THE ROLE OF CRITICAL THINKING IN A CERTIFICATE PROGRAM: THE NURSING ASSISTANT

by

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ABSTRACT

Critical thinking skills make the difference between life and death for hospitalized patients; nursing staff must recognize small and subtle changes in a patient's condition and act quickly. The aging population of the U.S. and the attrition of nursing staff have increased the need for nurses and nursing assistants. Community college Certified Nursing Assistant (CNA) programs can be a gateway course for multiple health careers, especially nursing. These programs are short two- to three-month programs that culminate in a certificate and employment. The challenge finding ways to add meaningful critical thinking approaches to the curriculum of short skills-based courses.

This mixed methods study examined the critical thinking skills of nursing assistants and identified ways to impact students' ability to make informed decisions. Quantitative questions examined students' performances on a critical thinking test compared with national results and the effect of critical thinking lessons prior to the test on those results and the statewide credentialing test. Qualitative questions examined students' perceptions of the test and the classroom exercises on their confidence and understanding of critical thinking. Critical thinking classroom interventions focused on prioritizing care, identifying potential problems, and making decisions about appropriate care, including when to alert the nurse to changes in the patients' condition.

Quantitative results showed a slight improvement in the students' scores on the critical thinking test and state credentialing exam; however, these were not statistically significant. Qualitative results indicated students learned from the lessons and could apply them to their clinical and classroom experiences. Recommendations from this study include (1) Critical thinking exercises should be embedded into CNA programs; (2) Faculty must model critical thinking and actively demonstrate critical thinking decision making; (3) Faculty should mentor students to encourage reflective practice and ensure student awareness and assessment of their own thinking process; (4) Community colleges should establish First Year Seminar courses as a means to embed critical thinking components into CNA programs.

Key Words: critical thinking, nurse aid / CNA training, community college

DEDICATION

This dissertation is dedicated to the nursing assistants who I have had the pleasure to work with or have had in my class. I have learned so much from you. You are the unsung heroes of healthcare.

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CHAPTER ONE: INTRODUCTION

INTRODUCTION

The mission of a community college is to provide quality college-level education through an open door for all in the local community and thereby to make a difference in the lives of the community and the student, both the traditional and non-traditional student. In 2009, Myran stated, “The mission of the Open-Door Community College is to empower students, businesses, and communities to achieve their goals through excellent and accessible higher education and career advancement programs and services” (p. 14). Community colleges historically have focused on the following three areas of commitment: (a) access, (b) responsiveness to community need), and (c) equity (Troyer, 2015, p. 1).

Prior to World War II, though, the mission of the community college centered primarily on students wishing to transfer to four-year colleges and universities, using their community college education for preparation. That changed with the end of World War II when the need for prepared workers to join the workforce increased tremendously. Community colleges would increase their workforce preparation programs with associate’s degrees, allowing graduates to move immediately into skilled trades and professions.

Since the 1980s, community colleges also expanded their role in workforce certification programs. In a paper for Community College Research Center, Dougherty, Lahr, & Morest (2017) state the mission of community colleges is to “carry out a crucial function in higher education by providing access to college, including baccalaureate opportunities, occupational education, remedial education, and other educational services” (p. i). Workforce certification programs provide short courses and programs of study that can prepare students to enter a job or shift their credentials to another job within the same company by acquiring specific skills (Jacobs, 2009). Certificate programs also have minimal requirements for entry, allowing students easy entry but not necessarily success (CCCSE, 2016). Students can upgrade their credentials with a certificate in less time than the two-to-four years to earn a degree.

In 2012, President Obama issued a challenge and goal that “by 2020, all adult Americans would commit to at least one year of higher education or career training, and once again, America would have the highest proportion of college graduates in the world” (Harmon, 2012, p. 1). This challenge once again affected the mission and the role of community colleges in the United States.

HISTORY OF HEALTHCARE EDUCATION IN THE UNITED STATES

Following World War II, the need for prepared workers in industry and healthcare increased tremendously. The history of nursing education started with Florence Nightingale. Prior to the Crimean War, there was no formalized nursing education. She was in one of the first classes for nursing. Through Nightingale’s work in the Crimea, she recognized that nursing education needed to become more formalized but also that her nursing assistants and orderlies needed formal of education to be beneficial to the patient. She was the originator of the nursing process and of evidence-based nursing, both critical-thinking concepts. Nursing education started as diploma programs in hospitals with on-the-job training and has progressed to a college education with an ADN (associate’s degree in nursing) or BSN (bachelor’s degree in nursing). In the United States, the first BSN program was launched at the University of Minnesota in 1909. It wasn’t until after World War II, with the GI Bill, the Truman Commission, and the Brown Report advocating for increased access to college, that community colleges became a large part of the workforce training. The Brown Report (1948) suggested to hospitals that it would be more cost effective to have colleges train nurses in a two-year academic program than to continue with their hospital-based programs. A proposal for a two-year program in nursing education — not attached to a hospital program — was proposed to increase access for those wanting to be educated to be nurses and to meet the need for nurses in the industry.

At that time, most nurses were taught in a hospital-based program or a four-year program, but that changed with the start of the community college system. Community colleges took the lead in preparing nurses and other workers, with many having workforce education as a central mission and including it in their mission statements (Jacobs, 2009). In the 1950s, community colleges started to meet that demand for nurses and was the start of workforce education to link employers with skilled employees and for students who wanted to learn those skills to prepare for advanced careers (Jacobs, 2009).

Nursing assistant courses would eventually become a part of that career advancement approach with the creation of Omnibus Reconciliation Act (OBRA). Karp, Hughes, and O'Gara, (2008) found that "by the early 1980s, more than 60% of nurses in the United States came from associate degree programs" (p. 110).

Community colleges have been the answer to the growing need for healthcare workers, and since the 1970s, community colleges have been the location where most RNs received their first healthcare degree, an associate's degree (American Association of Colleges of Nursing [AACN], 2016). Community colleges have also helped with the need for nursing assistants, and in 2018 in Illinois alone, about 6,000 community college students took the state exam to become Certified Nursing Assistants (CNAs) (Southern Illinois University Carbondale [SIUC], 2017).

Similar to other workforce certificate programs, CNA programs are short certificate programs that have open access with minimal prerequisites and consist of about six credit hours (PHI, 2015; Nursing.org, 2016). Students enrolling in the programs are typically focused on attaining a new job to increase their income as soon as possible, while also meeting their other nonacademic obligations. Most are often reluctant to take supplemental classes that do not directly meet their intended goals (Jacobs, 2009). Nursing assistant programs have curriculum mandated by state and federal regulations and focus on training nursing assistants to provide direct patient care and manage multiple patients' needs, but also to alert the nurse of any changes in mental and physical status. In many community colleges, nursing assistant programs are entry-level certificate programs taken by part-time and full-time students with low entrance requirements, often without any required college transition requirements, such as a first-year experience course. CNA programs are often the first rung of the ladder to other healthcare programs, including nursing. CNA students are also often at-risk students who may be vulnerable to failure because of lack of previous experience, weak academic backgrounds, and inadequate preparation for college.

INCREASING DEMAND FOR HEALTHCARE WORKERS

Because recent years have seen an increase in demand for healthcare workers, one of the fastest growing areas for certifications are Physician's Assistant programs and Nursing Assistant programs, which may require completion and passing the state competency test as a prerequisite for

entry into nursing programs (AACN, 2016; NCES, 2018). The Bureau of Labor Statistics (2018) cited a growing and aging population, increased severity of illnesses, and a generation of retiring professionals as the factors that have led to this current need for prepared healthcare professionals. This trend is not expected to lessen: BLS reports that the need for nursing assistants is expected to grow by another 8% by 2029 (BLS, 2019).

Nursing assistant positions have a high turnover rate due to the physical demands of the job, injuries, and emotional drain (PHI, 2019). The retirement of the baby boomer generation is adding to the lack of qualified workers for specific careers, especially nursing and nursing assistants. Jones (2015) predicted that the ramification of this shortage in healthcare workers is that there will also be a skills gap. Part of the community college mission is to be a link with workforce education, helping students be prepared with the skills for the desired job. Employers want and need a workforce with more skills than a high school diploma, especially for nursing assistants and other healthcare careers. Healthcare agencies are looking for CNAs who are dependable, team players, good communicators, and able to use their critical thinking skills to alert the nurse to any issues (Richards, n.d.).

The Bureau of Labor Statistics (2018) projects a 15% anticipated growth in the number of nurses needed by 2026, an additional 438,100 nurses. For nursing assistants, the anticipated growth is even higher: 18%. That figure does not take into consideration the replacement of nurses and nursing assistants who retire or decide not to stay in the nursing field. Our aging population, increased life expectancy, and aging workforce creates a massive shortfall in the number of prepared nurses and nursing assistants. AACN (2016) surveyed all nursing roles and published their results in a whitepaper entitled *AACN's Vision for Academic Nursing.* They summarize the findings from BLS as "712,000 new jobs and 495,500 replacement jobs, for a total of 1.2 million jobs by 2020" (p. 6). With that great of a shortage, there is a need to train more healthcare providers and to retain them once they are in the job. However, high attrition rates are also an issue in nursing programs and in the first year of work (Jeffreys, 2007). Jeffreys asks a why would someone quit or drop out of the work that they spent time, effort, and money to achieve that goal. Not surprisingly, the causes are complex and varied.

THE NEED FOR CRITICAL THINKING IN HEALTHCARE EDUCATION

Healthcare professionals often report that they enter the workforce feeling unprepared and unready for their first years as professionals, leading to attrition of prepared new nurses (Pitt, Powis, Levett-Jones, 2015). In a 2016 survey of nurses, the associate's degree trained RNs reported that their bedside skills were better, but that the bachelor's degree trained nurses had greater critical thinking skills (AACN, 2016). Several researchers have identified a lack of critical thinking skills and the preparation that grows into the clinical reasoning abilities as one of the reasons for this feeling of being underprepared (Facione & Facione, 2014; Pitt, Powis, Levett-Jones, & Hunter, 2015).

Critical thinking is more than problem solving. The Association of American Colleges and Universities (AACU, 2019) defines critical thinking as "a habit of mind characterized by the comprehensive exploration of issues, ideas, artifacts, and events before accepting or formulating an opinion or conclusion" (Critical Thinking VALUE Rubric Page, Website). In nursing, it is an understanding of the logical nursing process in which one considers potential solutions to a problem and makes a thoughtful decision. Critical thinking is key to preventing and solving problems, and is "controlled, purposeful, and well-reasoned" (Alfaro-Lefevre, 2016, p. 5). Khosravani, Manoocherhri, Memarian, (2004) describe critical thinking as "a process of purposeful, interactive reasoning, criticism and judgement about what we believe and do" (p. 1).

Healthcare programs have recognized the importance of integrating critical thinking into clinical training and continue to seek more effective ways for this integration. In many colleges and community colleges, first-year experience (FYE) courses include critical thinking as a foundational skill for all students, and require all full-time, first year students to complete the course (CCCSE, 2014). While FYE courses are primarily designed to help students transition to their college careers, they also prepare students for their academic lives by developing study habits and their critical thinking skills. Healthcare programming is beginning to take a lesson from FYE experiences; this emphasis on early integration and reinforcement of critical thinking skills is becoming critical to healthcare programming as well. Both first-year seminars and nursing programs want to help students to think critically, which requires a plan to incorporate it into the curriculum of the class that they are taking as early in their careers as possible

(Alfaro-Lefevre, 2016; Benner, 1984, Fancione & Fancione 2014; Greenfield, Keup, Gardner, 2013; Pitt, Powis, Levett-Jones, & Hunter, 2012; Rischer, 2015).

Critical thinking questions are now on all CNA state exams and require the student to apply lessons learned in the course to decide upon a course of action that is in the best interest of the patient. Once students are in the workplace, they are the ones providing CNA care and need to use those critical thinking skills to alert the nurse to any change in physical or mental status and act upon that information. When information is not reported to the nurse promptly, there is the potential for injury and death to the patient.

THE CHALLENGES FACED BY COMMUNITY COLLEGE WORKFORCE PROGRAMS

Open Access

The open-door promise in the community college mission has been the subject of debate because it can mean that there are no restrictions on entrance or minimal prerequisites for a class, which may put the student at risk for failure. Students may not be college-ready and consequently not prepared to succeed in a program of study. Because of this history, the open-door mission of the community college has collided with the issue of completion of a degree or certificate. Prerequisites and developmental programs may help the student be more successful but also slows a student's progress, increasing the effort required to complete. CCCSE (2016) found that 67% of community college students placed in at least one developmental class (p. 13).

Community colleges frequently have an open-enrollment policy to achieve that access. A survey of community college's open-door practices called the Open-Door Project was conducted by COMBASE, a national consortium of community colleges, to examine ways to sustain the open-door policy; to identify practices that lead to student retention, especially in underserved and underprepared groups; and to look at the policies and relationships of open-door implementation approaches and how they affect the open door (Myran, 2009). The overall goal was to positively impact a student's employment and economic potential via the open-door policies that encourage all students, but especially high-risk students, to persist and complete their degrees. High-risk students were defined in the survey to be students who were underprepared, work more than 30 hours a week, lack financial support, lack social support, are a

first-generation college attendee, and have expectations of failure. Some strategies identified as best practice approaches that colleges have found useful include forming student support groups, modularizing courses, applying case management, developing assessment tools to identify issues, and moving to competency-based instruction (Bolden, 2009).

Getting to Completion

Once students are enrolled, the next issue they face is getting to the finish line. Completion has been an issue for all colleges and universities, including the community college. Completion rates are a national issue with only about 50% completing a degree or certificate, which needs to be addressed not just for the student's sake but also as a nation (Jones, 2015; p. 26). Walter Bumphus, President and CEO of the American Association of Community Colleges, at a 2011 meeting asked, "Why aren't students completing programs that they were interested enough to enroll in?" (O'Banion, 2011). O'Banion, in his article "Pathways to Completion," continued with another quote from Bumphus stating, "Completion is not as embedded in our community college culture as access is. That is something we need to change" (p. 33).

Gary Rhodes (2012) states that the "completion agenda is incomplete… an unfunded mandate to do more with less" (p. 1). It also does not address the "key educational, social, and economic challenges" facing students and colleges (p. 1). For many programs, including most certificate programs, students can enroll without any or few prerequisites or barriers and may be under the radar for advising and success services. Community colleges have reduced the barriers to entry, including low achievement in high school (Rosenbaum & Rosenbaum, 2013). Currently, enrollment is how colleges are rewarded through funding, not by completion, quality, or other ways of measuring student success.

To help students successfully complete, increasingly colleges are putting prerequisites or a developmental or supplemental plan into their programs. However, Jones (2015) found that of "1.7 million students condemned to remediation (developmental programs), only one in ten was graduated" (p. 26). In addition, for short one- or two- semester certificate programs, there are often no prerequisites—a feature that attracts part-time students (AACN, 2016). They want a short course that can impact their wages quickly. However, as noted previously, attending school as a part-time student is one of the identified

markers for high-risk students, and a certificate program may not have the support to help the students overcome these problems, therefore setting up the students for failure. The challenge most certificate programs face is how to get the students to complete successfully.

The High Costs of Attrition

Increasing enrollment has been a goal for colleges and universities, especially with reduced financial support from governmental agencies. The American Institutes for Research (Schneider & Lin, 2011) reports that from 2006-11, “the number of first-time, full-time, degree- or certificate-seeking students increased,” with more than 800,000 at the “starting gate” of college in 2009 (p. 9). Not all of them completed or completed in the time expected. The initial shared expense of their starting school but not completing is a huge drain on their economic resources without the needed result. The American Institute for Research (2011) also reports their finding that “in the 2008–09 academic year, nearly $1 billions of taxpayer money was spent on first-time, full-time, community college students who dropped out before their second year—an amount that is up by more than 35% from five years ago” (p. 4). They report that Illinois lost $24,000,000 of state and local money and $5,900,000 in federal funds in 2008-09 due to dropouts (p. 10). Attention to students more likely to drop out could reduce that expenditure.

Watson (2009) identifies at-risk students as students entering college “academically underprepared, working more than 30 hours a week, lacking financial support, lacking social support, being first-generation college attendees, and having expectations of failure” (pp. 14-15). Students seeking a certificate have some of those at-risk characteristics, desiring a change in employment and more economic freedom, but with low restrictions for enrollment have challenges completing the program (PHI, 2015).

AACC (2017) reports that in the school year 2013-14, 494,995 certificates were awarded, while 795,235 associate degrees were awarded. In the state of Illinois, almost 16,000 students who completed the program signed up for the competency exam for nursing assistants in 2017, with 6,207 community college students (SIUC, 2017). Attrition rates for the program are not tracked by the state; however, the state pass rate for community college students is 90% (SIUC, 2017).

Stoltzfus (2015) reports a national average of “53% of students who entered college in the fall of 2009 had earned a degree or certificate by May 2015” (p. 1). She quotes Doug Shapiro, the National Student Clearinghouse Research Center executive research director as saying that "graduation rates went down for virtually every category of student--part time, full time, older, traditional” (p. 1). Jones (2015) states that students “wander through the curriculum, taking courses that do not count toward their degrees and exhausting their financial aid” (p. 28). They need a clear pathway so that they can anticipate the end of their schooling, starting new careers, or resuming their lives. Nursing assistant certification can be a way to change one’s circumstances but also the first step on a nursing or other healthcare pathway.

Community colleges have responded to these issues by using a Career Pathways Program. In Pathways programs, students have specific course selection, limited choices, predictable course selection, timelines, and anticipated completion (Dadgar, Venezia, Nodine, & Baracco, 2013; O’Banion, 2011). Students who enter college without a clear direction, or pathway, often waste time and money on unnecessary classes or miss timelines for entry into courses that are career specific. Stackable credentials and skills are another program being used, where the students have individual steps to get to the next level but have the flexibility of taking breaks between each step. In *Empowering the Community College, to Build the Nation’s Future,* the American Association of Community Colleges (2014) states that community colleges need to:

> ensure students’ opportunities for career advancement through the design of coherent career pathways leading to attainment of stackable credentials in these high-need areas. Moreover, they needed to build local, regional, and national partnerships (involving community colleges, employers, and government agencies) to accomplish a collaborative agenda that includes targeting skills gaps, promoting the associate degree as a desired employment credential, and establishing alternative models for completing skills-based credentials. (n.p.)

This role has been especially important in nursing (Jacobs, 2009).

THE COMMUNITY COLLEGE STUDENT PROFILE

The community college student population is diverse, especially in educational background, socioeconomics, and age. The AACC (2018) states that 36% of the students attending community colleges are the first generation to attend college and 17% are single parents, which is a nontraditional student. The nontraditional student average age is 25, is a first-generation college student, has

dependents, and may be a veteran or a reentry student. Community colleges attract nontraditional students for many reasons including cost, convenience, and ease of entry. In “Achieving Success for Non-Traditional Students,” cost was cited by students as the top factor for selecting a college and for quitting a program (Barnes and Noble College, 2016). The study also states that to encourage student success for the nontraditional student, colleges need to be identifying at-risk students, offer services for stress management and support systems in career counseling and other campus resources. The nontraditional student is where colleges will see the most growth in the next few years. While not all nontraditional students are at-risk students, many of them are.

Myran (2009) states that “Degree completion rates are very low, especially for minorities, single women with children, older learners, and non-degree enrollees” and may also be a feeling of alienation-social disconnect for these students (p. 17). In *The Game Changers*, Stan Jones (2015) succinctly states that “the longer it takes, [to complete], the more life gets in the way, and the less likely students are to graduate” (p. 26). They are balancing many things and trying to get ahead. Whether it is money, children, moves, health, etc., these increase the likelihood of delaying or missing the completion of a goal.

AACC (2016) found that 22% of full-time students and 41% of the part-time students are employed full time, while 40% are full-time students and 32% are employed part time. Many students are looking to increase their income, and in the current economic situation, completion of that certificate becomes even more critical than ever before. The cost of classes may be a challenge for the student, and then there are hidden in fees, books, and other expenses. These hidden costs can delay the start or cause gap years in one’s education. Certificate programs frequently do not have financial aid to help with the costs, or they do, if it is part of a career ladder. The Illinois Community College Board (2018) found that the “‘typical’ Illinois community college student is 29-years old and enrolled part-time.” Table 1 shows the typical community college student age in Illinois (not including high school programs) in 2018.

