THE IMPACT OF EVOLVE CASE STUDIES ON THE EVOLVE EXIT EXAMINATION SCORES FOR BACCALAUREATE AND ASSOCIATE DEGREE NURSING STUDENTS

A DISSERTATION

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

IN THE GRADUATE SCHOOL OF THE

TEXAS WOMAN'S UNIVERSITY

COLLEGE OF NURSING

BY

GLORIA M. ROSE, B.S.N, M.S.

DENTON, TEXAS

MAY 2010

TEXAS WOMAN'S UNIVERSITY
DENTON, TEXAS

December 14, 2009

To the Dean of the Graduate School:

I am submitting herewith a dissertation written by Gloria M. Rose entitled "The Impact of Evolve Case Studies on the Evolve Exit Examination Scores for Baccalaureate and Associate Degree Nursing Students." I have examined this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy with a major in Nursing Science.

Anne Young, Ed.D., Major Professor

We have read this dissertation and recommend its acceptance:

Rita A. Dells Hunt

Associate Dean, College of Nursing

Accepted:

Dean of the Graduate School

DEDICATION

To Jesus Christ, my Lord and Savior, because You have plans to prosper me.

To my late parents, Clifford and Esmie Rose, who taught me the value of being all that I can be. By instilling in me the faith that you both possessed you have given me the greatest gift anyone can give. Thank you Mom and Dad, I know that you are proud of me and looking down on me from Heaven.

ACKNOWLEDGMENTS

First, I thank God the Father, our Lord and Savior Jesus Christ, and my helper, the Holy Spirit, without Your love and grace I would be lost. Thank you for the promise that is in Jeremiah 29:11, "For I know the plans I have for you, declares the Lord, plans to prosper you and not to harm you," these words inspired me throughout this entire process. Thank You for giving me the strength and teaching me to set realistic goals for myself as well as challenging me to do my best. Thank You for showing me how to love You first, then to love myself as well as others. Thank You for my life and the people you have put in it.

The printed pages of this dissertation hold far more than the culmination of years of study. These pages also reflect the relationships with many generous and inspiring people that I have met since the beginning of my graduate work. The list is long, but I cherish each contribution to my development as a scholar and researcher.

I would like to express my deepest appreciation to my committee chair, Dr. Anne Young, who continually and convincingly conveyed a spirit of adventure with regard to research and scholarship, and an excitement with regard to teaching. Her guidance and professionalism helped to make this dissertation a reality. I am also grateful to Dr. Rae Langford and Dr. Rita DelloStritto, my committee members for their words of encouragement, thoughtful comments, and criticism and for willingly joining my committee in the middle of the process. I am also grateful to Dr. Robin Britt who started me on the journey for her enthusiasm, support and encouragement. To my Elsevier "family," Dr. Ainslie Nibert, Dr. Mary Yoho, and Dr. Pamela Willson I could not have done

this study without your constant guidance, encouragement, and support. Thank you Pam for being you, you were a tremendous inspiration to me throughout the years, even before I began this journey, you always believed in me.

To the Dean of Prairie View A & M University, College of Nursing, Dr. Betty Adams, thank you for your encouragement and support, to Dr. Chloe Gaines my co-worker, thanks for taking the time to edit my paper, and filling in for me whenever I had to work on completing this document.

I would like to conclude by thanking my family and friends for their incredible support. I am especially indebted to my niece, Zemora Andrew for her being there with me every step of the way, checking, copying and her unending support. To my sisters Erma Daniel and Claudette Williams for always believing in me and having the faith in my ability to succeed, and always encouraged me to hang in when I felt like giving up, and for listening when I needed to talk. To my friend Cynthia Wyllie, your thoughtful gifts and words of encouragement meant more than you will imagine. To my young nieces Stevanna and Surya Daniel, you are my angels and I hope that I am an inspiration to you. My classmate Steve Branham, the road was rough, but we stood by each other. Lastly, to all my friends who are too numerous to mention, especially Eugene Ollivierre for your words of encouragement, Pearl LaBeach, Marcelle Thomas, Helen McIntyre, Stevie Roberts, Bridget Bentley, and Dr. Edward Cox. I am truly grateful to all of you, and will never forget your encouragement throughout this most challenging journey.

