MEASURING CRITICAL THINKING IN NEWLY LICENSED REGISTERED NURSES

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A DISSERTATION

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ABSTRACT

A national conversation is stirring about mandating residency programs of newly-licensed nurses as findings indicate that they are not prepared to make appropriate patient care decisions. Even with many commercial instruments available for outcome measurements, accurately assessing the development of critical thinking (CT) remains elusive and difficult.

The purpose of the research study was to 1) assess the development and progression of CT in the newly-licensed registered nurses (NLRN) orientation program participants; 2) investigate differences in the development and progression of CT between the NLRN orientation program participants and the population involved in the development of the Watson-Glaser Critical Thinking Appraisal (WGCTA); 3) assess for differences in the development of critical thinking as it relates age and degree status; and 4) determine if there are differences in CT between cohort WGCTA scores of those participants in the original versus the revised version of the NLRN orientation.

The NLRN orientation used for the study, known as the *Span Program*, offers curriculum that is based on Patricia Benner's landmark nurse "novice to expert" theory (1982, p. 402), which supports the Experiential Learning Theory (ELT) by David Kolb (1984). Data analysis utilized the SPSS version 22.0 software to calculate both descriptive and inferential statistics.

The researcher was not able to conclusively establish concrete relationships with the aggregate WGCTA-FS scores of the dissertation participants and the introduction or intervention of the *Span Program* of orientation. The PI was not able to establish significant differences

between the WGCTA-FS charter study (i.e., post development short form of the WGCTA) group and the dissertation study. With respect to whether degree status or age has any influence or correlation to WGCTA-FS outcomes, the researcher was able to conduct analysis that suggested a positive correlation with greater probability between degree status and WGCTA-FS scores but there is no statistical significance between WGCTA-FS scores and age. Findings by the PI indicated that there was no differences in critical thinking between the original 2015 *Span Program* participants and revised 2016 orientation program participants for NLRNs at the host institution. It was the hope of the researcher that the study produced results that can make a difference in how nurse educators measure CT future NLRN orientation programs.

DEDICATION

My academic career started in the heart of an impoverished young girl who had an insatiable curiosity and grew into a lifetime of learning. I appreciate the early mentors who gave me opportunities to prove myself. I would never have had the confidence and/or rich experiences throughout my lifetime if I had not had those who pushed me early on to be better and to reach farther.

To my Children's of Alabama coworkers and peers, I could not have done it without you, your kindness, and your tolerance during this graduate school saga. Thank you for your patience and understanding on those exhausting days that I might not have been able to contribute with my full energy.

I am most grateful for the support of a family who has looked at me as being "a little different" but has always been and continues to be there for me. Thank you for the sacrifices you have made on my behalf during this quest (as well as my chosen profession) Mandy Gibson, Bradley Gibson, and Caitlyn Jones; and for your undying belief and faith in me, Randall Rush and Mona Schoonover. Although my mom never really understood my wanderlust for adventure and thirst for knowledge, my only regret is that she is not here to see my dreams finally come true.

LIST OF ABBREVIATIONS AND SYMBOLS

AACN	American Association of Colleges of Nursing
AD	Associate Degree (in nursing)
AEB	As Evidence By
ANOVA	Analysis of Variances (in statistics)
BLS	Basic Life Support
BSN	Bachelor of Nursing Degree
COA	Children's of Alabama Hospital
CT	Critical Thinking
CBT	Computer Based Training
CI	Confidence Interval (in statistics)
df	Degrees of Freedom (in statistics)
EBP	Evidence Based Practice
ELT	Experiential Learning Theory
EOC	Environment of Care
GLM	General Linear Model (in statistics)
IRB	Institutional Review Board
IT	Information Technology
Lab	Laboratory
M	Mean (in statistics)

N or n	Number (in statistics)
NCLEX-RN	National Council Licensure Examination for Registered Nurses
NCSBN	National Council of State Boards of Nursing
NLRN	Newly Licensed Registered Nurse
NRP	Nursing Residency Program
NSO	Nursing Service Orientation
OR	Operating Room
rho	Spearman's rank correlation (in statistics)
RM ANOVA	Repeated Measures of Analysis of Variances (in Statistics)
RN	Registered Nurse
SD	Standard Deviation (in statistics)
SE	Standard Error (in statistics)
Sim lab	Simulation Laboratory
SPSS	Statistical Package for the Social Sciences
Stats	Statistics
UA	University of Alabama
UAB	University of Alabama at Birmingham
UHC	University Healthcare Consortium
UW	University of Washington
US	United States
WGCTA	Watson-Glaser Critical Thinking Appraisal
WGCTA-FS	Watson-Glaser Critical Thinking Appraisal (short form)
α	Alpha (in statistics)

σ	Standard Deviation (in statistics)
ρ	Spearman's rank correlation (in statistics)

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I especially want to acknowledge all the participants involved in this study, which enabled this research to take place. Without you, my critical thinking knowledge building would not have been possible.

Finally, I wish to acknowledge the giver of gifts and forgiver of sins, Jesus Christ, for all his blessings on me. Without Him, there is no knowledge and I am grateful for his undying love.

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CHAPTER I:

INTRODUCTION

Traditionally, undergraduate-nursing curricula has focused on the content and competencies required of newly-licensed registered nurses (NLRNs) upon entry into professional practice, usually in a hospital setting (Hoffman, 2008). Because the content is too exhaustive to teach everything to new nurses, the goals of undergraduate nursing education have shifted to the preparation of critical thinkers and lifelong learners (Hoffman, 2008). Hospitals are increasingly adopting residency programs for new nurses who begin working at their organization fresh out of nursing school (Powell, 2015).

Evaluating learners to determine clinical competencies is a challenge faced by educators with current strategies for evaluating novice nurses' clinical performance as being criticized for being too subjective (Hayden, Keegan, Kardong-Edgren, & Smiley, 2014). Despite moving toward nursing residency programs (NRPs), the ability to measure novice nurses' critical thinking (CT) development remains difficult even with many commercially-available instruments presently on the market. Educators are thwarted by inconsistent CT definitions, poor understanding about measurable ways to teach a critical thought process, and a lack of reliable and valid nursing assessment tools to effectively evaluate new nurse reasoning (Mundy & Denham, 2008). With evaluation skills varying greatly among educators in all levels of academic nursing programs (Hayden et al., 2014), standardized tests lack the ability to effectively evaluate CT that targets clinical experience (Mundy & Denham, 2008). Nonetheless, outcome measurements of NRPs or NLRN orientation programs has become popular in

determining the level of success of these programs, with the instruments of measurement usually determined by program administrators.

Statement of the Problem

As NLRN orientation programs gain popularity and momentum toward assisting the NLRN's transition to practice, findings have indicated that novice nurses are not prepared with the knowledge and skills needed to develop appropriate decision making abilities [Institute of Medicine (IOM), 2010]. A major finding in the Carnegie National Nursing Education Study stated that today's nurses are undereducated for the demand of practice (Benner, Sutphen, Leonard, & Day, 2009). A survey conducted by the National Council of State Boards of Nursing (NCSBN) discovered that only 41.9% of respondents believed that NLRNs were prepared to give safe and effective care (Goode, Lynn, Krsek, Bednash, & Jannetti, 2009). In the US, successful completion of a nursing education program and achievement of a passing score on the National Council Licensure Examination for Registered Nurses (NCLEX-RN) are required to demonstrate entry-level competence to begin nursing practice (Dyess & Sherman, 2009). Despite successfully passing state licensure boards, these novices continue to have difficulty translating theory into practice. The translation difficulty is profoundly evident by 65-76% of inexperienced NLRNs not meeting the expectation of entry-level nursing judgment (Ulrich, Krozek, Early, Ashlock, Marquez-Africa, & Carman, 2010). With 10% of the current nurse work force employed in acute care settings made up of new nurse graduates (Dyess & Sherman, 2009), preparation of NLRNs to make critical decisions is important to all the stakeholders involved; administrators, practicing nurses, physicians, nursing faculty, nursing students, nursing peers, and the community at large (Fero, Witsberger, Wesmiller, Zullo, & Hoffman, 2008). With increased complicated processes and environmental issues, sound CT skills are necessary in the

nurse's care management of the pathophysiological and diagnostic aspects of a patient's clinical presentation and disease process (Fero et al., 2008). The demands of the future job market and employers' expectations of NLRNs raise the need for assessment of CT skills (Hassan & Madhum, 2007). NLRN orientation programs are designed to address decision-making through the CT process (Baxter, 2010; Bratt & Felzer, 2011; Hillman & Foster, 2011; Molinari, Monserud, & Hudzinski, 2008; Park & Jones, 2010; Wu, Hsiaso, Wu, Ling, & Huang, 2011). Consequently, NLRNs should transition into the practice arena through programs designed to assess existing CT skills and further develop these abilities that are crucial for safe patient care.

Theoretical Framework

Developed by American educational theorist David Kolb, Experiential Learning Theory (ELT) asserts that a person learns through his or her discovery where experience shapes the way learners grasp knowledge, affecting cognitive development (Kolb, 1984). ELT is a holistic perspective that combines experience, perception, cognition, and behavior (Kolb, 1984). The ELT was developed to explain the connections between the human developmental stages of maturation, learning processes, and experiences (Kolb, 1984). Based on the *Span Program* (i.e., program of interest in the current study; see Appendix A) Curriculum Map (see Appendix B), these stages of connection (e.g., maturation, learning processes, and experience) are fostered toward the acquisition of competencies. More specifically, acquisition of competency is achieved through the four stages of the ELT cycle: experiencing, reflecting, thinking, and acting (Kolb, 1984). Figure 1 shows ELT.

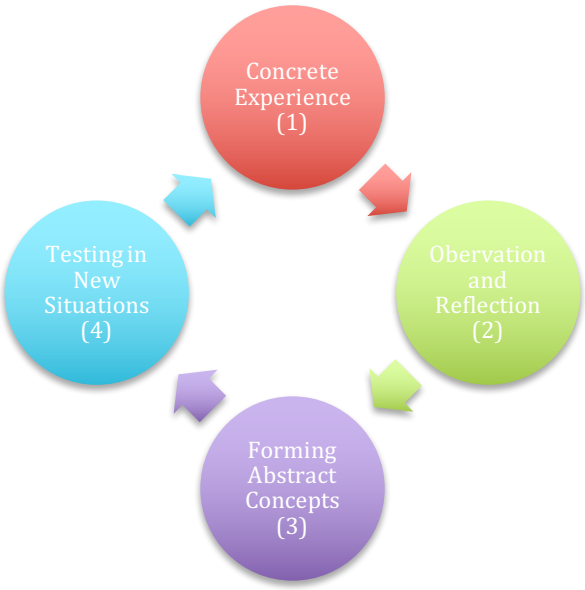

Figure 1. Experiential Learning Theory (ELT) in simple visual representation. Adapted from *Experiential learning: Experience as the source of learning and development* (Kolb, 1984).

The first stage of ELT (i.e., concrete experiencing) is where the learner actively experiences an activity, such as a laboratory (lab) session or fieldwork (Kolb, 1984). The NLRN orientation program utilized for this research study included opportunities for encountering the first stage via simulations, role-play, and preceptorships. The orientation program's use of the skills and computer lab encourages the gaining of experience in nursing tasks and include task-oriented behaviors (e.g., placement of a urinary catheter, practicing sterile technique, basic medication administration, insertion of the peripheral intravenous access). The *Span Program* also involves practicing cognitive skills (e.g., maintaining nutrition in the pediatric/neonatal critical care patient, choosing and using oxygen delivery devices, pediatric physical assessment, identifying and using computer icons on the desktop, and the review of abbreviations and terminology).

The second stage of ELT (i.e., reflective observation or reflecting) is when the learner consciously reflects back on the experience (Kolb, 1984). Reflection is considered a catalyst for

clinical learning since the nurses are continually adding to a knowledge base and developing such knowledge with each patient encounter. The purpose of reflective, critical thought is to ensure that the nurse has the depth of knowledge necessary to immediately comprehend the practice situation so that safe, effective, quality nursing care is provided to clients (Facione, Sanchez, Facione, & Gainen, 1995). The reflection stage is accomplished in the NLRN *Span Program* through debriefings and discussions of the simulations, role-play, case scenarios, as well as a relationship with an expert nurse preceptor. These opportunities include interaction with the instructor via the introductions to the organization and its charitable foundation, the facility's corporate compliance, and *Health Insurance Portability and Accountability Act* (HIPAA). The reflection stage of ELT continues through discussions of basic life support (BLS) and restraint/seclusion in the risk management section, employee health/wellness and emotional wellness in the benefits and payroll section, hand hygiene in the infection control section, the environment of care (EOC) in the fire/safety/security section, and the institution's nursing philosophy, mission, vision, and values. Reflection is further encouraged through investigating mock code review in the quality/safety module, documentation with specific electronic medical record functions during the technology module, growth and development assessments in the pediatric physical assessment module, application of oxygen delivery devices in the respiratory assessment module, calculations of medications, and the palliative care module. Other modules within the orientation program allow for opportunities for reflection as well but are too numerous to mention.

The third stage of ELT is thinking (i.e., abstract conceptualization), where the learner attempts to conceptualize a theory or model of what has been observed (Kolb, 1984). Sound nursing practice requires that the nurse be a sound thinker, one who is able to reason things

through, to direct her own mind in a way that is disciplined and effective in nursing "problem solving" (Facione et al., 1995, p. 40). The new nurse must construct an accurate and clear comprehension of the nursing care needs required by clients in daily practice (Facione et al., 1995). To this end, the nurse develops the ability to think critically about the knowledge required for care and the knowledge brought to the nursing care situation (Facione et al., 1995). The thinking stage is accomplished through the NLRN shadowing expert nurses in areas along the patient care continuum and leadership experiences, core classes including didactic, skills, and a variety of learning activities, computer education modules and other information technology (IT) classes as needed, simulations with debriefings, role play/case scenarios, and a preceptorship on home/assigned unit with a preceptor. These experiences for the program orientee include all the methods of instruction of the program [e.g., instructor led, computer based training (CBT), video, and skills]. One such format of instruction that assists the NLRN with the thinking process is video presentation. Magnetic Resonance Imaging (MRI) safety, social media/red flags for child abuse roles and responsibilities, and palliative care information are all presented to the audience in video format as indicated by the *Span Program* Curriculum Map of the orientation program.

The fourth stage of ELT is acting (i.e., active experimentation), where the learner is trying to actively test a model or theory (Kolb, 1984). All the stages of experience, reflecting, and thinking are demonstrated by the NLRN as learned skills within the final stage of ELT. The final fourth stage offers opportunities for learning via the same experiences listed prior for the program orientee (e.g., shadowing expert nurses, core classes, skills practice, IT classes, simulations, and preceptorship). The most effective methods of instruction for the acting ELT stage are the skills and CBT formats, which is how much of the curriculum in the NLRN

orientation program is delivered. IT education is just one use of CBT. Many topics are covered in the orientation program via the IT/CBT method of instruction as our health care environments have become highly technological, requiring NLRNs to be 'tech savvy.' The skills method of instruction is also an effective way of delivering information in the acting stage of ELT. Computer based technology and skills formats of instruction cover the previously mentioned topics. Further explanation of the ELT is demonstrated in Figure 2.

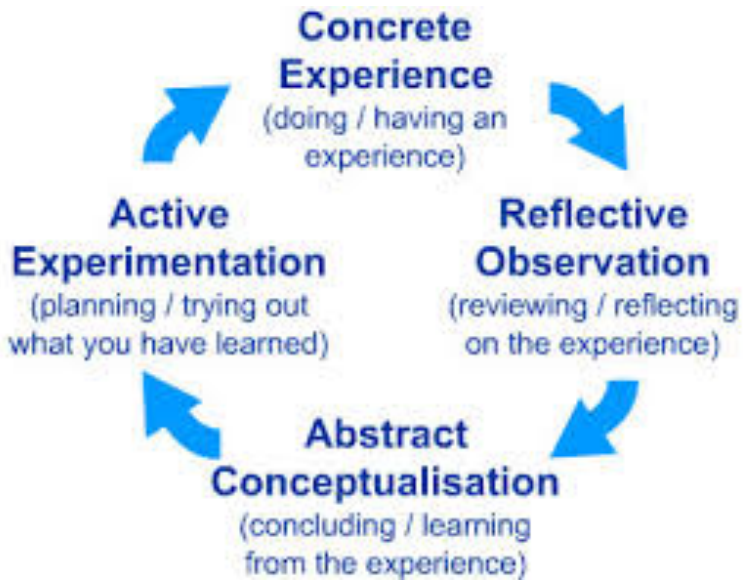

Figure 2. Experiential Learning Theory (ELT) in detailed visual representation. Adapted from *Experiential learning: Experience as the source of learning and development* (Kolb, 1984).

Purpose Statements

The purpose of the research study was to 1) assess the development and progression of CT in the NLRN orientation program participants; 2) investigate differences in the development and progression of CT between the NLRN orientation program participants and the population involved in the development of the Watson-Glaser Critical Thinking Appraisal (WGCTA); 3) assess for differences in the development of critical thinking (in participants) as it relates age and

degree status; and 4) determine if there are differences in CT between cohort WGCTA scores of those participants in the original versus the revised version of the NLRN orientation.

The NLRN orientation used for the study, known as the *Span Program*, is named for the gap between the academic education of the new graduate and the real life experience gained through the professional nursing practice. The NLRN *Span Program's* orientation framework used to integrate new knowledge, master new clinical skills, and change thinking processes (Baxter, 2010) is based on the landmark nurse "novice to expert" theory (Benner, 1982, p. 402). The "novice to expert" theory supports the ELT conceptual framework as the program participant builds knowledge, practices thinking, applies perceptions, and takes actions on the NLRN's journey to becoming the advanced beginner. The knowledge base of the novice nurse moves from abstract textbook principles to concrete experiences while thinking moves the participant from an analytic, rule-based process to an intuitive, flexible one. From the novice's point of view, perceptions of patient situations moves from seeing the patients as a sum of equally relevant elements to a complex whole with some elements being more salient than others and actions progress from being a detached observer to an involved performer.

The *Span Program* in the study pediatric teaching facility was developed to meet the hospital's need for supporting and developing NLRNs who have just been hired into practice. The *Span Program* is nine weeks in duration, including both the hospital and general nursing orientations. The original program was only offered three times a year each February, July, and October; whereas, the revised version is now offered monthly. The orientation program is a requirement of hire of NLRN who wish to be employed by the host institution, with the exception of the operating room (OR) nurses. The original and revised NLRN orientation *Span Program* is a hybrid or blended curriculum based on best practices research that was designed to

fit within the host hospital's practice and budgetary constraints. The participants of the study orientation program are required to complete tasks designed via the *Span Program* Curriculum Mapping through experiences and competencies. Comparisons of the results of the research baseline, mid-point, and post-program assessments assist the researcher with assessment of the NLRN orientation program's contributions to development of the novice nurse's CT skills. Presently, there is no direct measurement of the CT competency in the NLRN orientation program. Tasks necessary for achieving these CT competencies are (Facione, Facione, & Sanchez, 1994): mastering the abilities to recognize changes in patient conditions; selecting optimal interventions to solve patient problems; performing interventions independently; anticipating orders; evaluating the effectiveness of interventions to achieve the desired outcome; examining the theoretical connection between believed facts; practicing observation; and prioritizing all of these thoughts and actions.

The instrument used to quantify the evaluation process will be the WGCTA-FS (see Appendix C). The WGCTA-FS measurement tool was chosen by the researcher secondary to its long-standing history of reliability in the field of testing. Today's lively educational market has many instruments of measurement available to the researcher/educator, but the WGCTA is frequently used and highly respected in pre-employment screening of applicants vying for positions requiring the CT skill. The WGCTA is a standardized and commercialized testing tool widely used to measure logical and creative CT components (Mundy & Denham, 2008). With over 85 years in development, the WGCTA is the most common CT, psychometric test used in graduate, professional, and managerial recruitment (Hassan & Madhum, 2007). Developed as a multiple choice test, the questions measure an individual's ability to make correct inferences, recognize assumptions, make deductions, come to conclusions, and interpret or evaluate

arguments (Hassan & Madhum, 2007). The WGCTA instrument has withstood much scrutiny, as well as has been through many revisions in efforts to ensure measurement validity and trustworthiness. Therefore, the WGCTA is a reliable and valid instrument in measuring CT (Gadzella, Hogan, Maste, Stacks, Stephens, and Zascavage, 2005). The WGCTA-FS was utilized in baseline testing of the participants as well as mid-point and post-program testing for comparison of program results via ELT.

Research Questions

Based on the purposes of the study, four research questions were generated and follow:

1. What are the differences in NLRN critical thinking as measured by the WGCTA-FS instrument scores prior to the initiation (baseline), mid-point, and after the conclusion (post-program) of the *Span Program* orientation (in participants);
2. What are the differences in critical thinking between the *Span Program* orientation participants and the population found in the WGCTA-FS instrument development;
3. Are age and degree status related to the development of critical thinking (in participants); and
4. What are the differences in critical thinking between the 2015 original and 2016 revised *Span Program* participants as measured by the WGCTA-FS instrument?

Significance of the Research

Nursing Practice

New nurses must possess CT competencies [(American Association of Colleges of Nursing (AACN), 1998]. The researcher focused on measuring these competencies as outcomes in the NLRN orientation program participant. The significance of the research for nursing

practice is the ability to quantify CT outcomes of the NLRN orientation program participant in an effort to determine if the new nurse, as an advanced beginner, is prepared with CT skills as he/she enters nursing practice. Further impact of the dissertation study on nursing practice is retention of nurses with improved patient outcomes secondary to an effective orientation program. It was the hope of the researcher that the study assists in discovering the significance, if any, between the variables of age and degree status in relationship to the development of CT.

Nursing Research

Outcome measurements of CT skills in NLRN orientation programs continue to be evasive. The researcher used a long-standing, highly respected CT measurement tool to assess the component of CT in the participants of one NLRN orientation program. The significance of the study for nursing research was to expand the knowledge of outcome measurements of CT skills. More specifically, it was to determine and evaluate the results of the participant's activities, plans, and processes as well as compare the data to the intended or projected results.

Nursing Education

Good instruction, most fundamentally, entails moving a class from one place to another in their understanding of a subject or of content (Teach for America, 2011). When all other factors are held constant, the most successful instructors move their audience the greatest distance through developing good plans, constantly assessing individual progress, engaging in critical thought and reflection, and adjusting their plans to be most effective. The ultimate success of an instructor is the ability to apply that process while infusing it with a high level of critical thought about how best to further understanding in each phase (Teach for America, 2011).

The community of nursing educators has attempted to address the need for developing CT in nursing by making it one of the essential core competencies for the twenty-first century (Hoffman, 2008). The research study engaged the participants in critical thought throughout the orientation program, thus achieving the essential core competency of CT via ELT. Measurement of the development/progression of CT in the participants of the *Span Program* was the ultimate goal in the educational process. Quantifying CT outcomes within orientation program participants can be applied to measuring outcomes of future curriculum.

Definitions of Key Terms

The *advanced beginner* is the nurse who demonstrates marginally acceptable performance through learned procedures and rules to determine what actions are necessary for the immediate situation (Benner, 1982; Benner, 1984). The *advanced beginner* lacks the skills necessary in caring for patients with complex clinical problems (Goode et al., 2009). The advanced beginner nurse possesses limited "situational perception," (p. 7) treating all aspects of work with equal importance (Dreyfus & Dreyfus, 1980). Upon completion of the NLRN orientation program, the NLRN is considered to be prepared at the level of an *advanced beginner* (Dreyfus & Dreyfus, 1980).

Assessment is the judgment of a learner's work (Taras, 2005). These judgments are justified according to specific weighted set goals, yielding either comparative or numerical ratings (Taras, 2005). For an *assessment* to be formative, the process requires feedback which indicates the existence of a 'gap' between the actual level of the work being assessed and the required standard (Taras, 2005). The *assessment* process also requires an indication of how the work can be improved to reach the required standard or standards (Taras, 2005). Summative assessment is the judgment, which encapsulates all the evidence up to a given point (Taras,

2005). This point is seen as a termination of the judgment leading to decision-making (Taras, 2005). It is possible for *assessment* to be a uniquely summative process where the assessment stops at judgment; however, it is not possible for *assessment* to be a formative process without the summative *assessment* process having preceded it (Taras, 2005).