Table 1: Age of Community College Students in 2018

Age	Percent
19-24	44.8 %
25-28	9.6
29-52	19.0
53 and over	3.2

Source: ICCB, 2018

PURPOSE OF THE STUDY

The purpose of this study was to examine the critical thinking skills taught in the first year of a healthcare career education, specifically within a nursing assistant program at a community college, and to identify ways to impact CNAs' critical thinking skills within the state mandated curriculum.

OVERVIEW TO THE RESEARCH APPROACH

The purpose of this research study was to gain insight into the critical thinking skills of nursing assistants and identify patterns or theories to explain the phenomenon and its effect on the healthcare they provide. This study utilized a mixed method with a pre- and post-test quantitative comparison with a control group. Testing was done to measure the impact of critical thinking exercises on students in a nursing assistant program. A qualitative survey was used to evaluate the student's perceptions about the critical thinking exercises and the student's perceptions of their ability to think critically.

The Health Sciences Reasoning Test (HSRT-AD) is one of the tests available that assesses critical thinking. It has six categories of measurement and an overall score; this study focused on the overall score. While the students who participated in this study had the opportunity to look at the other categories, which may be effective to gauge their progress, they were not the focus of this study. The HSRT-AD test was chosen for this research because of its applicability to the Associate Degree population.

While no incentives were given to the students participating in the study, the students were encouraged to do their best on the testing. To collect the research data, the researcher needed to interact with the participants but attempted to distance herself from the classroom to minimize researcher and student bias.

Research Questions

This research study was designed to answer the following research questions:

1. How do the critical thinking skills, as measured by HRST-AD of first-year CNA students compare to national results?
2. To what extent can critical thinking exercises added to a CNA program to increase students' critical thinking abilities?

3. How does the addition of critical thinking lessons in the CNA curriculum impact student performance on the state credentialing exam?

4. To what extent do students perceive that the embedded critical thinking exercises helped them be more effective on tests and in the clinical experience?

Significance of the Study

Critical thinking has been identified as a critical skill in education and employment. It is a foundational skill that colleges and universities look to develop especially in the first year. Critical thinking is especially important for those going into healthcare careers who need to use those skills in providing quality care. In preparing them for critical healthcare careers, the educational system attempts to identify effective methods to increase the students' learning about critical thinking and their ability to apply them, both in the classroom and in the workplace through experiential learning. Combining both bedside skills with critical thinking at all levels for nursing is significant for the nursing profession, healthcare employers, and, of course, the patients.

In healthcare settings, critical thinking means that the caregiver sees that something is wrong with a patient, quickly evaluates the situation, decides on a course of action, and implements change in a matter of seconds. To develop any problem-solving skill, a person not only needs to learn appropriate actions, but also practice them regularly and repeatedly. Introducing critical thinking in the first year of students' healthcare education and encouraging them to practice that skill until completion is essential for developing and honing their skills. The need for well-trained nursing assistants and nurses is expected to increase because of attrition and increases in the country's aging population. By ensuring that our future CNAs and nurses are well prepared, with skills, ability, and confidence in their decision-making, they are more likely to feel satisfied with their work, stay in their position (Alfaro-Lefevre, 2016), and provide these essential skills.

Key Assumptions of the Study

Nursing research has generally taken a positivist paradigm (Polit & Beck, 2008). This research used that paradigm to make some key assumptions. This research is grounded on these assumptions: First, student scores should increase from the pre- to the post-test regarding their knowledge about critical thinking. Second, student performance in activities will reflect their critical thinking skills to a

greater extent than their scores the written tests. Third, students will actively participate in the classroom and individual exercises and will be honest in reporting their perceptions of the activities.

DELIMITATIONS OF STUDY

Delimitations are defined by the researcher as to what will be included within the parameters of the research study and the specific study elements (Leedy, 2010).

Delimitations for the Quantitative Study

1. A limited number of students participated in the study from one location and one CNA program. While this structure may limit its generalizability to other schools and other programs, the similarities across similar programs should make the results applicable and of value.

2. This study was conducted on one campus with a variety of class times and instructors in the Spring of 2018 for one healthcare (CNA) program. While the students were not randomized to specific classes, they self-selected their course schedules based upon their time constraints and personal and educational needs. Each class had a different instructor, so there was some variance in their teaching style and the extent to which they already incorporated some critical thinking activities and instruction. Instructors also self-identified dates for the researcher's critical thinking activities.

3. This study examined critical thinking modules within one healthcare program. The critical thinking modules and format are likely to be generalizable to other educational programs where critical thinking is a foundational skill.

4. Students took the pre- and post-test and then, after completion of the post-test, they received their results from both tests. This was done intentionally to not influence the post-test results. This structure, however, may have affected the overall results: It is possible that the students may have recalled the test questions and revised their answers on the post-test.

5. Self-reporting on survey questions for the qualitative study is dependent on the participation and honesty of the respondents.

Delimitations for the Qualitative Study

1. The survey was given to the intervention group only, since they were exposed to the formalized critical thinking exercises. It was given after the students completed the course final exam and after the post-test.

2. Self-reporting on survey questions was dependent on the participation and honesty of the respondents; thus, their responses might reflect positive bias. It is possible that their answers were affected by attempts to assist the researcher, and include positive feedback because of general kindness to the researcher.

DEFINITIONS OF TERMS

The following terms are defined here to avoid confusion and increase consistency and understanding across this dissertation

At-risk students: Students who were under prepared, working more than 30 hours a week, lacking financial support, lacking social support, being a first-generation college attendee, and having expectations of failure (Myran, 2009).

Certificate: “A formal award certifying the satisfactory completion of a postsecondary education program. Certificates can be awarded at any level of postsecondary education and include awards below the associate’s degree level” (NCES, 2019)

Clinical judgement: The outcome of critical thinking and clinical reasoning (Alfaro-LeFevre, 2016, Facione & Facione, 2014).

Clinical reasoning: The practiced process of thinking that includes the lived experience and reflection about issues of care, including prevention and management of patient problems and managing other clinical issues including teamwork, collaboration, and delegation (Alfaro-LeFevre, 2016). The key word is “practiced,” that means they have learned from experience, reflected upon the experience, and have an adapted their thinking to a higher level of expertise.

Community college (CC): A two-year postsecondary institution that offers the associate degree as the terminal degree. These institutions offer educational opportunities that enable students to transfer to four-year institutions; develop basic reading, writing, and mathematical skills; obtain a degree or training for technical or skill-based fields; and participate in noncredit courses.

Critical thinking skills (CTS): A logical process in which one considers potential solutions to a problem and makes a thoughtful decision. Critical thinking is key to preventing and solving problems, and is “controlled, purposeful and well-reasoned” (Alfaro-LeFevre, 2016, p. 5).

First-Year seminar (FYS) or First-Year Experience (FYE): A class for first-semester full-time students that may incorporate the following topics: utilizing college resources, finances, connecting with professors and peers, research, and critical thinking. It is being used for comparison to nursing assistant programs because both courses are generally taken in the first year of school and so have similar populations. In addition, FYS programs have compiled extensive research to demonstrate their effectiveness in preparing students in critical thinking skills (Greenfield, Keup, & Gardner, 2013).

Nurse (RN): Registered nurse from an education at program: either an associate-degree program (two year) or baccalaureate program (four year).

Nursing assistant students (CNA): Basic Nursing Assistant Training Program (BNATP) is a certificate entry level one course program with low entrance requirements of basic seventh grade reading and comprehension. *Upon completion of the program, they can sit for the state exam and then become certified.* For clarity, they will be referred to as CNA students even if they have not taken the state exam yet.

Nursing process: this thinking process is similar to the scientific method but in relationship to the patient. It involves nursing assessment or CNA observations, diagnosing or analyzing, planning, implementing, and evaluating. It also includes a human factor, in that patients

have the right to choose and make decisions for themselves independent of the plan, even if they were part of the process. In the nursing process, nursing assistants are a vital part and need to participate but are not allowed to assess or establish a nursing diagnosis. Nursing assessment and diagnosis are strictly nursing functions.

Patient or resident: The person being cared for, with “patient” being a hospital term and” resident” being used in long-term care.

Physician’s assistant (PA): A four-year program training students for working with a physician doing histories, physicals, and prescribing per protocol. physician assistants’ programs require 1,000 to 2,000 hours of clinical time (AAPA, 2020). Students can get those clinical hours by being a CNA to get those hours.

Problem solving skills: Solving an issue in specific situation. This is often confused with critical thinking, but critical thinking is a specific process.

Thinking: Any mental activity (Alfaro-LeFevre, 2016).

ORGANIZATION OF THE STUDY

The remainder of this dissertation is organized as follows:

Chapter Two: Literature Review provides a history of community colleges and their issues and the research, including attrition and persistence rates and the practices that impact those rates, and the effect of first-year experience courses. There is also a portrait of the community college student, the typical CNA student, their challenges, and the obstacles they face in pursuing a degree. Lastly, there is a review of specific theorists for critical thinking and clinical reasoning and the role and significance in nursing and healthcare careers.

Chapter Three, the methodology section, includes a definition of mixed methods research, an overview of the research site and participants, and a description of the data collection and analysis.

Chapter Four provides the results of the pre- and post-test, statement of statistical analysis, and the results of the qualitative survey.

Chapter Five provides a summary of the findings and their relevance to student success and levels of critical thinking as well as any deviation or support from research and theories. The data collected are reviewed with potential implications and discussion of the null hypothesis. There is a discussion of the results and their potential implications for the topic of critical thinking and its place in healthcare, especially in the first year, and it concludes with a discussion of how these findings apply to the curriculum and best practices for the educator in first year programs.

CHAPTER SUMMARY

The need for nursing assistants and nurses is expected to increase because of attrition and increasing need because of changes and aging in the population. If they are well prepared in their skills and ability and confident in their decision-making, they are more likely to stay in their position (Alfaro-Lefevre, 2016). Critical thinking is seeing that something is wrong with a patient, quickly evaluating the situation, deciding on a course of action, and implementing it in a matter of seconds. To do any skill well it needs to be learned and practiced regularly. Introducing critical thinking in the first year of a student's education for a healthcare career and encouraging them to practice that skill until completion, may facilitate their success in their chosen field.

CHAPTER TWO: REVIEW OF LITERATURE

INTRODUCTION

This study's research questions are centered around the impact of targeted critical thinking exercises on a nursing assistant's skills and the student's perceptions of the effectiveness of those exercises. This literature review looks at critical thinking, the impact of critical thinking on healthcare and nursing students, and the acquisition of critical thinking skills. There is an absence of studies that focus on certificate programs, especially on certified nursing assistant programs, CNAs' need for critical thinking skills, and the impact of those skills for success in completing CNA programs. Certificate programs like the CNA are frequently the initial step for first-year students going into a healthcare career. While there is a lack of research in the area of nursing assistant education, a large amount of research examines first-year seminars (FYS) and the inclusion of critical thinking in these seminars. A review of FYS helps provide a perspective on including critical thinking in the early stages of an academic program. This chapter is divided into the following sections: (1) The Role of First Year Seminars (FYS) and Gateway Courses, (2) Teaching Critical Thinking, (3) Critical Thinking as a Foundational Skill, (4) Teaching Adults (5) The CNA Curriculum

THE ROLE OF FIRST YEAR SEMINARS (FYS) AND GATEWAY COURSES

The issues impacting Community College student success discussed in Chapter One were student success, completion, and support of the at-risk student. There may not be one solution to student success, but some solutions have been addressed in literature.

The first semester has long been identified as the most challenging time for all students. The first-year seminar was introduced in the 1980s (Gordon, 1989). At that time, it identified that students who were starting their post-secondary education need help to adapt their skills to meet the rigors of academic life. From about 1960 to 1980, post-secondary schools adopted a sink-or swim approach, with everyone

hoping that the student would be successful without any help or support from the school (Greenfield, et al., 2013). Programs designed for entry-level students have seen a resurgence for a variety of reasons, but it is all about helping the student be successful in their first year in order to support their entire educational career (Green, 2015).

Young and Hopp (2014) found that 89.7% of institutions reported that they required FYS for freshmen. One of the topics included in a majority of FYS programs is critical thinking (Keup & Petschauer, 2011; Padgett, Keup, Pascarella, 2013). In Young's (2019) study, 264 (49%) of the Institutions surveyed reported that their institutional objectives included critical thinking, analytical, or problem solving as one of the key outcomes (Young, 2018).

FYS are one of the high-impact educational practices listed by the Association of American Colleges and Universities (2019). The current trend in FYS programs is a holistic approach of including academic skills such as critical thinking and research but also essential nonacademic skills of self-development (Cuseo, 2010). Keup (2016) stated that, while the foundation of critical thinking starts in the first year of post-secondary education, it is more frequently a topic taught at four-year institutions. CCCSE (2014) reports that of their 166 survey respondents, only 27% of the community colleges required all first-time part- or full-time students to complete a FYS. These results indicate that a majority of students enrolled in community colleges are unlikely to receive a foundation critical thinking at the college level. Mottola and Murphy (2001) concluded that "critical thinking is most likely to occur and continue when it is supported by others and repeatedly practiced" (p.161). CCCSE (2014) found that students who were required to take a gateway course, such as FYS, were more likely to be successful in subsequent classes. Connolly, Flynn, Jemmott, & Oestreicher, (2017) found that at- risk students benefited from an FYS class, and it improved their GPA and connection to the college and studies. They further suggest that early and continued support for education was important.

Tinto (1999) drew attention to the faculty relationship with students and a connection with others at the institution as being important for persistence. Barnett (2011) adds that faculty validation and connection with the student adds to the desire to persist on to completion. FYS classes can have an impact on the student's education, but they are not required at all colleges for full- or part-time students.

Similar to FYS courses, many certificate programs are used as gateway courses to develop and build key foundational skills. Certificate programs have a short-term goal of changing a student's job prospects at the conclusion of program. Gateway courses are first courses in a discipline that foster academic abilities to increase student success. In "Empowering community colleges to build the nation's future," the AACC (2014) suggests that gateway courses should review basic skills through contextualization, have evidenced based course work, "foster active, collaborative, and cooperative learning approaches" (p. 18). The goal for gateway courses, similar to FYE courses, is improved grades, increased motivation, and increased retention.

Many studies have been done on the success of first-year students for community colleges and have noted several indicators of success but also of attrition, withdrawal, or failure to continue in the class (Juszkiewicz, 2017). They have shown that the first year is crucial to continuation in school, but the issue with certificate programs is that this might be the only class they take if they are unsuccessful and will not progress.

CRITICAL THINKING AS A FOUNDATIONAL SKILL

Critical thinking is a concept that is as old as philosophy. The Greek philosophers had discussions with their students to get them to think about their thinking and ask critical questions. They discussed the importance of training for better thinking and the use of the Socratic method "of systematic doubt and questioning of another to elicit a clear expression of a truth supposed to be knowable by all rational beings" (Merriam-Webster, n.d.). In more modern times, the theory of teaching students about their thinking process has evolved from what is taught and used in college to how it is used in one's personal and professional life.

Socratic questioning is based on the first theory about critical thinking and is used to get students to think. Critical thinking principles include the understanding that persons in authority don't always have the correct answer, so it is up to the individual to seek out what they think is the best solution given information available (Paul, Elder, & Bartell, 1997). Since that time, there have been many theorists on the type of critical thinking and the best way to encourage it in students. In modern times, Edward Glaser, whose research led to the Watson-Glaser test for critical thinking, looked at the multiple dimensions of

critical thinking and linked its importance to education. Glaser, in his analysis of critical thinking in education (1941), defined critical thinking as:

> The ability to think critically, as conceived in this volume, involves three things: (1) an attitude of being disposed to consider in a thoughtful way the problems and subjects that come within the range of one's experiences, (2) knowledge of the methods of logical inquiry and reasoning, and (3) some skill in applying those methods. (n.p.)

Paul (2011) theorizes that there have been three movements the development of modern critical thinking education has gone through: argumentation, a recognition that critical thinking is more than just a cognitive debate and can be specific to different disciplines, and lastly, the current movement recognizes that the thinking process is combined with the traits of being human, such as empathy, personality, and creativity — not just one aspect of logic. Through those changes, there has been a recognition that critical thinking is more complex with variations in disciplines and with differences between critical thinking in academia versus in the workplace.

Arum and Roksa (2011) and Richards (n.d.) note that critical thinking is a more complicated issue that has evolved to be both a global and economic concern. Arum and Roksa (2011) note that while critical thinking is deemed important in college, 45% of students showed no improvement in critical thinking between in their first four semesters and only 36% in all four years (p. 36). This information has come as a shock and raises the question of whether academia meeting the needs of the workplace in the area of critical thinking. Examination as to how to improve that skill in all years in college needs to be done to better prepare students for the workplace. Pascarella and Terenzini (2005) define critical thinking as both the thinking skills and the desire to use them. Several studies support the premise that learning critical thinking skills was not enough to get students to use thinking skills and a desire to use those skills is also important (Denial, 2012; Stupnisky, Renaud, Daniels, Haynes, & Percy, 2008).

Barnett and Arum (2015) state that three things are needed for critical thinking in the workplace: that it is a practiced ability, they have disposition to think critically, and critical reasoning. The authors also note that critical thinking has

> six distinct, yet integrated and permeable, dimensions: (1) core skills in critical argumentation (reasoning and inference making), (2) critical judgments, (3) critical-thinking dispositions and attitudes, (4) critical being and critical actions, (5) societal and ideology critique, and (6) critical creativity or critical openness. (p. 8)

They add to that a personal and sociocultural dimension that influences that process. Critical thinking is a dynamic and complicated concept that, while recognizable, has different aspects depending upon the discipline and application.

Critical thinking calls for a persistent effort to examine any belief or supposed form of knowledge in the light of the evidence that supports it and the further conclusions to which it tends. It also generally requires ability to recognize problems, to find workable means for meeting those problems, to gather and marshal pertinent information, to recognize unstated assumptions and values, to comprehend and use language with accuracy, clarity, and discrimination, to interpret data, to appraise evidence and evaluate arguments, to recognize the existence (or non-existence) of logical relationships between propositions, to draw warranted conclusions and generalizations, to put to test the conclusions and generalizations at which one arrives, to reconstruct one's patterns of beliefs on the basis of wider experience, and to render accurate judgments about specific things and qualities in everyday life (Glaser, 1941, n.p.).

A survey conducted by the AACU (2011) found that 95% of the chief academic officers rated critical thinking as one of the most important intellectual skills for students. In a survey of 400 employers, 92% that critical thinking and problem solving are essential for workers to be successful in today's workforce (Casner-Lotto & Barrington, 2006). In a survey of 27 colleges, respondents said that critical thinking was one of the top three important topics being taught in FYS classes (Skipper, 2017).

Learning how to think critically can have a lifelong positive effect impacting educational success and practice (Padgett et al., 2013). Padgett et al. also support the use of AACU's high impact practices to teach and encourage critical thinking such as "undergraduate research, service learning, learning communities, capstone courses and cognitive development among students" (p. 147).

Robert Ennis (1985), who helped develop the Cornell Critical Thinking test, defined critical thinking as "reflective and reasonable thinking that is focused on deciding what to believe and do" (p. 45). The concept of what to believe and do take the critical thinking concept to actual action and make the idea more relevant to the application of thinking skills.

In their book *Academically Adrift,* Arum and Roksa (2011) detail their findings about critical thinking and the workforce. Their research included over 2,000 students from 2005 to 2009 and found that 45% of students made no significant improvement in their critical thinking or reasoning skills after four

years of college (p. 36). Casner-Lotto and Barrington (2006) found that 92% of the employers surveyed had concerns about the ability of high school, two-, and four-year college graduates to think critically. If critical thinking is not meeting the needs of the employers, that has a huge impact on the job outlook for graduates (Arum & Roksa, 2014). They also found that 98% of the faculty surveyed thought that critical thinking in college was important (Arum & Roksa, 2011). The question is that if faculty and employers think that critical thinking is important, but students are not improving, where is the disconnect? Some question whether it is being taught in all years of college (Arum & Roksa, 2014), while others (Denial, 2012; Facione & Facione, 2008) look at the desire to use critical thinking or having a disposition to use critical thinking adds to one's ability to thinking critically. In order to address this issue, it is important to look at how and when it is being taught.