ABSTRACT

GLORIA M. ROSE

THE IMPACT OF EVOLVE CASE STUDIES ON THE EVOLVE EXIT EXAMINATION SCORES FOR BACCALAUREATE AND ASSOCIATE DEGREE NURSING STUDENTS

MAY 2010

The purpose of the study was to determine if associate degree and baccalaureate student nurse utilization of Evolve Apply case studies had an impact on scores on the Evolve Reach Exit Examination (E^2) scores, a proprietary examination taken by nursing students to predict success on the NCLEX-RN. The study further investigated how the Evolve Apply case studies were utilized by nursing schools around the United States, including a determination of whether or not schools placed consequences on the use of computerized and standardized case studies within the nursing curriculum, and if use of case studies was validated.

The study employed a non-experimental descriptive study design using purposive sampling, a form of non-probability sampling. Three research questions guided the study: (1) Does the utilization of Evolve Apply case studies significantly increase baccalaureate and associate degree registered nurse student scores on the Evolve Reach E^2 as compared to students who do not use Evolve Apply case studies? (2) What consequences do nursing programs attach to the use of the Evolve Apply case studies in the curriculum? (3) Do the variables, consequences, and validation affect scores on the Evolve Reach E^2 for those students using the Evolve Apply case studies?

Findings revealed that the use of Evolve Apply case studies increased students' scores on the Evolve Exit exam. Common consequences programs attached to case study use included passing/failing course, grade impact, and remediation. Validation of case study use inversely influence E^2 outcomes. Students in programs not validating case study use had higher E^2 scores. Attaching consequences to case study use did not significantly influence E^2 scores.

TABLE OF CONTENTS

LIST OF TABLES

Table Page

LIST OF FIGURES

Figure Page

CHAPTER I

INTRODUCTION

The Nurse Reinvestment Act of 2002 has been hailed as an important step towards meeting the escalating demand for competent, credentialed nurses (Nibert, Young, & Britt, 2006). Recruiting and then retaining nurses has become a top priority in the face of predictions that the United States is facing a nursing shortage of unprecedented magnitude. According to Buerhaus, Staiger, and Auerbach (2000), with the demand for registered nurses growing by 2% to 3% each year the shortage could reach 500,000 by 2025. Five major factors have been defined as key contributors to the problem: an aging nursing workforce, decreasing enrollments in nurse education programs, changes in the work environment due to managed care and the proliferation of elderly patients with conditions that demand more complex care, and a negative image of nursing as a career (Goodin, 2003). Furthermore, newly registered nurses are required to pass the National Council Licensure Examination, Registered Nurse (NCLEX-RN) before becoming eligible to be added to the work force.

A major indicator of the registered nursing programs' effectiveness is the rate at which first-time candidates pass the NCLEX-RN (Beeson & Kissling, 2001). Boards of Nursing, the Commission on Collegiate Nursing Education (CCNE) ,and the National League for Nursing (NLN) tout the rate at which first-time test takers pass the NCLEX-RN in their accreditation standards and in evaluations of their program's effectiveness. Schools of nursing are challenged to facilitate the development of knowledge, ensure the competence of new graduates, and demonstrate the organizational and curriculum

effectiveness required to identify and remediate students who have a high risk of failing their first NCLEX-RN test.

Given that the annual pass-fail rate on the licensure examination is widely regarded as a benchmark of a program's accountability, a great deal of attention is given by nurse educators to variables that might help predict a student's passage of this difficult exam (Aucoin & Treas, 2005; Davenport, 2007; Frith, Sewell, & Clark, 2006; Lauchner, Newman, & Britt, 1999; Newman, Britt, & Lauchner, 2000; Siktberg & Dillard, 2001). During 2006, a total of 110,713 U.S. educated graduate nursing students took the NCLEX–RN, the first-time pass rate was 88.1%, whereas in 2007, a total of 119,579 U.S. educated graduate nursing students took the NCLEX–RN with a first time pass rate of 85.5%, demonstrating a decrease in graduate nurses passing the NCLEX–RN (NCSBN, 2008). Professional nursing education programs are well aware of this decrease in the NCLEX-RN examination's first-time pass rate in the United States. When this rate dropped from 90.3% in 1994 to 85.3% in 2005 for all U.S. educated first-time test candidates, significant concern was voiced by those responsible for the education of future nurses (NCSBN, 2008). Nursing program directors and faculty members are well aware that passing the NCLEX-RN can affect a school's reputation, enrollment, funding, and accreditation. These factors challenge nursing programs to develop strategies that are most likely to secure successful outcomes.