Assessment is defined as "gathering information about the health status of the patient, analyzing and synthesizing those data, making judgments about nursing interventions based on the findings, and evaluating patient care outcomes" (AACN, 1998, p. 18). *Assessment* is one of four CT core competencies chosen by AACN for evaluation; the other three competencies include communication, CT, and technical skills. Patient-centered care is dependent upon completing a comprehensive *assessment* (Todd, Manz, Hawkins, Parsons, & Hercinger, 2008).

Clinical judgment has been described as an essential skill needed by every nurse and as being critical to provide excellent patient care decisions leading to positive outcomes. The essential skill of *clinical judgment* can also be defined as "an interpretation or conclusion about a patient's needs, concerns, or health problems, and/or the judgment to take action (or not), use or modify standard approaches, or improvise new ones as deemed appropriate by the patient's response" (Lasater, 2011, p. 87; Tanner, 2006, p. 204). *Clinical judgment* is "the ways in which nurses come to understand the problems, issues, or concerns of clients/patients, to attend to salient information, and to respond in concerned and involved ways" (Lasater, 2007, p. 497).

Good clinical judgment requires flexibility in recognizing salient aspects of undefined clinical situations, interpreting their meanings, and responding appropriately through constant reorganization of priorities related to patient care (Tanner, 2006). With increased complicated processes and environmental issues, the nurse's care management of the pathophysiological and diagnostic aspects of a patient's clinical presentation and disease demand sound *clinical*

judgment. Changes in patient status/acuity and uncertainty about the appropriate course of action serve as an educational opportunity for the knowledge acquisition of *clinical judgment* for the novice nurse.

Nurse educators have long valued CT and *clinical judgment* as important characteristics for nurses, as well are often used interchangeably. The development of both remains fundamental and critically important aspects of nursing education (Lasater & Nielsen, 2009). The challenge for instructors with facilitating the development of these characteristics is their struggle to present *clinical judgment* to the learner as well as assessing its' uptake. Furthermore, the interpretive nature of *clinical judgment* is difficult to objectify any part, meaning the new nurse's thinking will never be completely objective (Lasater, 2011). *Clinical judgment* is more influenced by what nurses bring to the situation than the objective data about the situation at hand (Tanner, 2006).

Historically, the word *cohort* comes from ancient Rome; meaning, "a group of warriors of soldiers" (*Merriam Webster Online,* n.d., 1a) or "one of the ten divisions of a legion" (*Merriam Webster Online,* n.d., 1b). More modern versions define the term as a "group or band of people who have something in common" (*Merriam Webster Online,* n.d., 1d). Nursing leaders tend to place residents in *cohorts* of the same specialty to allow more focused discussions that address clinical situations appropriately (Welding, 2011). New nurse graduates are usually hired in *cohorts* so each has a peer group they know well in the first few years at the bedside (Bullock, Paris, and Terhaar, 2011).

The term *critical thinking (CT)* has become a buzzword in education with many associations and governing bodies promoting the ability to think critically as an important goal of higher education (Purvis, 2009). *CT* ability has been regarded as a highly valued educational

outcome, as well as a prerequisite competency in medical care and nursing education (Mundy & Denham, 2008; Yuan, Liao, Wang, & Chou, 2014). The concept of *CT* is difficult to assess in a valid and reliable manner because there is no single widely accepted, clearly understood, or consistent definition. The Delphi Report prepared for the American Philosophical Association (APA) provides a consensus statement that defines *CT* as purposeful, self-regulatory judgment, which results in interpretation, analysis, evaluation, methodological, criteriological, or contextual considerations upon which judgment is based (Facione, 1990). *CT* is defined by some as "reasonable reflective thinking focused on deciding what to believe or do" (p. 85), where logic and reasoning is utilized to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems (Robert & Peterson, 2013). Others define *CT* as the concept that underlies independent and interdependent decision making through questioning, analysis, synthesis, interpretation, inference, inductive and deductive reasoning, intuition, application, and creativity (AACN, 1998). Still others explain that *CT* goes beyond asking questions to critiquing solutions toward a better understanding of a broader spectrum of the issue (Fero et al., 2008). *CT* is all the cognitive processes used for analyzing knowledge based on evidence and science, such as experiencing and reflecting in addition to action or active behavior (Victor-Chmil, 2013). A comprehensive research program defined *CT* as the "ability to (a) define a problem, (b) select pertinent information for the solution of a problem, (c) recognize stated and unstated assumptions, (d) formulate and select relevant and promising hypotheses, and (e) draw valid conclusions and judge the validity of inferences" (Dressel and Mayhew, 1954, p. 179).

The term *CT* is often used interchangeably with terms such as problem-solving, clinical decision-making, clinical judgment, and clinical reasoning in the nursing literature (Fero et al.,

2008). Despite diverse views on the definition, nurse educators generally agree that *CT* is "an intellectually disciplined process in which medical care professional and nursing learners actively and skillfully conceptualized, apply, synthesize, and evaluate information generated by observation, experienced reflection, reasoning, and communication" (Yuan et al., 2014, p. 304). For the purposes of the dissertation study, Watson and Glaser's *CT* definition will be utilized: A composite of attitudes, knowledge, and skills which includes an attitude of inquiry that involves the ability to recognize the existence of problems and an acceptance of the general needs for evidence in support of what is asserted to be true; a knowledge of the nature of valid inferences, abstractions, and generalization in which the weight or accuracy of different kinds of evidence are logically determined; and the possession of skills in employing and applying the noted attitudes and knowledge (Mundy & Denham, 2008).

The *expert* performer no longer relies on an analytical principle, such as a rule or guideline, to connect his/her understanding of the situation to an appropriate action (Benner, 1982). The *expert* nurse, with his/her enormous background of experience, has an intuitive grasp of the situation and zeroes in on the accurate regions of the problem without wasteful consideration of a large range of unfruitful possible problem situations (Benner, 1982; Benner, 1984). The *expert* nurse also recognizes unexpected clinical responses and can alert others to potential problems before they occur (Benner, 1984). Because of their superior performance, *expert* nurses are often consulted by other nurses and relied upon to be preceptors. Although most nurses progress to the competent level of expertise, many will not become *experts* (Benner, 1984).

A *newly licensed registered nurse (NLRN)* is an individual who has completed and graduated from an accredited nursing program within the last six months, has passed the

NCLEX-RN, has been licensed by his/her intended state of practice Board of Nursing as a registered nurse (RN), but has not yet entered into professional practice (Baxter, 2010). However, the *NLRN* does possess some baseline practice knowledge via clinical rotations and simulation laboratory (sim lab) experiences developed during their educational curriculum.

A *novice* is a beginner nurse who has no experience with the situations in which they are expected to perform tasks (Benner, 1982). The heart of the difficulty that the *novice* nurse faces is the inability to use discretionary judgment (Benner, 1982). The *novice* stage of skill acquisition occurs in areas on which the new nurse has no experiential background to base approach or understanding of the clinical situation (Benner, 1982). One of nursing education's primary goals is to develop the *novice* into a critical thinker who can adapt to different contexts (Hassan & Madhum, 2007).

When addressing the *novice* nurses' perceptions of CT, three key themes emerged as the participants verbalized their experiences: Multi-perspective thinking, analytical activities, and decision-making process (Kaddoura, 2013). Within these key themes, subthemes were noted in Table 1.

Table 1

Main Themes and Sub-themes of Critical Thinking (CT)

Multi-perspective Thinking	Analytical Activities	Nursing Process Functions
Sub-themes	*Sub-themes*	*Sub-themes*
Expansive Thinking	Analysis	Assessment
Anticipating	Inquisitiveness	Planning
Problems	Problem Solving	Taking Action
Reflection		

Note. Adapted from *Educational Research Quarterly, 36*(3), by M. Kaddoura, 2013.

Expansive thinking denotes stretching the thinking skills with more challenging situations to view the whole picture (Kaddoura, 2013). CT is a method of expansive thinking that is open to multiple possibilities in viewing the big picture considering a variety of perspectives (Kaddoura, 2013). Explanation of the sub-theme of anticipating problems is an essential CT skill (Kaddoura, 2013). Anticipating problems is the ability to predict or think in advance so that nurses can avoid complications before they happen (Kaddoura, 2013).

The process of reflection is an essential component of CT development as the graduate nurses perceive if or how they critically think while reflecting on their learning to improve their clinical experiences (Kaddoura, 2013). The graduates perceived analysis as the inspection of pertinent information to choose the best course of action from various options (Kaddoura, 2013). The *novice* nurses' perspective of CT as being the process of inquisitiveness that entails seeking explanation and information through questioning to learn what is unknown (Kaddoura, 2013). Participants perceived problem solving as a cognitive, mental process that involves thinking critically to solve problems. Problem solving is a crucial constituent of CT while assessment is considered the most critical step in the decision making process (Kaddoura, 2013). Planning is a process that incorporates the establishment of patient outcomes to determine related nursing interventions that are most likely to help patients achieve the favored outcomes, whereas taking action helps foster CT development with great satisfaction (Kaddoura, 2013).

A *nurse residency program (NRP)* or a NLRN orientation program ensures successful transition from education to practice and produces an expert nursing work force (AACN, 1998). Defining a successful transition from academe to practice is difficult for educators and stakeholders alike. Some outcome data showed powerful gains relative to new graduates' ability to "think like a nurse" (p. 560) with participation in transition to practice programs (Bratt &

Felzer, 2011). Support for formal residencies for new graduate nurses is becoming more widespread (Neid, 2009). The American Nurses' Credentialing Center (ANCC), the organization that grants magnet status, supports a formal residency for new graduate nurses (Neid, 2009).

Reality shock is defined as the separation between the workplace ideal and values of NLRNs from the reality of the workplace (Cylke, 2012). The peak time of difficulty and "crisis of confidence" (p. 565) occurs at five to seven months of employment when feelings of inadequacy in clinical knowledge and fear related to making patient care decisions are most prevalent (Bratt & Felzer, 2011). Kramer's reality shock model of 1974 explains that during the shock phase, new graduates struggle with providing quality care and realizing that they are unprepared to manage their workload (Bratt &Felzer, 2011). It takes at least one year to transition from the theory to practice role, and the transition time frame is marked with emotional and visceral reactivity in the forms of tears, worries, and nightmares.

Statistical Package for the Social Sciences (SPSS) is a comprehensive and flexible statistical analysis and data management solution [International Business Machines (IBM) Analytics, 2017]. *SPSS* can take data from almost any type of file and use them to generate tabulated reports, charts, and plots of distributions and trends, as well as descriptive statistics (stats), inferential stats, and conduct complex statistical analyses (IBM Analytics, 2017). *SPSS* is available from several platforms; Windows, Macintosh, and the UNIX systems. *SPSS* customers can be found in virtually every industry, including telecommunications, banking, finance, insurance, healthcare, manufacturing, retail, consumer packaged goods, higher education, government, and market research (IBM Analytics, 2017). For the purposes of the dissertation

study, version 22.0 of the *SPSS* software has been purchased and was utilized. Study results were reported in the descriptive and inferential stats formats.

The definition of the adjective *value-free* is "not making judgments or having no value judgments" (Merriam Online, n.d.). It means "not altered or influenced by value judgments, such as in *value-free* research" (Your Dictionary, n.d.). Another was to describe *value-free* is lacking normative assumptions (Your Dictionary, n.d.). According to Lamb (2013), assumptions about knowledge being *value-free* can be conflicting. One assumption is that knowledge is "*value-free*, objective, measureable" (para. 2) and "can only be accessed through a scientific approach" (para. 2). An opposing assumption is that "knowledge is subjective, dependent on human minds, values, perceptions, and is related to a specific context" (Lamb, 2013, para. 11). According to this oppositional paradigm to *value-free* knowledge building (Lamb, 2013), this view asserts that "there is no particular right or correct path to knowledge, no special method that automatically leads to intellectual progress" (para.11). For the purposes of the dissertation study, the researcher attempted to adhere to the *value-free* assumption to knowledge building to avoid bias.

Summary

The care of patients within the health care organization is directly affected by the NLRN's ability to practice CT skills and manage the transition from academic to professional (Baxter, 2010; Cylke, 2012; Duteau, 2012; Lindsey & Kleiner, 2005; Park & Jones, 2010). NLRNs must possess indispensable critical competencies in order to maintain pace with the ever-changing treatment modalities and enhanced technologies, address complex ethical issues, care for patients who are seriously ill, and face growing expectations on a daily basis (Hoffman,

2008; Mundy & Denham, 2008). For nursing education, simulation provides an environment where all of these competencies can be practiced simultaneously (Todd et al., 2008).

CT requires reasoning skills, generic nursing knowledge, and sound judgment to appropriately match unique client problems or needs (Mundy & Denham, 2008). Presence of these qualities can benefit society, but deficiencies may be linked with increased patient risks, safety concerns, and poor clinical outcomes (Mundy & Denham, 2008). Concern for patient safety has grown worldwide as high rates of error and injury continue to be reported (Fero et al., 2008). The Joint Commission (TJC) [formerly known as the Joint Commission on Accreditation of Healthcare Organizations (JCAHO)] identified orientation, training, and competency assessment as top factors contributing to patient safety errors over the past 10 years (Fero et al., 2008). The IOM aims for the twenty-first century healthcare system to include providing safe, effective, patient-centered care that is timely, efficient, and equitable (Fero et al., 2008).

Although the clinical education environment is changing and presenting new challenges, the development of learner thinking remains fundamental and is a critically important aspect of nursing education (Lasater & Nielsen, 2009). The challenge for educators remains how to best give new nurses the necessary learning experiences that move thinking along a developmental continuum (Lasater & Nielsen, 2009). Additionally, moving nurses further along the educational continuum will require shared commitment among nurse educators and stakeholders that is fueled by innovation and collaboration (Raines & Taglaireni, 2008).

CHAPTER II:

REVIEW OF THE LITERATURE

In the introduction section, the review of the literature is presented. More specifically, CT and metacognition skills are discussed, ELT and previous research results are highlighted, and thoughts about transition into the future of CT measurements are summarized.

Critical Thinking

While CT is being more widely recognized as a liberating force in education and a powerful resource in one's personal and civic life, the burgeoning national interest in developing CT skills has deep historic roots (Facione et al., 1995). The intellectual roots and educational goal of teaching new nurses to reason well and think critically are as ancient as Socrates (Facione et al., 1995; Paul, Elder, & Bartell, 1997). Socrates established the importance of seeking evidence through questioning, probing into thinking, closely examining reasoning and assumptions, analyzing basic concepts, and tracing out implications. The practice known as Socratic questioning (para. 2) is still the best-known CT teaching strategy even 2,500 years after its inception (Paul et al., 1997). The CT of Plato, Aristotle, and the Greek skeptics, all of whom emphasized that things are often very different from what they appear to be, followed Socrates. These skeptics argued that only the trained mind is prepared to see through the way things look to the learner on the surface to the way they really are beneath the surface (Paul et al., 1997). The result of the collective contribution of the history of critical thought is that the basic questions of Socrates can now be much more powerful, focally framed, and used (Paul et al., 1997). In other words, questioning that focuses on these fundamentals of thought and reasoning

are now baseline in CT (Paul et al., 1997). A better synopsis of the history of CT can be found at the end of the study paper in Appendix D.

Newly-Licensed Registered Nurse (NLRN) Orientation Programs

Nurses, the largest of the health care professional groups, spend the most direct time with patients; thus, their role in health outcomes is vital (Benner et al., 2009). NLRN orientation programs are helping new nurses bridge the practice gap, reduce turnover, and enhance patient safety and quality of care (Bratt & Felzer, 2011; Neid, 2009). Nursing responsibilities require CT, advanced problem-solving skills, and clear communication; all of which are integral parts of nursing practice and should be developed through nursing education programs (Fero et al., 2008). Expenses of a NLRN orientation program in the short term would lead to long term rewards with return on investment through retention and intent to remain (Bullock et al., 2011; Goode et al., 2009; Neid, 2009). There are more than a few arguments for new nurse orientation programs: 1) hospitals can enjoy the shortened on-boarding time of these recent hires; 2) improved positive patient outcomes and patient safety; 3) better retention of well prepared and well trained staff; and 4) new graduate nurses who have developed appropriate CT skills (Bratt & Felzer, 2011).

A number of credible NRPs and NLRN orientation programs are presently being used throughout the country in efforts to meet the needs of novice nurses and these programs are noted in the study paper. The most highly recognized NRP and the nation's top nurse residency curriculum is the University Healthcare Consortium (UHC)/AACN NRP. Accredited by AANC and made commercially available, the UHC/AACN NRP is a "sound investment in patient care, nurse satisfaction, and fiscal health" (UHC/AACN, 2015, para. 1). The UHC/AACN program has claimed that a "turnover rate among first year nurses of just 5.6%" (para. 1) in their

institutions compared to a national average of 27.1% (UHC/AACN, 2015). The accredited NRP claims to increase both competence and confidence in decision-making in the new nurses, as well as produce stronger leadership and CT skills from their graduates, resulting in greater job satisfaction and commitment (UHC/AACN, 2015). The features of the UHC/AACN program are a curriculum focused on leadership, patient outcomes, and professionalism, with an emphasis on evidence-based practice (EBP) (UHC/AACN, 2015). The UHC/AACN NRP also offers a database allows custom benchmarking and program evaluation (UHC/AACN, 2015). These feats are accomplished by offering the field's leading evidence-base curriculum and a nationwide database for sharing best practices and benchmarking performance against that of peer institutions.

A second commercially available NRP is the Versant New Graduate RN Residency. The Versant NRP is a "comprehensive education and training system designed specifically to transition newly graduate RNs from academic to safe, competent, and professional practitioners" (Versant, 2014, para. 1). The program claims to

> Provide a highly integrated and systematic approach to transitioning new graduate nurses by defining a comprehensive baseline set of measurements and outcomes, evidence-based structure, processes, and content; integrating, teaching, monitoring, and managing adherence to those standards listed beforehand; and objectively evaluating success in achieving the RN Residency goals. (Versant, 2014, para. 4)

The Versant NRP promises integration into the organization's structure via guided clinical experience with a preceptor, along with specialized education and curriculum. A supportive component of the Versant NRP is composed of formal mentoring and debriefing/self-care sessions, with a 360-degree evaluation and measurement process as the NLRN moves toward competent performance at the bedside (Versant, 2014). NRPs and NLRN orientation programs are designed to address CT and decision making deficits. Most unaccredited programs

presently have no measurements of the acquisition of CT by the participants, but still need such outcome measurements to be able to compete with the accredited programs for various reasons.

Nursing Curriculum

Even after decades of dialogue about CT, teaching the skill of CT remains a challenge (Mundy & Denham, 2008). CT is frequently cited by nurse educators as a desirable professional attribute, with the general assumption being that nursing courses would or should have an impact upon the development of such behavior. Pedagogical factors that influenced the development of CT skills are curriculum design and integrative learning activities (Turner, 2009). Review of the literature stresses the need for NLRN orientation programs to change from the traditional didactic teaching strategies, while becoming more active and learner-focused to educate new nurses (Kennedy, Nichols, Halamek, & Arafeh, 2012). Nursing education should provide not only CT information but also opportunities to develop skills that produce a principled foundation of professional knowledge (Mundy & Denham, 2008). The structure of learning activities and assessments need to be carefully scrutinized for their capacity to encourage CT processes. Learning activities should be spread throughout the NLRN curriculum to allow for mental processing, socialization, and progression in CT skills (Kowalski & Cross, 2010). Several NLRN orientation programs utilize different teaching strategies (Cylke, 2012) and methods of learning incorporated throughout the program to meet the expected level of competency (Baxter, 2010; Kowalski & Cross, 2010; Lindsey & Kleiner, 2005; Ulrich et al., 2010).

In order to prompt the NLRN toward developing CT skills, an educational program should provide the graduate with the knowledge and skills to (AACN, 1998): 1) use nursing theories, models, and an appropriate ethical framework; 2) apply research-based knowledge as a basis for practice; 3) use of clinical judgment and decision making skills; 4) engage in reflection

and collegial dialogue about professional practice; 5) evaluate nursing care outcomes through the acquisition of data and the questioning of inconsistency, while allowing for the revision of actions and goals; and 6) engage in creative problem solving. Provisions provided via the study educational program per AACN (1998) recommendations are discuss further in the next chapter.

Research of Critical Thinking in Nursing

The expanding roles in health care delivery system require nurses to be capable of CT (Kaddoura, 2013). It is imperative that nurses are able to think critically in order to identify and address the varied health and illness needs of their patients (Kaddoura, 2013). Study findings indicated change in levels of CT during graduate nurse education (McMullen & McMullen, 2009). These changes were far more dynamic than expected based on results from prior research, begging the question: Is it reasonable to expect that the CT skills of all individuals participating in an educational program would change in the same direction at the same time during the program's time frame (McMullen & McMullen, 2009)? Expectations of such homogeneous change are implicit in educational outcome studies that use a pretest-posttest design and conventional analysis methods of analysis to answer questions about if growth occurred during a particular period of instruction (McMullen & McMullen, 2009). Using individual growth modeling indicated heterogeneous rather than homogeneous growth in CT skills, as the patterns of change varied depending on the level of CT skill each participant brought into the program (McMullen & McMullen, 2009).

CT is thought to be a key component of nursing practice, education, and knowledge, yet it is ambiguously and inconsistently defined (Fero et al., 2008). Finding the concept very difficult to quantify and measure, numerous scholars attempt to interpret the essential attributes of CT in various ways (Fero et al., 2008). For instance, ten attributes of the CT skill were

identified, which the advance beginner nurse should be able to accomplish upon completion of a NLRN orientation program (Robert and Peterson, 2013). These attributes are 1) recognize a unique situation that needs further evaluation; 2) define a set of criteria for analyzing ideas; 3) use reasoned judgment to evaluate a situation; 4) recognize personal assumptions and biases; 5) remain open-minded and flexible; 6) view the situation purposefully from all possible angles; 7) select the best solution based on personal knowledge and level of experience; 8) have the willingness to take a risk and implement a decision; 9) display self-confidence in implementing the selected solution; and 10) be willing to alter opinions when new facts are presented and commitment to excelling for better outcomes. While these attributes are admirable, quantifying or measuring them can be difficult.

Both historical and nursing scholars describe the ideal critical thinker as being well informed and knowledgeable, cognizant and inquisitive, analytical and mentally mature (Facione, 2010). According to the Delphi Report, critical thinkers are said to be focused on inquiry and open/fair-minded, flexible and honest in facing personal biases, truth seeking and prudent in making judgments (Facione, 2010). These same scholars attend that critical thinkers are willing to reconsider and be clear about issues, prefer order in complexity, tend to be systematic and self-confident, as well as explore alternative frames of reference (Facione, 2010). Remaining diligent in seeking relevant information and being reasonable in the selection of criteria are additional traits of the critical thinker, as well as being persistent in seeking results and continuing with fair-mindedness in evaluation (Facione et al., 1994; Fero et al., 2008). These characteristics need to be quantified for outcome measurements.

Outcome measurements consider the values, qualities, and attributes of the new nurse graduate program participant but the focus of these measurements performed during and after the

program is on the new nurse's ability to think critically (Duteau, 2012; Goode et al., 2009; Halfer, Graf, & Sullivan, 2008; Hillman & Foster, 2011; Kowalski & Cross, 2010; Lindsey & Kleiner, 2005; Ulrich et al., 2010; Welding, 2011). The challenge remains that nurse educators currently do not know much about how to operationally measure CT outcomes. These outcomes are further investigated in the following sections.

Critical Thinking Skills through NLRN Programs

The consensus in the literature is that CT is not discipline specific (Victor-Chmil, 2013), as there is no widely accepted definition of CT in the field of nursing, psychology, or education (Fero et al., 2008). CT has been discussed since the time of Socrates, with its dimensions explored by numerous scholars from Thomas Aquinas to John Dewey (Fero et al., 2008).

CT is an essential skill for every nurse and possession of the CT skill distinguishes professional nurses from those in a purely technical role. Nurturing the ability to think critically is an important element in the curriculum of both professional and educational programs (Facione et al., 1995). There is an assumption that CT abilities are learned and improve with practice. Some experts characterized CT as the process of purposeful, self-regulatory judgment; an interactive, reflective, reasoning process; and with the core cognitive skills identified as interpretation, analysis, inference, evaluation, and explanation (Facione et al., 1994).

