taught at diploma programs, 40% taught at baccalaureate degree programs, 5.4% taught at master's degree programs, and 1.3% taught at doctorate degree programs. The sample had a mean of 5.73 years of full-time equivalent teaching experience with their current employer, with a range of 0-35 years.

The data was anticipated to be parametric, due to the large sample size and on the basis that prior CNE data had been analyzed with parametric data analysis statistical tests. Normal Q-Q plots were created for each of the continuous variables to confirm or reject whether the data from each variable met the statistical criteria to be considered a normal distribution. A Shapiro-Wilk test of normality was also conducted for each continuous variable. The findings of the Q-Q plots and the Shapiro-Wilk tests of normality for the continuous variables concluded that none of the variables satisfied the assumptions of normality, and as a result, nonparametric statistics were used for hypothesis testing.

Research question # 1 asked whether there was a statistically significant difference in the academic employment status (full-time, part-time, or no academic employment) of academic nurse educators and first-time performance (pass/fail) on the CNE Examination. Cross tabulations and a Pearson Chi-Square test rejected the null hypothesis that there was no statistically significant difference in the academic employment status and first-time test performance. These data confirmed a statistically significant difference between the academic nurse educators who were employed full-time versus those who were employed part-time with the outcome of passing or failing the CNE® examination. Those working full-time had a statistically significant higher rate of passing the examination than those who worked part-time.

Research question # 2 asked whether there was a statistically significant difference between academic nurse educators having formal graduate-level academic coursework in the role of the academic nurse educator and academic nurse educators who do not have formal graduate-level academic coursework in the role of the academic nurse educator, and first-time performance on the CNE® examination. Because the variable of graduate-level academic

coursework was option on the registration, very few academic nurse educators provided the information and there was insufficient data to analyze.

Research question # 3 asked whether there was a statistically significant difference between demographic variables of academic nurse educators and first-time performance on the CNE® examination. Nonparametric tests confirmed there was no statistically significant relationship between the performance on the CNE examination and the independent variables of eligibility criteria type (Option A or Option B) and numbers of programs taught at during their teaching career. Nonparametric tests confirmed there was a statistically significant relationship between the performance on the CNE examination and the independent variables of: total years experience in the academic nurse educator role, current type of nursing program employment, and total years experience in the academic nurse educator role at their current place of employment. Testers who had more years of experience in the academic nurse educator role performed better on the CNE® examination with higher pass rates than those having fewer years of experience in the academic nurse educator role. Testers who were employed in diploma, baccalaureate, master's and doctoral programs performed better on the CNE® examination with higher pass rates than those testers who were employed at practical/vocational, and associate degree nursing programs. Testers who had greater years of experience in the academic nurse educator role at their current place of employment performed better on the CNE® examination with higher pass rates than those testers who had fewer years of experience in the academic nurse educator role at their current place of employment.

CHAPTER 5

DISCUSSION

The purpose of this research study was to examine the characteristics of academic nurse educator's first time performance on the NLN CNE® examination with subjects who had written the examination since the eligibility criteria were expanded on October 7, 2012. Specifically, data were examined to determine if any differences existed between the dependent variable of first-time performance (pass/fail) on the CNE® examination to the independent variables of: academic employment status (full-time, part-time, or not employed), formal graduate-level academic coursework in the role of the academic nurse educator (either has formal coursework in the academic nurse educator role or does not have formal coursework in the academic nurse educator role), CNE® eligibility criteria (Option A or Option B), total years of employment as an academic nurse educator, types of nursing education programs where the tester has been employed in the academic nurse educator role, and type of nursing education program where the majority of the tester's teaching has occurred. This chapter presents the results of this study as they relate to literature, how the theoretical framework provided a basis for the study and understanding the results of the study, the significance of this study's findings, limitations of this study, implications and recommendations from this study, and suggestions for further research in this area.