Researchers have systematically sought insight into salient predictors of student's future performance on the NCLEX-RN (Waterhouse & Beeman, 2003). Performance on the Evolve Reach Exit Examination (E^2) powered by HESI (Health Education Systems, Inc.) has been found to be a highly reliable predictor of NCLEX performance for students enrolled in diverse preparation programs (Lauchner, Newman,

& Britt, 1999; Morrison, Adamson, Nibert, & Hsai, 2006; Newman, Britt, & Lauchner, 2000; Nibert, Young, & Britt, 2006; Nibert & Young, 2001). Progression policies and remediation programs based on the HESI data have successfully increased the number of students who pass the NCLEX-RN (Morrison, Free, & Newman, 2002; Sifford & McDaniel, 2007).

Each edition of the E^2 is derived from a database of questions composed for HESI by nurse educators and clinicians from throughout the country (Morrison, Free, & Newman, 2002). Grounded in classical test theory, writers utilized a critical thinking model described by Paul (1992) and the cognitive taxonomy developed by Bloom and others in 1956 (Morrison, Nibert, & Flick, 2006) for formulating test items that demand critical thinking. The E^2 is consistently praised for the conceptual framework that stimulates students' critical thinking and underlies every product from Evolve Reach (Lauchner et al., 1999; Newman et al., 2000; Nibert, Young, & Adamson, 2002). Evolve Apply case studies are part of Elsevier's Evolve learning system and are used by schools of nursing to facilitate success on the E^2 and the NCLEX-RN by increasing the students' ability to employ their critical thinking skills (Elsevier, 2008).

Problem of Study

The purpose of this study was to determine if associate degree and baccalaureate student nurses use of Evolve Apply case studies have an impact on their Evolve Reach Exit Examination (E^2) scores, a proprietary examination taken by nursing students to predict success on the NCLEX-RN. This study further demonstrated how the Evolve Apply case studies were utilized by nursing schools around the United States. These include a determination of whether or not schools placed consequences on the use of computerized and standardized case studies within the nursing curriculum, such

as grades, course passage, clinical passage, and validation. This information is invaluable to nursing programs as they search for strategies that will strengthen their graduates' performance on the NCLEX-RN examination.

Rationale for the Study

Schools of nursing faculties must evaluate how well their curricula prepare students for success on the NCLEX-RN. Through repeated validity studies, a student's performance on the Evolve Reach E^2 has proven to be predictive of NCLEX-RN success (Lauchner, Newman, & Britt, 1999; Newman, Britt, & Lauchner, 2000; Nibert & Young, 2001; Nibert, Young, & Adamson, 2002). Case study usage can improve critical thinking, and students with improved critical thinking skills have demonstrated higher success rates on the NCLEX-RN.

Reports from the last decade have indicated that we are experiencing a serious nursing shortage that will only worsen with time (Buerhaus, Staiger, & Auerbach, 2000; Shelton, 2003). It is paramount that nursing educators carefully evaluate their methods of selecting, educating, retaining, and graduating nursing students so that attrition is low. Nursing student's program completion rates and NCLEX-RN success are crucial to resolving the nursing shortage. Even when students successfully completed a program, approximately 12% of RN candidates failed the NCLEX-RN, thereby delaying these graduates from entering the nursing workforce (Shelton, 2003).

Higher education has shifted from a teacher-centered approach to a student-centered approach, and from a content-based curriculum to one that is process-based. Such changes aim to improve the development of independence and critical thinking of students, and might help prepare nursing students to deal with the complex and ambiguous aspects of future health care systems (Oermann, 2004).

Case studies, part of a process-based curriculum, promote the development of critical thinking skills by providing an opportunity for the direct exploration of data and seeing the outcome of a particular nursing plan. Critical thinking skills are required to answer multi-logical thinking test questions since students must be knowledgeable of more than one fact in order to apply a concept to a clinical problem in a logical and systematic manner (Morrison & Free, 2001). Fostering critical thinking skills is paramount because "students who are challenged to think critically while still in the classroom setting can translate those skills into the clinic care setting" (Melander, 1996, p. xiii).