Promoting real world experience in an acute care setting and nursing skills practice for the novice nurse has been known to foster CT maturation (Baxter, 2010; Goode et al., 2009; Kowalski & Cross, 2010; Lindsey & Kleiner, 2005; Molinari et al., 2008; Welding, 2011). Today's practitioner must be informed by scientific evidence and technological development in order to develop good or best practice skills. These important nursing tasks require mature CT skills.

Experiential Learning Theory (ELT) in NLRN Programs

The experiential mindset required for knowledge absorption is "a state of receptivity of openness to experiencing in the sense of readiness to undergo whatever experiential events that may occur…" (Facione et al., 1995, p. 11). Experiential learning requires openness and the review of the literature yields many qualitative studies about NLRN job satisfaction, control over nursing practice, and confidence in patient care skills. There are a limited number of measures of CT using mixed methods. Quantifying measurements of the CT skill has been elusive in the literature; although some evidence clearly suggests that some educators are not doing well teaching or assessing CT skills (Mundy & Denham, 2008). A comprehensive orientation improves the knowledge and quality of nurses with outcome data showing powerful gains in these directions (Baxter, 2010).

It has been claimed "at the heart of good clinical wisdom lies experiential learning" (Benner, 2004, p. 189) and "experiential learning requires the stance of an engaged learner" (Benner, 2004, p. 190). Thus, effective learning is achieved when a person progresses through and executes all four stages of the ELT cycle. Through the developmental stages of maturation (e.g., experiencing, reflecting, thinking, and acting), a higher-level structure of consciousness can be acquired (Kolb & Kolb, 2005). Learning facilitation empowers the participants to apply theory and skills via vicarious learning from experience (Banning, 2008). The vicarious learning from experience promotes structured reflection on events and knowledge gained by participants from the experience (Banning, 2008). Facilitative approach to teaching assists learners in extracting the value to be gained from real life experience relative to real world events can prove very valuable (Banning, 2008).

ELT proposes that the learning cycle varies according to the individual's learning style and the learning context in which the learner is participating (Kolb & Kolb, 2005). The learner has control over their exposure to various experiences that program them to grasp and transform their reality (Kolb & Kolb, 2005). The self-programming of the learner determines the extent to which the learner dwells in each stage of the learning process (Kolb and Kolb, 2005). Figure 3 also gives a visual representation of the areas of the brain affected by ELT, starting with first element of ELT *concrete experience* at the right hand side of the diagram moving clock-wise to the last element *active testing* on the top of the diagram.

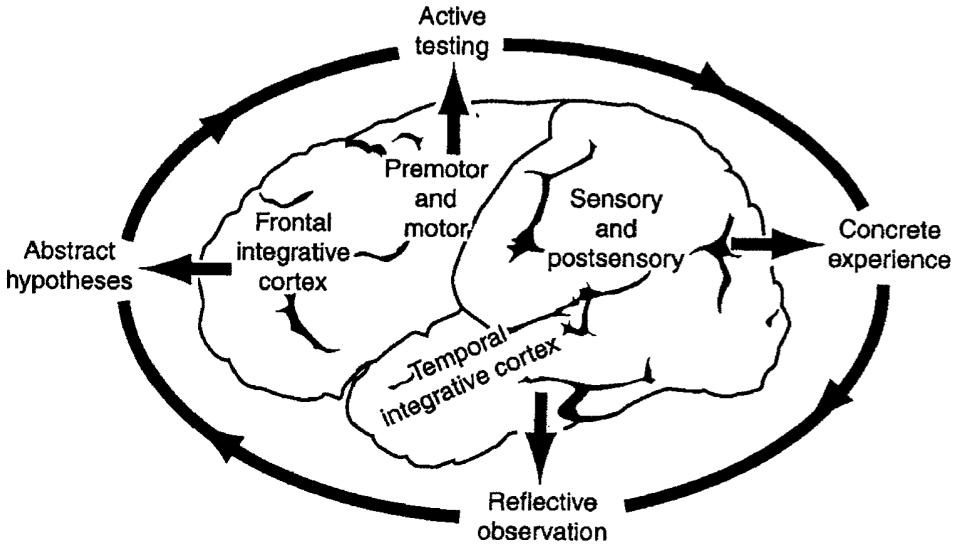

Figure 3. Experiential Learning Cycle and the regions of the cerebral cortex affected. Adapted from *The Art of Changing the Brain: Enriching Teaching by Exploring the Biology of Learning,* (Zull, 2002). Copyrighted by Stylus Publishers, Sterling, VA.

Results of NLRN Programs

Research confirms what nurses have always known. RNs are the key to patient safety; they play a central role in lowering mortality rates, preventing medical errors, and ensuring quality outcomes (Raines & Taglaireni, 2008). The nurse must be cognizant of the patient's needs through data or evidence, be able to prioritize and make sense of the data surrounding the event, and come to some conclusion about the best course of action in response to the event.

Graduates of an orientation program are better equipped to meet the expectations of stakeholders, as well as better understand of patient's condition and needs; the innovation of unique nursing theory and the indispensable power of CT are necessary for provision of quality nursing services (Mundy & Denham, 2008). The outcome of the NLRN program is better prepared nurses (Hillman & Foster, 2011).

Transition from Academe to Practice

The literature suggests that NLRN orientation programs are designed to supply the necessary tools for a successful transition from school to work (Baxter, 2010; Welding, 2011). It is recommended by some that the length of such a program be 2 to 18 months (Baxter, 2010), while others believe these programs need to last longer than 6 months to help new graduates weather the tumultuous "crisis of confidence" (Bratt & Felzer, 2011, p. 565) and "reality shock" periods (Cylke, 2012, p. 57). Lack of preparation for the realities of the work place is the number one contributing factor for termination of the relationship between the employer and the new nurse graduate (Baxter, 2010; Cylke, 2012; Duteau, 2012; Kowalski & Cross, 2010; Lindsey & Kleiner, 2005). These realities include the NLRN being placed in high acuity areas (e.g., critical care, labor and delivery, emergency, burn unit), which were once reserved for the expert nurse (Baxter, 2010). Regardless of the time frame, a NLRN orientation program must allow time for the new nurse graduate to acquire technical and CT skills while establishing a foundation for role transition (Baxter, 2010; Bratt & Felzer, 2011). Access to experienced nurses during the critical role transition time is important to help the NLRN develop CT skills (Bratt & Felzer, 2011).

In the late 1980s, the nursing profession began to question how CT related to clinical practice. Methods of evaluating the educational system with effective and reliable measurements

became the focus, especially how CT is accomplished through that system's curriculum (Fero et al., 2008). The outcome measurement movement was motivated by the directive of the US National League for Nursing (NLN) to measure CT as outcome criteria of nursing education programs (Fero et al., 2008). Nonetheless, accurate and meaningful CT measurements and education that emphatically demonstrate improved outcomes continue to be elusive (Mundy & Denham, 2008). A comprehensive orientation improves the knowledge and quality of nurses with outcome data showing powerful gains in these directions (Baxter, 2010).

The Future of NLRN Programs

Researchers have recommended that continued research using longitudinal exploration of outcomes determines best practices (Bratt & Felzer, 2011; Halfer et al., 2008; Park & Jones, 2010; Ulrich et al., 2010). Further studies are needed to explore the effects of these programs and uncover core elements that contribute to their success to establish best practices to achieving CT success (Bratt & Felzer, 2011). These studies are needed to identify areas of CT deficiency and begin to test objective, innovative educational strategies that enhance CT in the nursing work force (Fero et al., 2008). On-going studies are needed to ensure that CT is being represented in the curriculum of NLRN orientation programs as an important skill for the novice nurse, as well as being assessed in the evaluation and outcomes process (Bratt & Felzer, 2011; Fero et al., 2008). Moreover, studies of transition to practice programs must be conducted across diverse practice settings and must engage in further exploration of the program outcomes, particularly the influence on quality of care and the practice environment (Bratt & Felzer, 2011).

Summary

While obtaining a nursing education, learners must develop sophisticated problem-solving and decision-making skills for safe care and wellness promotion; CT is an essential dimension of these processes (Mundy & Denham, 2008). With the need to prepare health care professionals to safely care for patients, it is imperative that nurse educators use instruments that produce reliable and valid scores to assist them with conducting formative and summative evaluations of all activities of learning (Forsberg, Ziegert, Hult, & Fors, 2013; Hayden et al., 2014). The exploration of the phenomenon known as CT has been constrained by a dearth of instruments designed to capture measurement of "the critical spirit" (Facione et al., 1995, p. 345).

Until recently, the state of research on the subject of CT indicate reliable and valid instruments have been lacking in their ability to assist nurse educators with being more objective (Hayden et al., 2014). Many assessment instruments have been developed to evaluate performance in and CT outcomes of nursing programs; however, instructors developed most of these instruments for use in individual scenarios and often lack rigorous testing for reliability and validity (Hayden et al., 2014).

CHAPTER III:

RESEARCH METHODOLOGY

Introduction

To address the problem of defining a successful orientation program for NLRNs that accomplishes enhanced CT, the researcher investigated the participants in one orientation program at a selected institution. The NLRN orientation experience involves the new nurse encountering all four stages of the ELT cycle in varying degrees. Concrete experiences occur when a new situational experience is encountered and reflective observations are accomplished when the learner consciously reflects back on that new experience. Abstract conceptualizations (i.e., thinking) are those opportunities that give rise to a new idea or assist with the modification of an existing abstract concept based on what is observed through the new experience. Active experimentations (i.e., acting) are when the learner applies the new theory or concept developed through the ELT process to the world around them to see what results from their efforts. Effective learning is seen when a person progresses through and executes all four stages of the ELT cycle. The process of learning from experience is through the individual learner's selection and definition of that experience, which varies from person to person (Kolb, 1984). The methodology to be utilized to accomplish the Kolb's learning cycles is discussed in this section.

The research design chosen for the dissertation study by the researcher employed surveys as strategies of inquiry and numeric data methods (Creswell, 2009). Using the standards of validity and reliability, the researcher observed and measured information numerically via unbiased approaches (Creswell, 2009). The research method proposed by the research involved

the forms of data collection, analysis, and interpretation for the study (Creswell, 2009). The data collection tools for the study are further discussed in this section.

Purpose and Research Questions

The purpose of the dissertation research was to 1) assess the development and progression of CT in the NLRN orientation program participants; 2) investigate differences in the development of CT between the new nurses in the orientation program and the sample population involved as measured by the WGCTA-FS instrument; 3) determine the relationships between age and degree status of the *Span Program* participants as these variables relate to the development and progression of CT; and 4) compare the CT measurement outcomes of the different cohorts of two separate years. Based on the purposes of the study, these four research questions were generated. They including the following:

1. What are the differences in NLRN critical thinking as measured by the WGCTA-FS instrument scores prior to the initiation (baseline), mid-point, and after the conclusion (post-program) of the *Span Program* orientation (in participants);
2. What are the differences in critical thinking between the *Span Program* orientation participants and the sample population found in the WGCTA-FS instrument development;
3. Are age and degree status related to the development of critical thinking (in participants); and
4. What are the differences in critical thinking between the 2015 original and 2016 revised *Span Program* participants as measured by the WGCTA-FS instrument?

Prior research on differences in CT scores is based primarily on baseline and post-program assessments that provide minimal information about change. A study should examine

multiple panels of data to assess individual patterns of growth, rather than differences in-group means, to evaluate educational outcomes (McMullen & McMullen, 2009). The participant should be measured repeatedly over time, rather than as increments measuring the differences between pretest and posttest assessments (McMullen & McMullen, 2009). The format of evaluation and assessing change in CT via staged testing can then be modeled as a continuous process (McMullen & McMullen, 2009), which is described in the ELT. The application and successful accomplishment of professional judgment, the exchange of ideas and information, and the management of complex situations allows for the utilization of the ELT framework stages of experiencing, reflecting, thinking, and acting by the NLRN. The study participant must work through the ELT framework via the orientation program to accomplish a higher score on the post-program WGCTA-FS as compared to the baseline and mid-point scores.

Because the ability of the novice nurse graduate to make appropriate critical decisions impacts quality patient care, enhances patient safety, improves patient outcomes, and enhances self-confidence (Bratt & Felzer, 2011; Fero et al., 2008), a productive orientation is imperative for the NLRN population. Little is written about what constitutes a successful orientation for the NLRN (Baxter, 2010), but the expected return on investment in terms of assisting the novice nurse to move toward maturation of CT skills is invaluable (Goode et al., 2009; Halfer et al., 2008; Hillman & Foster, 2011; Kowalski & Cross, 2010; Lindsey & Kleiner, 2005; Neid, 2009; Park & Jones, 2010; Welding, 2011).

Setting

The setting for the dissertation research study was the Nursing Education and Simulation Departments of a 380-bed pediatric acute care hospital/facility in the southeastern United States (US). Recently hired NLRNs who are assigned to work in areas of patient care (with the

exception of the OR) participated in the *Span Program* of orientation. The *Span Program* had just started its fifth year at the host hospital, resulting in over one hundred NLRN orientation program graduates working throughout all areas of the organization. The original orientation program used for the dissertation study, named for the gap between academe and practice (i.e., the *Span Program),* was nine weeks in duration for both hospital and general nursing orientations. The original orientation program was only offered three times a year each February, July, and October. The revised orientation program has monthly cohorts who have one full day of introduction, four monthly sessions of structured learning, followed by monthly two hour blocks of sim lab exposure (see Appendix E). The newer, revised version of the *Span Program* of orientation follows the NLRN through their first year of employment. NLRN orientation is a requirement of hire of all NLRNs who wish to be employed by the host institution, with the exception of nursing staff hired to work in the OR. In-between the scheduled events in both versions of orientation, the NLRN would report to their assigned home unit to gain valuable nursing experience via the delivery of patient care under the guidance of a unit based mentor/preceptor and the unit educator.

Both versions of the NLRN orientation required didactic classroom environment learning experiences housed in the Nursing Education Department, as well as demonstrate application of acquired learning via simulation exercises in the Sim Lab of the facility. To foster improved communication and collaboration as defined as a best practice via Bullock et al., (2011), group gatherings for a core class were held every Monday for eight consecutive weeks for the NLRNs of the original *Span Program* (see Appendix F for more information). The participants were divided into four color associated groups: blue, red, yellow, and green. The blue and red groups

participated in the sim lab opportunities for learning on the odd weeks while the yellow and green groups did the same on the even weeks.

The revised *Span Program* divided the cohorts according to the month of hire and assignment to orientation. All participants in the revised program rotated through the monthly sessions, regardless of when they entered orientation, until all four sessions were accomplished by their cohort (see Appendix G). In between these monthly sessions, each cohort participated in two-hour blocks of sim lab activities throughout their first year of employment. Sometime these sim lab sessions would overlap with a second cohort in efforts to get all NLRNs up to seven sessions of sim lab activities over a year's time frame. With the revised format, the new nursing graduate had a few days' delay in their first official *Span Program* class. With the original orientation format, those participants went straight to the first scheduled NLRN class the day following NSO. The additional exposure to patient care might suggest that the revision participants could have had an advantage over the original program participants secondary to acute care and/or patient care exposure. Regardless of where the participant was placed in either program, the WGCTA-FS were assigned at the same time throughout the program: baseline at the beginning prior to NSO and any *Span Program* curriculum; at the end of the fourth week and during the fifth week of *Span Program* curriculum; and, at the end of the participant's ninth week of orientation.

Along with core classes, both *Span Program* format experiences encouraged learning via different delivery methods. These methods included didactic, skills labs, and a variety of other learning activities. Computer education modules were conducted, with remediated as needed. Simulations included debriefings, role play/case scenarios, and preceptorship on home/assigned unit with a preceptor to allow the new nurse opportunities to successfully complete all the stages

of the ELT. The competencies gained by completion of the program are focused on family/patient-centered care, integration of teamwork and collaboration, practicing evidence-based research, participation in quality improvement, acquisition of safety knowledge, and modern information/technology proficiency. Experiences for the program orientee included, but were not limited to, shadowing expert nurses in areas along the patient care continuum and exposure to nursing leadership.

Many of the learning opportunities in both the original and the revised *Span Program* were delivered to the NLRN audience using one or more of these various approaches to instruction to accommodate the participant's different learning styles. Much of the material covered in the curriculum is repetitive and overlapping other subject matter by design to mirror the ELT. As formerly mentioned, the didactic learning within both the original and the revised *Span Program* used various formats of teaching believed to be more effective for developing CT skills than a traditional lecture only format (Park & Jones, 2010; Ulrich et al., 2010). The logical written, classroom, skills demonstration, and clinical case presentations (Facione et al., 1995) were included within the *Span Program* curriculum. Several teaching and learning strategies should be employed to develop skills and encourages the use of concept mapping, inquiry based learning, jigsaw planning, open critiques, case presentation, problem based learning and the think aloud approach (Banning, 2008). Including these types of strategies in both the original and the revised NLRN orientation program helps augment CT skills through blended learning techniques to move the NLRN from novice to advanced beginner (Benner, 1982) via the ELT phases.

Research Design

The researcher used quantitative strategy of inquiry research design to determine and examine the relationships between variables about the phenomenon of interest (i.e., critical thinking). The researcher chose the non-experimental, descriptive approach to uncover new facts and meaning to increase understanding about measuring CT in a sample population that was not randomized. Participant observation was implemented in a setting where no external variables were introduced and existing variables could not be manipulated. As a passive agent, the researcher observed, measured, and described the phenomenon as it occurred or existed in the NLRN orientation *Span Program* participants without making any changes to the program(s). Strengths of the chosen research design are that the study can be replicated or repeated for future research, as well as personal bias was avoided by the researcher by keeping a 'distance' from the participating subjects. Measures to prevent bias included operational definitions of variables, valid and reliable research tools, and formal data collection methods (Creswell, 2009).

The study design included baseline, mid-point, and post-program assessment data collection at specified intervals throughout the NLRN orientation program. The researcher sought objective answers in efforts to generalize concepts more widely, predict future results, and investigate causal relationships. A closed cohort design (i.e., one with a fixed population) was employed by the researcher secondary to convenience sampling, with comparative analysis between original program and revised program cohorts. Dividing the groups into cohorts could limit the study as there is no control group, which may restrict the ability to establish a relationship between change in CT and participation in the educational program (McMullen & McMullen, 2009; Park & Jones, 2010). Due to the lack of randomization in the cohort design, the external validity is considerably lower than other study designs not utilizing cohorts

(Creswell, 2009). The study was also limited by the use of a convenience sample (Elfrink Cordi, Leighton, Ryan-Wenger, Doyle, & Ravert, 2012).

Data Collection Instruments

For the past three decades, nurse educators have struggled with the subjectivity and inconsistency associated with assessment of performance as it relates to CT (Manz, Hercinger, Todd, Hawkins, & Parsons, 2013). Prior studies have tested participants at the beginning and the end of a tutorial (Flannelly & Inouye, 1998), at the beginning and end of a course (Sandor, Clark, Campbell, Rains, & Cascio, 1998; Saucier, Stevens, & Williams, 2000), at the beginning and end of an academic year (McCarthy, Schuster, Zehr, & McDougal, 1999), or at the beginning and end of a nursing program (Vaughan-Wrobel, O'Sullivan, & Smith, 1997). Few studies reported a significant change in the new nurse's CT skills because the pretest-posttest assessments provide minimal information about change (McMullen & McMullen, 2009).

To date, researchers continue to be conflicted with evaluating the relationship between scores on standardized CT tests and nurses' clinical performance (Fero et al., 2008; Todd et al., 2008). Correct execution of technical skills is essential for safe nursing practice (Todd et al., 2008), while faculty researchers determined that the most efficacious method to improve consistency in the evaluation of performances was through an experiential process (Manz et al., 2013). Effective simulation should mimic reality as much as possible while improving technical skills proficiency and the development of teamwork, delegation, organization, and prioritization skills (Garrett, MacPhee, & Jackson, 2010). By offering a safe environment for improving competencies through repeated practice (Garrett et al., 2010), the experiential process provides an opportunity for nurse educators to observe scenarios in which demonstrated competency can be evaluated (Manz et al., 2013).

There is no definitive one way to measure the development of CT, but rather a variety of tools and processes to facilitate and assess their development (Victor-Chmil, 2013). Measurable outcomes to assess the development of CT in nursing can only be achieved through strategies appropriately designed to individually evaluate each of the processes used by the nurse (Victor-Chmil, 2013). Many college-level classes stress that CT is a reliable and valid measuring tool necessary for use in educational evaluations, needs assessments, and for educational research (Geisinger, 1994). Regardless of the tool, a valid and reliable instrument of evaluation minimizes ambiguity by providing an objective quantitative score (Manz et al., 2013).

Given the *Span Program* design and limited resources, as well as in efforts to maintain the theory of naturalistic observation, only one outcomes measurement tool was feasible for study implementation. The one instrument that quantifies the evaluation process is the WGCTA series, with the short form (i.e., WGCTA-FS) described in a following section.

Demographic Survey Questionnaire

The Demographic Survey Questionnaire (see Appendix H) was the first tool to be utilized in the dissertation study. The survey design is the preferred type of data collection secondary to economic advantages and rapid turnaround (Creswell, 2009). The plan included collecting data in the form of Survey Monkey software via a password protected secure website using a unique identifier. Participants of both the original and revised versions of the *Span Program* of orientation completed the survey questionnaire on the last day of hospital orientation, prior to the initiation of Nursing Service Orientation (NSO) (see Appendices I and J).

As researchers continue to explore new nurses' academic achievement, there is a need for measurement instruments that produce reliable and valid scores for the various participant populations (Dedrick, Shaunessy-Dedrick, Suldo, & Ferron, 2015). Problems with score

reliability and validity can compromise statistical analysis such as multiple regression and analysis of variance (ANOVA); thus, there is a need to better understand and evaluate the psychometric properties of measures (Dedrick et al., 2015). To address the psychometric needs, evaluation of the tool's reliability, measurement invariance, and criterion-related validity of the data can be invested (Dedrick et al., 2015). Demographic survey data were collected at a definitive point in time and, therefore, it was not possible to evaluate the stability of the results over time (Dedrick et al., 2015).

Watson-Glaser Critical Thinking Appraisal Short Form (WGCTA-FS)

The next instrument used to quantify the evaluation process was a standardized and commercialized testing tool, known as the Watson-Glaser Critical Thinking Appraisal-Short Form (WGCTA-FS), provided by the vendor TalentLens Assessment, Pearson Education, Incorporated, via software through a password protected website utilizing a unique identifier. The WGCTA is widely used to measure logical and creative CT components (Mundy & Denham, 2008). Developed in 1964 by Goodwin Watson and Edward Glaser (Hassan and Madhum, 2007), Watson and Glaser's professional involvement in psychometric testing goes all the way back to the 1920s. With over 85 years of development, the WGCTA is the most common CT, psychometric test used in graduate, professional, and managerial recruitment (Hassan & Madhum, 2007). Developed as a multiple choice test, the questions examine an individual's ability to make correct inferences, recognize assumptions, make deductions, come to conclusions, and interpret or evaluate arguments (Hassan & Madhum, 2007). Inference is defined as the subject's determination as to the extent to which one can discern the truth or falsity of a statement from the data provided (Gadzella et al., 2005, pp. 141-142). Recognition of assumptions is where the subject recognizes recognizing whether the assumptions are clearly

stated (Gadzella et al., 2005, p. 142). Deduction is when a subject decides whether certain conclusions necessarily follow the information provided and interpretation occurs when a subject considers the evidence provided and determines whether generalizations on the data are warranted (Gadzella et al., 2005, p. 142). Evaluation of arguments is defined as the time in which a subject distinguishes the strong and relevant arguments from those that are weak and irrelevant on particular issues (Gadzella et al., 2005, p. 142).