CRITICAL THINKING IN HEALTHCARE

Critical thinking used in healthcare is different than that used in philosophy, engineering, or other disciplines. It is still a thought process that revolves around evaluating a situation. Alfaro-LeFevre (2016) defines it as "your ability to focus your thinking to get the results you need-makes the difference between whether you succeed or fail. It makes the difference between keeping you and your patients safe" (p. 2). It requires prioritizing; understanding the physical, emotional, and intellectual needs of a patient; and the uniqueness of the current situation to make a deliberate plan of care, sometimes in seconds.

Gravlin and Bittner (2010) point out that is not just about lousy care but also about missed care. Missed care included things like not turning, ambulating(walking), feeding, mouth care, and toileting which can lead to injury and illness. These are things that they may not be able to do because of lack of time or low staffing, but do not report to the nurse because they do not want to get in trouble and may not see it as that necessary. This is an issue of communication and critical thinking on the part of both the nurse and nursing assistant. Nurse aides must continuously make decisions about the types of care they are authorized to give. This includes assessing and meeting the needs of the patients in their care and helping the RN, LPN, or nurse practitioner they are assigned to. Teaching critical thinking skills to nurse aides involves encouraging them to make decisions, analyzing those decisions, and discussing possible outcomes based on the care choices they make (Richards, n.d.). Facione and Facione (2008) stress the

importance of learning critical thinking in nursing. They state that critical thinking in nursing and healthcare is a judgment process of deciding "what to believe and/or what to do given a certain context" (p. 2). They go on to describe the process as

> a clinician should consider the unique character of the symptoms (evidence) in view of the patient's current health and life circumstances (context), using the knowledge and skills acquired over the course of their health sciences training and practice (methods, conceptualizations), anticipate the likely effects of a chosen intervention action (consideration of evidence and criteria), and finally monitor the eventual consequences of delivered care (evidence and criteria). (p. 2)

This is the nursing process of assessment, analyzing, planning, implementation, and evaluation of care. Facione and Facione (2008) identify two systems of critical thinking or decision making in healthcare: one is reactive and without reflection at the time and the other is a thoughtful process that is a more deliberate, analytical, and reflective process. Each has its purpose and needs to be integrated through practice and experience. The analogy that they use is a comparison of driving home on the same route, like one is on autopilot: this is heuristic or instinctive. The other is more of a process with several components of reasoning. They add that having discussions is not enough, it needs to be integrated into practice. One aspect of critical thinking is realizing that there are multiple actions one could take in the clinical area but choosing the one that bests fits the situation can be crucial.

Having a critical thinking disposition is a natural or encouraged desire to use one's critical thinking skills and not just to accept another person's assessment of a situations. Facione and Facione (2018) also note that one key difference in a person's ability to critically think is how one problem solves clinical situations, whether they decide on their own (which limits potential solutions) or through collaboration.

Facione and Facione (2008) state that as one becomes adept at critical thinking skills some of the complex actions become more heuristic in nature or more instinctual.

Benner (2005) applied critical thinking theory to healthcare, specifically nursing. She explained the changes that occur in nursing from a student nurse with critical thinking to a clinical reasoning of an experienced nurse. As a student progresses with use and experience, the process becomes quicker as the nurse remembers that experience and applies it. The theory emphasizes the importance of practice and experience in getting to the expert level. Benner (1984) conducted several studies that looked at the changes in nursing practice as the nurse uses the critical thinking skills as they gain experience. When

they get to the expert level, they have quicker assessment and planning skills to react quicker. In addition, as they use their skills, they become more adept at reading patient responses and understanding the constraints of the situation.

Benner's (1984) theory, as detailed in *From Novice to Expert: Excellence and Power in Clinical Nursing Practice,* details the steps in critical thinking for nurses. Benner identified key characteristics for each of the stages of acquiring and progressing toward clinical reasoning. The novice has little experience on which to draw conclusions, so they are tied to the rules for their skills and need the support and cues of another nurse (instructor or preceptor).

Benner (2005) also found that peers and discussion can expose the students to different actions and help with decision making. Collaboration can help with disposition to think and a comfort level in using that skill.

In the first year of nursing, the new graduate needs to start to make decisions on their own based on their limited experience and can be overwhelmed by duties. It is more procedural than wholistic (Orland-Barak & Wilhelm, 2005). This is a time where there can be a high attrition rate. One of the reasons cited for this attrition is that new nurses did not feel comfortable with their critical thinking abilities (Pitt et al., 2012).

Pitt et al. (2012), in their integrative literature review, looked at several studies to analyze the factors that influence nursing student's success and attrition rates. They looked at 36 studies and found that several factors were significantly impactful on nursing students' success. Some of those factors included self-efficacy, academic engagement, and critical thinking skills.

Kenny , Doiron, Hall, Street, Milton,-Wildey, & Parmenter (2012) found in their longitudinal study of the first-year retention that new nurses need mentoring in their critical thinking skills and learning on the job. Gravlin and Bittner (2010) note that the nurse needs to be able to use their critical thinking skills to delegate appropriately to a nursing assistant. As the nurse gains experience, their critical thinking abilities become habit, allowing them to quickly make decisions using that experience. Novice problem solving may solve the problem, but practiced and experienced critical thinking and clinical reasoning examines the other factors that might impact that care and the patient's response (Facione & Facione, 2008). Figure 1 illustrates Benner's Skill Acquisition Model. It looks at how a student nurse can progress

through needing approval and cues from an instructor to being a beginning nurse who is still focused on the performance of their nursing skills to the last stage of just knowing what to do and when with seemingly little effort.

Figure 1. Benner's Skill Acquisition

Novice:	Advanced Beginner:	Competent:	Proficient:	Expert:
Just learning a skill needs verbal cues. No confidence and skills take time to complete	Able to demonstrate acceptable performance because of experience. May need extra time to complete skill	Has been on job for two to three years. Efficient, coordinated, and confident.	With experience, can understand a situation and can anticipate how to adapt care given the nuances of the situation.	Able to quickly read a situation, and even if it has not been seen before, have a deep understanding of the entire situation and quickly plans care.

Source: Adapted from Benner (1984)

Each stage has particular markers and levels of experience with critical thinking, but it cannot be assigned a specific number of years of working as a nurse. Inclusion of critical thinking into the nursing curriculum is a forgone conclusion.

ADULT LEARNING

Adult learning (andragogy) has some similarity to pedagogy and some differences (Knowles, 1985). Knowles's theory of adult learning focuses on making learning relevant to the learner and to their life. His postulates for learning are:

1. The learner is self-motivated and self-directed.
2. Adults bring life experiences and knowledge to the learning experience.
3. They are goal oriented
4. They want content to be practical and applicable to their lives
5. Content needs to be relevant to their goals
6. They want to be respected and have a collaborative relationship with educators.

Knowles's (1985) theory on adult learners is that education needs to be relevant and usable. His theoretical framework of andragogy addresses the adults need for self-direction and concept and

application to their experience and learning to a subject or current problem. The other part of this is the application of past knowledge and current learning to a situation. This is an important part of the education of a nursing assistant, as the clinical experience and state competency exam is not memorization but application of the acquired knowledge. The average community college student age is 25, making them an adult learner. Application of Knowles's theory about learning for this population allows for the respect and recognition of past learning and has the goal of building on that knowledge base.

Richard and Stuart Dreyfus's (1980) theory of skills acquisition theorized that learning a skill is not enough but that it needs to be practiced frequently to move from novice to expert. The learner goes through five levels from novice to expert. Each level has anticipated behaviors and attitudes building on their own experience. The learner progresses from a controlled processing of information through taught principles to processing through their own experiences. As the learner progresses, processing becomes faster and more automatic. Dreyfus and Dreyfus focused on engineering skills, which is easier to document and measure than the critical thinking process.

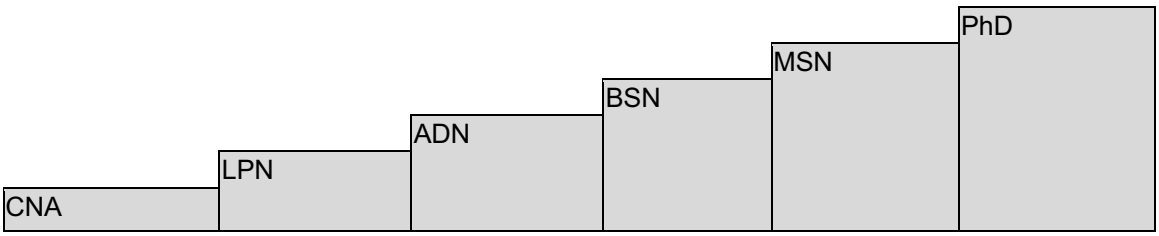
THE CNA CURRICULUM

In 1987, with the signing of the OBRA by President Ronald Reagan, the certification of nursing assistants with a formal education path was put in place. OBRA dictates the curriculum and program requirements including hours, while each state creates laws and oversite for each program. In the State of Illinois, that duty is performed by the Illinois Department of Public Health (IDPH). So, while there are common trends and policies, each state has their own policies as to how to meet those requirements. One of the common threads is the need to address the short fall in trained workers to fill those positions.

As a stackable credential, a CNA program addresses the skills gap for both CNAs and nursing, providing a clear entrance to the nursing pathway. Stackable credentials are "a sequence of multilevel, industry recognized credentials and /or certifications" (Bragg & Krismer, 2016, p. 21). The entry level in nursing is a CNA with several levels that build upon the previous credential while advancing in them in their nursing career path. It makes the skills learned at each those levels even more important to the success of the next level, including the academic skills. Many schools are now requiring CNA certification

for entry into nursing schools, making it a gateway course for nursing. The skills traditionally taught in CNA have been basic nursing skills but not necessarily the academic skills that are a part of a traditional gateway course and for the next level of nursing. Figure 1 illustrates the steps along the pathway.

Figure 2. Steps in a Nursing Career Path



Source: AACC, 2014

CNA programs vary from five weeks to nine months. The national law requires a specific number of hours for the classroom and clinical experience, while states monitor and establish specific course requirements and guidelines (IDPH, 2020; Turnham, 1987). Three components are required for all nursing assistant programs: the didactic, skills practice (lab), and clinical experience, which is the student's application of everything learned in the class (IDPH, 2020). During the class and clinical experiences, specific skills are taught, practiced, and demonstrated in the classroom and then performed on residents/patients in the clinical portion of the class (IDPH, 2020). It is during the clinical portion that the students must use their critical thinking skills to respond to the needs of the patient and observe and report any change in condition to the nurse (IDPH Program Requirement, 2020). Richards (n.d.) notes that a large part of the education of the nursing assistant in on-the-job training, or more experiential than didactic learning. The skills learned are fundamental nursing skills and are the first step in their nursing education, but the academic skills are often at the discretion of the instructor (IDPH, Model 2020).

While it is generally recognized as important to include critical thinking into the curriculum, the question is how, when, and the frequency. Azizi-Fini, Hajibagheri, & Adip-Hajbaghery, (2015) conducted a study that looked at the nursing student's first-year critical thinking scores and found that they did not predict first-year science grades. These scores in the first year did not predict their senior-year critical thinking scores in their cumulative GPA or the HESI RN exit exam scores but were weakly correlated with HESI Pharmacology Exam scores (Azizi-Fini, et. al, 2015). The critical thinking scores did not predict NCLEX-RN success. They suggest that critical thinking was not affected by the nursing education

program and conclude that a change in nursing programs curriculum and how they deliver content might be necessary. They further suggested identifying those students with low critical thinking and working with them early to encourage critical thinking, testing them early, and providing remediation and close observation for those who did not test well. They also proposed a longitudinal study to look at nursing students' critical thinking over time, which has not been studied yet.

In a review of Benner's theory, Altmann (2007) debates whether it is a theory or a philosophy citing that ways of knowing may not be able to be measured as quantitative but are more closely related to qualitative. Altmann cites Carper's four patterns of knowing in nursing: "empirics, moral/ethical knowledge, personal knowing and aesthetics" (p. 116). Altmann's review draws the conclusion that it is more of a philosophy than a theory. There have been other critiques of Benner because it does not take into consideration other criteria that is used in deciding, including social knowing and the difficulty in measuring changes (Cash, 1995; English, 1993). English (1993) also points out that Benner (1984) does not detail how a novice nurse can make that transition or how educators can help. Benner (2001b) advocates for experiential learning to help to make that transition. Nursing and nursing assistant programs require hands on learning of skills and experiential in the clinical site.

CHAPTER SUMMARY

Critical thinking is considered a necessary skill in education and is listed as the benefit of a bachelor's degree over an associate degree. While it is listed as an objective for FYS and many gateway courses, the reality is that it needs to be introduced in the first years and encouraged in all years to become a practiced way of thinking. In addition, theorists in critical thinking link a desire to use a practiced process of thinking (a predisposition) and to a higher level of practiced thinking called critical reasoning.

In academia and nursing classes, while the benefits of critical thinking are well documented and well established, what remains unclear is how and when to incorporate critical thinking into the curriculum. Azzi et al. (2015) found no difference in test results from the first year to the last year of classes, but they also noted that higher critical thinking skill scores were associated with higher scores on nursing registration exams or HESI exams. The conclusion they drew is that critical thinking needs to be

integrated into all levels of the nursing curriculum. The results of the AANC survey (2016) indicated that bachelor's degrees have more critical thinking incorporated into their curricula than associate degrees, whereas associate degree programs are perceived to have more skills

If students learn to think critically in a CNA program, then they have the skills to make thoughtful decisions for the care of that patient and report appropriately to the nurse. If they go on to nursing or another healthcare career, they can build upon those skills to become more skilled at clinical reasoning.

CHAPTER THREE: METHODOLOGY AND RESEARCH DESIGN

INTRODUCTION

The problem addressed in this study is the need for first-year students in a community college CNA program to increase their critical thinking skills. Community colleges are looking at ways to measure critical thinking skills and how to positively impact these skills in the college student. Many of the First Year Seminar (FYS) or gateway classes address critical thinking skills, but not all first-year students attend these classes. Those students going into a health career need these skills, both for being successful in classes and being successful in their career-specific courses and clinical work. As they transition into those career-specific courses, they will build upon the critical thinking skills, transitioning toward clinical reasoning. The absence or strength of those critical thinking skills can be crucial toward their success. It is the intention of this research to identify effective methods for measuring critical thinking skills and measuring the impact of embedded critical thinking exercises on student outcomes.

RESEARCH DESIGN

Purpose of Study

The purpose of this study is to look at the effects of including critical thinking exercises into the standard curriculum for nursing assistants. The curriculum is standardized by the state and currently does not specifically target critical thinking. At the college where the research was conducted, full-time. entry-level students in other disciplines are required to take an FYS, but students in the CNA curriculum are exempt from this requirement.

Research Questions

The following research questions guided this study's examination of the effect of critical thinking exercises in a CNA curriculum:

1. How do the critical thinking skills, as measured by HRST-AD of first-year CNA students compare to national results?

2. To what extent can critical thinking exercises added to a CNA program to increase students' critical thinking abilities?

3. How does the addition of critical thinking lessons in the CNA program impact student performance upon the state credentialing exam?

4. To what extent do the CNA students perceive that the embedded critical thinking exercises helped them be more effective on tests and in the clinical experience?

Mixed Methods Research

This is a mixed methods research paradigm with both quantitative and qualitative questions and data. It combines the rich data of the qualitative data with the specific quantitative data, which increases the validity and reliability of a research study (Creswell & Creswell, 2018; Johnson & Christensen, 2008). For this study, the quantitative paradigm is the dominant paradigm supported by the qualitative data of the student's perspectives.

Quantitative Paradigm

The quantitative paradigm is the "traditional, positivist scientific method" (Polit & Beck, 2008, p. 16). It is cause and effect, with the researcher making predictions that they then test in the real world. The data and results are something that can be quantified through one's senses. It is also a way of studying a topic that is very logical and with several planned steps involved. The researcher attempts to control several parts of the study to increase the strength of the observations. It is objective data that are collected from which the researcher can draw conclusions and prove or disprove a hypothesis. Frequently studies in health sciences and health care use a control group for comparison. which depends on the scientific method to draw conclusions on medications and other interventions. The generalizability of the quantitative study is used as a benchmark for the quality of the study.

Qualitative Paradigm

The qualitative paradigm is a naturalistic method of inquiry and research that was developed to answer questions that deal with "human complexity" (Polit & Beck, 2008 p. 17). Qualitative research looks at the subjective data that may explain the results of the quantitative data in a mixed methods study or as

an exploration of the human experience. It is more narrative and is frequently used in education and other topics that seek to study the motivations and perceptions of the participants. This paradigm helps the researcher understand the thought process and how the study components were perceived by the participants. This data can be particularly useful for changes for future studies and current teaching methods. It is the “why” explanation to the data using grounded theory to understand, analyze, and report the student’s perceptions. From these perceptions, some common themes can be derived (Chun, Birks, & Frances, 2019; Creswell & Creswell, 2018; Polit & Beck, 2008).

Mixed Methods Research

A mixed methods research study is complementarity with words and descriptions and statistics, which Polit and Beck (2008) report as being the two languages of humans. This kind of research creates a feedback loop, which is a common nursing communication method. It also replicates the nursing process by combining both objective and subjective data to reach a conclusion.

This study is a quasi-experimental design with a paired *t* test of students in a certificate (short-term) program, specifically a nursing assistant (CNA) program at a medium-sized rural community college in the state of Illinois. This program was chosen partially because of convenience, but also because it is a long-term established program with historical data. It also has a mandatory curriculum from the state that varies very little from instructor to instructor and has a state competency exam upon completion. A quasi-experimental design was chosen because the students were not selected individually; instead, the students enrolled in the class based upon their personal schedules and preferences. A critical thinking intervention was administered to specific classes within the standard curriculum of the CNA program. The standardized curriculum does not address critical thinking skills, so there is uncertainty as to whether and how thinking skills might be covered by individual instructors or programs.

Site Selection

The site for this study is a large midwestern community college in Illinois located in a suburban area outside of a major city. It has a high transfer rate and nontraditional Carnegie classification (NCES, 2019). The enrollment in 2017 was 13,749 with 64% being part time and 36% being full time (NCES, 2019). Other demographics include an ethnicity that is 51% Caucasian and 49% other, including 27%

Hispanic. Students are pursuing credits for transfer and a variety of career programs, including health careers. The basic nursing assistant program (CNA) has a consistent enrollment of about 700 dual-credit high school and college students taking the program annually. This is frequently the entry point class for those going in a health career, including a nursing program. The site was chosen because of the large nursing assistant program and for convenience.

Participant Selection

Students self-selected into the nursing assistant program and then selected a class that met their scheduling and personal preference. For the study, one class was randomly selected as a control and the other three were intervention classes. The intervention classes did not have additional course work, but some of the course content was taught in the classroom applying critical thinking skills. This self-selection into a specific class created a somewhat of a randomization of participants. Students received an invitation to join the research study during their class time and completed the consent form prior to completing the pre-test, the first HRST-AD test.

The sample size sought was approximately 120, with 3 classes of 30 students chosen for the experimental course and one class of 30 as a control. The sample size was calculated based upon approximately 200 students going through the CNA program every semester. Getting the largest sample size possible decreases the chances for a sampling error and allows for some attrition (Polit & Beck, 2008).

The calculation of a paired *t* score compares the mean of two related groups such as a control and intervention group. The mode of instruction delivery was three lecture classes and one blended class. One lecture class was the control group. These classes have a diverse student population, with full-time, part-time, and working students, and a variety of class times with two- day classes, an evening class, and a weekend blended class (part online and part in person).