The findings of this study are useful to nurse educators who are charged with the development of strategies that will strengthen the performance of their graduating students on the E^2 and the NCLEX-RN. Ultimately, the use of Evolve Apply case studies should reduce the likelihood of failure on the NCLEX-RN. The use of Evolve standardized case studies will have a positive impact on E^2 exam scores and NCLEX-RN and should be a highly successful strategy in decreasing the current rate of attrition in nursing programs. The results of this study will benefit both the faculty and students of nursing schools by identifying modalities, such as Evolve case studies, that will increase the students' success rate on the Evolve Exit Exam and requires no direct faculty intervention. If this modality could be correlated with passing the licensure exam, then the faculty could be focused on a specific strategy. Such pedagogy might allow the faculty more time to devote to areas of scholarship and service.

Theoretical Framework

Richard Paul (1992) is a philosopher whose work has been widely cited by scholars who use both philosophical and cognitive approaches to critical thinking. Paul

insisted that critical thinking can be defined in a number of ways that should not be seen as mutually exclusive. One of Paul's definitions of critical thinking is "thinking about your thinking while you're thinking to make your thinking better" (Paul, 1992, p. 91). Furthermore, Paul (1992) argued that critical thinking requires an integration of cognitive and affective domains. Content in any discipline should be viewed and taught as a mode of thinking; thus, Paul's model for critically thinking about a domain or problem includes cognitive elements of reasoning, normative standards, and affective dispositions (Paul & Heaslip, 1995).

The elements of critical thinking developed by Paul, director of the National Council on Excellence in Critical Thinking (NCECT), were used as the framework for this study's investigation into the use of case studies to enhance the percentage of nursing students who achieve passing scores on the Evolve Reach Exit Exam. Approval was obtained from the Foundation of Critical Thinking to use Paul's critical Thinking Framework (Appendix A). The NCECT model was selected due to its strong historical and theoretical base. Paul explained that critical thinking occurs when a person thinks systematically and continually probes for, and then evaluates additional information in a reflective manner that often leads to deliberative decision-making, which enables one to find valid and reliable solutions to patient care questions (Paul, 1992). While this study did not collect data specifically on critical thinking ability, it was inherent in the variables of the research questions: scores on a test (Evolve Exit Exam) developed using a conceptual framework derived from the critical thinking theory described by Paul (Morrison, Nibert, & Flick, 2006).

Paul and Heaslip (1995) outlined nine elements of reasoning that are applicable to critical thinking across all nursing care contexts (Figure 1). The first element is defined