Summary of Findings Related to Research Questions

This quantitative research study used a retrospective, multivariate, descriptive design. This was an appropriate design with the type of data that was available for analysis and the type of research questions the study was designed to investigate. This study can also be referred to as a secondary analysis of data, as all data planned for analysis had already been collected by other

parties. The demographic data of the subjects of this study had been collected at the time the academic nurse educators registered to take the NLN CNE® examination. The testing outcome data for the subjects were collected by the testing vendor that administers the examination. A significant data set was already in existence for all first-time testers since the eligibility criteria changed. Thus, a significant amount of data was available for this retrospective, multivariate, descriptive design.

Three research questions were addressed by this study. The first research question asked whether there was a statistically significant difference in the academic employment status of academic nurse educators and first-time performance on the CNE® examination. Data analysis revealed that there was a statistically significant difference between academic nurse educators who worked full-time in the academic nurse educator role and those who worked part-time in the academic nurse educator role. Testers who were employed on a full-time basis performed better, in terms of pass/fail on the examination, than the testers who were employed on a part-time basis.

The second research question asked whether there was a statistically significant difference between testers who had formal graduate-level academic coursework in the role of the academic nurse educator and those who did not, and first-time performance on the CNE® examination. Data received were insufficient to answer this research question.

The third research question sought to identify whether there was a statistically significant difference between various demographic variables of academic nurse educators and first-time performance on the CNE® examination. The demographic variable of examination eligibility option (Option A which required formal graduate level coursework in the role of the academic nurse educator but no employment experience in the role was required, and Option B which did

not require formal graduate level coursework in the role of the academic nurse educator but required a minimum of two years of experience in the role) with performance on the CNE® examination was examined. Data analysis confirmed that there was no statistically significant difference in the performance of testers identifying they met Option A eligibility criteria and testers identifying they met Option B eligibility criteria. The demographic variable of total years of employment as an academic nurse educator was found to have a statistically significant relationship to CNE® examination performance. Academic nurse educators who passed the examination overall had more years experience as an academic nurse educator than those who failed the examination. The demographic variable of the number of nursing programs of teaching experience as an academic nurse educator was not found to have a statistically significant relationship to the tester's performance on the CNE® examination. The demographic variable of current employment program type was found to be related to the tester's performance on the CNE® examination. Testers who were employed in diploma, baccalaureate, master's, and doctorate level nursing education programs were more likely to pass the CNE® examination. Conversely, testers who were currently employed in practical/vocational nursing, and associate degree nursing programs were less likely to pass the CNE® examination. The final demographic variable examined in relationship to performance on the CNE® examination was the total years of employment as an academic nurse educator with the tester's current employer. Data analysis identified a statistically significant relationship between the years of employment with the tester's current employer and their performance on the CNE examination. Testers with greater employment experience performed better on the CNE® examination.

Data analysis from this research study identified the following variables were associated with improved performance on the CNE® examination: full-time employment status in the role

of the academic nurse educator; greater years of experience in the role of the academic nurse educator; employment in diploma, baccalaureate, master's or doctorate nursing programs; and greater years of experience as a nurse educator in their current employment position. Variables that were not found to have a statistically significant relationship with CNE® examination performance included: the completion of graduate level coursework in the academic nurse educator role, type of eligibility criteria (Option A or Option B), and the number of programs the academic nurse educator has taught at during their academic nurse educator career.

Relationship to Literature

Certification research in any area typically proceeds from descriptive, to correlational, to quasi-experimental, and finally to experimental (L. Aiken, personal communication, January 27, 2012). General research regarding professional nurse certification has focused on describing factors associated with becoming certified (Nance, 1999), correlating attainment of the certification credential to higher levels of specialized knowledge (Cary, 2009), and how the attainment of certification brings an intrinsic reward for the individual who attains certification (Wade, 2009). Within the clinically focused nurse certifications, more recent research has focused on the value of certification to improved patient outcomes (Bulla, 2003; Kendall-Gallagher & Blegen, 2009).