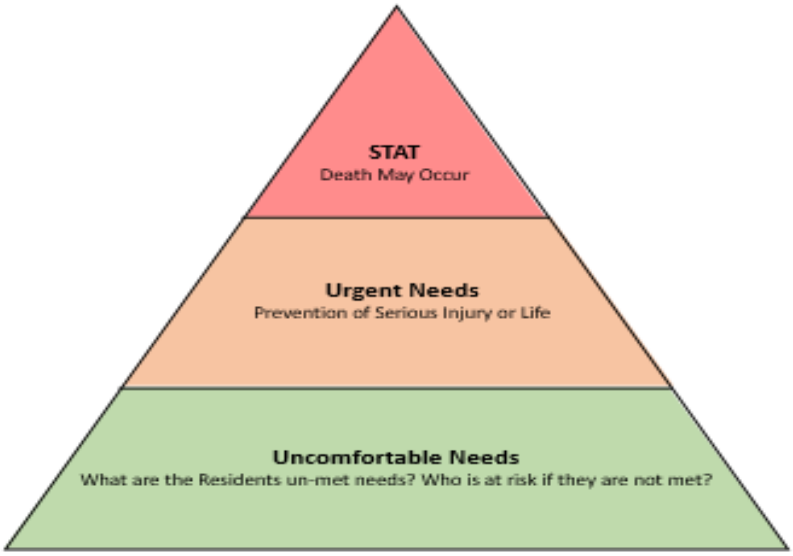
Each class that participated in this study was taught by a different instructor and at different times, and the students self-selected into those specific classes. Students self-select to enroll in a CNA class and must be able to function as a CNA. The participants ages ranges from 16 to over 50 years of age.

CRITICAL THINKING INTERVENTION

The intervention exercises applied to the in-class instruction consisted of everyday scenarios in the work of a CNA and applied the nursing method, prioritization of care, and the students' understanding and self-regulation of their critical thinking. The instructor selected the topic of the day and the topic of the scenario focusing on the CNA nursing method and prioritization of care approach and included explicit discussion of the students' thinking process as they worked through the scenario. Each student received a scenario that they decided on the care or steps to take, and then a general discussion about the thought process in making that decision was done.

The critical thinking tools used and designed for the intervention group were based on the nursing process and a prioritization triangle. Both were developed from nursing principles but customized for use with nursing assistants. The prioritization triangle was used to help students evaluate and triage care that is within the scope of practice for CNAs. Nursing assistants do not have the level of experience and education to assess and treat patients but using this method could be used to teach them how to prioritize the care that they can give, balancing care for several residents, or what and when they report or communicate to the nurse. Figure 3 illustrates the prioritization of care.

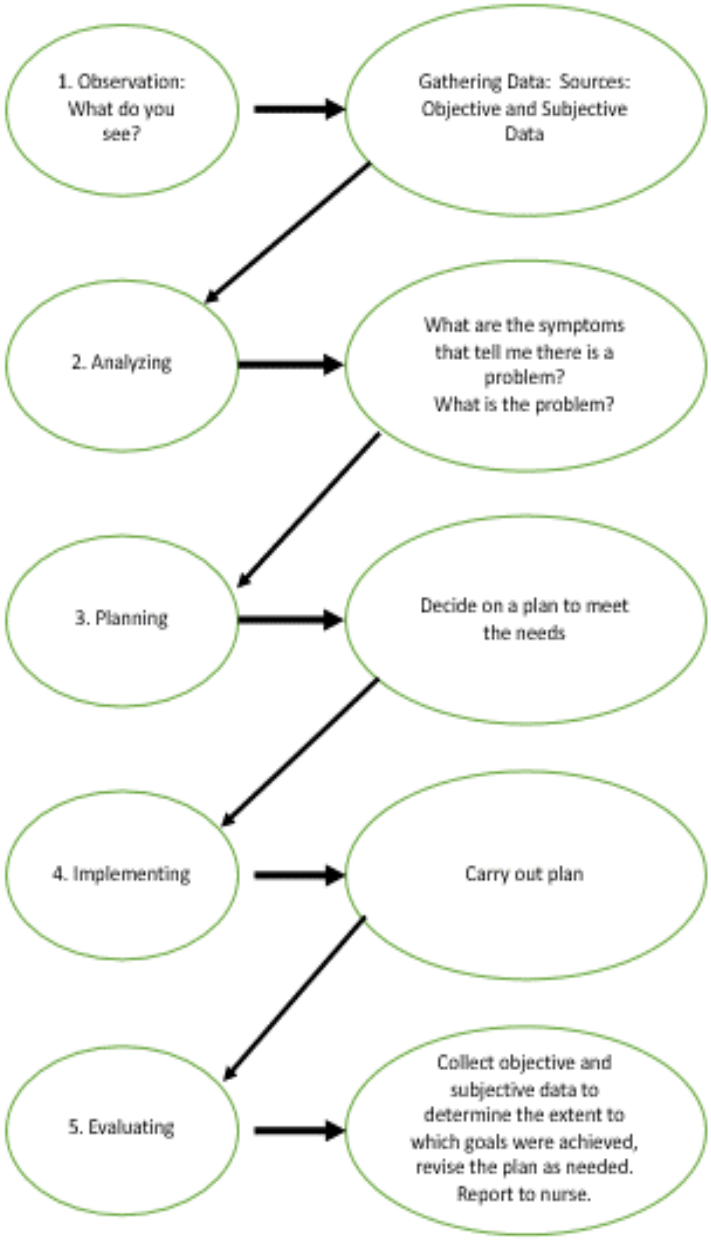
Figure 3. Prioritization of Care



Source: Pagenkopf, 2018©

Figure 4 illustrates CNA nursing process education. In the classroom, students were shown how to use both tools in analyzing interactions with residents. This problem-based learning allowed them to look at resident care, brainstorm ideas, and come to a solution that they would implement. They were also encouraged to recognize that there may be more than one solution.

Figure 4. CNA Version of the Nursing Process



Source: Pagenkopf, 2018©

DATA COLLECTION PROCEDURES

Quantitative Procedures

HRST-AD Pre- and Post-test

The Health Sciences Reasoning Test (HSRT-AD), a standardized test that assesses the critical thinking skills of students who have identified themselves as intending on entering a healthcare field, was used for this study. Using a pre-and post- test approach, the researcher administered the pre-test within the first weeks of class and then readministered the test, as the post-test, at the end of the semester, following their final course examination.

Prior to selecting the HSRT-AD test, the researcher reviewed several others; however, the others did not have the validity or reliability of testing or were found to be too lengthy during the pilot process.

There are two main tests for critical thinking: the Watson Glaser and Insight™ 's HSRT-AD. The HSRT-AD has been tested against other associate degree programs (Insight™, 2018). While both are considered reliable, the researcher's familiarity with the HSRT-AD and the ability to compare to a database of other community college students led to the selection of that specific test. Permission to purchase and administer the instrument was granted by the publishing company. The instrument was given to a control group and to three experimental groups.

The test measures an overall score that includes analysis, inference, evaluation, numeracy, interpretation, explanation, and inductive and deductive reasoning, as well as a score for several specific markers. This study used only the overall scores and did not analyze the individual scores. The instrument is also designed to be intentionally long to create a test-fatigue, which forces students to start guessing more, intentionally measuring other aspects of critical thinking.

Statistical analysis of the findings was calculated using SPSS (Statistical Package for the Social Sciences) and Microsoft Excel. Computation of normality to show a normal population of statistics and then a paired *t* test of the means and a p score to decide to reject or accept the null hypothesis. The acceptance level was for a 95% confidence level. Testing for normality is a prerequisite for a paired *t* test for accuracy (Norusis, 2008).

Administering the HRST-AD

The HRST-AD test was given as the pre-test and post-test for each class. By giving the same test to each class, if there is an error in the test, it would be visible in each circumstance. In addition, using the same instrument as the pre-test and post-test (Test, Retest) adds to the reliability as well. The classes last 9 to 14 weeks, a time period that prevents students remembering the specific test questions, maintaining the reliability. An average inter-item correlation was done by the test developer (Insight™, Inc) in the development of the HRST protocol to compare the question results by each student. The independent variable is the intervention or control, while the dependent variable is the pre- and post-test and the changes in the HRST-AD values; it is the post-test and any changes that were measured.

The intervention group was allowed to participate in group discussions and in class exercises designed to work on critical thinking. At the end of the course, the post-test was administered to both groups with the qualitative survey being given to the intervention groups at that time. The results of the pre-test and the post-test were sent to the student at the end of the study. Each group, independent of their being in the research or control groups, were expected to complete the state exam upon completion of the CNA course.

State Credentialing Exam Results

Following the students' completion of the state exam, the researcher collected and examined aggregate exam scores for the intervention group. Results were also compared to the credentialing exam administered by the State of Illinois. The state exam is an 85-question test with application-based questions. The state exam is certified for reliability and validity with item analysis for each question. Over 6,000 students in the state complete the test annually. Almost all 200 students from the research site take the state exam at the same location and at similar times, with the student self-selecting the time and place.

Further, the state completes a topic cluster analysis that is reported as a percentage of students who did not answer the questions correctly. The general topics the topic cluster analysis covers includes communication of information, performing basic nursing, personal care, and restorative skills, providing mental health and social services, and providing residents rights (SIUC, 2017).

For this study, the researcher also examined test pass rates and the cluster analysis and compared these to historical results of the aggregate scores. to identify significant changes. Although the state-mandated curriculum does not include critical thinking as a requirement, many of the questions on the state exam are designed to have the student apply knowledge to situations involving a patient. This application is not based on problem solving strategies but focuses instead on selecting the best solution to the problem using critical thinking.

It is important to recognize that cluster scores in the State of Illinois are used to identify potential problems in student understanding of key concepts of the curriculum in a specific program. If cluster scores are consistently below a certain percentage, that program could be put on probation until there are improved results. The state credentialing exam changes regularly while maintaining the same topics in the cluster score to prevent teaching to the test but rather teaching to the general topics.

Follow-up Survey

Another instrument used in this mixed methods study was designed to collect student perceptions about the effectiveness of the critical thinking intervention exercises.

Upon completion of the CNA course, the Intervention group was asked to complete a brief survey about their experience with the critical thinking exercises. The Qualitative Survey included 9 Likert Scale questions that included questions about the experience with the exercises and discussions. It also had questions on their confidence in passing the state exam. Then there were 4 open ended questions that asked them about their experience with the HRST-AD Insight™ test, the test results, what was most valuable and what would they change about the critical thinking exercises. As a qualitative measure, the survey also had the potential of eliciting rich data on the students' impression of the process and whether they felt it was useful (Polit & Beck, 2008).

The survey asked the participants for feedback on the critical thinking interventions, both independent exercises and the group discussions. These perceptions were important to include because qualitative research can more fully describe the issues of the problem by using the student's own words and perspectives, leading to a better understanding of the issues. Because the goal of this research was not to focus on successful certification, but instead on improving students' self-confidence about their

learning and their ability to make clinical decisions, qualitative data can draw those perceptions from the student (Polit & Beck, 2008).

Field Notes

During the research and testing processes, the researcher documented anything unusual that occurred as well as an overall synopsis of each assignment in the field notes. Field Notes also included documentation of the interventions applied in the classroom, the reactions of the students to testing, and the students' interactions during the critical thinking sessions. These notes were made after each class session. Field notes maintain the continuity of the sessions and provide supplemental data not collected by the other testing instruments.

Pilot Process: Quantitative and Qualitative Instruments

Before any of the research instruments were used for this study, pilot tests were completed. A panel of CNA instructors from the researcher's institution completed the HRST-AD and found it to be challenging and lengthy but with interesting results. No changes were made to the standardized HRST-AD. A pilot survey of the qualitative survey was completed, and changes were made based upon that feedback.

The CNA faculty group also reviewed the qualitative survey, and the researcher made minor edits based on these results to improve the instrument. In addition, student input on the survey was sought and those edits were also made. The Survey instrument is available in the appendices. Table 2 shows the pilot process.

Table 2: Timeline and Setting of Studies

Time	Panel of Experts	Pilot Student	Control Group	Experimental Group
Pilot of survey	X	X		
Consent			X	X
Pre-test			X	X
Starting on week 3-5 of the program: Intervention stage				X
Qualitative Survey about impressions of the class and the interventions: Given upon course completion or exit from class				X
Post-test administered, after course final exam			X	X
Comparison of State Exam Results			X	X

DATA ANALYSIS PROCEDURES

Quantitative Analysis

The HRST pre- and post-test results were analyzed using SPSS (Noursis, 2008), comparing these to a normative population, using a paired test on the intervention outcomes. Comparing the results to the experimental group was expected to indicate if changes in critical thinking skills are an organic change that occurs naturally within the course, or they may be fostered by the addition of the critical thinking exercises and discussions.

Testing included all three groups for the pre- and post-test as compared to a control group. Frequency distribution, mean, median, and mode all look at the central tendencies of the group. Standard deviation looks at the relationship of the scores to the mean, and range of scores looks for the presence of outliers (Trochim et al., 2016). The *p* value and alpha would need to be calculated to see if a Type 1 error was present, the r score shows how close a relationship there is for the testing (Trochim et al., 2016). The value that is being sought is a 95% confidence rate, a *p* value of 0.05. Demographic information was not used as this is not being researched; the only demographic data that were included was the participants' age, specifically to identify minors. For both the pre- and post-test, students were excluded from the study if they were minors or if they had not provided their consent to participate. However, even if the students were identified as minors or did not consent to participate, all students

were allowed to complete the pre- and post-test, have access to the diagnostic report, and participate in the critical thinking exercises; Their data were simply not included in or used for the actual study.

Quantitative Statistical Analysis

Statistical analysis of the variance from each of those sample groups allow a comparison of pre-tests, post-tests, and the three research groups. If the mean scores from the pre-tests to the post-tests were the same, then the null hypothesis cannot be rejected. For reliability, all the pre-tests are similar in that they were administered before any critical thinking interventions had been initiated; thus, the overall mean of the pre-tests provide a baseline. A p score was also analyzed to show the probability of the testing and to help determine whether the null hypothesis should, or should not, be rejected. The independent variable is the intervention with the critical thinking exercises in the classroom with the dependent variable being any change that occurred in the post-test results.

State Exam Results

Upon completing the CNA course successfully, each student is able to decide whether to take the state competency exam. The exam is offered at several days and times, and the precise day and time that the individual student completed the state exam is not reported with the results, and therefore not available to the researcher. The state results include pass rates as well as item analysis (called cluster scores by the state of Illinois). This aggregate data compares scores for all students completing the state exam for each institution. For this study, the results for the study institution will be compared with previous and subsequent years (2016-19).

Qualitative Analysis of Perceptions Survey

The qualitative perceptions survey was conducted for the intervention group upon completion of the quantitative post-test. The students generally had issues with the test length, which Insight™ intentionally places in the test to create fatigue and force guessing on the questions (2018). Some felt that the pre-test helped them with how to answer the post-test questions. They enjoyed and felt that the exercises were helpful in prioritization and recognition of the importance of their observational skills.

Coding Procedures

According to Saldona (2016), “A code in qualitative inquiry is most often a word or short phrase that symbolically assigns a summative, salient, essences-capturing, and/or an evocative attribute for a portion of language-based or visual data” (p. 4). It is a way of sorting the data collected so that it is retrievable and accessible. Initially there may be many codes and as patterns start to occur, there is a move from codes to “categories and themes” (Seers, 2012, p. 2). Sometimes coding, also called indexing, is used for easy retrieval. All the data accumulated can be overwhelming and coding the data by some system can make it manageable (Seers, 2017). As the data was sorted through the coding, themes appear that need further analysis.

LIMITATIONS, DELIMITATIONS, AND THREATS TO INTERNAL VALIDITY

Limitations

Limitations are components of the research that are outside the researcher’s control which can threaten the internal or external validity (Simon, 2006). The triangulation of the data of a mixed methods study with quantitative and qualitative data should help with the internal validity (Creswell & Creswell, 2018). Relying on more than one source of information about critical thinking should support each other.

Limitations for this study are:

- Most studies have some experimental attrition. Attrition is common, cannot be controlled or predicted, and is out of the researcher’s control. It was unforeseen that this rate would be this large. The study started with 80 students and went down to 26 in the treatment group and 7 in the control group.
- Initially one of the classes that was to be a part of the testing was a blended class (part online and part in the classroom). They took the pre-test in class and were to take the post-test on their own which was not done and yielded pre-test scores without post-test scores.
- The control group was unusable because the number was so low that getting results that met the need for a normal distribution was not possible.
- The participants’ ability/willingness to participate in the exercises and in the study. As the researcher is not the primary instructor for the class, some students might have been reluctant to participate in the exercises or take part in the testing or survey process.
- Students who were minors or did not complete the post-test yielded unusable data. Some of students who did not finish the test cited that the language made it hard for them to complete the test.

- Previous researchers have found it difficult to quantify critical thinking scores (Cash, 1995; English, 1993).

- The test was given in the English language and was not supported by any educational support. Students who had English as a second language or had any learning challenges made stated that the test was a struggle for them to understand the test questions.

Delimitations for the Quantitative Study

The potential delimitations include the following study factors:

- The number of students who participated in the study was limited to those whose instructors agreed to participate in the study.

- Each class had a different instructor with different teaching styles and different approaches to meeting the course outcomes.

- One location was used for the the study with a variety of class times and instructors.

- The study was completed with courses conducted in one semester.

- While the students were not randomized to specific classes, they self-selected based upon their time constraints and personal and educational needs.

- Students took the pre- and post-test and then after completion of the post-test they received their results from both tests.

- The HSRT-AD test has six categories of measurement; this study only examined the Overall Score. The students had the opportunity to look at the other categories, which may be effective for their progress; however, these were not the focus of this study.

- Application of the critical thinking activities was dependent on instructor and researcher schedules. Instructors were asked to choose dates that would work to have the researcher come into the class and incorporate critical thinking exercises into the topic of the day.

- Self-reporting on survey questions for the qualitative study is dependent on the participation and honesty of the respondents.

Delimitations for the Qualitative Study

1. The survey was given to the intervention group only, since they were exposed to the formalized critical thinking exercises. It was given after the students final and after the post test.

2. Self-reporting on survey questions was dependent on the participation and honesty of the respondents, however their responses might reflect student bias. They may want to report positive feedback because of general kindness to the researcher

Threats to Internal Validity

Several factors in the research environment provided challenges to the internal validity of the study.

First, because the standardized critical thinking test was given at the beginning of class as a pre-test and then administered again upon completion of the CNA course, the validity of the test as an assessment instrument is strengthened.

Second, each of the course sections was taught by a different instructor; however, all the course sections used the same textbook and state-proscribed content with the only variable being the inclusion of critical thinking intervention measures.

Third, attrition with students dropping the class can be a major issue that is not in the control of the researcher. The state encourages high pass rates above the minimal rate of 75% and state exam mean question analysis (cluster scores) of 80% or better. If a school has a state exam mean question analysis of below 80% of students answering correctly or pass rate of below 75%, a remedial plan for improvement must be submitted to the state for that instructor or program (SIUC, 2011). This practice encourages instructors to counsel students to withdraw if they do not maintain a 75 to 80% classroom testing average, demonstrating their likelihood of not passing the state exam. Thus, some classes have higher attrition, or drop-out rates, because of these state stipulations. For this study, any students who were advised to withdraw from the CNA program were offered the chance to join one of the intervention groups in the following semester.

ETHICAL CONSIDERATIONS: PROTECTION OF HUMAN SUBJECTS

In its code of ethics, the nursing profession includes the components of respect for the individual, beneficence, non-maleficence, and justice (American Nursing Association, 2015). Gaining knowledge is important but not at the risk of harming another person. This ethical foundation has led to the important step of not only getting approval for research, but also makes it imperative for the researcher to be alert to potential ethical issues. It is important for the researcher to establish protocols that will maintain the necessary ethical standards.

Ferris State University and the Midwest Community College have specific Internal Review Board requirements for ethical considerations. Part of that process is strict documentation of the research question, informed consent, the right to withdraw from the research at any time, a review of the risks, and benefits, and that there be a fair selection of participants (Polit & Beck, 2008).

Anonymity is another important part of the research, which allows the participants a comfort level and hopefully allows them to speak freely. Participants' real names were not used; instead, participants are identified by an assigned number. Program faculty involved in the study also signed a confidentiality agreement prior to their involvement, and students reviewed and signed Informed Consent agreements prior to the start of the study. Minors (under the age of consent) were allowed to participate and benefit from taking the test and participating in class activities; however, their results and data were not used in this study. Students were given information about the study during the class session before the pre-test was administered, and they received and signed the Consent on the day of pre-testing. All students were allowed to take the test even if they did not want to participate in the study. The post-test was administered after the course's final exam to ensure that any cognitive fatigue did not affect their course grade.