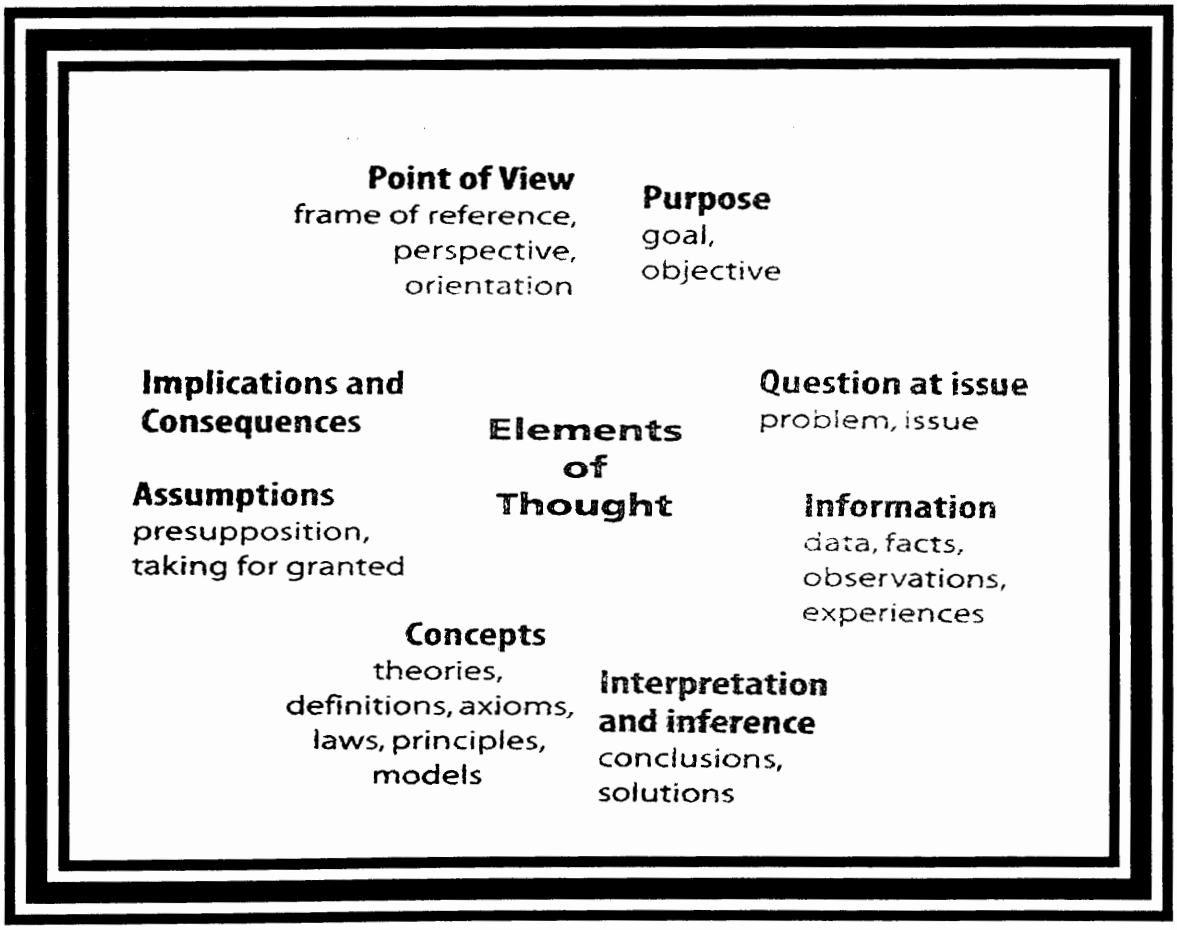

Figure 1. Richard Paul's critical thinking framework.

as the purpose, goal, or objective to nursing, which guides the entire nursing process in case studies. The second element defined is the question at issue for solving the nursing problem. The authors state that nurses must clearly and precisely articulate the problematic aspects of a case. The third element is information - the empirical dimension of nursing reasoning, which, as the term implies, denotes examining alternative evidence, data, and other factors that must be considered when making reasoned

decisions in case studies. The fourth is nursing interpretation and inference. Paul and Heaslip (1995) emphasize that any flaw in the inferences made by a nurse in the reasoning process has the potential to create an issue, which makes it essential that a nurse is aware of the nursing inferences they have made.

The fifth element is the conceptual dimension of nursing reasoning, the theories, definitions, principles, and models that support interpretation and inference in nursing (Paul & Heaslip, 1995). Sixth is nursing assumptions. Since assumptions are the starting point for reasoning, awareness of one's assumptions is crucial for the practice of sound nursing. The seventh element is nursing implications and consequences, meaning that the implications or consequences of nurses' reasoning and practice extend beyond the intended aims. The eighth element is the nursing point of view, frame of reference, perspective, or orientation. Nurses must be attuned to the point of view that underlies their thinking. Finally, the implicit and explicit reasons in nursing are the justifications for the process, which, for this study, are the scores on the Elsevier/Evolve Exit Examination (E^2).

This study investigated the use of case studies as a tool to improve exit exam test scores. An Evolve case study provides the students with real world clinical nursing situations in a multimedia format (Elsevier, 2008). Every single one of the Evolve Apply case questions are based on clinical applications, 85% of which involve critical thinking (Elsevier, 2008). Case studies can be used to enhance critical thinking, which will consequently improve the nursing students' E^2 and NCLEX-RN scores, which are based on critical thinking skills (Elsevier, 2008).

Assumptions

Assumptions made in this study are as follows:

1. Critical thinking, which can be learned, improves the quality of nursing practice, especially when there is virtually no consensus definition of critical thinking (Paul, 1992).
2. Critical thinking is a relevant aspect in nursing education; thus, fostering critical thinking is essential to improving the nursing education curriculum in nursing schools.