Very little research has been conducted on nurse education certification. Ortelli (2008) reported the results of a descriptive research study on those who passed the CNE® examination during the first few years of its existence. Higbie (2010) researched the perceived level of core competency attainment by CNE®s. And in 2012, Ortelli completed a dissertation on the correlation of demographic variables to pass/fail rates for those testers subjected to the original eligibility criteria.

The current study was conducted with data collected after the CNE® eligibility criteria changed in 2012 to include part-time nurse educators and to decrease the requirements for actual employment experience in the role of the academic nurse educator. Thus, comparison of the current findings to prior studies must acknowledge that the study samples between the current study and prior studies were taken from different sub-sets of the overall population of CNE® testers. However, even with that difference, there are comparisons between the current study findings and prior study findings that are worth discussion.

The demographic description of this study's sample was compared with the demographic description contained within the most recent study of CNEs® (Ortelli, 2012). Ortelli's study identified an overall pass rate on the CNE® examination of 83.1% (n = 2,673), while this study identified an overall pass rate of 59.4% (n = 795). As noted, this research included a sample that tested with the expanded eligibility criteria. The sample in this study would have included testers with little to no experience as an academic nurse educator, so a drop in the pass rate would have been expected. Although the eligibility options changed to decrease the amount of actual academic nurse educator experience required, the overall percentages of testers meeting Option A and Option B were similar between the current study (Option A = 60.4%; Option B = 39.6%) and Ortelli's 2012 study (Option A = 61.5%; Option B = 38.5%). As expected due to the decrease in work experience eligibility requirements, this study's population had a decreased in the mean total year's employment as an academic nurse educator (8.76 years), as compared with Ortelli's 2012 findings (11.6 years). Ortelli (2012) did not report the number of nursing programs of teaching experience for study subjects, so this study's data specific to this variable could not be compared to Ortelli's study. Although the exact employment type numbers could not be identified in Ortelli's (2012) study narrative, general percentages were estimated from a bar

graph Ortelli used to present the data. Table 16 presents a comparison of Ortelli's (2012) data and the current data.

Table 16

Current Employment Program Type
Original Eligibility Criteria and Revised Eligibility Criteria

Program Type	Original Eligibility Criteria*	Revised Eligibility Criteria**
Vocational/Practical	~ 6%	9.8%
Associate Degree	~42%	41.1%
Diploma	~ 7%	2.4%
Baccalaureate	~37%	40.0%
Master's/Doctorate	~ 8%	6.7%

*Original Eligibility Criteria refers to data from the study by Ortelli (2013)
**Revised Eligibility Criteria refers to data from this study

Ortelli's 2012 study identified slightly more testers from associate degree, diploma, and master's/doctoral programs, and fewer testers from the other types of nursing programs, as compared to this study. The most significant change in program employment type between Ortelli's study (2012) and this study was the decrease in diploma testers, which was consistent with the decreasing number of diploma nursing programs between the study periods. Ortelli's study (2012) did not include any testers who were new graduates or had less than 2 years of experience in the role of the academic nurse educator, which were included in this study. Other than the anticipated changes in the study population (examination pass rate, experience and work status variables) which would have been expected due to the change in eligibility criteria, the subject population remained quite similar between this research and Ortelli's findings (2012).

The only CNE® research with similar research questions to this study was Ortelli's 2012 study. A significant finding of Ortelli's (2012) study was the identification that more years of teaching experience was correlated with a higher pass rate on the CNE® examination. The result of this research also confirmed that higher pass rates were associated with greater work experience in the role of the academic nurse educator.