The WGCTA has a long history of use, as well as it is used with regularity in the assessment of CT skills (Geisinger, 1994). A number of forms of the WGCTA have appeared since the instrument was first published (Geisinger, 1994). The WGCTA instrument was revised and published in two new equivalent forms, simply known as the YM and ZM forms (Crites, 1965). These initial WGCTA tests were about 50 minutes long apiece with the raw score for the test being the total number of right responses. Although subtest scores are available, the authors of the WGCTA (e.g., Watson and Glaser) do not endorse the use of partial-scores because of their low reliability (Crites, 1965). The original normative data on the WGCTA-Forms YM and ZM were provided for several different groups, including grades 9-12, college-aged learners, and employed adults in executive and managerial occupations. The secondary school norms are based upon 20,312 high school aged participants in 13 states (Crites, 1965). No stability coefficients are provided. The internal consistency *r*'s are acceptably high, ranging in the upper 0.80s for WGCTA-Form YM and the lower 0.80s for WGCTA -Form YZ. The lowest raw score was 37 and the highest was 97, with a mean of 74.4 and a σ of 9.6 (Crites, 1965). The factor analysis done on the WGCTA-Forms YM and YZ are probably best classified as evaluations of the tests' construct validity. A factor analysis was performed to identify some of the unique abilities of semantics because CT involves a large number of unique abilities and most of the

data on the correlations of the WGCTA with other popular tests of the day can be taken as concurrent validity (Crites, 1965). The WGCTA correlated with Otis 0.60-0.70, California Test of Mental Maturity 0.68, Quick-Word Test 0.65-0.69, the Miller Analogies 0.55, the Wechsler Adult Intelligence Scale (WAIS) 0.41, and the College Entrance Examination Board (CEEB) 0.43-0.54 (Crites, 1965). The WGCTA correlated moderate to high positive with intelligence tests so it can be concluded that the WGCTA relates as might be expected with older measures of intellectual functioning, but not so highly correlated that it merely duplicates them (Crites, 1965). The only statement made by the manual about the test's predictive validity is "the Critical Thinking Appraisal is a potentially useful instrument for predicting performance in situations involving critical thinking" (Crites, 1965, p. 330). Finally, the WGCTA is quite adequate for the appraisal of CT as its internal consistency is high and its concurrent validity is acceptable (Crites, 1965).

In 1980, the newer versions of the WGCTA-Forms A and B were reviewed (Berger, 1985). New forms, fewer items, and new time limits are the first noticeable differences in the WGCTA-Forms A and B. These forms were composed of 80 items per form instead of 100 items, allowing 40 minutes to complete rather than 50. The 160 items are contained in five subtests, which reflect the authors' view of CT, which were the same subtests of the original WGCTA (Berger, 1985). The evaluation included problems, statements, arguments, and interpretations of data similar to those that are encountered on a daily basis at work, in the classroom, and in newspaper and magazine articles. To determine reliability, estimates were made of the test's internal consistency (split-half reliability coefficients ranged from 0.69 to 0.85), stability of test scores [test-retest at a 3-month interval was 0.73 with means and standard deviations virtually identical across time], and scores on alternate forms (r=0.75). Validity was

determined through construct and content analysis (Berger, 1985). The latest version (Forms A & B) of the WGCTA was assessed as "a well-constructed test" (p. 1693) and with no similar test being was on par with this one (Berger, 1985).

In 1994, Watson and Glaser revised the WGCTA-Form A to a new version called WGCTA-Form S (Gazelle et al., 2005; Geisinger, 1994). WGCTA-Form S (i.e., WGCTA-FS) consists of 40 test items and may be given untimed or in a 30-minute timeframe (Gadzella et al., 2005; Geisinger, 1994; Ivens, 1994). Permission to use the latest WGCTA-FS was granted upon purchase of the hard copy testing tools commercially available through TalentLens Assessment, Pearson Education, Incorporated.

Relationships of the Instruments to the Study

To assess the efficacy of the NLRN orientation program in the development and progression of CT in the participants, the dependent variables were the WGCTA-FS scores at three stages (i.e., baseline, mid-point, and post-program), with the independent variable being the NLRN orientation program. To investigate differences in the development of CT between the NLRN orientation program participants and the sample population involved in the development of the instrument (see Appendices K and L), the independent variables were the one score of the group used during the development of these instruments while the dependent variables are the baseline WGCTA-FS scores of the NLRN orientation program participants. Comparison of a Cronbach's α coefficient calculation generated for these two groups will assisted the researcher with answering the research question.

To determine the relationships between age and degree status of the NLRN orientation program participants as it relates to the development and progression of CT, the independent variables were the age and degree status of the participants of the NLRN orientation program

(e.g., diploma, two-year, or four-year degree) while the dependent variables are the aggregate WGCTA-FS baseline, mid-point, and post-program scores. To determine differences in critical thinking between the 2015 original and 2016 revised *Span Program* participants as measured by the WGCTA-FS instrument, the independent variables were the cohorts (i.e., 2015 versus 2016) and the dependent variable were the aggregate WGCTA-FS scores of each cohort.

Sample

Participants

The sample was non-random, of non-probability, and one of convenience. Participants consisted of cohorts of NLRNs at the host institution, starting with the October 2015 cohort and going through February 2016. The number of cohorts originally depended on the number of participants needed to reach the recommended number of 100 participants as determined by G-power analysis. The number of available participants in the first cohort (e.g., October 2015) was low, so additional cohorts were included in the sample (e.g., January & February 2016). The total number of potential participants invited to join the sample was 97 but only 24 participants committed to the study.

Inclusions

NLRNs (with the exception of the exclusions listed in the next section) hired by the host institution are required to orient via the *Span Program* (i.e., the dissertation study program) and have current BLS training with certification, regardless of academic preparation. These NLRNs must be employed as a full-time or a part-time RN at the host institution.

Exclusions

Attempts to eliminate any possible outliers and/or those meeting exclusion criteria were used to avoid skewed results. The exclusions included any NLRN that had previously practiced

in the clinical setting, any NLRN that had previously practiced as an LPN, a RN with a graduate degree, or those working per diem. It is important to note that any NLRN hired by the host institution for the OR specialty is not required to complete NSO or the *Span* orientation program; therefore, these NLRNs was excluded from the study. Exclusion criteria was any newly hired NLRN who did not meet the requirements listed in the inclusion criteria, as well as any NLRN who did not complete the program for any reason.

Recruitment

Recruitment consisted of all NLRNs participating in the Span Orientation Program that met the inclusion criteria at a pediatric hospital in the Southeastern US, with the exception of those who met the exclusion criteria. The original *Span Program* was hosted three times a year in February, July, and October. Until the end of 2015, cohort number of participants ranged from a low of 35 to a high of 74. Starting in 2016, the format of the NLRN orientation changed from three cohorts a year to monthly cohorts. The changed format is referred to in the study as the revised *Span Program.*

Attempts were made to recruit all recently hired orientees from all academic levels of NLRNs who were assigned to work in areas of patient care, with the exception of the OR (see Exclusions). Participation was voluntary with informed consent (see APPENDIX M) obtained prior to initiation of the study.

Ethical Considerations

Prior to the implementation of the dissertation study, protection of human subject approval was obtained from the Institutional Review Board (IRB) of the parent institution, The University of Alabama (UA), as well as the host institution, University of Alabama at Birmingham (UAB). The participants were considered an 'at risk' population secondary to being

employees of the host institution and the inquirer did not marginalize or dis-empower the study participants. The researcher did not to use language or words that were biased against persons because of gender, sexual orientation, racial or ethnic group, disability, or age. The plan included not suppressing falsifying, or inventing any findings of the study to meet the needs of the researcher or any audience. The researcher promoted the integrity of the study, guarding against misconduct and impropriety. The non-experimental research design chosen by the researcher did not allow for manipulation of the variables, therefore, researcher bias was eliminated. No physical, psychological, social, economic, or legal risks to the sample population were identified secondary to addressing all ethical considerations (Creswell, 2009).

IRB approval from the parent institution as well as the host institution was completed an additional time to reflect revisions in recruiter methodology, such as offering incentives/tokens of appreciation (see appendices N and O). Once revisions were approved by both IRBs, incentives/tokens of appreciation were offered to the participants starting with the October 2015 cohort. The incentives/tokens of appreciation included items of monetary value up to $125 for one participant of each cohort via drawing with all other members of the cohort receiving items valued at less than $25 per participant token.

Informed Consent

All eligible parties were informed of the opportunity to participate, with the researcher offering a clarifying document explaining that all data collection would be performed under a unique identifier (i.e., Study ID #) that protected the identity of the participant. Signatures on the waiver/contract indicate that the volunteer agreed with the terms of the study.

Confidentiality

All data collection was performed using a unique identifier (i.e., Study ID #) that protects the identity of the participant and all study information has been secured. The researcher is the only individual with access to any data to protect confidentiality of the participants and the integrity of the research.

Researcher Positionality

The researcher believed that achieving value-free knowledge is especially important and applicable to any dissertation study (Powell, 2013). The research design chosen for the study did not influence nor did it represent the researcher's values or ideology. The researcher remained socially and politically neutral in the dissertation study process to avoid the creation of or give the appearance of bias. Acknowledging that the NLRN CT measurement subject is close to the researcher's heart, the hope is that any bias was unmasked throughout the study process so that a critical and sensitive reception to the data collection and analysis was solicited from the researcher.

Validity

Internal

One problem of internal validity was the subject variability secondary to the exposure of the participants to varied patient care environments between WGCTA-FS assessments (i.e., threat of history) (Creswell, 2009). The limited exposure was beyond the control of the researcher and the study design. The study was directed by the non-experimental design with nonrandomized sampling, thus there is no intervention or control group.

According to the power analysis, the size of the subject population was planned to be approximately at least 100 participants but the total number was twenty-two (n=22) after inviting

ninety-seven (*n*=97) NLRNs to participate. The time allotted for the data collection was modified to include additional cohorts of the sample population in efforts to achieve credibility and attempt trustworthiness with the sample size.

Because human beings compile the sample, attrition of individuals in the sample population was considered in the case of an NLRN resignation (i.e., threat of mortality) (Creswell, 2009). It is reasonable to omit the data collected for the individual from the analysis if the NLRN resigns prior to the completion of the orientation program. One threat to internal validity is the three staged testing format used in the data collection. The study participants might become familiar with the WGCTA-FS outcomes measured in the baseline assessment and remember responses for later in the mid-point and post-program assessment. The design of the WGCTA-FS from TalentLens Assessment, Pearson Assessments, Incorporated considers these types of threats. The WGCTA-FS utilizes a large database of questions which are randomly selected each and every time a participant opens the appraisal to complete it.

The demographic data of the NLRN participants might be helpful in understanding how these factors affect the study, so demographic information was collected.

External

External validity was accomplished by consideration of the variables associated with the sample in hopes that the findings can be applied to contexts other than the one carried out in the research study. For example, the population characteristics of the sample were different genders, races/ethnic groups, ages, and academic preparation. The research design did not allow for a highly controlled lab environment allowing for the findings to faithfully represent what might or could happen in other NLRN orientation programs or NRPs. The interaction of the subjects and

the research study occurred in the NLRN's familiar environment of the host hospital, with only observation of the researcher and with no intervention.

There were no recognizable threats to external validity of interaction of selection and treatment, interaction of setting and treatment, and/or interaction of history and treatment (Creswell, 2009) noted by the researcher.

Construct

Construct validity (i.e., the degree to which a test measures what it claims to be measuring) or the appropriateness of inferences was made on the basis of observations or measurements. The validity included whether the scores serve a useful purpose and has positive consequences when used in practice (Creswell, 2009). Establishing the validity of the scores in a survey helped to identify whether an instrument might be good one to use in survey research (Creswell, 2009). Published validity and reliability data from the original WGCTA-FS study was utilized to discuss and answer research question #2.

Preparation

Internal Review Board (IRB)

In addition to the original approvals, revised IRB approvals were necessary via both the parent and the host institutions secondary to the addition of incentives and/or tokens of appreciation in the recruiting process. Once the final approvals were accomplished, different data collection preparation was indicated secondary to these changes prior to the initiation of the study.

Folders

Each *Span Program* participant was given a folder housing two copies of the informed consent, four blank index cards, instructions describing how to complete the Demographic

Questionnaire Survey via the Survey Monkey website, and instructions about accessing the WGCTA-FS online via the TalentLens Assessment, Pearson Education, Incorporated, website. The participant filled out index cards with an answer to a question and the participant's unique identifier for each time a data collection task was completed. For instance, a card was filled out and handed in by the participant when he or she completed the Demographic Questionnaire Survey. A second index card was filled out and handed in with the completion of the baseline WGCTA-FS, and so on until a total of four filled cards were filled out and handed in by each participant. Each index card was placed into a random drawing to determine which participant would be given the large incentive token of appreciation. All participants received small incentive tokens of appreciation with one person per cohort receiving the large token. The large token of appreciation was selected via random drawing of index cards completed by the participants (each participant had four cards each representing every step of the data collection process). The participant index cards were collected and the coordinator of the *Span Program* was responsible for choosing a large token recipient per cohort via random drawing.

Consent

At the end of the last day of hospital orientation but prior to the NSO, all *Span Program* NLRNs were invited to participate on a voluntary basis in the dissertation study. The researcher explained the purpose of the study, the activities associated with the study, confidentiality with assessment scores, hard copy material security, and that participation or declining to participate would not affect the NLRN's progress in the orientation program. All the voluntary participants signed an informed consent form approved by both UAB and UA IRBs. The signed copy of the consent document was collected and hard copy stored by the researcher, with the second copy remaining in the participant's folder for reference.

Data Collection

Prior to beginning the research study, the PI conducted an extensive literature search on the subject matter included within the study paper in efforts to consider previous and the most recent studies related to measuring CT in NLRNs. The reference list at the end of the dissertation paper reflects these efforts.

Demographic Survey Questionnaire

Demographic stats were reported for the entire sample. The literature indicated that the identification of whether increased CT abilities are related to age, education, or other unidentifiable factors could prove to be helpful (Mundy & Denham, 2008). The Demographic Survey Questionnaire was delivered to the participants via the Survey Monkey format. The participant process included accessing a security protected link that led the him or her to the appropriate website page to initiate the survey, as well as allowed for unique identifiers and password protection. The host institution provided laptop computers on site for these purposes but most participants chose to perform the task via home computer off site or via phone at the participant's leisure.

The demographic survey questionnaire results are housed in a password protected secure access website. These confidential materials produced for the study will be securely housed for five years.

WGCTA-FS Evaluations

Evaluation of the NLRN's baseline CT skills was completed on the last day of hospital orientation and prior to the first day of NSO for both the original and revised formats of the *Span Program* using the WGCTA-FS standardized and commercialized testing tool via computer link to the website, unique identifiers, and password protection. The WGCTA-FS is a database in

which random questions are presented each and every time the appraisal is opened for completion to keep the participants from growing familiar with the material. The appraisal was completed two additional times by each of the cohort participants at specific intervals during the NLRN *Span Program*. The host institution provided laptop computers for these purposes to complete these tasks on site but most participants chose to complete the appraisal via home computer off campus.

The electronic assessment results, both the Demographic Survey Questionnaire and the three WGCTA-FSs, are housed in the researcher's personal computer that is password protected and kept behind a locked door off premises. If paper copies of any electronic assessment were needed or created by the researcher for any reason, these copies are housed off premises behind a secured door. These confidential materials will be stored by both the vendors and the researcher for five years and, then destroyed per the PI's authority.

Baseline Evaluation

Since CT abilities differ among participants at entry into orientation programs secondary to many factors, it is important to obtain baseline data and track individual growth in CT skills (Mundy & Denham, 2008). Evaluation of the NLRN's baseline CT skills was performed after the completion of hospital orientation on the last day of the orientation. The evaluation was achieved using the WGCTA-FS standardized and commercialized testing tool was purchased by the researcher and housed in the password protect secure access TalentLens Assessment, Pearson Education, Incorporated website. The researcher for data mining and analysis collected the baseline WGCTA-FS. These confidential materials will be securely housed for five years electronically via the commercial host, with the researcher controlling the destruction of

intellectual property. The first step of three in the linear/longitudinal design of data collection was concluded.

The WGCTA tool comes with a long history of successful use in instructional and evaluation research in such programs and courses. The validation evidence in the manual is "sufficiently reliable and should be expected to be approximately as valid as one would expect" (Geisinger, 1994, para. 16). The short form (i.e., Form S) does appear to continue to represent the history of the WGCTA successfully, with strength found in the voluminous amount of research performed with this measure (Geisinger, 1994). The WGCTA-FS is sufficiently reliable and should be expected to be valid (Gadzella et al., 2005; Geisinger, 1994). This version of the WGCTA is a short, practical measure of CT (Ivens, 1994).

Assessments were administered to a convenience group of NLRNs represent up to three levels of nursing degrees in the *Span Program*. The coordinator of the *Span Program* proctored the computer based appraisals if done on the host facility site, while some participants chose to complete the task off campus. The participants should report varying CT skills levels at program entry with different patterns of growth throughout the program.

Mid-Point Evaluation

Much like already noted, tests were administered to the NLRNs participating in the *Span Program* at the end of four weeks into orientation. The coordinator of the *Span Program* proctored the computer based appraisals if completed by the participant on site, while some participants chose to do the task offsite. The mid-point WGCTA-FS completion was the second step of three in the progressive longitudinal design of data collection. The WGCTA-FS was administered at the end of the 5th week of orientation on Nov. 2nd for the Oct. 2015 cohort, Feb. 2nd for the Jan. 2016 cohort, and Mar. 7th for the Feb. 2016 cohort.

The WGCTA-FS instrument was collected by the researcher once again via the password protected secure access TalentLens Assessment, Pearson Education, Incorporated website for data mining and analysis. As with previous materials, these confidential documents will be securely housed for five years.

Post-Program Evaluation

Once the participant has completed all requirements of attendance and participation as noted on the *Span Program* Curriculum Map, the final WGCTA-FS was administered post-program on the last day of structured orientation. These dates were Dec. 7th for 2015 cohort, Feb. 8th for Jan. 2016 cohort, and Mar. 7th for Feb. 2016 cohort. A list of the scores for each stage of the WGCTA-FS testing per participant can be found in APPENDIX P.

The completed WGCTA-FS instrument was collected by the researcher each and every time the test was administered, as well as housed in a password protected secure website. These confidential materials are securely housed for five years by both the vendor and the researcher. After the time lapses, the PI will give the authority to the vendors to destroy the data. Any additional materials collected during the dissertation study will be subsequently destroyed by the researcher after time frame has lapsed. Table 2 displays the relationships of the research questions to the data collection measurement tools.

Table 2

The Relationship of the Research Questions to the Data Collection

Question	Data Collection
1. What are the differences in NLRN critical thinking as measured by the WGCTA-FS instrument scores prior to the initiation (baseline), mid-point, and after the conclusion (post-program) of the *Span Program* orientation (in participants)?	WGCTA-FS via Linear/Longitudinal Design
2. What are the differences in critical thinking between the *Span Program* orientation participants and the sample population found in the WGCTA-FS instrument development?	WGCTA-FS and literature on previous studies
3. Are age and degree status related to the development of critical thinking (in participants)?	Demographic Questionnaire Survey and WGCTA-FS
4. What are the differences in critical thinking between the 2015 original and 2016 revised *Span Program* participants as measured by the WGCTA-FS instrument?	WGCTA-FS

Data Analysis Procedures

The researcher was interested in examining how, rather than if, the CT skills of the NLRNs changed during their participation in the *Span Program.* First, aggregate WGCTA-FS scores were calculated at three distinct points in time (i.e., at baseline, mid-point, and post-program). These data were entered into the SPSS version 22.0 software, where descriptive stats of the baseline WGCTA-FS scores were used to establish the initial measurement of the participant's CT skill prior to the intervention of the *Span Program* curriculum. Inferential RM ANOVA calculations were then performed to determine differences in CT in the participants between the fore-mentioned three points in time monitored throughout the *Span Program* of orientation. These data were used to answer research question #1.

To address research question #2, differences in CT between *the Span Program* (dissertation study) participants and the sample population used in the development of the

WGCTA-FS instrument (charter study) were considered. Inferential stat calculations of WGCTA-FS aggregate baseline scores from the Span Program dissertation study participants were conducted via the one sample *t*-test followed by tests of normality using descriptive stats. Cronbach's α coefficient calculation via inferential stats was conducted as well. The particular Cronbach's α coefficient calculation was chosen by the PI secondary to having access to limited results from the development sample (charter study) population. The WGCTA-FS development sample population (charter) study results were presented next to the Span Program (dissertation) study to come to these conclusions.

The Demographic Survey Questionnaire was used to describe the dissertation study participants and identify the presence of certain extraneous variables used to answer research question #3. Results from the questionnaire data collection will be discussed in a later chapter.

Calculations of aggregate WGCTA-FS scores were initially conducted. Consideration of the techniques of exploratory data analysis was needed to discover the various aspects of the data. These considerations included a correlation research design using Pearson's *r*, as the age and degree groups were identified by nominal/categorical data not raw numerical data. If relationships between these variables existed, the strength of the relationship was determined using Spearman's ρ to determine correlation coefficients. Again, the variable groups were defined in the data sets as nominal, not ordinal.

To assist the researcher in determining the difference in CT between the two years of cohorts (i.e., the original vs. the revised orientation), descriptive statistics calculations of aggregate WGCTA-FS scores divided by cohort were conducted followed by inferential calculations using the two factor RM ANOVA. Table 3 refers to the relationship of the to the data analysis methods utilized in the dissertation study.

Table 3

The Relationship of the Research Questions to the Data Analysis Methods

Question	Data Analysis Methods
1. What are/were the differences in NLRN critical thinking scores as measured by the WGCTA-FS instrument prior to the initiation (baseline), mid-point, and after the conclusion (post-program) of the *Span Program* orientation (in participants)?	Descriptive statistics calculations of the aggregate scores divided into baseline, mid-point, and post-program WGCTA-FS scores were used followed by inferential RM ANOVA calculations to determine differences in CT between three points of time.
2. What are/were the differences in critical thinking between the *Span Program* orientation participants and the sample population found in the WGCTA-FS instrument development?	Inferential statistics calculations of WGCTA-FS aggregate baseline scores divided into orientation and sample populations via the one sample *t*-test followed by a Cronbach's α coefficient calculation.
3. Are/Were age and degree status related to the development of critical thinking (in participants)?	Descriptive statistics calculations of aggregate WGCTA-FS scores followed by inferential calculations via a correlation research design using Pearson's *r*; if relationships between these variables exist, the strength of the relationship was determined using Spearman's rho to determine correlation coefficients.
4. What are/were the differences in critical thinking between the 2015 original and 2016 revised *Span Program* participants as measured by the WGCTA-FS instrument?	Descriptive statistics calculations of aggregate WGCTA-FS scores followed by inferential calculations using two factor RM ANOVA (Cohort X Time Points)

Outcomes

In both education and practice, nurses must demonstrate competency through measurable outcomes (Victor-Chmil, 2013). Measuring and addressing the outcomes of the teaching strategies of the NLRN orientation program on its participants might assist the program coordinator and director with determining the need for curriculum updates or confirm whether CT requirements have been met. The ability to differentiate patterns of growth at different levels

of competence and expertise allows educators to individualize educational programs to meet the needs of the participants (McMullen & McMullen, 2009). One would hope that CT ability of the participants would increase from the beginning to the end of the orientation program (McCarthy et al., 1999). The researcher would like to contribute to the literature supporting a paradigm shift in nursing education that would facilitate producing nurses who have the CT abilities necessary for facing the changes in the world today (McCarthy et al., 1999). In addition, continued importance of outcome measures for accreditation and/or funding needs to be stressed to nursing education community (McCarthy (1999).

Summary

In professional and higher education, the ability to think critically is often described as a desirable educational outcome (Mundy and Denham, 2008). Most educators and authors in the literature agree that it is an implicit and important aspect of nursing education directly aligned with clinical practice (Mundy & Denham, 2008). Teaching methods based on content and knowledge have become outdated (Hoffman, 2008). To better serve the nursing educational community, replacement by a focus on outcomes needs to be considered.

In the previous chapter, the researcher has described the design and methodology by which the dissertation study was conducted. A convenience sample of NLRNs was invited to participate in completing a demographic survey questionnaire and a three staged WGCTA-FS. Data collection, analysis methods, and presentation formats were included in the tables noted in the fore mentioned chapter, whereas the findings and results of these activities are presented in the following chapters.

CHAPTER IV:

RESEARCH RESULTS

Description of Sample Participants

The number of cohorts was originally dependent on the number of participants needed to reach a total of one hundred (*n*=100) as recommended by G-power analysis. The host institution made a decision to revised the *Span Program* between 2015 and 2016, making the last cohort of 2015 (October group of eleven NLRNs) the original program participants. With changes in format, including offering the NLRN orientation program monthly and reorganization of the curriculum, the first two cohorts of 2016 (January and February groups, totaling thirteen NLRNs) became the revised program participants. Therefore, the sample consisted of only three groups of NLRNs at the host institution. The low number of participants is a limitation as denoted later in the study paper.