Research Questions

The investigator addressed the following research questions in this study:

1. Does the utilization of Evolve Apply case studies significantly increase baccalaureate and associate degree registered nursing students' scores on the Evolve Reach E^2 when compared to students who do not have access to Evolve Apply case studies?
2. What consequences do nursing programs attach to the use of Evolve Apply case studies in their curriculum?
3. Do the variables consequences and validation affect the scores on the Evolve Reach E^2 for those registered nursing students using the Evolve apply case studies?

Definition of Terms

The following conceptual and operational terms were used in this study:

1. Evolve Apply case studies are on-line case studies that introduce real-world, patient situations and stimulate the use of critical thinking to assist students in managing complex patient situations, enabling the students to reach sound clinical judgments. For this study, Evolve case study use was measured by an affirmative answer on the Case Studies Implementation Survey (CSIS).

2. Evolve Reach Exit Examination (E^2) is a comprehensive, computerized, and standardized nursing competency examination developed by Elsevier Reach and powered by Health Education Systems Inc. (HESI), which is administered to registered nursing students at the conclusion of their ADN and BSN accredited academic nursing programs. The blueprint for the exam parallels the NCLEX-RN blueprint. The examination is designed to measure the registered nursing students' readiness for the NCLEX-RN. In this study, the exam scores were recorded as derived from Elsevier's use of the HESI Predictability Model (HPM), a proprietary mathematical model that is used to calculate all E^2 scores. These scores reflect the application of the HPM mathematical model to raw scores and are dependent upon the difficulty level of the test items (Nibert, Young, & Adamson, 2002). The E^2 scores are reported as both component (content areas) and overall scores. In this study, the overall scores were used as a measure of the results from a student's critical thinking.
3. Schools of nursing are defined as any school or department that is a client of Elsevier Evolve and is accredited by either the National League of Nursing Accrediting Commission (NLNAC), the Commission on Collegiate Nursing Education (CCNE), or an individual State's Board of Nursing to operate a program that educates and prepares students to become associate degree or baccalaureate degree nurses.
4. Consequences are defined as the actions, such as grades, course passage, and clinical passage that result from using Elsevier Apply case studies within the curriculum as described in the Case Studies Implementation Survey. In this study consequences were indicated by positive responses by schools of nursing on the

Case Studies Implementation Survey question six (6), "Are there consequences involved in the utilization of Evolve Apply Case Studies?" requesting that participants check all relevant consequences that were applied regarding use of case studies.

5. Validation is conceptually defined as proof of access. In this study a positive response to question four (4), "Do you require proof that students accessed the case study?" on the Case Study Implementation survey was rated as validation of case study use.

Limitations

The limitations of this study are as follows:

1. The sample used for this study was limited to associate and baccalaureate schools of nursing that are clients of Elsevier; thus, excluding diploma schools of nursing and schools of nursing that are not Elsevier clients, and those that did not respond to the survey.
2. Scores on the Elsevier Exit (E^2) examination are affected by variables other than the use of Elsevier Apply case studies.

Summary

This study investigated if the use of Evolve Apply case studies impacted the scores of associate and baccalaureate degree student nurses on the Evolve Reach Exit Examination (E^2), a proprietary examination taken by nursing students to predict their success on the NCLEX-RN. Furthermore, this study investigated how the Evolve Apply case studies were used by nursing schools around the United States, including a determination of whether or not the schools placed consequences on the use of computerized and standardized case studies within their nursing curriculum. The theoretical framework was derived from Paul's critical thinking model, which postulates

that critical thinking occurs when one thinks systematically and continually probes for and evaluates all of the additional information available in a reflective manner and that this type of consideration often leads to deliberative decision-making. The Evolve Apply case studies employ critical thinking questions to assist students with learning how to manage complex patient conditions. The limitations of this study's design included the exclusion of any schools of nursing that are not Elsevier clients and diploma schools of nursing.