As part of the audit trail, all documentation, including digital, memos, and field notes, were held in a secured place for the appropriate amount of time. While this information needs to be held for a period in case of a need for an audit, generally three years, after that point it will be destroyed to preserve confidentiality.

Even with the IRB procedures and other ethical standards in place, ultimately it is the researcher who can lose credibility with research that is not ethical (Merriam, 2009). Through the transparency of the documentation, the validity, credibility, transferability, trustworthiness, and ethical standard can strengthen and support the conclusion of the research. Further, the trustworthiness and quality of the research reflects the person doing the research. Merriam (2009) states that the best a "researcher can do is to be conscious of the ethical issues that pervade the research process and to examine his or her own philosophical orientation vis-a vis these issues" (p. 235). It is the researcher's reputation and credibility that will be counted and can tarnish their reputation and credibility.

CHAPTER SUMMARY

The null hypothesis for this research is that planned critical thinking exercises administered on a regular schedule will not increase the number of students who are successful in the program. The alternative hypothesis is that embedded practices into a certificate program that address the needs of

study habits, numeracy, test-taking skills, and critical thinking skills can have both short- and long-term effects on student goal achievement. If the analysis shows no difference between the four classes, then it does not reject the null hypothesis and supplemental critical thinking exercises did not help the students. The analysis may also reinforce a need for alternative solutions to help struggling certificate students or indicate that remedial classes are a necessary step for those students. If this study shows an improvement of the critical thinking scores with the intervention groups, then the critical thinking education shows promise. If the post-test shows a positive difference in the three intervention groups, then the null hypothesis is rejected. Because the topic of this research involves developing critical thinking skills, the results may also apply to the broader general education curriculum and may also be generalized to other short-term (certificate) programs.

CHAPTER FOUR: FINDINGS AND RESULTS

INTRODUCTION

Students going into the healthcare fields need a broad base of knowledge of math, science, communication, law, and ethics. They also need to learn skills required for the caring of patients. One of those skills that needs development and practice is critical thinking that grows into critical reasoning (Benner, 1984; Facione & Facione, 2014; Pitt, 2013). Critical thinking involves efficiently gathering objective and subjective data, identifying potential solutions, and reaching a decision as to the next steps for the healthcare provider to act upon. This study sought to assess the ability of CNA students to think critically and examine the effects of targeted exercises to increase the student's confidence and abilities to assess a clinical situation.

QUANTITATIVE RESEARCH PROTOCOL

The students in the CNA program self-selected the class that they would attend, then the classes were randomized as to whether they were a control or intervention group. The quantitative protocol of the research was to administer HSRT-AD as pre-test to three classes, two in the intervention group and one in the control group. Each class in the study had between 15 and 30 students for a total of 75 students for the intervention group and 30 for the control group, with all receiving the pre-test. The control group took the pre- and post-test but did not have the intervention of the classroom-based critical thinking exercises. The Intervention groups had the critical thinking content between the pre- and post-test.

Administrating the Pre- and Post-tests

Of the four classes in the study, only two intervention classes completed the pre- and post-test. The pre- and post-test were administered to all students who wanted to take the test; however, when test data were prepared for analysis, only students who had consented, were over 18 years of age, completed

both the pre- and post-test, and completed enough of test to ensure data validity (spending over six minutes on the test and completing over 60% of the test questions answered) were used. These inclusion and exclusion criteria were used for all results. A total of 26 students completed both pre- and post-tests and were included in the analysis.

Each participant in the study received their pre- and post-test results at the end of the course. Initially, the researcher was concerned that the allowing the participants to review their pre-test results before completing the post-test might affect their scores on the post-test if they remembered the questions and answers. However, this concern was noted but did not change the process, because the likelihood that participants would remember and apply information from the test's 45 items over the entire semester was considered to be unlikely and not significant.

Administering the Critical Thinking Interventions

The three intervention groups had three sessions in which critical thinking exercises were completed in the classroom. The intervention group was exposed to the addition of targeted critical thinking exercises. The goal of the exercises was discussed prior to the sessions, and each session was tailored to the subject matter for the day. For example, if the class topic for the day was a discussion of toileting for the resident, then the critical thinking topic focused on prioritizing care. The specific topics, exercises, and instruments for the various critical thinking exercises are included in Appendix D.

Upon completion of the CNA course curriculum and after their final exam for the class, the HRST-AD was administered. A total of 26 students completed the HRST-AD pre- and post-test and were included in the analysis.

Administering the Perceptions Survey

For the intervention group, a qualitative survey was also administered. No incentives were given; however, students were encouraged to do their best. A total of 31 students from the intervention group completed the Perceptions Survey and were included in the analysis. The survey asked questions, using a Likert Scale, that were about their impressions of the critical thinking test, exercises, and materials used in class to cover critical thinking, and their level of confidence in passing the state exam for credentialling.

The survey also had open-ended questions to collect perceptions about the exercises and the critical thinking test.

Adjustments to the Qualitative Research Protocol

The control group had a total of seven participants who fit the criteria for inclusion in the study, with only seven students completing the post-test and meeting the inclusion criteria. Because of these low numbers, no further analysis of the data was completed, and the data were not compared with the intervention groups' data.

Initially, one of the classes that was to be a part of the testing was a blended class (part online and part in the classroom). The blended class took the pre-test in class and were to take the post-test on their own; however, the students did not complete the post-test, yielding pre-test scores without post-test scores. This class participated in the critical thinking intervention but did not complete the post-test. Their results were not used in the analysis.

QUANTITATIVE FINDINGS BY RESEARCH QUESTION

Three research questions guided this study of the effects of enhancing critical thinking activities in a CNA curriculum on student performance. The results and analysis are presented for each of these in the following discussion.

Research Question 1: How do the critical thinking skills, as measured by HRST-AD of first-year CNA students compare to national results?

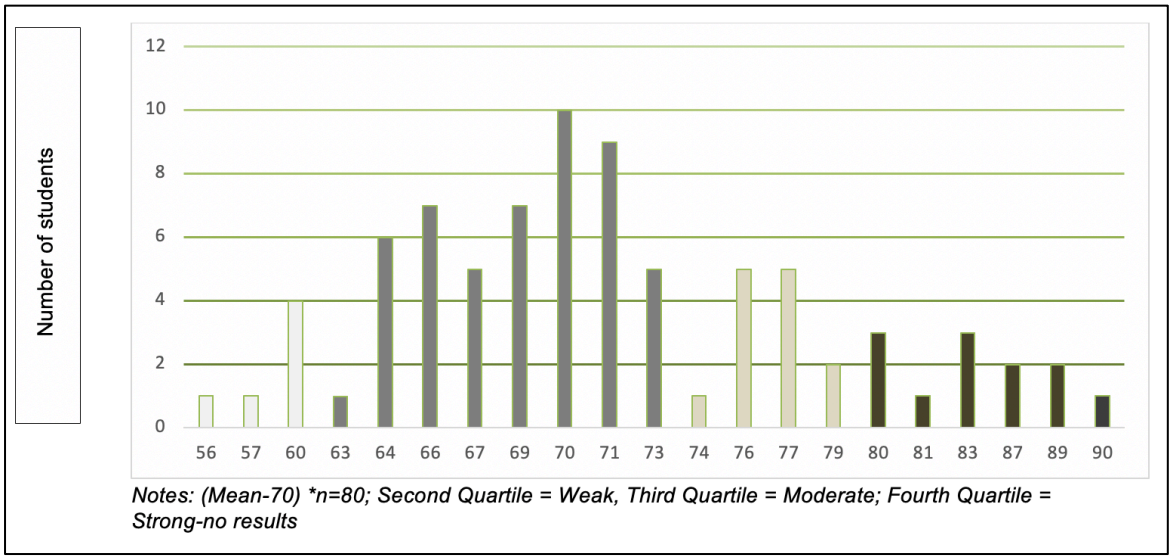
Discussion — Research Question 1

The HRST-AD is designed to measure critical thinking for healthcare students enrolled in associate degree programs, essentially community college students. The HSRT-AD report includes a percentile score comparing the test take to the national sample of two-year college students. Insight™ designed and compiles the HSRT-AD results and uses two metrics for evaluation: the percent score for the mean and the percentiles for comparison of individual scores with the nationally based scores. For the percentile calculations, Insight™ starts the quartile calculations with a baseline of 55% and below as the

first quartile, with the second, third, and fourth quartiles adjusted to the national norm values above that 55% baseline.

Compared to the national scores, the intervention group had a pre-test score that was slightly lower than the mean percentile score of 22, which places most of the scores and the mean in the second percentile. The Midwest Community College (all pre-test students including the control group, n=80) students were compared with the national averages. The Midwest Community College had a mean score on the test was at the 72nd percentile rank with the national scores having mean scores of between 74-81% (Figures 5, 6, and 7; Tables 3 and 4). An important note is that these pre-test scores preceded the research protocol's critical thinking intervention activities. Only the overall score was used in this study and that included all tested markers: analysis, inference, evaluation, numeracy, and inductive and deductive reasoning. However, students received results for the overall and the individual markers.

Figure 5. HSRT-RA Pre-test Scores with Percentiles for Midwest College



*Notes: (Mean-70) *n=80; Second Quartile = Weak, Third Quartile = Moderate; Fourth Quartile = Strong-no results*

Figure 6. HSRT-AD Normative Scores: National and Midwest College scores

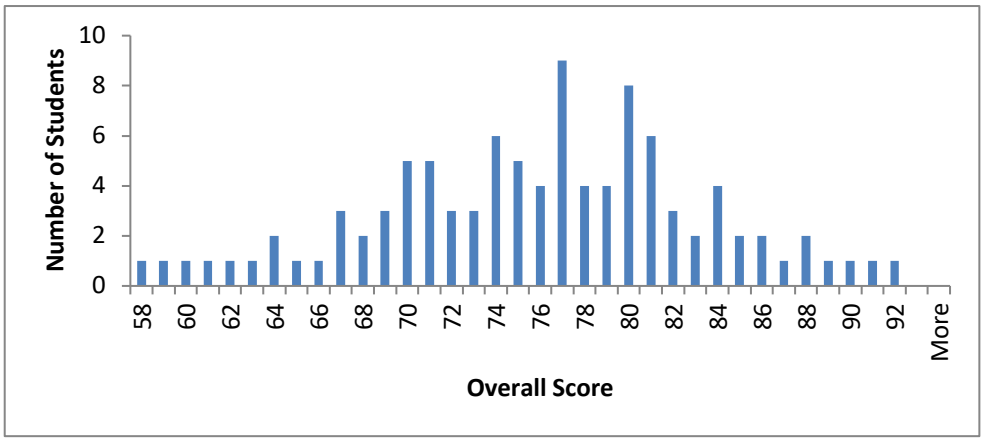


Figure 7. HSRT-RA Pre-test Scores, National Scores Compared with Midwest College

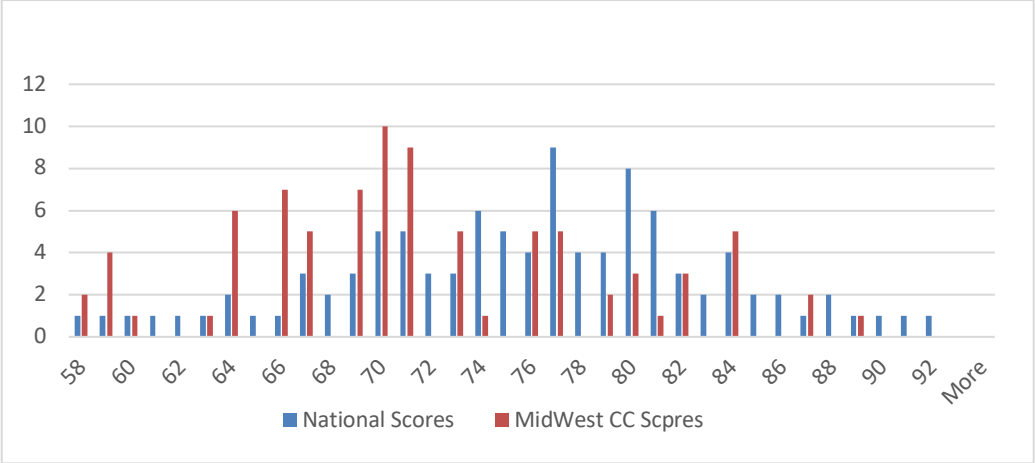


Table 3: Pre-test Scores, Midwest Community College

DESCRIPTION	SCORE
N	80
Mean Score (percentile rank)	70.4
Median	70.0
Standard Deviation	8.6
SE Mean	1.0
Minimum	50
Maximum	89
Quartile 1	64
Quartile 3	75
Quartile 4	None
Mean Sample Percentile	70
Mean National Percentile	74

Table 4: Pre- and Post-test Results, National and Midwest College

	Not Completed	Weak	Moderate	Strong	Superior
National (n = unknown)	50-62	63-73	74-81	82-92	93-100
Midwest Community College (*n=80)	7	45	22	6	0

Insight™ classifies information in quartiles with the first one being 50% or lower as a baseline, followed by the second, third, and fourth. The quartiles are based upon the national averages, and the specific groups that were tested are matched by score within those quartiles. For this study, a mixed specialties group was used for comparison, which is the makeup of the participant pool for this study, since not all students go into nursing. The expectation based upon Insight™'s national statistics would be that there would be more in the third quartile and some in the fourth for a normal distribution: "They model the US population of persons engaged in health science education programs at the associate degree level" (Insight™, 2018, p. 9). However, the Midwest Community College group did not have any students who scored in the fourth quartile as compared to the national statistics. In order to evaluate this result further by running a statistical analysis to determine whether or not this is statistically significant would require the raw data; however, these data were not available from the publisher at the time of this research. Thus, only the overall scores were used for comparison in this study, described by Insight™ (2018) as the students' overall strength in using reasoning to form reflective judgments about what to believe or what to do. To score well overall, the test taker must excel in the sustained, focused, and integrated application of core thinking skills measured on this test, including analysis, interpretation, inference, evaluation, explanation, induction, and deduction. The Overall score predicts the capacity for success in educational or workplace settings which demand reasoned decision making and thoughtful problem solving (p. 1).

Summary of Findings – Research Question 1

On the HRST-AD test, the Midwest Community College students scored slightly lower than the national average. The national average is all student groups taking the test at the associate's degree level, including first-, second-, and third-year students. Because the mean results of the Midwest CC's

student group are four points lower than the national scores, a comparison could not be done to establish the significance of the study; however, these can be used as a benchmark for this study and could be examined in the future with raw data for comparison.

Analysis of Findings — Research Question 1

A comparison of the Midwest CC students with the national testing group showed that the Midwest CC students had slightly lower scores than the national averages. A key data point is that the Midwest CC students' scores were predominantly in the weak and moderate quartile of the HRST-AD critical thinking test. These data raise the question about the program's intended outcome: What is the program's target for students upon completion of the CNA program and how can educators' impact that result?

Research Question 2: To what extent can critical thinking exercises added to a CNA program to increase students' critical thinking abilities?

Discussion — Research Question 2

The null hypothesis for this research is that planned critical thinking intervention exercises administered on a regular schedule will not increase the score of CNA students as measured by the HRST-AD post-test.

For this study, the pre-test and post-test were conducted for both an intervention group and a control group with 80 students taking the HRST-AD as a pre-test for both groups. Of that group, only 54 took the post-test. For both the pre- and post-test, students excluded from the study were those who had not consented, were minors, and who started the test but did not complete at least 60% of the test for unknown reasons. The control group had the largest attrition rate with only 15 completing the post-test and seven of those spending at least 10 minutes on the test (see Appendix E for test scores). Thus, with only seven in the control group completing both pre- and -post-tests, no further analysis was completed on these scores for this group.

For the data analysis, all calculations were completed using SPSS. Following recommendations by Insight™ (2018), once the raw data were purged of results from students who had not completed the minimum number of questions, a test for normality was done.

In order to compare the intervention and the control group, they each needed to have a normal distribution of scores, a typical bell curve of scores to represent a normal population. A test for normality is required to be able to use a *t*-test. This required that they be subjected to the same tests for normality. For the intervention group, the test for normality showed a normal distribution, with the Shapiro-Wilk indicating 0.164 for the pre-test and 0.079 for the post-test, both of which are above .05, reflecting a normal distribution. To further confirm the normalcy of the data, a Kolmogorov-Smirnov test was completed, also indicating a normal distribution and a normal curve. However, the control group did not have a normal distribution of scores, with a result of .017 is below .05. This result does not reflect a normal distribution. Another test was done, the Kolmogorov-Smirnov test reflected the same lack of normal distribution.

Several tests were completed to try to normalize the control group data including removing all student test results for those who spent less than 10 minutes to compete the test. However, even with those modifications, the post-test results for the control group did not show the normal distribution that is required for a valid *t* test. Comparison of the descriptive data of the mean, standard distribution, and standard error mean was completed for both groups (see Table 3).

Table 5: Paired *t*-Test: Intervention Pre-test Versus Post-test

	Mean	N	Std. Deviation	Std. Error Mean
Overall Pre-test Results	73.0000	26	7.17217	1.40658
Overall Post-test Results	74.5385	26	8.09558	1.58767

A paired *t*-test compares two sets of data and is used frequently in pre- and post-test studies with a control. The scores can provide a comparison of the means for both groups and define the significance. Once a *t* test is done, the *t* value is converted to a p-value (sig) for the significance and to accept or reject the null hypothesis. Table 6 shows the *t*-test results.

Table 6: Paired *t*-Test Scores, Overall Post-test

Description	Value
Mean Difference	1.53846
Standard deviation	5.29325
Standard error mean	1.03809

DESCRIPTION	VALUE
95% confidence interval of the difference	
Lower	3.67645
Upper	.59953
t	-1.482
df	25
p value	.151 (not Significant)

Summary of findings – Research Question 2

The alternative hypotheses were not proven because the p-value was greater than 0.05, indicating that evidence was insufficient or not strong enough to refute the null hypotheses; therefore, the null hypotheses stands, with no change indicated from pre- to post-test results. The test scores for the critical thinking test also showed insignificant change, based on a desired confidence value of 95%. While there was a small change in the scores from the intervention group, the control group was not usable for comparison because the group did not meet the criteria for a normal distribution; thus, again, no comparisons could be drawn. The research plan included a comparison with the control group results; however, because of a significant decrease in usable test scores in the control group, proof of a normal distribution — necessary for a *t* test — could not be completed.

The instrument used to test critical thinking, the HRST-AD, is a well-researched instrument that includes measures for cognitive fatigue. While this factor made the instrument accurate, the length and complexity of the test made completion of the test difficult. Many students, in fact, did not complete the test because they experienced extreme levels of cognitive fatigue; thus, their results were not included. Additional discussion of the effects of the instrument are included in the qualitative survey results.

Analysis of Findings —Research Question 2

The value on the *t*-test for the intervention group showed the probability value of a significance change of 0.151, which is greater than 0.05, and is not a statistically not a significant change. The intervention group could not be compared to the control group because this group's scores did not have a normal distribution due to the low completion rate. The *p* value sought for strength of value and proof was 0.05 or a 95% confidence level. While the mean scores of the intervention group versus showed a slight

improvement in the scores, the findings were not significant. A comparison with the control group was not normalized as only seven students had both a pre- and post-test. *T*-tests carry more validity with normalized data.

The difficulties with the group size for both the control and intervention groups made the results of the HRST-AD testing impossible to compare and to use for research analysis. Because the null hypothesis was not rejected, a Type 1 error (false positive) is unlikely; however, a Type 2 error of a false negative is possible.

Research Question 3: How does the addition of critical thinking lessons in the CNA program impact student performance upon the state credentialing exam?

Discussion — Research Question 3

The State Credentialing Exam in the state of Illinois reports results in terms of Cluster Scores. Cluster Scores are aggregate data reports of test item analysis that group (cluster) test questions into similar topics. Those topics include communicating information, performing basic nursing skills, performing personal care skills, performing basic restorative skills, providing mental health and social services, and promoting residents' rights. However, the state does not make specific test questions available externally in order to prevent the inclination to teach to the test as opposed to covering all essential content for the program (SIUC, 2017).