Relationship to Theoretical Framework

This research was grounded in the theoretical framework of Dreyfus and Dreyfus (Dreyfus, 2004) and Benner (2001). Both theories addressed knowledge and skills acquisition as including a number of steps, ranging from novice to expert. Both Dreyfus (2004) and Benner (2001) identified the following steps of knowledge and skills attainment: novice, advanced beginner, competent, proficient, and expert. The CNE® examination is based upon competence in the full scope of the academic nurse educator role. According to Benner (2001) competence occurs following one to two years of actual practice in the role, but this can vary according to the individual.

The results of this research support the importance of experience in the academic nurse educator role to passing the CNE® examination. Within this study, testers with more experience in the role of the academic nurse educator demonstrated a significantly higher performance on the examination than those with less experience in the role. Based upon the theoretical framework, it was speculated at the creation of this study that failures on this certification exam would likely reflect novice practitioners who have not yet gained the knowledge to pass the examination. It was also speculated that the proficiency level at which the nurse educator has the knowledge to pass the CNE® examination would be within the competent to expert level.

The theoretical frameworks of the Dreyfus model of adult skills acquisition and the Benner model of clinical nursing skills acquisition provided a basis for understanding this study's outcome that more experience in the academic nurse educator role is associated with higher pass rates on the CNE® examination. To pass the CNE® examination, the tester must demonstrate competence in the full scope of the academic nurse educator role, which is associated with more years of experience in the role.

Significance of Findings

The findings of this study indicate that academic nurse educators with greater work experience perform better on the CNE® examination, which tests competency in the full scope of the academic nurse educator role. This finding is significant for nursing education programs with respect to the assignments given to nurse educators. Those academic nurse educators who have little experience could benefit by having the resource of a mentoring faculty who has several years of experience as an academic nurse educator. New faculty in the role of the academic nurse educator will need experience to gain competence to function in the full scope of the academic nurse educator role.

Findings from this study can extend to the type of orientation programs that academic nurse educator employers would implement with new faculty who do not have graduate level coursework in the nurse educator role. Since results of the current research identified similar testing outcomes between testers with graduate level education in the nurse educator role and no experience, and testers with no graduate level coursework in the nurse educator role but with a minimum of two years experience in the academic nurse educator role, there would be support to have a prolonged orientation period for new faculty without graduate level coursework. For example, many academic nurse educator programs may utilize a mentor program to pair new

faculty with experienced faculty. Based upon the findings of this research, the length of the mentor program for faculty with no graduate level coursework may need to be expanded to assist the new faculty's transition to competence within the academic nurse educator role.

It is also significant that academic nurse educators from different types of nursing education programs were either more likely or less likely to pass the CNE® examination according to the type of nursing education where they were employed. Those program types that had faculty who were less likely to pass the CNE® examination were practical/vocational nursing programs and associate degree nursing programs. Although the actual reason for this finding is not known, the employers at these institutions can use these findings to support their academic nurse educators gain knowledge in the full scope of the academic nurse educator role. For example, faculty workshops could be provided that focus on aspects of the academic nurse educator role that are not frequently encountered in their current positions.

Graduate nursing programs can also utilize the findings of this study with respect to their graduate nurse educator curricula. The overall effectiveness of graduate nurse education courses are validated by these results since testers with no minimum work experience and completion of graduate level coursework in the academic nurse educator role perform essentially the same on the CNE® examination as those testers with a minimum of two years work experience and no graduate level coursework in the academic nurse educator role.

Findings from this study have significance to the role of the academic nurse educator, but it must be remembered that many limitations to this study exist. Many of these limitations are noted below.

Limitations

Various limitations existed within this study. This study encountered the initial limitation of the lack of availability for some of the variables that were collected during the CNE® registration and testing process. For example, it was not known whether the subjects practiced in the full scope of the academic nurse educator role because no data was collected regarding this variable. Not all of the variables that were included within the registration process were maintained by the NLN in a form that resulted in useable data for this study. For example, registration data specific to type of graduate coursework was not maintained in a reliable form as a separate variable. Data related to type of education coursework could vary widely among educational programs. The limitations related to lack of demographic information impacted having a clear understanding of the current research results. This study identified some factors that have an association with first-time CNE® examination performance, but the study cannot answer why these factors were associated with examination performance.