Looking more closely at the study group, total possible enrollees were ninety-seven (97) and only 25% of that number volunteered to participate (*n*=24). In the first step of data collection, all volunteers completed a demographic survey questionnaire and the baseline WGCTA-FS via computer based software format. One participant from the January 2016 cohort decided to terminate employment with the host institution after completing these two tasks; therefore, the participant's raw data was excluded from the aggregated pool of information. The remaining volunteers (*n*=23) proceeded with the completion of the mid-point WGCTA-FS. Following the completion of the task, a second volunteer was dropped from the study as it was revealed that the participant's first degree for RN licensure was an AD prepared RN prior to

completing a BSN. Therefore, the volunteer had practiced as an RN did not meet the criteria for a NLRN and the participant's raw data was omitted from the aggregate information. The remaining volunteers (*n*=22) completed the final task of the WGCTA-FS, with the total sample numbers of the 2015 and the 2016 cohorts being eleven (*n*=11) participants each. The low participant number is also mentioned later as a limitation.

Recruitment

Recruitment consisted of all NLRNs participating in the original *Span Program* hosted three times a year in February, July, and October. With decisions to run the program monthly, the numbers of available participants per class dropped significantly. Also, the plan to recruit all recently hired NLRNs (with the exception of those hired for the OR) was not without its hazards. Since participation was voluntary with informed consent obtained prior to initiation of the study, numbers from the July 2015 cohort were low with no follow up by the participants to complete the remaining sections of the study (i.e., the three staged WGCTA-FS). For instance, over ten participants completed the demographic but only one participant completed a computerized WGCTA-FSs. Secondly, resources at the host institution were very limited. Therefore, support for this study was also limited in the form of encouragement to participate and importance of the study to the host institution.

With these challenges, a decision was made by the researcher to utilize the pilot cohort information to offer incentives and/or tokens of appreciation for participation to encourage volunteering among the sample population. The pilot cohort decision involved going back to the both the UA and the UAB IRBs for revisions, which were both approved prior to attempting data collection in the October 2015 cohort.

Exclusions

Attempts to eliminate any possible exclusions were successful in efforts to protect the purity and validity of results. One exclusion that had not been initially considered in the study design was the possibility of a participant leaving the host institution. A second exclusion was a participant who had already entered the nursing field and practiced as a licensed individual. For instance, a participant who leaves the host institution was considered an exclusion because he or she did not complete the requirements of the orientation program (as noted in the previous Exclusions section). Whereas, the participant who did not meet the inclusion criteria for a NLRN (i.e., the AD prepared RN who was now participating in the *Span Program* as a BSN prepared nurse) was excluded from the participant pool as noted in rules of exclusion. The data collected for both participants were not included in the calculations.

Findings

The purpose of the study was to determine if there were differences in the CT skills of NLRNs when the participants progressed through the *Span* orientation program at one Alabama hospital. The researcher assessed CT progression at specific intervals during the orientation, resulting in three measurements. The participants for an additional measurement also completed a demographic survey questionnaire. All data were entered into the SPSS version 22.0 for data analysis (IBM Analytics, 2017). Statistics were calculated in efforts to respond to all the research questions and these results are reported. Caution was taken by the researcher not to extrapolate findings.

Data Analysis

Research Question One

What were the differences in NLRN critical thinking as measured by the WGCTA-FS instrument scores prior to the initiation (i.e., baseline), mid-point, and after the conclusion (i.e., post-program) of the Span Program orientation (in participants)? To address the first research question, a linear/longitudinal data analysis was required to determine the differences in CT as measured by the WGCTA-FS instrument prior to the initiation (i.e., baseline), at midpoint, and after the conclusion (i.e., post-program) of the *Span Program* orientation (in the participants). One factor RM ANOVA was calculated using the SPSS version 22.0 software for three points in time via analysis. The within subjects variables consisted of the WGCTA-FS scores at points in time already fore-mentioned. The general linear model (GLM) was used to assess the repeated measures via a full factorial model with Type III sum of squares. Polynomial contrasts and the time factor were submitted to be displayed in descriptive stats, estimates of effect size, observed power, and homogeneity of variance tests formats. Comparison included main effects and confidence interval adjustment to post-hoc Bonferroni. Significance level remained 0.05, making confidence intervals 95%. Results of these calculations are reflected in Table 4 through 8.

Table 4

Statistical Results for Measuring Differences in WGCTA-FS Scores at Three Points in Time: Comparison of the Means and Standard Deviations

	Mean	Std. Deviation	N
Baseline	23.55	6.193	22
Midpoint	23.77	5.614	22
Post Program	23.45	6.270	22

Table 5

Statistical Results for Measuring Differences in WGCTA-FS Scores at Three Points in Time: Multivariate Tests

Multivariate Tests[a]									
Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power[c]
Time	Pillai's Trace	.011	.111[b]	2.00	20.00	.895	.011	.223	.065
	Wilks' Lambda	.989	.111[b]	2.00	20.00	.895	.011	.223	.065
	Hotelling's Trace	.011	.111[b]	2.00	20.00	.895	.011	.223	.065
	Roy's Largest Root	.011	.111[b]	2.00	20.00	.895	.011	.223	.065

a. Within Subjects Design: time
b. Computed using alpha = 0.05

Table 6

Statistical Results for Measuring Differences in WGCTA-FS Scores at Three Points in Time: Mauchly's Test of Sphericity

Mauchly's Test of Sphericity[a]							
Within Subjects Effect	Mauchly's W	Approx. Chi-Square	Df	Sig.	Epsilon[b]		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Time	.969	.625	2	.732	.970	1.000	.500

a. Within Subjects Design: time
b. May be used to adjust the degrees of freedom for the averaged tests of significance.
c. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

Table 7

Statistical Results for Measuring Differences in WGCTA-FS Scores at Three Points in Time: Estimated Marginal Means

Time	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1	23.545	1.320	20.800	26.291
2	23.773	1.197	21.284	26.262
3	23.455	1.337	20.675	26.234

Table 8

Statistical Results for Measuring Differences in WGCTA-FS Scores at Three Points in Time: Pairwise Comparisons

(I) time	(J) time	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	
					Lower Bound	Upper Bound
1	2	-.227	.756	1.000	-2.193	1.739
	3	.091	.795	1.000	-1.977	2.158
2	1	.227	.756	1.000	-1.739	2.193
	3	.318	.682	1.000	-1.455	2.092
3	1	-.091	.795	1.000	-2.158	1.977
	2	-.318	.682	1.000	-2.092	1.455

a. Adjustment for multiple comparisons: Bonferroni.

Comparison of the means and the *SD*s of these data in Table 4 indicate that there were no differences throughout the three different points in time (i.e., baseline, mid-point, and post-program) as measured by the WGCTA-FS scores. Multivariate tests provided results for the multivariate test of mean differences between the repeated measures (Lomax & Hahs-Vaughn, 2012). In Table 5, Wilks' Lambda indicates there was no statistically significant multivariate mean difference within subjects since $p>\alpha$ [i.e., ($p=0.895$)>($\alpha=0.05$)].

Mauchly's test of sphericity is displayed in Table 6 for review to determine if the assumption of sphericity has been met (Lomax & Hahs-Vaughn, 2012). The *p* value here is larger than the α [($p=0.732$)>($\alpha=0.05$)], so the assumption of sphericity has been met. Therefore, there is no need for the researcher to consider Epsilon results to gauge difference in the variances. Epsilon can, however, assist the researcher with determining homogeneity of variances (Lomax & Hahs-Vaughn, 2012). Homogeneity is determined by the 'lower bound' number, which is computed by the number of within subjects factors, and the number's distance from 1.0. In the case of Table 6, the 'lower bound' number is 0.500 and therefore cannot be

defined as either homogenous or heterogeneous. Caution should be considered in studies with low subject numbers.

Table 7 displays the estimated marginal means, but also reports the standard error (*SE*) and 95% confidence interval (*CI*). Table 8 demonstrates pairwise comparisons as it relates to research question one. The *p* value here (p=1.00) provides the results of the Bonferroni post hoc procedure and reflects that there was no statistically significant mean difference between any of the three timed WGCTA-FS scores.

Research Question Two

What were the differences in critical thinking between the Span Program orientation participants and the sample population found in the WGCTA-FS instrument development? For analysis, the techniques of exploratory data analysis to discover the various aspects of the data were utilized. Exploratory analysis of linear/longitudinal data seeks to discover patterns and/or variations across groups of participants [University of Washington (UW), 2016]. Discovery of patterns and/or variations across groups can be accomplished throughout analysis of the group means and σ over a specific time interval can reveal whether the groups are changing in a similar or different fashion (UW, 2016).

If the means and mean differences increase, the intervention had a significant effect on knowledge building (UW, 2016). According to the UW (2016), the small improvements/increases in the means can only be seen by the observation over time (i.e., linear or longitudinal view).

Using correlation research design, differences in CT between program participants and the sample population used in the development of the WGCTA-FS instrument were conducted using a one-sample *t*-test. Using classical probability, sample spaced to determine the

probability of the event (i.e., the Span Program of orientation creates an increase in CT in participants) were conducted using descriptive analysis of all scores according to stage of WGCTA-FS (i.e., baseline to baseline, mid-point to mid-point, and post-program to post-program).

WGCTA-FS Development (Charter) Study

For the charter study of 1994 following the development of the WGCTA-FS, the sample included over sixteen hundred learners (*n*=1,608) from all industries and careers. The data analyzed in the study were participants' responses (Gadzella et al., 2005). The original five subscales were utilized, with the total CT appraisal score being summations of these subscale scores. These subscales included the inference, the recognition of assumption, the deduction, the interpretation, and the evaluation of arguments categories. The subscale format provided a more accurate estimate of individuals' overall proficiency with respect to attitudes, knowledge, and skills (Gadzella et al., 2005). According to Crites (1965) and Geisinger (1994), the subtest scores should not be used independently. Therefore, compliance with the subtest scores rule was noted AEB the charter study singular WGCTA-FS scores. Scores are raw number scores with no adjustments, but these raw number scores were not made available in the literature. Learners who are further along in their educational paths or professional development do better on the exam (Geisinger, 1994). Considerable evidence is provided that scores are positively affected by instructional experiences such as CT classes and lab centered science classes (Geisinger, 1994).

According to the WGCTA-FS manual (Watson & Glaser, 2008) supplied by the TalentLens Assessment, Pearson Education, Incorporated vendor, the internal consistency and test-retest reliability (or Cronbach's alpha coefficient) for the WGCTA-FS were both 0.81. The criterion-related validity was 0.30, which is interpreted as having a definite practical value via

the Watson & Glaser WGCTA-FS manual (2008). The Cronbach's alpha (α) for the total charter WGCTA-FS scores showed that the internal consistencies ranged from 0.74 to 0.92 and were within the ranges reported in the WGCTA-FS manual as having definite practical value. These numbers and ranges are acceptable as long as the instrument is used as one component in a more complex measurement process (Ivens, 1994). Tables 9 and 10 display the results of the charter group *t*-test.

Table 9

Charter Group Statistical Results: Comparison of Means and Standard Deviation on Baseline WGCTA-FS Scores

	N	Mean	Std. Deviation	Std. Error Mean
Mean	21	31.1305	2.66153	.58079

Table 10

Charter Group Statistical Results: One Sample t-test on Baseline WGCTA-FS Scores

	Test Value = 0					
	T	Df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Mean	53.600	20	.000	31.13048	29.9190	32.3420

***Span Program* (Dissertation) Study**

In the current *Span Program* dissertation study for the WGCTA-FS, the sample included a total of twenty-four participants with two of these excluded from the study for not meeting the requirements of inclusion. Differences in CT between the two study populations was calculated via the SPSS version 22.0 software starting with utilizing inferential stats to analyze the data through the compare means command and the independent samples *t*-test followed by a Cronbach's α coefficient calculation on the dissertation study WGCTA-FS results. Tables 11

through 13 display the comparison of means for the baseline WGCTA-FS scores and the findings of the one sample *t*-test on the same group.

Table 11

Dissertation Group Statistical Results: Comparison of Means and Standard Deviation on Baseline WGCTA-FS Scores

	N	Mean	Std. Deviation	Std. Error Mean
Baseline Scores	22	23.55	6.193	1.320

Table 12

Dissertation Group Statistical Results: One Sample t-test on Baseline WGCTA-FS Scores

	Test Value = 0					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Baseline Scores	17.832	21	.000	23.545	20.80	26.29

Table 13

Dissertation Group Statistical Results: Tests of Normality on Baseline WGCTA-FS Scores

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	Df	Sig.
Baseline	.080	22	.200*	.971	22	.741

*. This is a lower bound of the true significance.
a. Lilliefors Significance Correction

Options in included defining the *CI* as 95% with an α of 0.05 (α=0.05). With the limited information available to the researcher via literature searches on the charter study (population involved in the development of the WGCTA-FS sample), calculation results to address research question #2 can be found in the comparison Tables 14 and 15.

Tables 14 and 15 display internal consistencies measured via Cronbach's α indicated the criterion-related validity was 0.32, concluding that the WGCTA-FS instrument is deemed reliable since validity is 0.30 or better. The total WGCTA-FS scores for the dissertation study group showed that the internal consistencies ranged from 0.62 to 0.94 per Lambda, indicating definite practical value. The resulting Cronbach's α reliability coefficient was 0.938, indicating a greater internal consistency of the variables because the larger the number and its closeness to 1.00, the better the correlation or inter-reliability. Unfortunately, with the limited data found in the literature about the charter study (i.e., sample population studied during the development of the WGCTA-FS), the researcher found it difficult to tell if there were any differences between the two groups.

Table 14

Both Study Groups Statistical Results: Comparison of Aggregate Means and Standard Deviations

	N	M	SD
Charter	1,608	31.13	2.66
Dissertation	22	23.55	6.193

Table 15

Both Study Group Statistical Results: Comparison for Internal Consistencies

	Charter	Dissertation
Criterion Related Validity	0.30	0.32
Cronbach α	0.92	0.94

Research Question Number Three

Were age and degree status related to the development of critical thinking (in participants)? The age range of the dissertation study participants was twenty-one to twenty-nine years of age. The two degree statuses observed were the Associate and Bachelor prepared individuals. Most of the participants (77%) were BSN graduates (n=17) while the lesser number (23%) were AD graduates (n=5). To investigate whether age and/or degree status were related to the development of CT in these cohorts, calculations were conducted via the SPSS version 22.0 software to assess whether these two variables have any correlation to the aggregate, three staged (i.e., baseline, mid-point, and post-program) WGCTA-FS scores. The first correlation test performed was the Pearson's r, followed by the Spearman ρ to determine correlation coefficients. Tables 16 through 19 demonstrate the researcher's findings.

Table 16

Statistical Results for Correlation Between the Age Groups and the WGCTA-FS Scores of the Dissertation Sample

		Age Group	Avg Score
Age Group	Pearson Correlation	1	-.355
	Sig. (2-tailed)		.105
	N	22	22
Avg Score	Pearson Correlation	-.355	1
	Sig. (2-tailed)	.105	
	N	22	22

Table 17

Statistical Results for Correlation Coefficient between the Age Groups and the WGCTA-FS Scores of the Dissertation Sample

			Age Group	Avg Score
Spearman's ρ	Age Group	Correlation Coefficient	1.000	-.426*
		Sig. (2-tailed)		.048
		N	22	22
	Avg Score	Correlation Coefficient	-.426*	1.00
		Sig. (2-tailed)	.048	
		N	22	22

*. Correlation is significant at the 0.05 level (2-tailed).

Table 18

Statistical Results for Correlation between the Degree Groups and the WGCTA-FS Scores of the Dissertation Sample

		Degree Group	Avg Score
Degree Group	Pearson Correlation	1	.239
	Sig. (2-tailed)		.283
	N	22	22
Avg Score	Pearson Correlation	.239	1
	Sig. (2-tailed)	.283	
	N	22	22

Table 19

Statistical Results for Correlation Coefficients between the Degree Groups and the WGCTA-FS Scores of the Dissertation Sample

			Degree Group	Avg Score
Spearman's ρ	Degree Group	Correlation Coefficient	1.000	.257
		Sig. (2-tailed)		.249
		N	22	22
	Avg Score	Correlation Coefficient	.257	1.000
		Sig. (2-tailed)	.249	
		N	22	22

Tables 16 through 19 demonstrate the Pearson correlation, which can be found in the top row. The correlation value of interest is the number other than '1', which is (-0.355) for the age variable and 0.239 for the degree variable. Probability is around 10.5% for age and 28.3% for degree. Spearman's ρ is interpreted in a similar fashion. The correlation values of interest were (-0.426) for the age variable and 0.257 for the degree variable with probability being 4% & 24.9%, respectively. Correlation is significant at 0.05 (α=0.05), so there is no statistical significance between age and the WGCTA-FS scores. However, there is a greater probability of a correlation between degree and the WGCTA-FS scores than age.

Research Question Four

What were the differences in critical thinking between the 2015 original and 2016 revised Span Program participants as measured by the WGCTA-FS instrument? To address research question number four, data analysis using the SPSS version 22.0 software was required to determine the differences in CT as measured by the WGCTA-FS instrument in the participants of the 2015 year cohort and the two 2016 year cohorts. Aggregate WGCTA-FS scores were the

variables used for each cohort year. A two factor RM ANOVA was calculated for two points in time (one for the 2015 and one for the 2016 cohorts). The within subjects variables consisted of the WGCTA-FS scores for two separate years already fore-mentioned. The GLM was used to assess the repeated measures via a full factorial model with Type III sum of squares. Comparison included main effects and confidence interval adjustment to Bonferroni. Significance level remained 0.05, making confidence intervals 95%. Results of these calculations are reflected in Tables 20 through 25, as well as Figure 4.

Table 20

Statistical Results for Measuring Differences in WGCTA-FS Scores Between the 2015 and 2016 Cohorts: Comparison of the Means and Standard Deviations

	Mean	Std. Deviation	N
2015	22.85	6.305	33
2016	24.33	5.549	33

Table 21

Statistical Results for Measuring Differences in WGCTA-FS Scores Between the 2015 and 2016 Cohorts: Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power[c]
Years	Pillai's Trace	.026	.847[b]	1.000	32.000	.364	.026	.847	.145
	Wilks' Lambda	.974	.847[b]	1.000	32.000	.364	.026	.847	.145
	Hotelling's Trace	.026	.847[b]	1.000	32.000	.364	.026	.847	.145
	Roy's Largest Root	.026	.847[b]	1.000	32.000	.364	.026	.847	.145

a. Design: Intercept; Within Subjects Design: Years
b. Exact statistic
c. Computed using alpha = 0.05

Table 22

Statistical Results for Measuring Differences in WGCTA-FS Scores Between the 2015 and 2016 Cohorts: Mauchly's Test of Sphericity[a]

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	Df	Sig.	Epsilon[b]		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Years	1.000	.000	0		1.000	1.000	1.000

Note. Measure: MEASURE_1
Note. Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.
a. Design: Intercept; Within Subjects Design: Years
b. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

Table 23

Statistical Results for Measuring Differences in WGCTA-FS Scores Between the 2015 and 2016 Cohorts: Within Subjects Effect

Source		Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power[a]
Years	Sphericity Assumed	36.379	1	36.379	.847	.364	.026	.847	.145
	Greenhouse-Geisser	36.379	1.000	36.379	.847	.364	.026	.847	.145
	Huynh-Feldt	36.379	1.000	36.379	.847	.364	.026	.847	.145
	Lower-bound	36.379	1.000	36.379	.847	.364	.026	.847	.145
Error	Sphericity Assumed	1375.121	32	42.973					
(Years)	Greenhouse-Geisser	1375.121	32.000	42.973					
	Huynh-Feldt	1375.121	32.000	42.973					
	Lower-bound	1375.121	32.000	42.973					

Note. Measure: MEASURE_1
a. Computed using alpha = 0.05

Table 24

Statistical Results for Measuring Differences in WGCTA-FS Scores Between the 2015 and 2016 Cohorts: Estimated Marginal Means

Years	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1	22.848	1.098	20.613	25.084
2	24.333	.966	22.366	26.301

Note. Measure: MEASURE_1

Table 25

Statistical Results for Measuring Differences in WGCTA-FS Scores Between the 2015 and 2016 Cohorts: Pairwise Comparisons

(I) Years	(J) Years	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	
					Lower Bound	Upper Bound
1	2	-1.485	1.614	.364	-4.772	1.802
2	1	1.485	1.614	.364	-1.802	4.772

Note. Measure: MEASURE_1
Note. Based on estimated marginal means
a. Adjustment for multiple comparisons: Bonferroni.

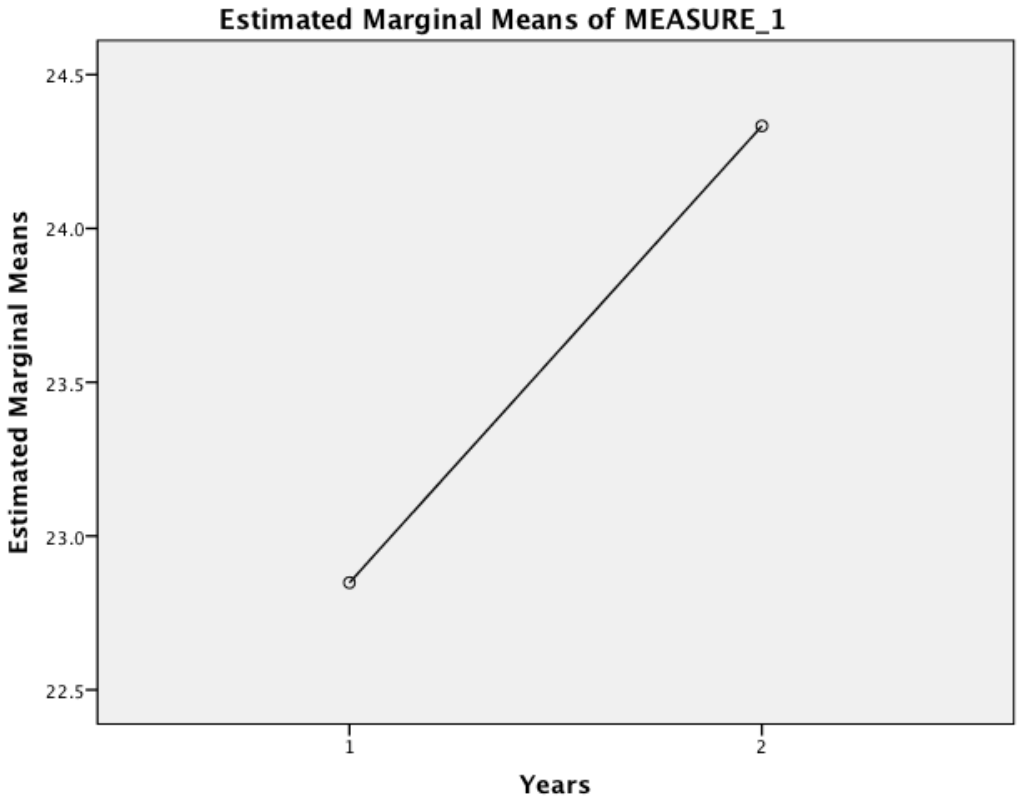

Figure 4. Statistical results for measuring differences in WGCTA-FS scores between the 2015 and 2016 cohorts: Profile plot.

Comparison of the means and the *SD*s of these data in Table 13 indicate that there were differences in the mean between the two years of WGCTA-FS scores under consideration (i.e., 2015 and 2016 cohorts). The increase in mean from the first year to the next is reflected but is not statistically significant. In Table 14, Wilks' Lambda indicates there is no statistically significant multivariate mean difference within subjects since $p>\alpha$ [i.e., ($p=0.364$)>($\alpha=0.05$)].

Mauchly's test of sphericity is displayed in Table 15 indicates a p value less than the α [($p=0.00$)<($\alpha=0.05$)]. Therefore, the assumption of sphericity has not been met and has been violated. Epsilon results were considered by looking at the sum of squares in Table 16. The 'year' variable results were all the same at 198.125 yet the degrees of freedom (*df*) were all different for each source for the same variable. The observed power column within the same

table tells the researcher whether or not the test is powerful enough to detect mean differences. If mean differences really do exist in the calculation, the observed power column will be 1.0 or close to 1.0. With a result of 0.145, the researcher can assume that there is a weak ability to detect mean differences.

The Epsilon 'lower bound' number in Table 15 determines homogeneity. The number is computed by within subjects factors, as well as the number's distance from 1.0. The lower bound number is1.00 and is therefore definitely homogenous.