A comparison of the Cluster Scores for the Midwest Community College CNA program was completed comparing results from 2016, 2017, and 2019 with the results of the intervention year, 2018 (Table 7). The Cluster Scores were used to understand the students' and the programs' potential areas for improvement. Comparisons indicated slight differences between the Cluster Scores for the intervention group in 2018, the year that they took the state exam compared with the groups that took the state exam in 2019, 2017, or 2016. It is important to note that the cluster score information is aggregate data and not student or class specific. In addition, students have up to one year following their completion of a CNA program to take the test and, thus, may not have taken the exam in 2018, but instead waited until 2019.

Table 7: Cluster Scores for Overall and Pass Rates

	Overall Score	Pass rates
2018: Intervention Year	84	94
2017	82	93
Mean scores for 2016, 2017, and 2019	83	93

Summary of Findings – Research Question 3

Based on the state exam results, the Midwest College results did not improve significantly with the critical thinking exercises. While there was a slight increase in the pass rate and the overall cluster scores, these improvements cannot be definitively attached to the critical thinking scores.

Analysis of Findings — Research Question 3

The pass rate and cluster scores from the state exam are important data points for state compliance to maintain a CNA program. If those scores are low, the program can be put on probation or closed (SIUC, 2019). While the pass rate and cluster scores for the Midwest College did improve by one point, they did not improve significantly, nor did they decrease. Many factors can impact these data including (1) they are aggregate scores, and (2) the data were collected from all classes that took the test that year, not just the classes included in this study. In addition, as noted above, because the students have up to one year to take the test, this means that the students involved in this study might have completed the exam in 2019 and their results would be reflected in the data from that year instead.

Summary of Quantitative Findings

Based on the results from the quantitative components of this research study, the research does not statistically show a significant change with the exercises both in comparison with a control group or the state results. The results of the comparison of the study group with a national group did show that critical thinking is below the national norm. While it cannot be said from a statistical point that the exercises improved the students critical thinking, the national comparison shows that the students need help in improving their critical thinking.

QUALITATIVE RESEARCH PROTOCOL

This mixed-methods research study included the quantitative components described above that were collected during the semester the CNA course was held. The qualitative portion of this study examined student perceptions about their growth and development in practicing and applying critical thinking strategies. As the literature emphasizes, students going into healthcare fields need a broad base of knowledge of math, science, communication, law, and ethics; however, they also need to learn skills required for the caring of patients. One of those skills that needs development and practice is critical thinking that grows into critical reasoning (Benner, 1984; Facione & Facione, 2014; Pitt, 2015). The literature also reinforces the importance of building confidence in this thinking process, both for skills and competency testing, as well as for providing the care needed (Azzi-Fini, et.al, 2015).

Research Question 4: To what extent did the student feel that the critical thinking exercises helped them be more effective on tests and in the clinical experience?

This research question was the focus of the qualitative survey designed to examine the students' perceptions of their critical thinking skills and their ability to apply them to CNA tasks. The protocol for the qualitative study was to administer the survey to the intervention group after they had completed both the final examination for the course and the HSRT-AD post-test. After the surveys were completed, the researcher compiled the results and coded the responses in order to identify and analyze reoccurring themes, according to qualitative research protocol (Creswell and Creswell, 2018).

The survey consisted of three sections: nine questions that used a Likert Scale for responses, four open-ended questions, and a Comment section allowing participants to add additional comments and suggestions.

Survey Questions using Likert Scale Scale-Scale Responses

The first group of survey questions used a Likert Scale (1 = never; 5 = always) to rate participant perceptions about the critical thinking activities and their abilities. There responses were from "never" to "always." The instructions prompted the participants to give a response assessing the critical thinking exercises, not the classroom content. In general, the students indicated that they appreciated the feedback on the exercises and that they enjoyed the discussions that were done in class. They also found

the connection to the hands-on or clinical experience to be relevant. The responses also showed lower responses to confidence and the use of the content in clinical.

Table 8: Responses to the Survey Questions Given to Intervention Group

Question	Percent of Responses				
	Never	2	3	4	Always
The CNA classroom assignments made sense to me and I understood their purpose.	4	3	7	10	76
I enjoyed the assignments and think that they helped me prepare for my tests.	3	6	3	19	69
I felt encouraged to participate in discussions and respond to others.	0	3	7	10	76
I got clear responses to what I said in assignments and found out how to improve.	0	3	0	9	88
To what degree did the instructor encourage you and your fellow students to ask questions and give answers?	0	10	20	0	70
I enjoyed the discussion groups and learned from my group.	0	3	7	14	76
I felt more confident in my ability to make the best decision for my resident when in clinical.	0	3	3	27	67
I used what I learned from the critical thinking assignments and discussions in my clinical rotation.	4	4	4	32	56
My confidence in passing the state exam is (please rate your confidence: with 5 being the highest confidence).	0	0	12	36	52

**N= 31 students (students who completed the survey).*

Analysis of the Likert Scale Response Questions

Overall, the responses showed that the students:

- Enjoyed both the exercises, discussion, and the immediate feedback
- The exercises and content did not improve their confidence.
- They may need help in connecting the critical thinking exercises with their clinical experience.
- More encouragement needs to be incorporated in the getting all students to respond
- Better instructions on the assignments might have been helpful

- These responses can be beneficial to any instructor looking to teach critical thinking or any class. It was a useful tool to sum up the student experience for the exercises and the experience.

Survey Questions using Open-Ended Responses

The second portion of the survey included four open-ended questions, prompting students to provide their perceptions of the critical thinking activities and intervention activities.

- What did you notice about your scores on the post-test compared to the pre-test?
- What did you find most valuable about the CNA critical thinking exercises?
- What would you like to change about the CNA clinical scenarios, discussions, or assignments?
- Do you think that the feedback you got from the HRST-AD Critical Thinking Test was valuable?

Once the surveys were tallied and the comments were gathered, they were coded by common themes (Table 9). The student responses were that they did find a connection to the classroom or clinical experience. They also felt that the exercises were helpful to them especially with regards to prioritize care, thinking, and making decisions improved. The responses to the final questions asking students for their perceptions about the value of the feedback they received from the HRST-AD test ranged from perceptions about the difficulties they encountered when taking the test (63%) to mixed perceptions about its helpfulness with 30% responding that the test was helpful to 43% saying that the test was not helpful (Table 10).

Table 9: Coded Comments to Survey Questions About the Critical Thinking Exercises

Learning Exercise Themes	Results	Theory
Application to learning	63% found a connection to the class and/or clinical experience	Facione: Critical thinking / reasoning Knowles: Adult Learning
Confidence/ability to think critically	83% thought their ability to prioritize care, thinking, and making decisions improved	Benner: Skill building
Specific critical thinking exercises	88% specifically stated that the CT exercises that were done by researcher in class were helpful	Benner: Skill building

Table 10: Responses to Open-Ended Questions about HRST-AD

Perceptions About the HRST-AD Pre/Post Test	Percent response
No help	43
Challenges with the test	63
Learned from test, gained insight	30
Did Better	2

*(n=31) *students could respond to more than one, so each question could have multiple responses*

Analysis of Comments from the Open-Ended Questions

The feedback on the exercises was that they were helpful in decision making and in prioritizing care. Only 63% felt there was a connection to the course content. Because the researcher was not the lead instructor, this could be where the disconnect might have happened. The results indicate that a stronger connection with the course content would be helpful. One thing that came out the field notes is that students wanted to know what the correct answer was, indicating again a belief that the authority figure had the answers and that there was only one correct answer.

The feedback about the HRST-AD was mixed, with 63% noting that there were challenges to the test (Table 10). During the testing (based on field notes), several were frustrated by the language used and some had educational support that was not available during the testing. These results indicate that while a critical thinking test as extensive as the HRST-AD test might be useful to the students, it is a challenging test. Having the test available in other languages and having educational test-taking support available could be valuable improvements.

Results from the Survey's Comment Section

The Survey's Comment section provided the students with the opportunity to provide additional feedback and suggestions for the researcher. Of the 31 students who completed the survey, 31 provided responses. Some of the key comments included these (see Appendix F for additional responses):

- I would've liked to start them [critical thinking activities] earlier in the semester. I think these exercises were in some ways more helpful than exam and book questions because we were forced to work through the problems, and there wasn't one correct answer.
- More NCLEX-style questions [these are questions that have multiple correct answers].

- Maybe more questions like the 5 call lights at once and how do you prioritize these.
- Being given the opportunity to practice these critical thinking exercises

Analysis of the Comments Section

While adding Comments was entirely optional for the students, many offered responses in the open-ended questions. This practice itself was interesting; in the researcher's experience, it is easier for students to respond to questions that apply Likert Scale choice as opposed to completing open-ended questions.

Qualitative Analysis — Research Question 4

When considering the results from the entire survey, the researcher identified several themes that connected to the research hypothesis or expected themes (Bernard, 2002). The theoretical basis or initial themes were about adult learning, critical thinking skills, and self confidence in using the skills. These were anticipated prior to the use of the survey based upon the literature review. The emerging subthemes that were discovered from the examination of the results were the (1) the challenges presented by the test, (2) confusions about the purpose of the testing as it related to the class, and (3) the critical thinking activities not affecting confidence levels. Table 11 summarizes the dominant themes and subthemes.

Table 11: Summary of Dominant Themes and Subthemes

DOMINANT THEME	A PRIORI SUBTHEME: EXPECTED	EMERGING SUBTHEME: NOT ANTICIPATED
Adult learning	Knowles: Postulates of adult learning, making it relevant and usable (1985)	Not sure of connection to test. Challenges with test: language and frustration.
Critical thinking stages	Benner: Stages of development (1984)	Connection to pre- and post-test
Self confidence in the use of critical thinking skills	Fancione: Confidence in use (1990)	Self-confidence

Dominant Themes from the Qualitative Survey

The qualitative survey and student commentary on the process were important parts of the research because they gave insight into the students' perceptions about critical thinking and the impact

the interventions had on their learning. The themes that were dominant were adult learning, critical thinking stages, and self-confidence.

Theme 1: Adult Learning

Survey results showed the 88% of the students found the exercises done in class were helpful. The exercises included a prioritization tool with multiple scenarios for the students to prioritize, NCLEX-style questions with multiple correct answers, and use of the CNA nursing process for practice in decision making. The students' seemed to recognize the importance of critical thinking in the clinical site, making the content applicable to their interests.

Theme 2: Critical thinking Stages

The critical thinking interventions were designed to be the focus of the strategy for improving students' ability to apply critical thinking on the job. One of the challenges were some of the exercises. At the start of the exercise, the researcher stated that there may be more than one answer. Several students noted that having multiple options was frustrating. One student said, "That exercise was great, it really got me thinking, but what is the answer?" This comment reflects many students' understanding of critical thinking and provides an important aspect of critical thinking that should be explored further. Entry-level CNAs need to understand the complexities of making decisions in the healthcare setting and learn to respond quickly while selecting from multiple "correct" options, knowing how to choose the best option for the situation.

Theme 3: Self-confidence

The HRST-AD test is meant to be challenging: the fact that 43% of the respondents found the test not to be helpful is an issue indicating that further support of the testing and discussion with the student might be advisable. Some comments that were made by students during testing were about the difficulty of the test. For some students, the difficulty of the test may not have improved or decreased their confidence, while for others it may have helped. One student stated that she did not understand English well enough to answer the questions, while another wondered if she could use her Individualized Educational Plan to help her do better on the test. These were aspects that had not been considered

when the study was first designed. While the test was available in multiple languages, for this study, only the English version was used. Making the test available in the students' native language may have been helpful. Discussion of the pre-test including the purpose and the individual results might have made the test and post-test results more relevant.

SUMMARY OF FINDINGS

The table below (Table 12) summarizes the key findings for this mixed methods study.

Table 12: Summary of Research Questions, Hypotheses, and Key Findings

RESEARCH QUESTION: NULL HYPOTHESIS, RESULTS, AND KEY FINDINGS
1. How do the critical thinking skills, as measured by HRST-AD of first-year CNA students compare to national results?
Null Hypothesis
Students from the study community college are no different from the national average as measured by the HRST-AD.
Results
The population studied was slightly lower when compared to national results having taken the same test, however, it was not enough to reject the null hypothesis
Key Findings
The results from the research site institution were lower than the national average on the pre-test but were closer to the national average at the end. There was a gain for both the control and the intervention group, with the intervention group increasing their mean average by 1.5 points. This is not statistically significant change. Alternative hypothesis not proven
2. To what extent can critical thinking exercises added to a traditional nursing assistant class increase their critical thinking abilities.
Null Hypothesis
Planned critical thinking exercises administered in the intervention group will not increase the post-test scores as compared with the control group.
Results
The absence of statistically significant findings means that the alternative hypotheses can't be accepted, and the null hypotheses stands, that the intervention did not make a difference on the HRST-AD. While a small change did occur, it was not enough to accept the alternative hypotheses. As the control group results had issues, there is the potential for a Type II error, or a false negative result.
Key Findings

Research Question: Null Hypothesis, Results, and Key Findings
The findings when compared to pre and post-tests of the intervention group compared to the control group were incomplete. The control group was not a normal distribution, making a comparison of the groups impossible. The change for the intervention group pre- and post-intervention were insignificant. Results were inconclusive Alternative hypothesis not proven
3. How does the addition of critical thinking lessons in the CNA impact performance upon the state credentialing exam?
Null Hypothesis
The scores for the state exam will not be different as compared to previous score reports.
Results
The absence of statistically significant findings means that the alternative hypotheses can't be accepted, and the null hypotheses stands, that the state exam cluster scores were not improved with the intervention. While a small change did occur, it was not enough to accept the alternative hypotheses.
Key Findings
There was an improvement of the pass rate and scores from cluster scores from the previous year of two points but not in comparison with all years cited. Results were inconclusive Alternative hypothesis not proven
4. To what extent do the CNA students perceive that the embedded critical thinking exercises helped them be more effective on tests and in the clinical experience?
Results
29 out of 31 (88%) students identified that the specific critical thinking exercises done by researcher in class were beneficial.
Key Findings
Students indicated on the survey that they felt more confident in making decisions in the clinical area and on their final. 88% of the students identified that the critical thinking exercises helped in understanding of content or confident. Students found the test to be challenging especially the language and the testing conditions for students with a learning challenge.

CHAPTER SUMMARY

Although arduous, a mixed-methods design helped to collect rich data demonstrating the complexity of the research question. Although the quantitative results did not show a significant difference in any of the research questions, this information is valuable as it provided important guidance for

additional research. The feedback from the students in the qualitative study provided important Insight™ into the students' perceptions of the HSRT- AD test and the critical thinking intervention exercises. Despite the fact there was a small change in the quantitative findings, overall, students found the exercises to be helpful. In addition, the qualitative results provided significant feedback that is actionable for healthcare programs and educators in the field.

CHAPTER FIVE: ANALYSIS AND IMPLICATIONS OF THE RESULTS

INTRODUCTION

When most people think of healthcare, they think of doctors and nurses. The reality is that healthcare is provided by a team of healthcare providers, each of whom has a specific role on that team. Everyone who touches the patient needs to be able to discern the patient's overall status. With a goal of improving patient and student outcomes, this research sought to positively impact the critical thinking skills of one team member, the nursing assistant, who is the team member with the most contact with the patient/resident.

While not all the questions posed in this research reached a definitive conclusion, from the results, some conclusions can be drawn. The use of a mixed-methods paradigm helped with triangulation of data and the quantitative and qualitative data providing and supporting or disputing that information. There were issues that were not anticipated that arose in the study, however some lessons were learned.

REVIEW OF QUANTITATIVE FINDINGS

Research Question 1: How do the critical thinking skills, as measured by HRST-AD of first-year CNA students compare to national results?

The test sample's baseline score was lower than the national average of students in associate degree programs (see Table 4).

Research Question 2: To what extent can critical thinking exercises added to a CNA program to increase students' critical thinking abilities?

Comparison of the two groups — intervention and control — was not accomplished because the data for the control group could not be normalized for comparison and a *t* test used to compare statistical means. However, comparison within the intervention group did show a small change from pre- to post-

test. While the results were not statistically significant, this approach might be valuable to modify and apply for a future study.

The independent variable that affected the critical thinking interventions was the faculty member assigned to each class section and the faculty's teaching methods. Whether these differences affected the scores and outcomes for the intervention group as compared to the control group is unknown. The intervention group's mean score on the post-test improved by about 1.5 points; however, that increase is statistically insignificant at the 95% confidence level. While the change between the control and the intervention groups was not significant, the changes from pre-test to post-test scores were significant in some of the cases (see Table 4). This increase indicates that some students did benefit from the exercises. It might be beneficial to look at why certain students did improve, whether it was their perception of the importance or other factors.

Research Question 3: How does the addition of critical thinking lessons in the CNA curriculum impact student performance on the state credentialing exam?

Based on item analysis, the state exam test results showed an increase in 2018 from 2017; however, the mean values for 2018 did not increase over the 2016, 2017, and 2019 scores (see Table 7).

As noted previously, the state exam reports results using Cluster Scores. While the state exam questions vary each time it is administered, the specific cluster topics do not change. Instructors do not know the test questions in advance to prevent teaching to the test. Because the state exam results are reported as aggregate data of all test results, evaluation of data specific to a student or instructor is not possible. This study's results, however, indicate that the addition of the critical thinking exercises did not impact the state exam results.

REVIEW OF QUALITATIVE FINDINGS

Research Question 4: To what extent do students perceive that the embedded critical thinking exercises helped them be more effective on tests and in the clinical experience?

The qualitative findings supported some of the results of the quantitative findings and also gave insightful feedback on the test, the exercises, and the process of the research. The results of the qualitative survey showed that the students had frustrations with the HSRT-RA test; however, they

reported that the exercises and other content helped them understand some key concepts of critical thinking (see Table 11).

RESEARCHER BIAS

As with any survey with self-reporting, there is the potential for students to say what the researcher wants to hear. There is also the potential for researcher bias in developing coding and identifying themes for analysis.

Any research that includes coding also has the potential for researcher bias/subjectivity. For the qualitative study the coding was done by one person, the researcher. The researcher is a faculty member at the Midwest Community College. Effort was taken to accurately represent the student's view; however, some bias may be present.

IMPLICATIONS OF THE STUDY

Community Colleges

The Nursing.org survey (2016) noted that the perceived difference between a bachelor's degree in nursing (BSN) and an associate's degree in nursing (and) program is critical thinking versus skill proficiency. Community colleges generally offer ADN programs and, while they are changing in many states to offer a BSN, teaching critical thinking throughout each year of their program might be advantageous. As a novice progresses to more experienced skill levels, critical thinking skills become more automatic. All nursing skills, however, need to be practiced and tiered into several levels in each year of the program (Benner, 1984). CNA students may not choose to remain CNAs or go into nursing or other health careers; however, businesses also want prospective employees to have critical thinking skills, and it would be advantageous to the student to have those skills (Afizi et al., 2015).

Liu, Frankel, & Rohr, (2014) reviewed multiple studies about the use of critical thinking skills and drew the conclusion that using a critical thinking test can have value for instructional use and for individual use if it is a reliable test for students. Faculty can use the information gained from any test to alter teaching methods and focus and, if the specific results point to an area for improvement, they can

create individual education plans for their class. The institution, too, can use the information to support the student.

This research study's qualitative responses were very helpful in understanding students' confidence levels. Building upon students' learning and ability to help them think critically increases their self-confidence. Benner's theory of the progression from being a novice to being a more experienced healthcare provider shows the transition from telling the novice what to do to having them recognize what to do. The state exam attempts to build on that, focusing mainly on the application of knowledge gained, not memorization. Application of knowledge is problem-based assessment in which the student must consider options, analyze them, and draw a conclusion and an action plan.

Critical Thinking Impacts on Work and School

Nursing assistants learn a majority of their critical thinking while on the job (Richards, n.d.), making it important for students to gain active experience as nursing assistants, especially if they are planning to go into nursing or other healthcare fields. The nursing process and the scientific method are closely related. In order to enhance students' critical thinking abilities, both the scientific method and the nursing process model were integrated into the critical thinking intervention exercises to improve students' ability to process information and make decisions. Working as a CNA includes gathering data, making an informed decision, and passing on that information to the nurse (Richards, n.d.). Knowles (1985) also said that using learned skills on the job makes the skills more relevant to the student. Because of this recognition of the importance of critical thinking, the high-impact educational practices of the AACU and CCCSE include internships/experiential learning as ways to connect the classroom to the workforce. The clinical experience for the nursing assistant also provides the essential experiential learning opportunities that connect the classroom and the real-life experience.