Another limitation of this study, and more specifically, applying the results of this study to practice, is the lack of a common employment position description for academic nurse educator among types of nursing programs and with varying full-time/part-time assignments. The type employment for the academic nurse educator could vary widely between positions, as related to full-scope or partial-scope of the role. NLN has described the full scope of the academic nurse educator role, but it is not known whether the typical academic nurse educator includes practice in the full scope of this role (L. Simmons, personal communication, March 18, 2015). Employment expectations for academic nurse educators can also vary widely between types of nursing education programs. Some programs may expect the academic nurse educator to focus solely on teaching in the classroom and in the clinical area, with no expectation of

functioning within the full scope of the academic nurse educator role. Other nursing educator programs would expect the academic nurse educator to function in the full scope of the role, ranging from teaching, to department and institutional committee work, to the scholarship of conducting research and involvement in faculty practice. These limitations to actual work experience may have greatly affected the results of this study and thus affect the application of the study results to all academic nurse educators in all settings.

Academic nurse educators who voluntarily seek certification as a CNE® may not represent the "whole" of the academic nurse educator population. The CNE® testers in this study were not a random sample of the entire population of academic nurse educators. The testers may be the "superstars" of the profession and actually test higher than the overall population of academic nurse educators. It is also possible that the "superstars" of the academic nurse educators seek certification at a lower rate than the overall pool of academic nurse educators.

Overall there are many limitations to this study because there are many unanswered questions about the nurse educator role. Results of this study are applicable to the subjects included within this study population. It is not known if the results from this study can be generalized to the entire population of academic nurse educators due to the many limitations that existed within this study.

Implications and Recommendations

A major implication from these research results is that those who are more likely to have experience in the full scope of the academic nurse educator role are more likely to perform better on the CNE® examination. The full scope of the academic nurse educator role is found in positions where all of the academic nurse educator competencies are part of the position description. Another implication is that there is significant interest among academic nurse

educators to become certified even though their current employment positions likely do not include practice in the full scope of the academic nurse educator role. This implication is drawn from the findings that practical/vocational and associate degree nurse educators typically do not practice in the full scope of the academic nurse educator role and performed at a lower level on the CNE® examination, yet accounted for a significant portion of the total testers. The resulting implication is that it takes experience in an employment position to gain knowledge and in the full scope of the academic nurse educator. A recommendation for all potential testers who do not currently work full-time in the full scope of the academic nurse educator role or those who have little to no experience in this role, would be to assess their knowledge base of each academic nurse educator competency and review relevant materials in areas where they have knowledge deficits prior to seeking certification.

An additional implication from this research study would be that NLN review the current demographic collected and data storage in relation to future research. Not all data collected during the CNE® registration process is available for research. Current data related is maintained on two databases and requires significant computer database personnel time to combine the two datasets. The recommendation would be that the role of the academic nurse educator would continue to be researched and that data collected during the CNE® testing process would be maintained in a one comprehensive computer database.

Future Research

Research in the role of the academic nurse educator is in its infancy. Additional research needs to occur to fully understand the role of the academic nurse educator practicing in the full scope of the role, as well as currently accepted common variations of this role. If not all academic nurse educators practice in the full scope of the role, future research could identify

what partial scope roles exist and within which settings they exist. For example, is there a consistently identified role for a “clinical only nurse educator” or a “part-time nurse educator?” Future research could identify why academic nurse educator working in some types of academic nurse educator programs perform better on the CNE® examination. Research into the type of academic nurse educator role in different educator settings could assist those preparing nurses for academic positions, to identify the necessary competencies for various academic education positions. Although academic nurse educators performed better on the CNE® examination with more years of academic nurse educator experience, raw data verified that there were testers with no experience working in the academic nurse educator role that were successful in writing the CNE® examination. Research into these individuals having absolutely no work experience in the academic nurse educator role would seek to identify how these individuals learned the necessary competencies of the academic nurse educator role. That type of research outcome would be significant guidance for any graduate nurse educator program in building their curriculum to support students to become academic nurse educators.