Table 16 displays the estimated marginal means, but also reports the standard error (*SE*) and 95% confidence interval (*CI*). Table 17 demonstrates pairwise comparisons as it relates to research question four. The *p* value here (p=0.364) provides the results of the Bonferroni post hoc procedure and reflects that there is no statistically significant mean difference between the two years (i.e., 2015 cohort, 2016 cohorts) of WGCTA-FS scores [($p<\alpha$=significant difference) whereas ($p>\alpha$= no significant difference) if (α=0.05)].

Summary

In the previous section, calculations of all data were conducted utilizing the SPSS version 22.0 software in efforts to answer the four research questions of the dissertation study. Methodology of analysis has been revealed and results displayed in multiple formats. The following chapter reveals significant findings and limitations of the study, hosts a discussion of these findings, explores the implications of the research, and presents recommendations from the researcher for future studies.

CHAPTER V:

DISCUSSION OF RESEARCH RESULTS

Significant Findings

To address the first research question results, there were no differences throughout the three different points in time (i.e., baseline, mid-point, and post-program) as measured by WGCTA-FS scores. There were no statistical significance multivariate mean differences within subjects. Observing the figures created from the data, the points of each Q-Q Plot lie close to their respective diagonal lines displaying normally distributed population of the data groups which meets classical probability criteria (see Appendix Q).

To address the second research question findings, no differences were found in the WGCTA-FS scores between the charter sample and the dissertation sample of participants. The means and mean differences did not increase which suggest no increase in CT. Calculations indicated good validity with these results. To address the third research question calculations, the data indicated a positive correlation with greater probability between degree status and the WGCTA-FS scores but there is no statistical significance between age and the WGCTA-FS scores. To address the fourth research question analysis, there were differences between the two years of WGCTA-FS scores under consideration (i.e., 2015 cohorts, 2016 cohorts) AEB the difference in observed means. There is no statistically significant difference within subjects and the assumption of sphericity has been violated. The researcher assumes that there is a weak ability to detect mean differences for the calculation but the calculation is definitely homogenous.

Limitations

A closed cohort design (i.e., one with a fixed population) was employed by the researcher secondary to convenience sampling, with comparative analysis between original program and revised program cohorts. Dividing the groups into cohorts could limit the study as there is no control group, which may restrict the ability to establish a relationship between change in CT and participation in the educational program (McMullen & McMullen, 2009; Park & Jones, 2010). Due to the lack of randomization in the cohort design, the external validity is considerably lower than other study designs not utilizing cohorts (Creswell, 2009). The study was also limited by the use of a convenience sample (Elfrink Cordi, Leighton, Ryan-Wenger, Doyle, and Ravert, 2012).

The number of cohorts was originally dependent on the number of participants needed to reach recommended number of 100 participants as determined by G-power analysis. The host institution made a decision to revise the *Span Program* between 2015 and 2016, making the last cohort of 2015 (October group of eleven NLRNs) the original program participants. With these changes in format to offer the NLRN orientation program monthly and additions to the curriculum, the first two cohorts of 2016 (January and February groups, totaling eleven NLRNs) became the revised program participants. Therefore, participants consisted of only three groups of NLRNs at the host institution. The low number of participants was a definitive threat to validity and contributed to low or lack of significance in findings or Type II error.

Another challenge of the linear/longitudinal study was participant follow up. According to the faculty at the University of Washington (UW) (2016), there is always a risk of bias due to incomplete follow up or 'drop out' of study participants. Faculty at the UW (2016) also concluded if subjects that were followed to the planned end of the study differ from subjects who

discontinue follow up, the risk of naive analysis provides summaries that were not representative of the original target population. The analysis of correlated data needs to be considered since the statistical analysis of linear/longitudinal data requires methods needed to properly account for intra-subject correlation of response measurements (UW, 2016). Per faculty at the UW (2016), ignoring these correlations can cause is ignored inference via statistical tests or confidence intervals may be invalid. A final limitation might be time varying covariates. Although longitudinal designs offer the opportunity to associate changes in exposure with changes in the outcome of interest, the direction of causality can be complicated by "feedback" between the outcome and the exposure (UW, 2016, p. 3).

Within the dissertation study, the limitation experienced was the incomplete follow up by two of the participants. Some literature suggests utilizing accepted methods for the "missing-ness" (UW, 2016, p. 53). The faculty at the UW (2016) writes that missing data can lead to biased estimates of means and/or regression parameters when the probability of missing-ness is associated with outcomes. Despite having opportunities to classify the missing data via missing data mechanisms, the PI decided to continue the study without making any changes or additions to the raw data. No imputation, modeling, and/or weighting of missing data were included in the dissertation study for the two participants who were not able to complete the requirements.

Another limitation to consider was the inability of the researcher to control exposure and access of the participants to patient care. The original design of the *Span Program* had very little time for the participant on their home unit in between orientation sessions. These sessions were on consecutive weeks, totally nine for completion. The revised version of the *Span Program* was spread out over a year's timeframe, leaving more opportunity for the development of CT in between structured orientation sessions. Increased exposure to patient care might have given the

revised orientation NLRNs an advantage to CT skill acquisition when compared to the original orientation participants.

Discussion

The findings of the study indicated the researcher was not able to conclusively establish concrete relationship with the aggregate WGCTA-FS scores of the dissertation participants and the introduction or intervention of the *Span Program* of orientation. The only significant finding for the analysis was the evidence of normality of the sample distribution in the Q-Q plots. The PI was not able to establish significant differences between the WGCTA-FS charter study group and the dissertation study. With respect to whether degree status or age has any influence or correlation to WGCTA-FS outcomes, the researcher was able to conduct analysis that suggested a positive correlation with greater probability between degree status and WGCTA-FS scores but there is no statistical significance between WGCTA-FS scores and age. Findings by the PI indicated that there was no differences in critical thinking between the original 2015 *Span Program* participants and revised 2016 orientation program participants for NLRNs at the host institution.

Implications

For research purposes, the findings of the study implicated that progression of CT cannot be accurately measured in the NLRN *Span Program* using the WGCTA-FS instrument. However, when the dissertation study group was compared to the charter study group of the WGCTA-FS development, the results were inconclusive. Therefore, the measurement of CT remains evasive. Building a safe patient care environment and strong CT work force is important to the PI. The researcher will continue to assist NLRNs in the CT knowledge acquisition process while working with these individuals as a preceptor and unit based trainer.

For the participants, the findings of the study and its benefits to the participants were somewhat inconclusive. If the WGCTA-FS contains forty (40) questions, a score of '40' would be considered a perfect score. Looking at the raw scores of the three staged WGCTA-FS indicates some forward progression in CT knowledge acquisition (AEB by continuous rise in scores from baseline to mid-point to post-program) in only three (3) NRLNs. The majority of the NRLNs scores actually dropped from baseline to mid-point or from mid-point to post-program or from baseline to post-program. One implication of that study might be that the participants of NRP may require more attention and assistance as noted in the literature during the on-boarding process. Hopefully, the integration of orientation concepts into practice will continue to expand the NLRN's baseline CT knowledge while moving from advance beginner to expert nurse.

For the host institution, the findings of the study and its relationship to the host institution were not conclusive. The raw scores of the three staged WGCTA-FS implicated that the host institution might have benefitted from creating and changing the delivery format of their NLRN orientation. Considering the 2015 participants' scores to the 2016 participants' scores, there seems to be a slight improvement from the original and revised *Span Program* format outcomes AEB the averaged post-program score of the 2015 cohort being 23.3 compared to the 2016 cohorts' 23.6 score. Nonetheless, the progressive measurement of CT growth in the study participants is not necessarily evident in the results of the study.

For nursing, the findings of the study implicated that it remains important for the nursing community to be able to assess the CT ability of NLRNs in a progressive fashion. The outcomes of the dissertation study were unable to yield any positive results about such progression. According to Kirkman (2011), members of nursing faculty desire to produce graduates that are

proficient in providing safe patient care after graduation. NLRN programs in the future can only aspire to produce such outcomes.

Conclusions

The benefits of linear and/or longitudinal studies can be very meaningful and conclusive, especially to the health care community. According to UW (2016), some of these benefits include recording of incident events, prospective ascertainment of exposure, measurement of individual change in outcomes, separation of time effects by cohort/period/age, and control for cohort effects.

Based on the analysis of the data and the limitations noted, preliminary benefits and conclusions are offered. It is unfortunate that the study was not entirely conclusive secondary to some of the limitations experienced during its conception and implementation. Exposure to the dissertation study and gained experience through the process has been very beneficial for the PI. There are more than ample opportunities in the future to continue the work associated with CT and NLRNs, to which the researcher looks forward. Working through the challenges associated with a voluntary participant based study can be difficult. Utilizing the cohort design, as well as attempting to control the effects on the cohorts, was helpful. Studies over time would possibly yield greater significance in answering the research questions.

As a whole, outcome measurements continue to be evasive to the nursing community. Outcome measurement is specifically challenging in nursing education and academe. Contributing to professional nursing practice should be a welcomed opportunity for all those involved in the industry; from students to the advanced beginner (i.e., NRLNs), to the expert nurses (i.e., seasoned and experienced), and to those who chose every day to walk the nursing career path.

Recommendations

Measuring and addressing the outcomes of the teaching strategies of the NLRN orientation program on its participants might assist the program coordinator and director with determining the need for curriculum updates or confirm whether CT requirements have been met. One would hope that CT ability of the participants would increase from the beginning to the end of any orientation program (McCarthy et al., 1999). After reviewing and discussing the results of the study, the PI has identified areas for recommendations for future research studies. The recommendations are as follows.

The sample for the study consisted of only twenty-two (n=22) NLRNs, which did not meet the recommendations of sample size necessary to maintain the desired power level as predetermined by the analysis of power. The analysis of power projected a need for one hundred (n=100) subjects and the plan was not realistic when the host institution made changes to the delivery format in the *Span* orientation program. The researcher suggests using a larger population in future studies to generate trustworthiness and validity of the study results.

The sample for the study consisted of NLRNs from the host institution. Convenience samples tend to be homogenous with the local nursing population. The researcher suggests using multiple sites to generate more heterogeneity in the participants.

The research setting was conducted at the same institution where the PI was currently employed. The convenience location may have produced results that could be skewed secondary to the researcher's familiarity with the *Span Program* and/or the participants due to all parties being employed by the host institution.

The sample was voluntary and may not be representative of the desired population. The participants who chose to contribute to the data collection might be those who were already

confident with their CT skills and/or their test taking ability. The sample might also include only those participants who have had great success already in their academic career; thus, weighting the results towards academic scholars (or vice versa).

Since the sample was voluntary and two participants failed to complete the study, the researcher recommends a more controlled and/or supportive environment to gain cooperation from the participants with commitments made to the study. Despite offering incentives, the low participation rate and omission of two participants could or might have jeopardized the study results.

Demographic data could yield some interesting results related to age and/or academic status. The researcher suggests utilizing the information in future studies to assess the direct influence of these variables on the development and progression of CT skills. An additional possible variable to consider in future studies might be participants coming from various acuity levels (i.e., acute vs. intensive care, for instance) as it relates to the development of CT.

With consideration to the Span Program data collection running over a short nine week timeframe, administration of the mid-point WGCTA-FS could be omitted. The baseline and post-program scores might yield the same results and avoid exam or survey fatigue.

Collection of the data was done at three precise points in time. The researcher suggests an additional data collection of the same WGCTA-FS at a future, designated point in time. Perhaps a follow up data collection at the end of the NLRN's probationary period or on their one year anniversary from their date of hire would yield further information as to whether (or not) if CT skills increase over time in the practice. The longer length of time might also avoid exam or survey fatigue as well.

Finally, future studies that include measurement of the active phase of the ELT should be considered. The ELT has many facets of opportunity to grow a better understanding of learning that have yet to be investigated.

It is the hope of the researcher that the collection of these data can not only be utilized for detailed analysis through exploration, but provide for the possibility of future comparative, correlation, cross-sectional, retrospective, and/or longitudinal studies. It is also the hope of the researcher that the dissertation study produced results that can make a difference in how nurse educators measure CT future NLRN orientation programs.

Summary

Changes in patient status/acuity and uncertainty about the appropriate course of action serve as an educational opportunity for the novice nurse to learn CT (Fero et al., 2008) and quality assessment skills. The core competency of communication skills is required for establishing relationships with patients, interdisciplinary collaboration for informed practice, and addressing quality improvement issues to improve care and ensure patient safety and involves written documentation, listening, and verbal and nonverbal skills (Todd et al., 2008). The CT core competency is essential for critical appraisal, analysis, application, and dissemination of evidence-based practice and information utilization (Todd et al., 2008). By engaging new nurses in real-life patient care situations that require their full participation, simulation is a powerful way to simulate CT (Garrett et al., 2010). The diversity of real work experience cannot be fully recreated despite efforts to build new nurse competence through the simulation environment and its contexts (Blum, Borglund, & Parcells, 2010).

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APPENDIX A:

COA HOSPITAL NEW GRADUATE NURSE PROGRAM RATIONALE, REQUIREMENTS, FRAMEWORK, AND COMPETENCIES

Point of Hire: Acute Care or Critical Care

Rationale for program:

Graduation schedules from various schools of nursing will most likely not guarantee that a nurse will have time to graduate, receive approval from the Board of Nursing to test, schedule the test, take the test, and get approval for license back from the ABN by the second week in July. Therefore, the number of qualified applicants with a license in-hand may be small.

Best evidence demonstrates that optimal orientation occurs with blended, interactive learning. The use of case studies, case scenarios, and case simulations is recommended in conjunction with didactic discussions. When scenario/simulations are used in teaching, small group size is essential in order for all learners to have equal and active participation. For example, the American Heart Association limits the number of instructors- to- learners to a 1 to 6 ratio for all their interactive skills classes. Additionally, all nurse educators and the simulation center itself are busy now, and will be even more involved, with education/training for the transition to the expansion facility.

Yearly Admissions: cohorts admitted for in February, July, and October each year

Length of Program: 9 weeks

Components: Didactic and Clinical

Experiences include, but are not limited to:

- Shadowing (areas along patient care continuum and leadership experiences)
- Core classes (includes didactic, skills and a variety of learning activities)
- CHEX modules and other classes as needed (i.e. IT classes)
- Simulations, including debriefings
- Role play/case scenarios
- UBTS preceptor

Requirements:

- A registered nursing degree from an accredited nursing program
- Graduated from a nursing program within last 6 months
- Minimum GPA --3.0
- AL Registered Nurse license (passed NCLEX-RN)
- Current BLS training

Framework: Patricia Benner: *From Novice to Expert: Excellence and Power in Clinical Nursing Practice*

- *Knowledge* base moves from abstract textbook principles to concrete experiences
- *Thinking* moves from an analytic, rule-based process to an intuitive, flexible one
- *Perceptions* of patient situations moves from seeing the patient as a sum of equally relevant elements to a complex whole with some elements being more salient than others
- *Actions* go from being a detached observer to an involved performer Stages*:
  - Novice
  - Advanced beginner
  - Competent

- Proficient
- Expert

*The COA New Graduate Program assists nurses to move from novice to advanced beginner.

Competencies [Quality and Safety Education for Nurses (QSEN), 2010]**:**

Family (Patient)-centered care

Teamwork and collaboration

Evidence-based practice

Quality improvement

Safety

Informatics (technology

Patient and Family-Centered Care		
Definition: Recognize the patient or designee as the source of control and full partner in providing compassionate and coordinated care based on respect for patient's preference, values, and needs.		
Knowledge	**Skills**	**Attitudes**
Integrate understanding of multiple dimensions of patient centered care: • Patient/family/community preferences, values, and needs • Coordination and integration of care • Information, communication, and education • Physical comfort and emotional support • Involvement of family and friends • Transition and continuity	Elicit patient values, preferences and expressed needs as part of clinical interview, implementation of care plan and evaluation of care Communicate patient values, preferences, and expressed needs to other members of health care team	Value seeing health care situations "through patients' eyes" Respect and encourage individual expression of patient values, preferences, and expressed needs Value the patient's expertise with own health and symptoms
Describe how diverse cultural, ethnic, and social backgrounds function as sources or patient, family, and community values	Provide patient-centered care with sensitivity and respect for the diversity of human experience	Seek learning opportunities with patients who represent all aspect of human diversity Recognize personally held attitudes about working with patients from different ethnic, cultural and social backgrounds Willingly support patient-centered care for individuals and groups whose values differ from own
Demonstrate comprehensive understanding of the concepts of pain and suffering, including physiologic models of pain and comfort	Assess presence and extent of pain and suffering Assess levels of physical and emotional comfort Elicit expectations of patient & family for relief of pain, discomfort, or suffering Initiate effective treatment to relieve pain and suffering in light of patient values, preferences, and expressed needs	Recognize personally held values and beliefs about the management of pain of suffering Appreciate the role of the nurse in relief of all types and sources of pain or suffering Recognize that patient expectations influence outcomes in management of pain or suffering

Examine how the safety, quality, and cost effectiveness of health care can be improved through the active involvement of patients and families Examine common barriers to active involvement of patients in their own health care processes Describe strategies to empower patients or families in all aspects of the health care process	Remove barriers to presence of families and other designated surrogates based on patient preferences Assess level of patient's decisional conflict and provide access to resources Engage patients or designated surrogates in active partnerships that promote health, safety, well-being, and self-care management	Value active partnership with patients or designated surrogates in planning, implementation, and evaluation of care Respect patient preferences for degree of active engagement in care process Respect patient's right to access to personal health records
Explore ethical and legal implications of patient-centered care Describe the limits and boundaries of therapeutic patient-centered care	Recognize the boundaries of therapeutic relationships Facilitate informed patient consent for care	Acknowledge the tension that may exist between patient rights and the organizational responsibility for professional, ethical care Appreciate shared decision-making with empowered patients and families, even when conflicts occur
Discuss principles of effective communication Describe basic principles of consensus building and conflict resolution Examine nursing roles in assuring coordination, integration, and continuity of care	Assess own level of communication skill in encounters with patients and families Participate in building consensus or resolving conflict in the context of patient care Communicate care provided and needed at each transition in care	Value continuous improvement of own communication and conflict resolution skills

Teamwork and Collaboration		
Definition: Function effectively within nursing and inter-professional teams, fostering open communication, mutual respect, and shared decision-making to achieve quality patient care.		
Knowledge	**Skills**	**Attitudes**
Describe own strengths, limitations, and values in functioning as a member of a team	Demonstrate awareness of own strengths and limitations as a team member Initiate plan for self-development as a team member Act with integrity, consistency and respect for differing views	Acknowledge own potential to contribute to effective team functioning Appreciate importance of intra- and inter-professional collaboration
Describe scopes of practice and roles of health care team members Describe strategies for identifying and managing overlaps in team member roles and accountabilities Recognize contributions of other individuals and groups in helping patient/family achieve health goals	Function competently within own scope of practice as a member of the health care team Assume role of team member or leader based on the situation Initiate requests for help when appropriate to situation Clarify roles and accountabilities under conditions of potential overlap in team member functioning Integrate the contributions of others who play a role in helping patient/family achieve health goals	Value the perspectives and expertise of all health team members Respect the centrality of the patient/family as core members of any health care team Respect the unique attributes that members bring to a team, including variations in professional orientations and accountabilities
Analyze differences in communication style preferences among patients and families, nurses and other members of the health team Describe impact of own communication style on others Discuss effective strategies for communicating and resolving conflict	Communicate with team members, adapting own style of communicating to needs of the team and situation Demonstrate commitment to team goals Solicit input from other team members to improve individual, as well as team, performance Initiate actions to resolve conflict	Value teamwork and the relationships upon which it is based Value different styles of communication used by patients, families and health care providers Contribute to resolution of conflict and disagreement
Describe examples of the impact of team	Follow communication practices that minimize risks associated with handoffs among providers and across transitions in care	

functioning on safety and quality of care Explain how authority gradients influence teamwork and patient safety	Assert own position/perspective in discussions about patient care Choose communication styles that diminish the risks associated with authority gradients among team members	Appreciate the risks associated with handoffs among providers and across transitions in care
Identify system barriers and facilitators of effective team functioning Examine strategies for improving systems to support team functioning	Participate in designing systems that support effective teamwork	Value the influence of system solutions in achieving effective team functioning

Evidence-based Practice (EBP)		
Definition: Integrate best current evidence with clinical expertise and patient/family preferences and values for delivery of optimal health care.		
Knowledge	**Skills**	**Attitudes**
Demonstrate knowledge of basic scientific methods and processes Describe EBP to include the components of research evidence, clinical expertise and patient/family values.	Participate effectively in appropriate data collection and other research activities Adhere to Institutional Review Board (IRB) guidelines Base individualized care plan on patient values, clinical expertise and evidence	Appreciate strengths and weaknesses of scientific bases for practice Value the need for ethical conduct of research and quality improvement Value the concept of EBP as integral to determining best clinical practice
Differentiate clinical opinion from research and evidence summaries Describe reliable sources for locating evidence reports and clinical practice guidelines	Read original research and evidence reports related to area of practice Locate evidence reports related to clinical practice topics and guidelines	Appreciate the importance of regularly reading relevant professional journals
Explain the role of evidence in	Participate in structuring	Value the need for

determining best clinical practice Describe how the strength and relevance of available evidence influences the choice of interventions in provision of patient-centered care	the work environment to facilitate integration of new evidence into standards of practice Question rationale for routine approaches to care that result in less-than-desired outcomes or adverse events	continuous improvement in clinical practice based on new knowledge
Discriminate between valid and invalid reasons for modifying evidence-based clinical practice based on clinical expertise or patient/family preferences	Consult with clinical experts before deciding to deviate from evidence-based protocols	Acknowledge own limitations in knowledge and clinical expertise before determining when to deviate from evidence-based best practices

Quality Improvement (QI)		
Definition: Use data to monitor the outcomes of care processes and use improvement methods to design and test changes to continuously improve the quality and safety of health care systems.		
Knowledge	**Skills**	**Attitudes**
Describe strategies for learning about the outcomes of care in the setting in which one is engaged in clinical practice	Seek information about outcomes of care for populations served in care setting Seek information about quality improvement projects in the care setting	Appreciate that continuous quality improvement is an essential part of the daily work of all health professionals
Recognize that nursing and other health professions students are parts of systems of care and care processes that affect outcomes for patients and families Give examples of the tension between professional autonomy and system functioning	Use tools (such as flow charts, cause-effect diagrams) to make processes of care explicit Participate in a root cause analysis of a sentinel event	Value own and others' contributions to outcomes of care in local care settings
Explain the importance of variation and measurement in assessing quality of care	Use quality measures to understand performance Use tools (such as control charts and run	Appreciate how unwanted variation affects care Value measurement and its role in good patient care

	charts) that are helpful for understanding variation Identify gaps between local and best practice	
Describe approaches for changing processes of care	Design a small test of change in daily work (using an experiential learning method such as Plan-Do-Study-Act) Practice aligning the aims, measures and changes involved in improving care Use measures to evaluate the effect of change	Value local change (in individual practice or team practice on a unit) and its role in creating joy in work Appreciate the value of what individuals and teams can to do to improve care

Safety		
Definition: Minimizes risk of harm to patients and providers through both system effectiveness and individual performance.		
Knowledge	**Skills**	**Attitudes**
Examine human factors and other basic safety design principles as well as commonly used unsafe practices (such as, work-arounds and dangerous abbreviations) Describe the benefits and limitations of selected safety-enhancing technologies (such as, barcodes, Computer Provider Order Entry, medication pumps, and automatic alerts/alarms) Discuss effective strategies to reduce reliance on memory	Demonstrate effective use of technology and standardized practices that support safety and quality Demonstrate effective use of strategies to reduce risk of harm to self or others Use appropriate strategies to reduce reliance on memory (such as. forcing functions, checklists)	Value the contributions of standardization/ reliability to safety Appreciate the cognitive and physical limits of human performance
Delineate general categories of errors and hazards in care Describe factors that create a culture of safety (such as, open communication	Communicate observations or concerns related to hazards and errors to patients, families and	Value own role in preventing errors

strategies and organizational error reporting systems)	the health care team Use organizational error reporting systems for near miss and error reporting	
Describe processes used in understanding causes of error and allocation of responsibility and accountability (such as, root cause analysis and failure mode effects analysis)	Participate appropriately in analyzing errors and designing system improvements Engage in root cause analysis rather than blaming when errors or near misses occur	Value vigilance and monitoring (even of own performance of care activities) by patients, families, and other members of the health care team
Discuss potential and actual impact of national patient safety resources, initiatives and regulations	Use national patient safety resources for own professional development and to focus attention on safety in care settings	Value relationship between national safety campaigns and implementation in local practices and practice settings