Berridge, Tyler, & Miller, (2018) found that staff empowerment, especially with CNAs, led to a higher retention rate of CNAs, in part because they felt valued on the job. The empowerment was in the form of incentives for more education, choice of residents to care for, positive and effective communication with the nurse, and other aspects of being a part of a team. Communication was one of the more significant components of this empowerment for the CNAs. Madden, Clayson, Canary, Towsley,

Cloyes, & Lund, (2017) found that nurse-to-CNA communication with respect and collegiality improved patient care. Madden's research provides an important reminder to nurses that the teamwork and connection with the CNA is important for positive patient outcomes. Part of this information flow relies on the CNAs knowing what needs to be reported and using critical thinking skills to identify when a resident has a change of health status.

Facione and Facione (2008) differentiate between two systems of reasoning: the first "reactive, instinctive, quick and holistic" (p. 5) and the "more deliberative, reflective, analytical and procedural" (p. 5). Reactive reasoning improves in accuracy after repeated use and experience and eventually progresses to the next level, which is more analytical and reflective. Critical thinking begins at the first reactive level and progresses to clinical reasoning, which is the basis for competent care. As these skills become more familiar, they become more instinctive. Educators recognize that critical thinking is a skill that can be learned; however, as with all skills, to develop, the skill needs practice (Lipe & Beasley, 2004). Whether the students work as CNAs or continue to an advanced career in healthcare, critical thinking skills will impact the care they give. The life of a resident/patient is dependent on the critical thinking and care of the healthcare professional (Facione & Facione, 2008).

Gravlin and Bittner (2010) discuss care aspects that were missed by CNAs because they did not understand their relevance or their seriousness, while Allemann and Sund-Levander (2015) note that CNAs are more likely to pick up early signs of infections or other potential difficulties if encouraged to use critical thinking skills. These studies point out the need for CNAs to have and use their critical thinking skills and for educators and employers to encourage and empower them to use those skills.

Critical Thinking in Healthcare Education

In a study of future healthcare providers (specifically, opticians), Denial (2012) found that there were three obstacles for learning critical thinking: (1) the perception that critical thinking was innate — everyone knows how to think, (2) students could not see critical thinking as important for their learning, and (3) critical thinking was taught passively, with the belief that students would absorb how to think critically as they learn the material. Addressing these obstacles needs to be a part of the educational plan for healthcare providers, and if students have not been taught critical thinking, educators need to help

students see the role that critical thinking plays in clinical decision making (Facione & Facione, 2014; DeYoung, 2014; Alfaro-Lefevre, 2016; Rischer, 2016).

In examining the role of healthcare programming in critical thinking education, this research study identified the following patterns:

- Practice and encourage students to use critical thinking skills both at the workplace / clinical sites and in the classroom
- Empower CNAs and students to use critical thinking skills and make decisions
- Embed critical thinking opportunities into gateway courses such as FYS
- Embed critical thinking in education at all levels
- Involve students and faculty to encourage use and awareness of the importance of critical thinking.

RECOMMENDATIONS FROM LITERATURE

Changing Practice

Healthcare is going to have an increased need for healthcare professionals who are prepared well enough to be successful and stay in the nursing workforce (NursingProcess.org, 2016; PHI, 2015). Creating an environment in healthcare classrooms that encourages active use of critical thinking reinforces the importance of critical thinking. By demonstrating critical thinking skills and decision-making, nursing instructors educate and are role models for the profession (DeYoung, 2014). Using critical thinking in the classroom sends the message that the instructor does not have all of the answers; however, they can demonstrate how to use those thinking skills effectively to identify appropriate care options and alternatives.

Changing the Faculty Role

Tinto (1999) and Astin (1991)'s research focused on the effective role of classroom instruction for preparing students. They highlighted the relationship of the faculty to the students' desire to continue and faculty's role in serving as a role model. This research study also demonstrated the importance of the faculty member. As reflected in their comments, students were motivated to complete assignments and

credited their faculty member. One student commented, “I learned from my instructor and from the nurses at clinical.”

To encourage critical thinking in the students, faculty education needs to include additional emphasis on critical thinking and methods for incorporating it into the classroom. In-service training and professional education can help faculty understand how to apply critical thinking effectively in the classroom. Faculty also benefit from discussions with other faculty about how they incorporate critical thinking and problem-solving activities into the classroom. This team approach has two other benefits: Collaboration can encourage others to use these methods, and the faculty members can benefit from someone else’s experience. Just as students learn from each other, so do faculty.

Students would also benefit from hearing the faculty “think out loud.” Students assume that the faculty know everything about the topic. When the faculty show students that they don’t know everything and don’t have all of the answers, they can teach them how to approach challenges with humility and encourage their desire to learn more. A key principle of effective nursing practice is evidenced-based nursing and knowing how to evaluate that evidence. These principles are a part of the foundation of critical thinking.

Benner (1984) points out that faculty have enough experience and expertise to practice at the expert level. Faculty need to remember that their level of expertise has been developed over time and through experience and not assume that the novice students have the same skills. When experienced nursing faculty members list the steps of a procedure or observation, they may unwittingly assume prior knowledge. Benner (2001a) encourages faculty members to embrace openness in applying experiential learning as they develop critical thinking skills. Faculty need to identify when they are using their critical thinking and identify when they do not have all the answers. This openness transitions the experiential learning experiences from “taken for granted background (knowledge) for consideration in a clinical situation” (p. 188).

Changing Institutional Practices

Denial (2012) pointed out that educational institutions assume that everyone knows how to think. While everyone can think, thinking clearly and logically is not easy; it needs practice and a desire to use

the skill effectively. Fancione and Fancione (2014) point out that critical thinking includes instinctive decisions that are made constantly and are the more thoughtful decisions that require analyzing multiple data points and a reflective thinking process.

Foundational skills (also known as general education skills), the primary topics of FYS classes, need to be offered in all first encounters with college, certificate, and part-time students, as well as full-time freshmen. However, research by Pitt (2015) showed that nurses who receive training in critical thinking in their first year and then are not required to use it in subsequent classes often do not retain what they learned. While FYE and program gateway courses can initiate critical thinking skills, those skills must be reinforced and practiced in subsequent classes. To be developed adequately, critical thinking skills need to be a learning outcome across the curriculum and in all courses.

However, when determining the best way to apply, teach, ad evaluate critical thinking skills, many educators disagree on the methods and even what to measure. Theoretically, many educators will define critical thinking abstractly, focusing on the ability to create logical arguments on both sides. In experiential learning settings, such as healthcare classrooms, those logical arguments need to be made quickly to result in appropriate healthcare actions.

As explored in this research, an in-depth critical thinking test may be an appropriate method for diagnosing and measuring critical thinking skills. The HRST-AD test used in this research was used for limited purposes; the test includes many categories of test results that were not included or analyzed during this study. A more extensive use of the test might provide useful information and opportunities for developing critical thinking skills. For example, students could complete the test upon entry to a CNA program or an FYS class and then use the results to create a plan to improve their thinking skills. Giving the students feedback and discussing each of the components early in their academic training might help them recognize what they could do to change or improve that skill. Using a sophisticated test such as the HRST-AD and incorporating the various categories of critical thinking, including induction and deduction, analysis, and evaluation, might help the students view their critical thinking skills more comprehensively (Insight™, 2018).

Additional suggestions for institutional approaches to enhancing critical thinking skills across the curriculum can be summarized by these points:

- Provide faculty education on effective methods for imbedding critical thinking into classes
- Enhance early identification of high-risk students who may need additional support or education in critical thinking
- Require First Year Seminars or imbed similar foundational work in gateway classes such as the first CNA course.
- Develop partnerships with businesses and clinical work settings to provide opportunities for experiential learning
- Reinforce critical thinking education at all levels to help students progress from novice to expert critical thinkers
- Apply critical thinking education and experiences across the curriculum and across the institution
- Use appropriate testing for critical thinking to alert students to their abilities and reinforce the institution's conviction that critical thinking as a foundation for education.

KEY CONCLUSIONS FROM THE RESEARCH

This mixed-methods study focused on the effect of critical thinking interventions on student learning and subsequent success in their CNA education. However, the process of completing the research identified broader results that reach beyond the CNA curriculum and gateway courses, from the faculty-student relationship and the importance of critical thinking skills in higher education, to the key role that community colleges play in educating skilled workers for the community.

Student and Faculty Involvement

When looking at the student engagement or lack of engagement,in the critical thinking interventions, the faculty's role was important. The National Council of State Boards of Nursing's (2005) position statement recommends that faculty encourage the clinical experience and feedback to help the student think critically. Critical thinking andragogy needs to be a part of faculty education, including the advancement to clinical reasoning. The role of the faculty member in creating learner-centered education is crucial to encouraging critical thinking skills (Mangena & Chabeli, 2005). Nilson (2016) points to the importance of the instructor as being a role model in all things nursing, including critical thinking. The faculty role is important in the student's success in class and in the profession, especially in the fundamental skills.

Every course and every instructor should consider incorporating critical thinking exercises and content into their classes on a consistent and on a frequent basis to reinforce its importance and encourage the students to participate. Denial (2012), Fancione (1990), and Alfaro-Lefever (2016) all point to another concept in the use of critical thinking skills: the importance of having a desire to use those skills. By contextualizing critical thinking to the students chosen discipline, the faculty can show the importance of the skill and makes it relevant to the student's interests.

Critical Thinking is a Skill with Impact on Work and School

Retention and success for CNAs and nursing students is essential to meet the need of the need for healthcare workers. Jeffreys (2007) noted that a "strong foundation in the principles, concepts, skills ethics, and critical thinking… will be more successful throughout their educational journey toward becoming a registered professional nurse" (p. 416). That study "emphasizes the need to provide a strong foundation, identify at-risk students early, and develop early interventions to enhance success" (p. 416). Developing critical thinking skills is considered by nurses to be the big difference between a BSN program and an ADN program (AANC, 2016).

Critical Thinking in Community Colleges

As indicated previously, the First Year Seminar research showed the value of critical thinking in a first year/semester class for future success in subsequent semesters (CCSSE, 2014). The first semester has been found to be especially significant in establishing a feeling of belonging and success, as well as laying the foundation skills for future success (Tinto, 1999). CCSSE notes that if FYS classes are optional or required only for full-time students, other students won't take them. These high-impact programs have resulted in many colleges making FYS classes mandatory for full-time students and considering it for all students. Because FYS classes provide valuable, foundational skills — including critical thinking — institutions must commit to making completion mandatory and develop an equivalent option for part-time students.

FYS courses not only develop foundational skills, but they also provide key supports for an important population of students, high-risk students. High-risk students, as defined by COMBASE, are under prepared, often work more than 30 hours a week, lack financial support, lack social support, may

be first-generation college students, and have expectations of failure (Myran, 2009). Since high-risk students are frequently predisposed to feelings of potential failure, any steps, including First Year Semester courses can make them feel more hopeful and believe that their success is important and possible. These FYS courses not only emphasize study skills, critical thinking skills, and college survival skills, they also develop connections to faculty and other students and resources at the institution that can help them be successful (Bickerstaff et al., 2014).

For part-time experiential programs like CNA programs, the gateway courses typically serve the same populations and high-risk students served by FYS courses; thus, embedding critical thinking into that first semester experience should have the same positive effects.

LIMITATIONS AND DELIMITATIONS: THEMES FOR FUTURE RESEARCH

Study Limitations

Limitations and their effect on this study are discussed below.

1. Experimental attrition. The study started with 80 students and went down to 26 in the treatment group and seven in the control group. Attrition is also common in this class as well because of grades, health, and other life events. What was sought was a large pool of students to counter act that attrition, but many students saw the testing as being optional.

2. Some data was not usable because of the students' age (minors), students who did not complete enough of the test to have their scores count, or they did not complete both the pre- and post-test. These effects were especially prominent with the control group that did not complete enough of the tests to be included. The effects of experimental attrition faced by this research was evident in the results: many students sign up for the CNA program with the intention of pursuing a career in the healthcare field; however, they decided to drop the class for a variety of reasons.

3. One whole class completed the pre-test, but when asked to do the post-test on their own, they did not do so. This tendency reinforces Knowles and McKerney's (2012) concepts that the student needs to see the importance of a task and that "students don't do optional."

4. Because the researcher is not the primary instructor for the class, students might have been reluctant to participate in the exercises or take part in the testing or survey process.

5. The data from the control group was unusable because the participant number was so low that getting results meeting the requirements for a normal distribution was not possible.

6. Students who were minors or did not complete the post-test yielded unusable data.

7. The test was given in the English language and was not supported by any educational support. Students who had English as a second language or had any learning challenges made stated that the test was a struggle for them to understand the test questions.

Delimitations for the Quantitative Study

1. The potential delimitations for this study include the number of students who participated in the study, the selection of faculty and course sections, as well as the location and timing of the study. First, this study was completed on one campus with a variety of class times and instructors in the Spring of 2018. Second, this study was conducted in one semester. Third, each class had a different instructor; thus, there were expected variances in teaching style and extent to which the instructor already incorporated critical thinking as part of the class activities. Each of these factors may decrease the generalizability of the results to other schools and/or programs.

2. While this study focused on critical thinking in CNA programs, the results may apply to other healthcare and non-healthcare programs. The critical thinking modules and format might be generalizable to other programs.

3. For this study, students took the pre- and post-test and then, after completion of the post-test, they received their results from both tests. This process was followed to minimize effects of prior knowledge on the post-test. Because the test includes 45 distinct questions, it would be a challenge for the students to remember them and use this knowledge in completing the post-test.

4. The HSRT-AD test has six categories of measurement; this study only examined the Overall Score. While the students had the opportunity to look at their results in the other categories, which may be effective for their progress, these scores were not the focus of this study.

5. This research focused on a gateway course, the initial program in a nursing pathway.

Delimitations for the Qualitative Study

1. The survey was given to the intervention group only, since they were exposed to the formalized critical thinking exercises. It was given after the students final and after the post test.

2. Self-reporting on survey questions was dependent on the participation and honesty of the respondents; thus, their responses might reflect student bias. They may have also wanted to report positive feedback because of general kindness to the researcher.

Options for Future Research Based on the Limitations and Delimitations

1. Use a larger pool of students from other locations

2. Extend the study data collection to cover multiple semesters or years

3. Require both the pre- and post-test

4. Discuss the pre-test results with the students, and provide more background for the testing

5. Offer the post-test on a different day from the course final exam

6. Offer the test in multiple languages and provide test-taking support for students

7. Using a longitudinal approach, examine the effects of critical thinking practices on student success across the curriculum and/or educational career.

RECOMMENDATIONS FOR FUTURE RESEARCH

While these notes have focused on the broader implications of this research study, it has also presented some important opportunities for future research. While the topic of critical thinking in healthcare is extensive and requires much research, results from this study suggest the following as important next steps.

1. Critical Thinking Embedded in the CNA Curriculum

The students in this study found the critical thinking exercises useful and wanted them incorporated into their classes earlier and more often. Over the next few years, the increasing state mandates for including critical thinking and making it a required component of the state exam will begin to have a pronounced effect on CNA curricula. A future research study should examine the effects of the enhanced focus on critical thinking focus on course success and state exam scores.

2. Effect of Predisposition

Future studies should also address the predisposition of the students to use critical thinking. This predisposition to use critical thinking would extend to their practices outside of their academic program and would address use in everyday life. Walker (2003) noted that active learning is important to the disposition to critical thinking skills, and that the disposition can be nurtured. Students need to be encouraged to be inquisitive, skeptical, and creative. Denial (2012) noted that many of the students in their study did not have the desire to analyze and think through the process.

3. Effect of FYS and Learning Communities

Insight™, Tinto (1999), and Astin (1991) identified the connection with other students and the instructor as establishing a feeling of community. The importance of the learning community in developing critical thinking or any other content and skills cannot be overstated. As reflected in research by Benner (2001b) struggling student nurses found that the creation of community helped with learning critical thinking and a feeling of support and belonging. The use of FYS courses has been shown to enhance this sense of community and may also contribute to, or enhance, development of critical thinking skills or predisposition toward critical thinking. Examination into these possible connections would be important.

4. Longitudinal Studies of Critical Thinking

An additional area for important research would be a longitudinal examination of critical thinking skill development in the CNAs who continue their education into nursing. A study into students' development from novice to expert may identify additional factors that influence critical thinking as students progress. In addition, a longitudinal study could examine the effects of CNA experience and years in the position on participants' growth and comfort in using their critical thinking skills. As Richards (n.d.) points out, CNAs typically learn better on the job, with real life circumstances, thus making the critical thinking skill more relevant.

Finding ways to examine growth and development of critical thinking skills over time and in other environments would be an extremely valuable area of study. Other healthcare and non-healthcare programs could benefit from embedding critical thinking activities, and the critical thinking modules and approach could be applicable and valuable to other programs. While previous research has found it difficult to quantify critical thinking skills, development, and growth (Cash, 1995; English, 1993), future research into the effects of critical thinking on students' subsequent coursework and employment might yield interesting data on the effect of critical thinking on student success.

5. Exploration of the Initial Pre-test

One of this study's delimitations, the small testing group, provides additional areas for further research. The initial pre-test results in this study, for example, reflected scores that were lower than the national average, while the post-test scores were closer to the national average. Because it was unclear if the differences were because of the small testing group or other factors in the testing protocols, the reasons for these disparities should be explored further.

FOUNDATIONS FOR A MODEL TO IMPROVE PRACTICE

The literature review and the student's comments from the classroom and the qualitative survey led to the identification of key themes. This information led to the following model for incorporating critical thinking into the classroom for nursing assistants. The recommendations identified from this research study can be embedded into the classroom and improve student practice.

Theme 1: Faculty-student relationship.

Students noted that they learned from their instructor, the nurses, and CNAs that they worked with in clinical settings. These comments confirmed Tinto (1999) and Astin's (1991) research on the importance of the faculty member and the connections made in the classroom. This connection can be a part of the role model of the faculty member. Students need to see the faculty member using critical thinking and involving students in decision making and use of critical thinking.

Theme 2: Student-to-student learning.

Benner and others noted the importance of the student-to-student engagement in learning. Benner (2001b) saw value in students helping students and collaboration for learning and practicing. Group work allows students to brainstorm different solutions and discuss the benefits of each solution. In doing the group work, the actual practice of critical thinking can occur and become more of a habit.

Theme 3: Perceived importance of critical thinking.

Denial (2012) found that educators often assume that everyone knows how to think and therefore critical thinking does not need to be taught. Employers, though, have found that new employees often can't apply those skills. Arum and Roksa's (2014) survey of educators and employers found that critical thinking was important to them, with employers concerned about students apparently not learning critical thinking in schools. The problem, however, may be whether or not the students perceive the importance of critical thinking. Developing a desire to use critical thinking and a predisposition to use those critical thinking skills should be explored through faculty professional development opportunities. Critical thinking, similar to many general education skills, needs practice throughout all of one's education (Glaser, 1941).

In this study, students noted that taking HRST-AD pre-test helped them identify critical thinking criteria and to examine their own thinking process. The HRST-AD test, with additional attention to all the evaluation criteria, could be used to identify specific areas needing development and could be used by the students to improve their thinking process and by faculty introduce the topic of critical thinking in the classroom.

Theme 4: Self-regulation and metacognition for the student as a first step.

Being aware of one's process of thinking, metacognition, is one of the critical components of critical thinking (Kuiper, 2002). Even if the complete HSRT-AD and extensive dedicated classroom time are not available, a simplified test to alert the student and instructor of the need to strengthen or practice critical thinking skills can still be beneficial. If a curriculum can, at the least, introduce the concept of critical thinking and its current and future use, students can be encouraged to seek out other ways of developing and using those skills. Applying metacognition, or the process of analyzing one's own thinking processes, across the higher education curricula can be useful for students' future professional success (Kuiper, 2002).

Theme 5: Contextualizing active experiential learning.