Certification research begins with describing various aspects related to certification, but then moves onto the effects of certification to the profession. After more research is conducted on the basic aspects of certification, as described above, the certification research would move to identifying the actual benefits of certification to the profession. For example, do students receiving education from certified academic nurse educators perform better in their academic studies than students who receive education from academic nurse educators that are not certified? And further, do nursing students perform at a higher level in the clinical area with actual clients when they have been taught by certified academic nurse educators? Is there a value to the health and well being to the public when nurses are taught by certified academic nurse

educators? The research into academic nurse educator certification is just beginning and there is much to be discovered.

Summary

This research sought to identify factors related to success on the NLN CNE® examination. The current research is the only CNE research based upon data collected following a change in the CNE® testing eligibility criteria, which had the effect of enlarging the potential population of academic nurse educators who would be eligible for the examination. Very few studies could be found that focused on the academic nurse educator role. Results of the current research indicated that performance on the CNE examination is related to employment status (full-time employees in the academic nurse educator role have a higher pass rate), total years of employment as an academic nurse educator (more years of employment in the academic nurse educator role is associated with a higher pass rate), nursing program type of employment (employment at diploma, baccalaureate, master's, and doctoral programs is associated with a higher pass rate), and years of employment with the current academic employer (more years of employment in the academic nurse educator role with the current employer is associated with a higher pass rate). This study was limited by the availability of data related to testers, and the lack of universal expectations of full-time versus part-time academic nurse educators. Future research should continue to investigate the factors that correlate with success on the CNE® examination. The identification of such factors can assist nurse educators who are considering writing the CNE examination, significant guidance to use in their preparation for taking the examination. Graduate nursing education programs can also use the results of this research, as well as future research in the development and revision of nursing education courses. Research results can also impact the identification of overall faculty strengths and weaknesses according to the categories

of the NLN nurse educator competencies, which then provide a grounded basis for faculty development. Overall, as nurse educators have increased competence, their skills as educators are enhanced and they may have greater capability to promote student learning.

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Appendix A

NLN Consent Letter

NLN
National League
for Nursing

April 24, 2014

Linda S. Christensen
5062 South 108th Street, #281
Omaha, NE 68137

Dear Ms. Christensen:

The National League for Nursing has received your request to conduct research focused on data from the NLN Certified Nurse Educator Program. Specifically, you have requested permission to obtain non-identifiable application demographic data and testing outcome data for individuals who wrote the CNE® exam between October, 2012 and May 31, 2014. The data will be used solely for the purpose of your doctoral dissertation, currently titled "Factors Related to Success on the Certified Nurse Educator (CNE®) Exam" and any resulting publications. You have noted that your study is being conducted as part of your doctoral studies at the College of St. Mary, Omaha, NE.

I am pleased to grant permission for you to conduct research focused on NLN CNE® information within your dissertation, to specifically include non-identifiable application demographic data and testing outcome data for individuals who wrote the CNE® exam between October 2012 and May 31, 2014. In granting this permission, the following caveats will apply:

- all data will be maintained in a password protected computer file,
- all data will be destroyed within three years after completing the dissertation,
- all data will be maintained as confidential and the sole property of the NLN, and
- the NLN will have first right of refusal for any written publication of the research findings, other than the publication of the dissertation itself.

Best wishes as you complete your dissertation. The NLN will be interested in the findings as they will contribute to the body of researching being conducted on the NLN Certified Nurse Educator Program.

Respectfully,

Beverly Malone, PhD, RN, FAAN
Chief Executive Officer
National League for Nursing