Informatics		
Definition: Use information and technology to communicate, manage knowledge, mitigate error, and support decision-making.		
Knowledge	**Skills**	**Attitudes**
Explain why information and technology skills are essential for safe patient care	Seek education about how information is managed in care settings before providing care Apply technology and information management tools to support safe processes of care	Appreciate the necessity for all health professionals to seek lifelong, continuous learning of information technology skills
Identify essential information that must be available in a common database to support patient care Contrast benefits and limitations of	Navigate the electronic health record Document and	Value technologies that support clinical decision-making, error prevention, and care coordination

different communication technologies and their impact on safety and quality	plan patient care in an electronic health record Employ communication technologies to coordinate care for patients	Protect confidentiality of protected health information in electronic health records
Describe examples of how technology and information management are related to the quality and safety of patient care Recognize the time, effort, and skill required for computers, databases and other technologies to become reliable and effective tools for patient care	Respond appropriately to clinical decision-making supports and alerts Use information management tools to monitor outcomes of care processes Use high quality electronic sources of healthcare information	Value nurses' involvement in design, selection, implementation, and evaluation of information technologies to support patient care

QSEN References

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Other References/Resources:

- Site Visit to UAB re: Orientation
- *Nurse Residency Program Builder, Tools for a Successful New Graduate Program* by

  Jim Hansen, MSN, RN-BC, HcPro, 2011

- *From Novice to Expert; Excellence and Power in Clinical Nursing Practice* by Patricia Benner, 2001
- Phoenix Children's GAPP program
- CHCA Collaborative: Nursing Orientation Curriculum and Model

APPENDIX B:

THE *SPAN PROGRAM* CURRICULUM MAP

TITLE	Class Type	Current Curriculum	Proposed Curriculum
Children's Organization and Charitable Foundation	Instructor led	X	X
Corporate Compliance	Instructor led	X	X
HIPAA	Instructor led	X	X
Quality & Safety (Risk Management & Performance Improvement)	Instructor led	X	X
Basic Life Support	Instructor led & CBT	X	X
Restraint and Seclusion	Instructor led	X	X
MRI Safety	Video	X	X
Introduction to Workplace Diversity	CBT 15 min	X	X
Workplace Violence	CBT	X	X
Benefits/Payroll	Instructor led	X	X
Employee Wellness	Instructor led	X	X
Employee Health	Instructor led	X	X
Emotional Wellness	Instructor led	X	X
Infection Control	Instructor led	X	X
Bloodborne Pathogens	CBT	X	X
Hand Hygiene/Just-In-Time Coach/Clean Hands Club	Instructor led & CBT	X	X
Fire/Safety/Security (Environment of Care)	Instructor led	X	X
Disaster and Emergency Management	CBT	X	X
Electrical Safety	CBT	X	X
Fire Safety	CBT	X	X
Hazardous Chemicals	CBT	X	X
Infectious Waste and Decontamination	CBT	X	X
Growth and Development	Instructor led	X	X
Nursing Philosophy, Mission/Vision/Value	Instructor led	X	X
Nursing Interdisciplinary Model of Care	CBT	X	X
Quality/Safety			
Evidence Based Practice and Research	Instructor led	X	X
Mock Code Review	Instructor led	X	X
Emergency Cart & Checklist	CBT & Instructor led	X	X
Roles & Responsibilities	Instructor led	X	X
Code of Ethics	CBT & Instructor led	X	X
Social Media	Video	X	X
Child Abuse and Neglect v4.0	CBT	X	X
Red Flags for Child Abuse	Video	X	X
Pre-Op Surgical Care	Instructor led	X	X
Child Safety and Information Center (Patient Teaching & Car Seats)	Instructor led	X	X

Palliative Care	Video & Instructor led	X	X
Pediatric Physical Assessment	Instructor led	X	X
Principles of Documentation	CBT/Instructor led	X	X
Medication Compatibility & Administration of IV Drugs	CBT	X	X
Medication Calculations	Instructor led	X	X
Medication Error Reduction	CBT	X	X
Insulin Therapy	CBT	X	X
Vascular Access: Central Venous Line Devices	CBT	X	X
Vascular Access: Central Venous Line Devices	CBT & Instructor led	X	X
PICC Care and Management	CBT	X	X
Bed-Side Testing	CBT	X	X

Technology:			
Introduction to Children's of Alabama Computer Systems	CBT	X	X
iConnection 101 Assessment	CBT	X	X
ChartMaxx: Chart Navigator	CBT	X	X
iConnect 100: Introduction to iConnect Acute Care	CBT	X	X
iConnect (Orders & Results; eMAR; ClinDoc; CPOE)	Instructor led	X	X
Blood Administration: Administration of Blood and Blood Components	CBT	X	X
Blood Administration: Tranfusion Reaction	CBT	X	X
Blood Gas: Introduction to Arterial Blood Gas Interpretation	CBT	X	X
Moderate Sedation in the Pediatric Patient	CBT	X	X
Organ and Tissue Donation: The Gift of Life	CBT	X	X
Pain Mgmt: Assessement of Pain	CBT	X	X
Pain Mgmt: Pharmacological Management of Pediatric Pain	CBT	X	X
Pain Mgmt: Non-Pharmacological Therapies in the Management of Ped. Pain	CBT	X	X
Care of the Hospitalized Neonate	CBT	X	X
Managing Psychosocial, Spiritual, & Cultural Diversity in Patient Care	CBT	X	X
Neonatal/Pediatric Thermoregulation	CBT	X	X
Pediatric Nutrition	CBT	X	X
Pediatric/Neonatal Transpyloric Type Placement	CBT	X	X
SBAR: Effective Communication	CBT	X	X
SIDS Risk Reduction	CBT	X	X
Accu Chek Assessment	Instructor led	X	X
Asthma Education	Instructor led	X	X
Tracheostomy Management and Emergency Reinsertion	Instructor led	X	X
Problem Feeders, Role of PT/OT	Instructor led	X	X
Nutrition in the Pedicatric/Neonatal Critical Care Patient	Skills	X	X
Sterile Technique	Skills	X	X
Urinary Catherization	Skills	X	X
Vascular Access	Skills	X	X
GI Tubes (Feeding Devices)	Skills	X	X

APPENDIX C:

WATSON-GLASER CRITICAL THINKING APPRAISAL-FORM S (WGCTA-FS)

Instrument Overview
The WGCTA is a psychometric test of critical thinking and reasoning. It measures skills related to problem solving and decision making in a variety question types. The questions are of varying difficulty and format in order to measure all areas of critical thinking ability. It is a test of power, which means that it measures the quality and depth of critical reasoning rather than the speed at which an individual can perform.

The WGCTA is a multi-faceted measure of critical thinking. The five subtests require different, through interdependent, applications of analytical reasoning in a verbal context with scores reported on three subscales. Each subtest is composed of reading passages or scenarios that include problems, statements, arguments, and interpretations of data similar to those encountered on a daily basis at work, in study and in newspaper or magazine articles. There are a variety of topics and content is typical of that found in business and the media which requires critical evaluation and cannot necessarily be accepted unquestioningly. Each scenario is accompanied by a number of items to which the participant responds.

Subtest 1: Inference-Rating the probability of truth of inferences based on given information.

Examples: Inference item
The Tariff Act of 1883 declared a 10 percent duty on all vegetables entering the country, but allowed fruit to enter duty-free. The New York Customs Collector saw an opportunity to increase revenue and declared the tomato to be a vegetable. Angry importers sued but in Nix v. Hedden Justice Horace Gray ruled : "Although botanists consider the tomato a fruit, tomatoes are eaten as a principal part of a meal, like squash or peas, so it is the court's decision that the tomato is a vegetable as a matter of law."

The law that levied import taxes on vegetables but not on fruit was a reasonable and just law. __True __Probably True __Insufficient Data __Probably False __False

Prior to 1883, the tomato had been considered to be, for all intents and purposes, a fruit.
__True __Probably True __Insufficient Data __Probably False __False

The New York Customs Collector had no basis whatsoever for declaring the tomato a vegetable other than a desire for more income.
__True __Probably True __Insufficient Data __Probably False __False

Subtest 2: Recognition of Assumptions-Identifying unstated assumptions or presuppositions underlying given statements.

Examples: Recognition of Assumptions item

We need to save money so we'd better take a holiday in the UK.

Holidays in the UK are cheaper than holidays elsewhere.

__True __Probably True __Insufficient Data __Probably False __False

Transport costs make international holidays more expensive than those in the UK.
__True __Probably True __Insufficient Data __Probably False __False

It is possible to take a holiday within the UK.

__True __Probably True __Insufficient Data __Probably False __False

Subtest 3: Deduction-Determining whether conclusions follow logically from given information.

Examples: Deduction item

It sometimes snows in January. Schools are always closed when it snows. Therefore:

Schools are never closed on days when it is not snowing.

__True __Probably True __Insufficient Data __Probably False __False

Schools are sometimes closed in January.

__True __Probably True __Insufficient Data __Probably False __False

Sometimes schools are open in January.

__True __Probably True __Insufficient Data __Probably False __False

Subtest 4: Interpretation-Weighing evidence and deciding if generalizations or conclusions based on data are warranted.

Examples: Interpretation item

A study of carbon dioxide (CO2) emissions within the EU from 1990 to 2010 shows that the volume of CO2 emissions fell consistently, from 24bn tonnes per year in 1990 to 16bn tonnes per year in 2010.

The reductions in CO2 emissions demonstrate that energy efficiency initiatives have been successful.

__True __Probably True __Insufficient Data __Probably False __False

The amount of CO2 emitted within the EU in 1992 was less that 24bn tonnes.

__True __Probably True __Insufficient Data __Probably False __False

CO2 emissions in 2011 were lower than in 1990.

__True __Probably True __Insufficient Data __Probably False __False

Subtest 5: Evaluation of Arguments-Evaluating the strength and relevance of arguments with respect to a particular question or issue.

Examples: Evaluation of Arguments item

Should the voting age in the UK be lowered to 16?

Yes; voting provides an opportunity for young people to feel like adults. __weak__strong

Yes; young people will be affected in the future by decisions made today. __weak__strong

No; celebrities unduly influence 16-year-olds. __weak__strong

APPENDIX D:

THE HISTORY OF CRITICAL THINKING

Time Frame	**Historical Figure/Location**	**Book/Works**
400-300 BC	Socrates/ Greece	"Socratic Questioning"; used to pursue thought in many directions and for many purposes, including exploring complex ideas, getting to the truth of things, opening up issues and problems, uncovering assumptions, analyzing concepts, distinguishing what is known from what is not, following out logical implications of thought, and/or controlling the discussion; founder of the Western philosophy
400-300 BC	Plato/ Greece	Mathematical philosophy student of Socrates and followed the Socratic critical thought/thinking beliefs that things are different from what they appear to be
300 BC	Aristotle/ Greece	Student of Plato; shared Platonism with his student, Alexander the Great; influence extended into the Renaissance; ideas on critical thought were not replaced until the Enlightenment; zoological observations were not confirmed or refuted until the 19th century; works contain the earliest known formal study of logic; shifted late in life to empiricism
Middle Ages	Thomas Aquinas/Italy	*Sumna Theologica*; criticism is necessary to developing ideas; Italian philosopher and theologian; Catholic Priest
Renaissance	John Colet/England	Along with Erasmus, began to think critically about religion, art, society, human nature, law, and freedom; a scholar, humanist, theologian, and educational pioneer
Renaissance	Desiderius Erasmus/ England	Began to think critically about religion, art, society, human nature, law, and freedom; was a Dutch Catholic priest, social critic, teacher, and theologian

Renaissance	Francis Bacon/ England	*The Advancement of Learning*; laid the foundation for modern science via the information-gathering process; philosopher, statesman, scientist, jurist, orator, essayist, and author; called the father of empiricism; established and popularized inductive methodologies for scientific inquiry, often called the scientific method
Post Renaissance	Descartes/ France	*Rules For the Direction of the Mind*; the mind should be disciplined to for clarity and precision of thinking; a philosopher, mathematician and writer; dubbed the father of modern philosophy
Post Renaissance	Sir Thomas More/England	*Utopia*; every domain of thought is subject to critique; a lawyer, social philosopher, author, statesman, and humanist
Italian Renaissance	Niccolo' Machiavelli/ Italy	*The Prince*; laid the foundation for modern critical political thought; a historian, politician, diplomat, philosopher, humanist, and writer; a founder of modern political science and ethics
16th and 17th Century	John Hobbs/ England	Laid the theoretical foundation for critical thinking about basic human rights and the responsibilities of all governments to submit to the reasoned criticism of thoughtful citizens; Hobbs was a philosopher known for his work on political philosophy and science; founder of the social contract tradition, believed that life in the state of nature is "solitary, poor, nasty, brutish and short"; Locke was a philosopher and physician; one of the most influential of Enlightenment thinkers and the "Father of Classical Liberalism"; one of the first of the British empiricists; important to social contract theory
16th and 17th Century	John Hobbs and John Lock/England	Laid the theoretical foundation for critical thinking about basic human rights and the responsibilities of all governments to submit to the reasoned criticism of thoughtful citizens; Hobbs was a philosopher known for his work on political philosophy and science; founder of the social contract tradition, believed that life in the state of nature is "solitary, poor, nasty, brutish and short"; Locke was a philosopher and physician; one of the most influential of Enlightenment thinkers and the "Father of Classical Liberalism"; one of the first of the British empiricists; important to social contract theory

17th Century	Robert Boyle/ England	*Sceptical Chymist*; severely criticized the chemical theory that had preceded him; born in Ireland but migrated to England; natural philosopher, chemist, physicist, and inventor; founder of modern chemistry
17th and 18th Century	Sir Isaac Newton/ England	Developed a far-reaching framework of thought which roundly criticized the traditionally accepted world view; physicist and mathematician; described as a "natural philosopher"; widely recognized as one of the most influential scientists of all time and as a key figure in the scientific revolution
17th and 18th Century	Nicolaus Corpernicus/ Poland	With Galileo and Kepler, extended his mind about critical thought via belief in Boyle and Newton's theories; mathematician and astronomer who formulated a heliocentric model of the universe which placed the Sun, rather than the Earth, at the center
17th and 18th Century	Galileo Galilei/Italy	With Corpernicus and Kepler, extended his mind about critical thought via belief in Boyle and Newton's theories; physicist, mathematician, engineer, astronomer, and philosopher who played a major role in the scientific revolution; works included telescope and astronomical observations; supported Copernicanism; called the "father of modern observational astronomy", the "father of modern physics", the "father of science", and "the Father of Modern Science"
17th and 18th Century	Johannes Kepler/ Germany	With Corpernicus and Galileo, extended his mind about critical thought via belief in Boyle and Newton's theories; a German mathematician, astronomer, and astrologer; a key figure in the 17th century scientific revolution; his works provided foundation for Newton's theory of universal gravitation
French Enlightenment	Pierre Bayle/France	Along with Montesquieu, Voltaire, and Deridot, believe that the human mind is better able to figure out the nature of the world when disciplined by reason; thus, all authority must submit to the scrutiny of reasonable critical; a French philosopher and writer; advocated a separation between the spheres of faith and reason, on the grounds of God being incomprehensible to man; influenced the development of the Enlightenment

French Enlightenment	Baron de La Brède et de Montesquieu/France	Along with Bayle, Voltaire, and Deridot, believe that the human mind is better able to figure out the nature of the world when disciplined by reason; thus, all authority must submit to the scrutiny of reasonable critical questioning; a lawyer and political philosopher; famous for his articulation of the theory of separation of powers
French Enlightenment	François-Marie Arouet Voltaire/ France	Along with Montesquieu, Bayle, and Deridot, believe that the human mind is better able to figure out the nature of the world when disciplined by reason; thus, all authority must submit to the scrutiny of reasonable critical questioning; a writer, historian and philosopher; advocate of freedom of religion, freedom of expression, and separation of church and state
French Enlightenment	Denis Diderot/ France	Along with Montesquieu, Voltaire, and Bayle, believe that the human mind is better able to figure out the nature of the world when disciplined by reason; thus, all authority must submit to the scrutiny of reasonable critical questioning; a philosopher, art critic, and writer; a prominent figure during the Enlightenment;
Scottish Enlightenment	Adam Smith/ Scotland	*Wealth of Nations*; developed a sense of the power of critical thought and of its tools as it relates to economics; a Scottish moral philosopher and a pioneer of political economy; cited as the "father of modern economics"
18th Century	Forefathers of America	The Declaration of Independence; created secondary to the application of critical thinking to the traditional concept of loyalty to the king
18th Century	Immanuel Kant/German	*Critique of Pure Reason*; a philosopher; considered to be a central figure of modern philosophy; argued that fundamental concepts structure human experience, and that reason is the source of morality
19th Century	Auguste Comte/ France	Along with Spencer, extended critical thought even further into the domain of human social life; founder of the discipline of sociology and of the doctrine of positivism; regarded as the first philosopher of science; influenced the development of religious humanist and secular humanist organizations in the 19th century; coined the word altruisme (altruism)

19th Century	Herbert Spencer/ England	Along with Comte, extended critical thought even further into the domain of human social life; a philosopher, biologist, anthropologist, sociologist, and prominent classical liberal political theorist of the Victorian era; developed a conception of evolution as the progressive development of the physical world, biological organisms, the human mind, and human culture and societies; contributed to a wide range of subjects, including ethics, religion, anthropology, economics, political theory, philosophy, literature, biology, sociology, and psychology; best known for coining the expression "survival of the fittest"
19th Century	Karl Heinrich Marx/ Germany	*The Communist Manifesto* ; applied critical thinking to the history of human culture and the basis of biological life, leading to Darwin's *Descent of Man*; a philosopher, economist, sociologist, historian, journalist, and revolutionary socialist; work laid the basis for the current understanding of labor and its relation to capital, and has influenced much of subsequent economic thought
19th Century	Sigmund Freud/ Germany	Applied critical thinking to the unconscious mind; an Austrian neurologist who became known as the founding father of psychoanalysis; qualified as a doctor of medicine at the University of Vienna
19th Century	Unknown	Critical thinking applied to the cultures established the field of Anthropological studies
19th Century	Unknown	Critical thinking applied to language led to the field of Linguistics and to many deep probings of the functions of symbols and language
20th Century	Unknown	The understanding of the power and nature of critical thinking has emerged in increasingly more explicit formulations
20th Century	John Dewey/ America	Increased the sense of the pragmatic basis of human thought, especially its grounding in actual human purposes, goals, and objectives; a philosopher, psychologist, and educational reformer whose ideas have been influential in education and social reform; one of the primary figures associated with philosophy of pragmatism; one of the founders of functional psychology; a major voice of progressive education and liberalism

20th Century	Ludwig Wittgenstein/Austria and Britian	Increased awareness of the importance of concepts in human thought as well as the need to analyze concepts and assess their power and limitations; a philosopher who worked primarily in logic, the philosophy of mathematics, the philosophy of mind, and the philosophy of language
20th Century	Jean Piaget/ Switzerland	"Conscious Realization" ; increased awareness of the egocentric and socio-centric tendencies of human thought and of the special need to develop critical thought which is able to reason within multiple standpoints; a psychologist who was the first to make a systematic study of the acquisition of understanding in children; a major figure in 20th-century developmental psychology; a doctor of philosophy; combined biological training with epistemology
1906	William Graham Sumner/ America	*Folkways*; a land-breaking study of the foundations of sociology and anthropology; a Classic Liberal academic; held the first professorship in sociology at Yale College; credited with introducing the term "ethnocentrism," a term intended to identify imperialists' chief means of justification; a proto-libertarian; the first to teach a course entitled "Sociology"

Note: Adapted from *A Brief History of the Idea of Critical Thinking*, by R. Paul, L. Elder, & R. Bartell, 1997.

APPENDIX E:

THE *SPAN PROGRAM* AGENDA (REVISED PROGRAM)

Day 5 – New graduates

0730	Coffee/Socializing	Surpora Thomas Department of Nursing Education & Research
0800	Discussion CAUTI & CLABSI	Marjorie McCaskey, PI/QI, RN
1000	BREAK	
1030	PI/QUEST /SPS/RCA/Falls/Pressure ulcers	Barbra Ash, PI/QI, RN
1130	LUNCH	
1230	Pressure Ulcers	Elizabeth Day, WCON, RN
1400	SPS CAUTI & CLABSI CBT Practice PIV, CVL, PICC, and Implanted Port Practice sterile technique and catheterization Practice PPE	Carrie Dooley, MSN, RN
1500	BREAK Competency Check Off PIV, CVL, PICC, and Implanted Port Competency Check Off sterile technique and catheterization Skills check off PPE	
1630	Adjourn	

Class 3-6 – All day sessions occur Monthly 2016

<u>Session I (Feb. 8th, May 23th, Sept. 29th)</u>

0730	Coffee/Socializing	Surpora Thomas Department of Nursing Education & Research
0800	CBT/Skill Practice Stations/Sim PCA Alaris Infusion Smart Pump Code medication tray Foley mannequin Trach baby PICC arm	Carrie Dooley, MSN, RN
1000	BREAK	
1030	Respiratory Distress – Video and Discussion	Kortney Dixon, RT
1100	Vascular Access	Julie Green, PICC RN
1200	LUNCH	
1300	Joint Commission	Lisa Cooper, MSN, RN
1400	BREAK	
1430	Cardiac Assessment & Rhythms	Paula Midyette, MSN, RN
1630	Adjourn	

Session II (Mar. 7th, June 27th, Oct. 17th)

0730	Coffee/Socializing	Surpora Thomas Department of Nursing Education & Research
0800	CBT/Skill Stations/Sim/Case Studies	Carrie Dooley, MSN, RN
0930	BREAK	
1000	Professional Boundaries- When We Care Too Much	Lou Lacey, Emotional Wellness
1100	Neuro Lecture	Samantha Weaver
1200	LUNCH	
1300	Pediatric Nutrition	Jennifer Coltharp
1330	Problem Feeders	Christy Moran, OT
1400	BREAK	
1430	Feeding Devices	Laura Hauguel
1500	Educating MD's at COA Hospital	Chief Resident
1530		
1630	Adjourn	

Session III (Apr. 4th, July 25th, Oct. 17th)

0730	Coffee/Socializing	Surpora Thomas Department of Nursing Education & Research
0800	CBT/Skill Stations/Sim/Case Studies	Carrie Dooley, MSN, RN
1000	Customer Service	Leslie Boelm, RN Jake Harper, MSN, RN
1030	BREAK	
1100	Narcotic Diversion	Sarah Hancock
1200	LUNCH	
1300	Nursing Support Services	Colleen Hormel
1330	ADE and reporting	Lisa Bishop, PhD
1345	Social work	Eleanor Barnes, MSW
1400	Case Management	Sherry Garlington, RN
1415	BREAK	
1445	Asthma Education	Janet Johnston, RN
1630	Adjourn	

Session IV (May2nd, Aug. 22nd, Dec. 13th)

0730	Coffee/Socializing	Surpora Thomas Department of Nursing Education & Research
0800	CBT/Skill Stations/Sim/Case Studies	
1000	BREAK	
1030	How to be Kind to Yourself	Lou Lacey, Emotional Wellness
1100	Ronald McDonald House & Tour	Laurie Smith
1130		
1200	LUNCH	
1300	Sim Lab House of Horrors	Carrie Dooley, MSN, RN
1430	BREAK	
1500	Q & A	
1630	Adjourn	

APPENDIX F:

THE *SPAN PROGRAM* AGENDA (ORIGINAL PROGRAM)

	Monday#1	Monday#2	Monday#3	Monday#4	Monday#5	Monday#6	Monday#7	Monday#8
	Date	Date	Date	Date	Date	Date	Date	Date
0800-1000	*Sim Lab* Red Team Blue Team	*Sim Lab* Yellow Team Green Team	*Sim Lab* Red Team Blue Team	*Sim Lab* Yellow Team Green Team	*Sim Lab* Red Team Blue Team	*Sim Lab* Yellow Team Green Team	*Sim Lab* Red Team Blue Team	*Sim Lab* Yellow Team Green Team
0800-1000	*Bradley* Yellow Team Green Team Vascular Access Devices Interactive Session *Angela Lee*	*Bradley* Red Team Blue Team Vascular Access Devices Interactive Session *Angela Lee*	*Bradley* Yellow Team Green Team Critical Thinking And Clinical Judgment *D. Stewart*	*Bradley* Red Team Blue Team Critical Thinking And Clinical Judgment *D. Stewart*	*Bradley* Yellow Team Green Team *Unit Educator*	*Bradley* Red Team Blue Team *Unit Educator*	*Bradley* Yellow Team Green Team *Unit Educator*	*Bradley* Red Team Blue Team *Unit Educator*
1000-1030							Recognition Breakfast & Evaluation	Recognition Breakfast & Evaluation
1000-1100	Professionalism and Customer Service *Bette Jolly*	Quality and Performance Improvement SPS/QUEST *Barbra Ash*	Personal Wellness *Lou Lacey*	Narcotics and Controlled Substances Diversion Education *B. Denson*				
1100-1200	Respiratory Distress *D. Stewart*	Joint Commission Update *A. Cooper*	Oxygen Delivery Devices *T. Powers*	Feeding Devices *L. Hougel*				
1200-1300	LUNCH	LUNCH	LUNCH	LUNCH				
1300-1400	Cardiac Assessment *J. Midyette*	Neuro Assessment *S. Weaver*	Pressure Ulcer Lecture And Practicum *J. Day*	Alarms Management Chain of Command Delegation Legal and Ethical Issues in Nursing *D. Stewart*				
1400-1500	Alaris Pump Tutorial, Trouble-shooting, and Practicum *Andy Plemons* *F. Henry* *D. Stewart*	Training MDs at COA Video *C. Hough-Telford*						
1500-1600		Restraint and Seclusion Skills Validation *C. Gooch*	ABN/COA On-line Courses (independent)					

APPENDIX G:

"YEAR AT A GLANCE" NLRN ORIENTATION PROGRAM (REVISED VERSION)

Date	Jan	Feb	March	April	May
1					
2					**Session IV**
3			Feb		
4		Jan		**Session III** **Feb-sim**	NSO
5					NSO
6				NSO	NSO
7			**Session II** **Jan sim**	NSO	
8		**Session I ***		NSO	
9			Mar NSO		
10		Feb NSO	Mar NSO		
11		Feb NSO	Mar NSO	Mar sim	
12		Feb NSO			
13	Jan NSO				
14	Jan NSO		Mar –sim 8-10		
15	Jan NSO	Feb-sim 8-10			
16					
17					
18				Mar sim	
19					
20					
21			Mar Feb-sim		
22		Feb Jan sim			
23					**Session I**
24					
25	Jan			Mar sim	
26					
27					
28			Feb-sim		
29		Jan sim			
30					
31					

APPENDIX H:

DEMOGRAPHIC SURVEY QUESTIONNAIRE

Demographics:

1. What is your gender? Male Female

2. What is your race/ethnicity? (Circle all that apply)

   a. America Indian or Alaska Native

   b. Asian

   c. Black/African American

   d. Native Hawaiian or Other Pacific Islander

   e. White/Caucasian

   f. Hispanic/Latino

   g. Other_____

   (fill in the blank, if known but not listed)

3. What is your age? _____years

4. What type of nursing degree/credential qualified you for your first US Registered Nursing license?

   a. Diploma-Nursing

   b. Associate Degree-Nursing

   c. Baccalaureate Degree-Nursing

5. What is your highest level of education?

   a. Diploma-Nursing

b. Associate Degree-Nursing

c. Baccalaureate Degree-Nursing

Employment Information:

6. What is your employment status?

a. Full time

b. Part time

Note: A full time position is an arrangement wherein a nurse is employed >/= to 36 hours a week (this position usually comes with benefits); a part time position is an arrangement wherein a nurse is employed <36 hours a week (this position can be with or without benefits).