CHAPTER II

REVIEW OF LITERATURE

The literature presented in this review was drawn from the following sources: MEDLINE, Academic Search Premier, Business Source Premier, MasterFILE Premier, and MasterFILE Select. Other database sources used to search for headings related to the study's subject included these sources: CINAHL, Dissertation Abstracts International (Theses and Dissertations), ERIC First Search, Health and Psychosocial Instruments, Nursing and Health Sciences (SAGE full-text collection), OVID Full Text, and ProQuest Nursing Journals. Keywords used either individually or in combination included the terms: nurses, nursing, students, critical thinking, Paul, education, associate, baccalaureate, degree, case study, qualifications, Evolve Apply, Evolve Reach, and Health Education Systems, Inc. (HESI). This chapter presents information regarding the recent curriculum changes made by nursing programs to address the decreasing NCLEX-RN pass rates. Other subjects addressed include: critical thinking in nursing with conceptual models, nursing educators' perspectives and critical thinking practices, interventions and strategies that attempt to improve critical thinking in nursing, case study use in health care and nursing, and Evolve Apply case studies.

Curriculum Changes Addressing Decreasing NCLEX-RN Success Rates

In 2005, shifts began to occur in the passage rate for the NCLEX-RN examination. Pass rates diminished from 90.3 % in 1994 to 85.3% by 2005 (National Council of State Boards of Nursing, 2008) (NCSBN). The declining rates served as a wakeup call for curricular adjustment. Schools of nursing responded by raising

admission requirements and adopting more innovative teaching methods within their curriculum.

Siktberg and Dillard (2001) described the changes made by a university whose BSN program was performing below the national average on the NCLEX-RN. Needing to improve the exam performance of BSN students while sustaining the high pass rates of the ADN program, the university's initiative successfully produced NCLEX-RN pass rates that ranged from 95.7% to 100% for six consecutive years.

First, the university raised admissions requirements for BSN candidates from the existing 2.00 cumulative GPA requirement to a 2.75 GPA requirement and tightened the requirements for a passing C grade (Siktberg & Dillard, 2001). Other changes rectified policies that allowed students to use projects that compensated for failed examinations, increased the amount of review devoted to high-level professional practice exam questions, and added clinical hours to the coursework. In addition, the university enacted review procedures for BSN seniors to evaluate the course content learned early on in the program.

The teaching practices of the nursing faculty were a major area of reform (Siktberg & Dillard, 2001). The faculty adopted a more interactive teaching style, which included the use of case studies, encouraged students to use critical thinking and problem-solving skills, and become active learners (Siktberg & Dillard, 2001). Furthermore, the students became accountable for their learning and the faculty dealt with any attitude problems they observed in graduating BSN candidates. While many researchers would focus on the potentially devastating effects that NCLEX-RN failure could have on a student, Siktberg and Dillard (2001) found a number of students who felt they did not have to pass on the first attempt. They worked diligently with the students to

alter their attitudes and attempted to instill in them the importance of the licensing exam. Discussions ranged from the professional prestige of attaining RN licensure to the pragmatic issue of salary. Student leaders were entrusted with the responsibility of organizing study sessions so that their classes might achieve a 100%success rate.

Uyehara, Magnussen, Itano, and Zhang (2007) conducted a study of 280 BSN students in order to asses factors related to program withdrawal or NCLEX-RN success. They undertook their study in the context of a new nursing curriculum and used it to serve as an evaluation of the revised program. All students were monitored from the time they entered the program until they either left or graduated. The new program produced highly favorable outcomes. Eight out of ten of the students completed the program and 97.25% of those students passed the NCLEX-RN. These outcomes contrast sharply with previous years where the pass rate declined to 82% for some classes and averaged at about 90%.

Faculty members attributed much of the success to the innovations made to the new nursing curriculum (Uyehara et al., 2007). First, the most significant change was the reorganization of the nursing curriculum that extended it from two years to three with courses organized to reflect a progressively greater complexity. Second, a pathophysiology course and the students' scores on the NLN Adult Health Comprehensive Test were identified as major risk factors for program completion. Third, two adult health courses were repositioned to reduce their attrition and expose the students to the courses' material just before graduation. Fourth, an elective, fifth semester NCLEX review course was introduced. Finally, the faculty committed itself to creating a more supportive and caring environment for all of their students, with

additional support for those students who were at risk of dropping out or failing the NCLEX.

Uyehara et al. (2007) concluded, "Reviewing elements of the curriculum that predict student success facilitates the planning and implementation of appropriate teaching strategies" (p. 38). Other authors concur with this approach (Stuenkel, 2006; Waterhouse & Beeman, 2003).