Teaching critical thinking exercises in a CNA curriculum can be done in a variety of ways including nursing assistant simulations, case studies, and other active learning activities (Alfaro-Lefevre 2016; DeYoung, 2014; Rischer, 2015). Richards (n.d.) reminds us that the clinical portion and on-the-job learning is crucial to the practice and reinforcement of critical thinking skills, especially for CNAs. When the students go into clinical settings and then work as CNAs, these real-life experiences give them the chance to practice critical thinking. Current educational practices including flipped classrooms and similar methodologies are effective tools meant to replace lecturing and didactic practices; however, guided discussions and problem solving in the classroom has been reported to have even greater impact upon critical thinking. Carvalho, Azevedo, Cruz, Mafra, Rego, Vitor, Santos, Cogo, & Ferrera, (2017) found that problem-based learning stimulates critical thinking and made a positive difference in education. Their study examined the impact of teaching practices in nursing education and at six research studies and found that the most impactful intervention in teaching critical thinking was problem-based learning.

Theme 6: Creating a critical thinking environment.

Richards (n.d.), in her article about CNAs, said that they need a key take away that is practical and usable for their daily duties. The perceived importance of critical thinking can be fostered by creating a critical thinking environment (Denial, 2012). This includes the faculty member using their critical thinking skills in the classroom and working with the students to problem solve a situation, classroom rules, or a

variety of scenarios. The definition of critical thinking includes looking at all of the potential solutions and choosing the answer that seems to fit the situation the best.

Benner's (1984) theory supports the novice learner not seeing critical thinking as important because they rely on the directions from the expert or instructor. As they progress and have more of a knowledge base, they can draw more informed decisions. When the term "skills gap" is used in nursing, it refers to the gap between what is taught and the reality of the job of nursing (Schneider et al., 2015).

A MODEL FOR A CRITICAL-THINKING ENHANCED CNA PROGRAM

The themes identified above provide a clear foundation for a Model of a CNA program that is infused with critical thinking. As indicated by the literature, more nursing programs are using nursing assistant programs as a gateway course to prepare the student for a nursing program. Adapting the Benner's theory of skills acquisition and the importance of practice was discussed by several authors (Alfaro-Lefevre, 2016; DeYoung, 2014). The concept of the deliberate practice of engaging the learner with repetitive skill practice of psychomotor or cognitive skills is cited by the NCSBN (Chisari, et al., 2005) in their position paper as important in nursing education. New nurses stated that using their skills helped with their confidence in their new role (Joseph & Juwah, 2012). Benner's educational theory focuses on the progression from novice to professional in nursing and healthcare (1984). CNA students are novices, needing guidance on developing their critical thinking skills.

Table 13 outlines the proposed steps, suggestions, and supporting documentation for inclusion of critical thinking in a CNA program, linking these practices to the recurring themes from literature, the qualitative study themes, and the feedback from students in this research study.

Table 13: A Model for Adding Critical Thinking Skills into the Nursing Assistant

STEPS	SUGGESTIONS	RATIONALE
Do a critical thinking test/quiz/ or self-assessment	Create or use an established testing platform. Be aware of students who may have reading and comprehension challenges. Adapt testing for Individual Education Plans and for English as a second language students	Gives a baseline of current abilities. Alerts students that instructor considers this to be important (Denial, 2012; Fancione and Fancione, 2014)
Discuss the students' test result	Let them self-assess themselves and their abilities. Where did they draw faulty conclusions	Reflection by student of their current ability. Metacognition of abilities (Azizi-Fini et al., 2015; Denial, 2012;)
Discuss critical thinking – its role in healthcare, what it is, how to improve it	Have student do case studies, interaction with healthcare professionals Create an environment for that encourages critical thinking	Knowles: students need to understand the application and relevance of the thinking process in their learning. Attach concept of critical thinking to relevant experiences (Burrell, 2014; Knowles, 1985)
Have students identify how they can improve their critical thinking	Journals, self-assessment, review their test results,	Metacognition (thinking about thinking)/critical thinking, reflection, or self-regulation (Burrell, 2014; De Young, 2015)
Plan frequent ways for them to use their skills. Variety of types of using it- so they can identify: Students don't do optional	Use case studies, simulations, role play, discussions. Use of problem-based learning, concept mapping, and simulation have had positive outcomes on critical thinking. Especially for a short program, frequent practice. Crucial component is connection to patient.	Using multiple methods for the same concept allows for practice and multiplicity of practice: best practices include reflection, concept mapping, questioning, clinical practice, simulation, case studies, assessments, and written assignments (Burrell, 2014; Carvello et al., 2017; Jones, 2017; Nilson, 2016; Rischer, 2015; West et al., 2012). Students need it connected to the patient and may need help in making the connection (Jones, 2017).
Incorporate critical thinking into the clinical experience	Clinical care: Active and experiential learning.	CNAs learn on the job and when they can attach to relevant experience (Bristol, 2017; Chisari et al., 2005; Richards, n.d.)
Have them retake the test or self-assess and compare their skills	Self-assessment encourages changes in critical thinking and disposition.	Create a critical thinking environment (Burrell, 2014). Role models need to analyze their critical thinking.

CONCLUSION

Critical thinking is the first step to clinical reasoning, both of which are essential for healthcare providers. Critical thinking is problem solving based upon key learnings, and clinical reasoning is putting one's whole healthcare experience into thoughtful decision making. Retention and success for CNAs and nursing students is essential to meet the need for healthcare workers. The quality of the care is also important. Critical thinking skills and support for the nursing assistant and nurses in the field can make a difference in the quality of care one receives. When CNAs are involved in the planning and present their observations to the nurse, they are using their critical thinking skills for the benefit of the patient.

Showing entry-level students the importance of critical thinking, how it applies to them and to their future, and how using and practicing those thinking skills is vital to their success and to the workforce: "Critical thinking can enable students to control their own destiny by learning to ask probing question looking for evidence, seeking and scrutinizing alternatives, and critiquing their ideas and the ideas of others (Brown & Sorrell, 1993, p. 5). Mentoring, encouraging, and forcing students to recognize, use, and self-critique their critical thinking skills enables students to control their own destiny and could be the best gift that we pass on. They need to practice thinking like a nurse.

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APPENDIX A: IRB APPROVALS

FERRIS STATE UNIVERSITY

Date: March 29, 2018

To: Sandra Balkema, Elizabeth Pagenkopf
From: Gregory Wellman, R.Ph, Ph.D, IRB Chair
Re: IRB Application *IRB-FY17-18-123 Impacting Critical Thinking in Entry Level Health Career Classes*

The Ferris State University Institutional Review Board (IRB) has reviewed your application for using human subjects in the study, *Impacting Critical Thinking in Entry Level Health Career Classes(IRB-FY17-18-123)* and approved this project under Federal Regulations Exempt Category 1. Research conducted in established or commonly accepted educational settings, involving normal educational practices, such as (i) research on regular and special education instructional strategies, or (ii) research on the effectiveness of or the comparison among instructional techniques, curricula, or classroom management methods.
Category 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.

Approval has an expiration date of three years from the date of this letter. **As such, you may collect data according to the procedures outlined in your application until March 29, 2021**. Should additional time be needed to conduct your approved study, a request for extension must be submitted to the IRB a month prior to its expiration.

Your protocol has been assigned project number IRB-FY17-18-123. Approval mandates that you follow all University policy and procedures, in addition to applicable governmental regulations. Approval applies only to the activities described in the protocol submission; should revisions need to be made, all materials must be reviewed and approved by the IRB prior to initiation. In addition, the IRB must be made aware of any serious and unexpected and/or unanticipated adverse events as well as complaints and non-compliance issues.

Understand that informed consent is a process beginning with a description of the study and participant rights, with the assurance of participant understanding followed by a signed consent form. Informed consent must continue throughout the study via a dialogue between the researcher and research participant. Federal regulations require each participant receive a copy of the signed consent document and investigators maintain consent records for a minimum of three years.

As mandated by Title 45 Code of Federal Regulations, Part 46 (45 CFR 46) the IRB requires submission of annual reviews during the life of the research project and a Final Report Form upon study completion. Thank you for your compliance with these guidelines and best wishes for a successful research endeavor.

Regards,

Gregory Wellman, R.Ph, Ph.D, IRB Chair

Harper College

Office of Institutional Research

1200 West Algonquin Road
Palatine, Illinois 60067

847.925.6950
847.925.6055 fax

Date: March 8, 2018

Ms. Elizabeth Pagenkopf
Ferris State University

Dear Ms. Pagenkopf

I am writing to express our support for your research study, Impacting Critical Thinking in Entry Level Health Career Classes, to be conducted by you and your research team *in the Spring of 2018*. Harper College is very supportive of research efforts dedicated to improving success of its students. To that end, Harper College will expedite the Harper College Secondary IRB application once the approval from the primary IRB is received. This secondary approval from the Harper College IRB will permit you and your research team to conduct research on the Harper College campus.

You agree to keep all data confidential, which includes creating special subject numbers, keeping data safeguarded, not sharing or reporting individual data to third parties for research or other purposes, and using the data only for agreed upon research. You understand and agree that no confidential information regarding any students or employees will be disclosed in any document intended for public disclosure.

We look forward to learning the results of your research.

With kind regards,

Katherine Coy, Ph.D.
Director, Institutional Research
Chair, Institutional Review Board
William Rainey Harper College
1200 West Algonquin Road
Palatine, IL 60067

Phone: 847-925-6955
Fax: 847-925-6055

APPENDIX B: SURVEY

The following questions are about your experience and participation in the classroom activities. While your instructor did many of the classroom discussions and assignments, please think about the discussions and assignments given to you by Ms. Pagenkopf and their impact on your learning. This is anonymous, so please be honest so that we can learn from your input.

Course: CNA 101 Instructor's Name: _____

1 = Never; 5 = Always

1	The CNA classroom assignments made sense to me and I understood their purpose.	5	2	3	4	5
2	I enjoyed the assignments and think that they helped me prepare for my tests.	1	2	3	4	5
3	I felt encouraged to participate in discussions and respond to others.	1	2	3	4	5
4	I got clear responses to what I said in assignments and found out how to improve.	1	2	3	4	5
5	To what degree did the instructor encourage you and your fellow students to ask questions and give answers?	1	2	3	4	5
6	I enjoyed the discussion groups and learned from my group.	1	2	3	4	5
7	I felt more confident in my ability to make the best decision for my resident when in clinical.	1	2	3	4	5
8	I used what I learned from the critical thinking assignments and discussions in my clinical rotation.	1	2	3	4	5
9	My confidence in passing the state exam is (please rate your confidence: with 5 being the highest confidence).	1	2	3	4	5

Do you feel that the feedback you got from the HRST-AD Critical Thinking Test was valuable?

What did you notice about your scores on the post-test compared to the pre-test?

What did you find most valuable about the CNA critical thinking exercises?

What would you like to change about the CNA Clinical Scenarios discussions or assignments?

APPENDIX C: TOPICS AND CRITICAL THINKING EXERCISES

TOPICS	CLASS: GENERAL DISCUSSION:
What is critical thinking	How do you make decisions? What did you think about the test? What is critical thinking?
Nursing Process	What does each step involve? Identifying the patient issue or complaint (Subjective Data) What is observed (Objective data) What should be done for the issue? Planning Initiate plan- which may be alerting the nurse, positioning, or other CNA tasks How did the patient respond, did the plan work? Why? How do you know? Go back to step 1: Identifying the patient issue or complaint (Subjective Data)
Prioritization	How to prioritize? What are conditions that need to be addressed immediately? What are situations that might lower the priority? What might be escalations of the issue that would make it a higher priority? What are situations that might lower the priority?
Scenarios	Involving: Activities of daily living: care skills Time Management of taking care of several patients at once? Discussions about how the student made the decision and other considerations that they may want to consider

APPENDIX D: FULL TEST SCORES

Number	Assignment Description	OVERALL	Percentile	Assignment Description	OVERALL	Percentile
1	Pre	70	16	Post	64	4
2	Pre	70	16	Post	66	4
3	Pre	90	86	Post	91	86
4	Pre	69	12	Post	74	26
5	Pre	67	6	Post	73	22
6	Pre	66	4	Post	69	12
7	Pre	64	4	Post	67	6
8	Pre	71	16	Post	74	26
9	Pre	79	43	Post	91	86
10	Pre	76	26	Post	74	26
11	Pre	71	16	Post	70	16
12	Pre	89	82	Post	84	68
13	Pre	67	6	Post	73	22
14	Pre	73	22	Post	70	16
15	Pre	80	50	Post	84	68
16	Pre	76	26	Post	77	32
17	Pre	80	50	Post	81	50
18	Pre	77	32	Post	76	26
19	Pre	71	16	Post	70	16
20	Pre	66	4	Post	79	43
21	Pre	76	26	Post	67	6
22	Pre	81	50	Post	89	82
23	Pre	60	2	Post	63	3
24	Pre	69	12	Post	66	4
25	Pre	70	16	Post	69	12
26	Pre	70	16	Post	77	32

APPENDIX E: PARTICIPANT COMMENTS AND THEMES

Participant Comments and Themes

FEEDBACK	THEMES	THEORIST
Kind of hard to understand	Challenges with the test	Knowles
Nothing really, I didn't understand the questions	Challenges with the test	Knowles
Make them less lengthy	Challenges with the test	Knowles
Maybe more questions similar to the 5 call lights at once and who do you prioritize	Application to learning critical thinking	Knowles Benner
Yes, I think taking the test gave me an idea of how testing will be in the future	Application to learning Critical thinking	Knowles
Yes, It showed me which category I did best in and which one I should work on more	Application to learning	Knowles Benner
helps? Into real world situations	Application to learning Critical thinking	Knowles Benner
Seeing how well I was able to comprehend critical thinking questions. Shows I wasn't so good at is as I thought	Application to learning	Knowles
It was things that were going to use	Application to learning Critical thinking	Knowles Benner
Helps to think more and choose which is the better answers	Application to learning Critical thinking	Knowles Benner
Working through problems and exercises we will be exposed to in a professional healthcare setting	Application to learning Critical thinking	Knowles
Made me realize I need to improve	Application to learning	Knowles
Understanding how my thinking process was	Application to learning	Knowles
Push you to think	Application to learning	Knowles
Really makes you think	Application to learning	Knowles
NCLEX Style questions	Application to learning Critical thinking	Knowles Benner
Get a little more information	Application to learning	Knowles
I would've liked to start them earlier in the semester. I think these exercises were in some ways more helpful than exam and book questions because we were forced to work through the problems and there wasn't one correct answer	Application to learning Critical thinking	Knowles Benner
I think it was just fine	Application to learning Critical thinking	Knowles Benne
Nothing -it was great	Application to learning Critical thinking	Knowles Benne
I like it the way it is	Application to learning Critical thinking	Knowles Benne

FEEDBACK	THEMES	THEORIST
I wouldn't change much, but maybe make sure to explain what the results mean for the test, but the discussions and assignments were helpful	Application to learning Critical thinking	Knowles Benner
That I could have done better	Confidence	Knowles
I believe it helps students get a better grasp on what priority means	Confidence Critical thinking	Knowles Benner
Trying to find the right answer to many	Confidence	Knowles Benner
Everything	Confidence	Knowles Benner
Is? Help you	Confidence	Knowles Benner
They challenge you to think	Confidence Critical thinking	Knowles Benne
They were helpful in learning how to prioritize	Confidence Critical thinking	Knowles Benner
It was important to act right under pressure	Confidence Critical thinking	Knowles Benner
How to enhance my judgement	Confidence Critical thinking	Knowles Benner
The evaluating and thinking	Confidence Critical thinking	Knowles Benner
Helped to try and think outset the box	Confidence Critical thinking	Knowles Benner
To see how other came to decisions.	Confidence Critical thinking	Knowles Benner
Being given the opportunity to practice these critical thinking exercises	Confidence Critical thinking	Knowles Benner
Planning and organization.	Confidence Critical thinking	Knowles Benner
They challenge you to think	Confidence	Knowles Benner
Critical Thinking exercise is always very helpful. Time in the healthcare is the most important.	Confidence Critical thinking	Knowles Benner
The question in critical thinking is very helpful.	Confidence Critical thinking	Knowles Benner
To know what the preferred answers to the scenarios are and why	Confidence Critical thinking	Knowles Benner
Nothing that I can think of.	Confidence Critical thinking	Benner
Nothing. Very helpful. Thank you	Confidence Critical thinking	Knowles Benner

FEEDBACK	THEMES	THEORIST
Nothing. Very helpful. Thank you	Confidence Critical thinking	Knowles Benner
That I could have done better	Confidence	Knowles Benner
It wasn't all that informative. Didn't know what questions were wrong or right. I took a test and got graded w/no feedback- Really	Connection to pre/post test	Knowles
Didn't see pre-test scores	Connection to pre/post test	Knowles
I did well in the post-test. I didn't see my pre-test scores	Connection to pre/post test	Knowles
I did not see my scores on the pre-test, but the scores on the post-test did make me discouraged a little bit	Connection to pre/post test	Knowles
I didn't get the first post-test, but it was lower. I have to try again	Connection to pre/post test	Knowles
It was a little bit higher that last time	Did Better	Knowles
I did a little better than the last time	Did better	Knowles
They were higher but not by much	Did better	Knowles
Slightly Better	Did better	Knowles
They got better	Did better	Knowles
My scores in the post test were much higher than the pre-test	Did better	Knowles
Just that it makes you think more, but the questions are too long, and you can lose focus easily	Challenges with the test	
Sort of the questions were worded strongly	Challenges with the test	
I think it was somewhat ?, but still it was so lengthy, I couldn't finish	Challenges with the test	
I wasn't able to do the first one. Any	Challenges with the test	
I think it was somewhat ?, but still it was so lengthy, I couldn't finish	Challenges with the test	
did not finish the last test	Challenges with the test	
My score was more or less the same or a little bit better than before. Both times I just randomly guessed the last 10 questions due to fatigue	Challenges with the test	
It was a really long test	Challenges with the test	
Shorter thought processing questions. Spend more time reading rather than thinking about the questions	Challenges with the test	
Make them more understandable	Challenges with the test	

FEEDBACK	THEMES	THEORIST
More open-ended. With Multiple choice, it is hard to see what the person is really thinking/She is reasoning of kind the answered. The deduction questions can always have a "what if". Also, it forces students to learn in one given way, when a student may reach the same conclusion, but w/a diff thought process	Challenges with the test	
I have an IEP, so maybe someone could read it to me. I didn't understand half of what the questions wanted	Challenges with the test	
Nothing -it was good	Confidence Critical thinking	Benner
Nothing	Confidence Critical thinking	Benner
Nothing -it was good	Confidence Critical thinking	Benner
It was Insight™ ful	Learned from test, gained insight	Knowles Benner
Yes	Learned from test, gained insight	Knowles Benner
Yes, showed what areas I need improvement on	Learned from test, gained insight	Knowles Benner
Yes, because it lets me know what I need to work on	Learned from test, gained insight	Knowles Benner
Yes, makes you think outside the basic answers	Learned from test, gained insight Critical thinking	Benner
Yes	Learned from test, gained insight	Knowles Benner
It went up a few points	Learned from test, gained insight	Knowles Benner
It was good	Learned from test, gained insight	Knowles Benner
They improved	Learned from test, gained insight	Knowles Benner
Score a little higher that before	Learned from test, gained insight	Knowles Benner
Professor provided me all of my clinical experience. CNA's and nurses were minimally helpful. Then need to step up.	N/A	
N/A	NA	
No because I don't know how to apply these results	No help because I don't know how to apply these results	
Somewhat	No help	

FEEDBACK	THEMES	THEORIST
No not really	No Help	
I did better that the first time	No help	
Not much	No help	
Almost the same	No help	
I don't remember	No help	
I didn't do well at all	No help	
U don't know	No help	
I don't remember	No help	
Took the test only once	No help	
No significant difference	No help	
Not really	No help	
N/A	No help	
I don't know -said I was weak	No help	
I believe I did better, but I also think I answered a lot of questions the same the second time around	Challenges with the test	
No because I don't know how to apply these results	Challenges with the test	
Some involved math questions would be better to have some scratch paper to properly think out questions	Challenges with the test	
Questions were fairly long	Challenges with the test	
Make it less reading	Challenges with the test	
I think we should focus more on the individual areas of the exam and how to improve them	Challenges with the test	
More preparation or objectives and outcomes	Challenges with the test	