7. Please indicate your primary, secondary, and third nursing positions (circle answers)

a. Primary

i. Staff nurse

ii. Supervisory nurse

iii. Managerial nurse

iv. Administrative nurse

v. other_____(fill in title)

vi. not applicable

b. Secondary

i. Staff nurse

ii. Supervisory nurse

iii. Managerial nurse

iv. Administrative nurse

v. other_____(fill in title)

vi. not applicable

Note: Your primary position is the position at which you work the most hours during your regular work year; your secondary position is the position at which you work the second greatest number of hours during your regular work year.

References

National Council of State Boards of Nursing (NCSBN) (2013). National RN Workforce Survey. *Journal of Nursing Regulation, 4(*2), S66-S69.

Health Resources and Services Administration (HRSA), (2002). Projected supply, demand, and shortages of Registered Nurses, 2000-2020. Retrieved on 6/9/14 from http://files.eric.ed.gov/fulltext/ED468472.pdf.

APPENDIX I:

NURSING SERVICE ORIENTATION (NSO) AGENDA (ORIGINAL PROGRAM)

WEDNESDAY

- 8:00 – Welcome and RN/LPN Roles and Responsibilities
- 9:00 – Pre-op surgical care
- 10:30 –COA Hospital Health and Safety Information
- 11:30 – Meet and greet your Unit Educator
- 12:00 – LUNCH
- 13:00 – Palliative Care
- 13:30 – Pediatric Physical Assessment video and **TEST***
- 14:30 – Documentation
- 15:30 – Medication calculation **TEST***

THURSDAY

- 8:00 – Medication Compatibility & Administration of Intravenous Drugs
- 9:30 – Customer Service
- 10:00 – Vascular Access: Pediatric & Neonatal Intravenous therapy CBT and **TEST***
- 11:00 – Vascular Access: Central Venous Line therapy CBT and **TEST***
- 12:00 – LUNCH
- 13:00 – Vascular Access: Interactive session
- 13:30 – MRI Safety
- 14:30 – Bedside Testing
- 15:30 – Insulin Therapy CBT

FRIDAY

- 8:00 – Insulin Therapy Practicum (Skills Validation)
- 8:30 – Insulin Therapy **TEST***
- 9:00 – Mock Code Review CBT
- 10:30 – Simulation Center for Mock Code scenario, etc.
- 12:00 – LUNCH
- 13:00 – Evidence-based Practice CBT
- 14:00 –Summary Sheet and Evaluation

***TEST**: An opportunity for the educator to evaluate comprehension of the material presented in that particular section of learning. For instance, the word "TEST" follows the 1330 session on Wednesday of NSO entitled "Pediatric Physical Assessment" video. The "TEST" in this case would evaluate the new nurse's retained knowledge of the physical assessment of the pediatric patient. This is captured in a hard copy format with pen/pencil and paper. Immediately following the completion and submission of the "TEST" to the instructor by the participants, discussion led by the educator using reflection and debriefing of answers will be accomplished.

APPENDIX J:

NURSING SERVICE ORIENTATION (NSO) AGENDA (REVISED)

	Day 1 – Wednesday	**0800-1630**
0800	Welcome to Nursing Service Orientation (NSO)	Carrie Dooley, MSN, RN, CPN, Educator II, New Graduate Nurse Orientation Program Coordinator
0830	Professional Practice and Care Delivery Models	Carrie Dooley
0915	Nursing Philosophy, Mission/Vision/Values	Andrew B. Loehr, MSN, RN CNML, CPNP, Vice President, Nursing Operations
0930	Solutions for Patient Safety (SPS)	Carrie Dooley
1000	Medication Administration	
1015	Quick Pediatric Assessment and Intervention	
1030	Pediatric Physical Assessment Video (45 min)	
1115	Pediatric Physical Assessment TEST	
1130	Medication Calculation TEST	
1145	Meet and Greet	Unit Level Educators
1200	**LUNCH**	
1300	iConnect CBT – 65 min	Carrie Dooley
1405	Pyxis CBT – 54 min	
1500	Insulin Therapy – CBT – 60 min	
1530	Accuchek CBT – 30 min	

	Day 2 – Thursday	**0800-1630**
0800	Insulin Therapy Skills Validation & TEST	Denise Cooks, RN
0900	Lab and point of care testing	Becky Curry, MT (ASCP) Kadambari Naik MS, MLS (ASCP)
1000	Medication Compatibility & Administration of IV Drugs	Brenda Denson, PharmD
1200	**LUNCH**	
1300	COA Hospital Health and Safety Information	Marilyn Prier, MPH, RN
1345	Nursing Standards and Documentation	Carrie Dooley
1415	Tracheostomy Management and Emergency Reinsertion	
1500	Oxygen Delivery Devices	
1530	Emergency Equipment	
1600	Chest Tube Management	

	Day 3 – Friday	**0800-1630**
0800	Pre-Op Surgical Care	Elizabeth Blackburn, R0900
	Mock Code Review CBT- 30 min	Carrie Dooley
1000	Emergency Cart & Checklist (**Simulation Center**)	Lynn Zinkan, MPH, RN Amber Youngblood, RN
1200	**LUNCH**	
1300	IV Therapy – Peripheral and Central Venous Devices	Carrie Dooley
1330	Alaris Pump	
1400	Computer Icons and Abbreviations	
1415	Vascular Access "The Right Touch" Video	
1445	Vascular Access: Central Venous Line Devices CBT&TEST	
1515	Vascular Access: Pediatric Neonatal IV Therapy CBT&TEST	
1545	MRI Safety CBT	

	Day 4 – Monday	**0800-1200**
0800	Complete CBT and Skills Check off Report to Nursing Unit	

APPENDIX K:

GROUPS INCLUDED IN THE CHARTER STUDY FOR THE WGCTA-FS

Group	*N*
Lower-level management applicants	219
Lower to upper-level management applicants	501
Mid-level management applicants	211
Upper-level management applicants at Board of County Commissioners	215
Construction management applicants	322
Executive management applicants	453
Supervisory and managerial applicants in the corrugated container industry	149
Sales applicants	473
Mid-level marketing applicants	909
Bank employees	95
Bank management associates	131
Candidates for the ministry	126
Clergy	99
Railroad dispatchers	199
Nurse managers and educators	111
Police officers	225
Administrative applicants in city government	23
Security applicants	42
Candidates for police captain	41
Police department executives	55
Various occupations	133

APPENDIX L:

STATISTICAL RESULTS FOR THE GROUPS INCLUDED IN THE CHARTER STUDY FOR THE WGCTA-FS

Group	*N*	Mean	*SD*	SEM	r_{alpha}
Lower-level management applicants	219	33.50	4.40	2.17	.76
Lower to upper-level management applicants	501	32.29	4.63	2.31	.75
Mid-level management applicants	211	33.99	4.20	2.12	.74
Upper-level management applicants at a Board of County Commissioners	215	31.80	5.20	2.35	.80
Executive management applicants	453	33.42	4.21	2.18	.73
Construction management applicants	322	32.05	4.87	2.32	.77
Supervisory and managerial applicants in the corrugated container industry	149	31.48	5.00	2.39	.77
Sales applicants	473	30.88	4.98	2.43	.76
Mid-level marketing applicants	909	31.02	5.08	2.42	.77
Bank employees	95	32.75	4.58	2.25	.76
Bank management associates	131	31.61	4.69	2.39	.74
Candidates for the ministry	126	34.10	4.71	2.08	.80
Clergy	99	34.56	3.79	2.05	.71
Railroad dispatchers	199	25.15	5.00	2.78	.69
Nurse managers and educators	111	30.52	4.86	2.46	.74
Police officers	225	28.00	6.03	2.64	.81
Various occupations	133	30.68	6.65	2.40	.87
Administrative applicants in city government[1]	23	30.43	5.82	2.42	.83
Security applicants	42	25.00	4.79	2.77	.67
Candidates for police captain[2]	41	27.95	4.60	2.69	.66
Police department executives[3]	55	32.56	4.14	2.32	.69

APPENDIX M:

INFORMED CONSENT

You are being asked to be in a research study. The study is called "Measuring Critical Thinking in Newly Licensed Registered Nurses." This study is being done by supervising faculty and Carreen Rush, a doctoral candidate in the Instructional Leadership for Nurse Educators' program in the College of Education at the University of Alabama.

What is this study about?
The care of patients within the health care organization is directly affected by the Newly Licensed Registered Nurse's (NLRN) ability to practice critical thinking skills. The ability of the novice nurse graduate to make critical decisions impacts quality patient care, improves patient outcomes, and enhances self-confidence.

What is the investigator trying to learn?
The investigator wants to learn if the present NLRN orientation program at this facility does, indeed, develop the program participants into critical thinkers.

Why is this study important or useful?
General benefits of the study include advancement in the understanding of how to develop critical thinkers in one comprehensive NLRN orientation program in one hospital. Additionally, the research plans to explore if there are any correlations between critical thinking skill development and preparation of the NLRNs.
The knowledge is important to assisting the program coordinator and director with determining the need for curriculum updates or confirm satisfactory NLRN critical thinking product. Measuring and addressing the outcomes of the teaching strategies of the NLRN orientation program might assist nurse educators in gaining valuable information about modern curriculum and its relationship to the development of critical thinking in this population.

Why have I been asked to take part in this study?
You are being asked to take part in this study because you are a newly licensed Registered Nurse (NLRN) participating in the Children's of Alabama (COA) Hospital orientation program, known as the *Span Program*, designed for new nurse graduates who are entering nursing profession for the first time. You are in a position to help nurse educators and future nursing students understand the value of critical thinking teaching strategies.

How many people are selected be in this study?
The investigator is inviting all the NLRN orientation participants of at least two COA Hospital cohorts to take part in this study [Note: A Cohort is a group of people who have something in common. New nurse graduates are usually hired in cohorts so each participant would have a

peer group during the first few years of practice at the bedside (Bullock, Paris, and Terhaar, 2011)]. A total of 100 participants will be selected for this study, which may require additional cohorts.

What am I asked to do in this study?
If you agree to participate in this study, you need to complete a personal statistics/demographic survey questionnaire prior to starting your nursing service orientation (NSO). You then need to complete a second document called the Watson-Glaser Critical Thinking Appraisal (WGCTA) before NSO, mid-program (the end of the fourth week), and on your last day of the *Span Program* orientation. You agree not to talk about the questionnaire or your answers to the questionnaire with others.

How much time do I spend being in this study?
The original questionnaire takes about 10 minutes to complete, with the WGCTA taking longer (about 30 minutes). Since you are taking the WGCTA three times (once prior to your orientation, midway through your orientation, and then again upon completion), your time commitment is about an hour and 40 minutes.

Does being in this study cost me anything?
The only expense to you is your time.

Will I be compensated for being in this study?
There will be no monetary compensation for your time applied to this study.

What are the risks (problems or dangers) from being in this study?
There are minimal risks from being in this study. You may become tired, uncomfortable, or stressed while you answer the questionnaire, during simulation observation, or both. These issues are no different than other experiences during your nursing training. Your participation in this study is voluntary. Your decision to take part or not to take part does not affect the outcome of your orientation program and you may withdraw at any time.

What are the benefits of being in this study?
No direct benefits can be promised to you. However, the information gained from the study may help NLRNs who take part in this orientation program in the future.

What are the benefits of this study to science and/or society?
This study assists educators in determining how to design curriculum to produce critical thinkers.

How is my privacy to be protected?
The only place your name appears in connection with the study is on this informed consent form. Unique identifiers (i.e., participant numbers) will be assigned to allow identification of questionnaires. Demographic data are to be collected but no other identification information is to be used. All confidential materials will be securely housed in a locked cabinet behind a locked office door behind an employee only access door.

How is my confidentiality to be protected?
You answer the questionnaire on a computer in the computer laboratory. Paper copies of the information you provide are to be kept in a locked file drawer in the investigator's office. The information you provide in the questionnaire is kept confidential as no unique identifier is noted on this document. All confidential materials will be securely housed in a locked cabinet behind a locked office door behind an employee only access door. The investigator uses the data from this study to complete a doctorate dissertation. In addition, the data may be used to write research articles and make professional presentations. Participants are to be identified only as "COA *Span Program* NLRNs." Aggregate data only will be published, not individual level data.

What are the alternatives to being in this study?
The only other alternative is not to participate or not to take part in the study.

What are my rights as a participant?
Being a part of this study is totally voluntary. You are free to withdraw your consent and discontinue your participation in this study at any time. Your refusal to participate does not involve any penalty or loss of rights to which you are otherwise entitled. Not participating or stopping your participation will have no effect on your relationship with COA or the University of Alabama. You will receive a copy of this consent form.
The University of Alabama Institutional Review Board (IRB) and the University of Alabama at Birmingham (UAB) IRB are committees that look out for the ethical treatment of people in research studies. They may review the study records if they wish. This is to be sure that people in research studies are being treated fairly and that the study is being carried out as planned.

Who do I call if I have questions or problems?
If you have questions about this study right now, please ask them. If you have questions later on, please call Carreen Rush at (205)222-1436 or via email @ carrie.rush@childrensal.org.
If you have any questions or complaints about your rights as a research participant, call Ms. Tanta Myles, the Research Compliance Officer at the University of Alabama, at (205)348-8461 or 1(800)933-2262; or contact Pam Barlow, COA Grants Administrator at (205)638-2452 or via email @ pam.barlow@childrensal.org.

I have read this consent form. I have had a chance to ask questions.

Signature of Research Participant_____Date_____

Email Address of Research Participant_____Date_____

Signature of Investigator_____Date_____

APPENDIX N:

UA IRB APPROVAL LETTER

THE UNIVERSITY OF ALABAMA | Office of the Vice President for Research & Economic Development
Office for Research Compliance

March 7, 2017

Carreen Rush, MSN, RN
3048 Old Stone Drive
Birmingham, AL 35242

Re: IRB # EX-15-CM-082-R2 "Measuring Critical Thinking in Newly Licensed Registered Nurses"

Dear Ms. Rush:

The University of Alabama Institutional Review Board has granted approval for your renewal application. Your renewal application has been given exempt approval according to 45 CFR part 46.101(b)(2) as outlined below:

(2) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless:
(i) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

Your application will expire on March 6, 2018. If your research will continue beyond this date, complete the relevant portions of Continuing Review and Closure From. If you wish to modify the application, complete the Modification of an Approved Protocol Form. When the study closes, complete the appropriate portions of FORM: Continuing Review and Closure.

Should you need to submit any further correspondence regarding this proposal, please include the assigned IRB application number.

Good luck with your research.

Sincerely,

[redacted]

Carpantato T. Myles, MSM, CIM, CIP
Director & Research Compliance Officer
Office for Research Compliance

358 Rose Administration Building | Box 870127 | Tuscaloosa, AL 35487-0127
205-348-8461 | Fax 205-348-7189 | Toll Free 1-877-820-3066

APPENDIX O:

UAB IRB APPROVAL LETTER

THE UNIVERSITY OF ALABAMA AT BIRMINGHAM

Institutional Review Board for Human Use

Form 4: IRB Approval Form
Identification and Certification of Research
Projects Involving Human Subjects

UAB's Institutional Review Boards for Human Use (IRBs) have an approved Federalwide Assurance with the Office for Human Research Protections (OHRP). The Assurance number is FWA00005960 and it expires on January 24, 2017. The UAB IRBs are also in compliance with 21 CFR Parts 50 and 56.

Principal Investigator: RUSH, CARREEN

Co-Investigator(s):

Protocol Number: **E150604002**

Protocol Title: *Measuring Critical Thinking In A Newly Licensed Registered Nurses*

The above project was reviewed on 6/25/15. The review was conducted in accordance with UAB's Assurance of Compliance approved by the Department of Health and Human Services. This project qualifies as an exemption as defined in 45CF46.101, paragraph 2.

This project received EXEMPT review.

IRB Approval Date: 6/25/15

Date IRB Approval Issued: 6/25/15

[redacted]

Cari Oliver
Assistant Director, Office of the
Institutional Review Board for Human Use
(IRB)

Investigators please note:

IRB approval is given for one year unless otherwise noted. For projects subject to annual review research activities may not continue past the one year anniversary of the IRB approval date.

Any modifications in the study methodology, protocol and/or consent form must be submitted for review and approval to the IRB prior to implementation.

Adverse Events and/or unanticipated risks to subjects or others at UAB or other participating institutions must be reported promptly to the IRB.

470 Administration Building
701 20th Street South
205.934.3789
Fax 205.934.1301
irb@uab.edu

The University of
Alabama at Birmingham
Mailing Address:
AB 470
1720 2ND AVE S
BIRMINGHAM AL 35294-0104

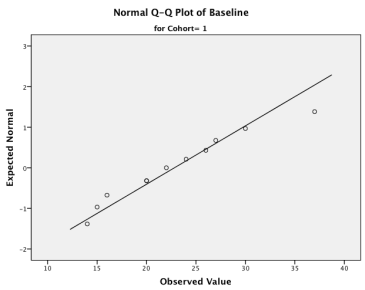
APPENDIX P:

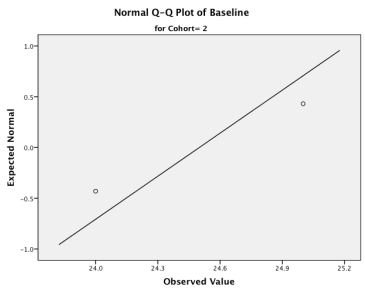
WATSON-GLASER CRITICAL THINKING APPRAISAL-FORM S (WGCTA-FS) RAW DATA AND SCORES

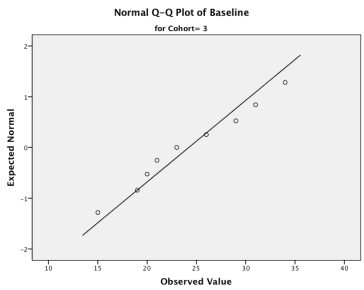
	NLRN#	Baseline	Mid-Point	Post-Program
October 2015				
	3	20	20	21
	5	15	20	20
	6	20	23	22
	7	24	23	18
	8	37	32	38
	9	16	18	15
	10	22	24	24
	11	27	22	26
	12	30	32	34
	22	14	15	20
	23	26	18	18
January 2016				
	1	24	31	26
	3	25	22	25
February 2016				
	1	23	20	17
	2	34	36	33
	7	19	21	16
	10	26	27	27
	12	29	28	30
	18	31	31	28
	19	20	20	21
	20	15	20	20
	21	21	20	17

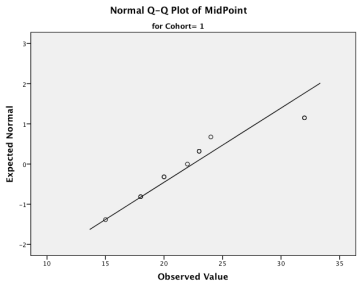
APPENDIX Q:

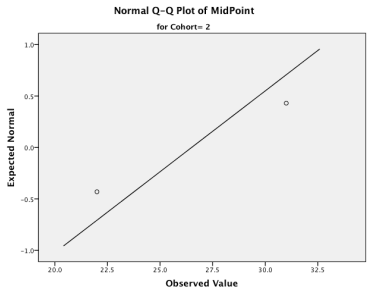
Q-Q PLOTS FOR NORMALITY OF THE SAMPLE DISTRIBUTION: QUESTION #1

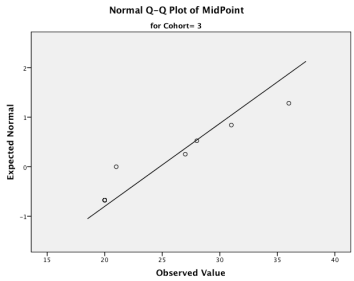


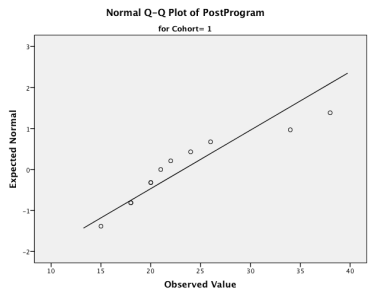








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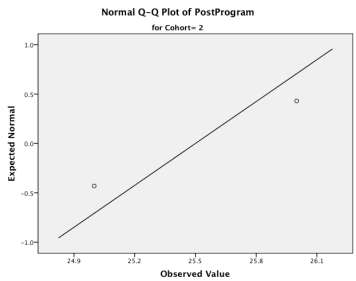
for Cohort= 1
Expected Normal
Observed Value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Expected Normal
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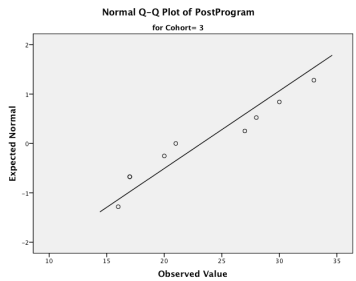
Normal Q-Q Plot of PostProgram
for Cohort= 3
Expected Normal
Observed Value