In 2006, Frith, Sewell, and Clark described a BSN program that implemented an innovative course in response to the dramatic decline they suffered in first-time NCLEX-RN pass rates. After a decade of pass rates consistently ranging from 85% to 95%, their pass rate dropped to 73% in 2001. That poor showing became the stimulus for a diligent review of the program and an analysis of their students' preparations for the licensing exam.

Examination of student records revealed no significant difference between the cumulative GPA of students who passed or failed the NCLEX-RN (Frith, Sewell, & Clark, 2006). Further analysis revealed that the NLN Achievement Tests could be used to predict the students' future performance on Mosby's Assesstest, and students who performed poorly on both tests risked failing both Mosby's exam and, ultimately, the NCLEX-RN. Faculty members also concluded that students lacked accurate self-assessment skills regarding their preparation for the NCLEX-RN. The faculty members concluded that these failures warranted a new NCLEX-RN preparatory course as well as the implementation of computerized testing; hence, the program implemented the HESI.

The review course that emerged was titled Integrated Clinical Concepts (Frith et al., 2006). The course integrated psycho-educational elements to address issues, such as test anxiety and negative self-talk with cognitive components that included content

reviews, test-taking techniques, and practice questions. Case studies were also included in order to help students apply their knowledge across a variety of contexts.

Frith et al. (2006) noted that despite the fact that passing an exit exam was a program requisite for twenty years, the inception of the computerized program made a marked difference. The first-time pass rate for the HESI exit exam soared from 30% in 2002 to 89% in 2005. In 2002, the NCLEX-RN pass rate was 83%, which increased to 90% in 2005. The students' comments supported the effectiveness of the HESI specialty and exit exams in helping them target their weak points, clarify concepts, and gain a deeper understanding of the material.

A commonality of these nursing programs is that curricular changes were made to enhance the critical thinking activities that were required by the program. Many nursing programs began the use of case studies in the curriculum oriented toward critical thinking in order to improve their curriculum structure and teaching methodology.

Critical Thinking in Nursing

Jones and Brown (1991) stated, "Critical thinking as an educational ideal is based on the philosophy that critical thinking is essential to true autonomy in our complex society" (p. 529). Paul, Elder, and Bartell (1997b) were surprised that only a scant minority, a mere 9% of college faculties made any reference to the need for critical thinking in a rapidly changing environment or in the context of human complexity. None expounded upon the point.

Jones and Brown (1991) trace the emergence of critical thinking in nursing to efforts to develop a body of nursing knowledge that would be independent from the medical model. The nursing process supplanted the medical model as the preferred mode for acquiring knowledge in the 1960s, yet, it was still governed by the acceptance

of scientific method as "the only true and legitimate means of understanding the world" (p. 529). According to Jones and Brown (1991), "This rule-driven approach to nursing practice effectively reduced the complexity of the discipline to procedural problems" (p. 529). The idea that there should be only one "true and legitimate means" is directly antithetical to critical thinking models founded on Socratic questioning (Paul et al., 1997a).

Daly (1998) attributes the integration of critical thinking into the professional nursing practice to three key factors: 1) changes in health care and information, 2) epistemological changes in nursing ideology, and 3) structural and cultural changes in nurse education. Daly concurs with Jones and Brown (1991) that tenets of the medical model and scientific method are incongruent with the current philosophy of nursing, describing the change as a "paradigm shift" (p. 326). According to Daly:

> The current emphasis is towards unbiased, holistic, autonomous clinical reasoning, which reflects non-detached considerations of individualized physical, cognitive, contextual and affective variables, and is thus testament to the changed perceptions of nursing cognitive demands in relation to its professional practice (p. 326).

Critical thinking in nursing is based on the acknowledgment that nursing practice is a complex endeavor (Daly, 1998). Critical thinking has been recognized as an essential practice competency by governing bodies such as the National League for Nursing Accrediting Commission and the Commission on Collegiate Nursing Education (Turner, 2005). The emphasis on critical thinking as a core competency is not unique to the United States, critical thinking also has a prominent position in international literature

(Daly, 1998; Hsu, 2004; Khosravani, Manoochehri, & Memarian, 2005; Toofany, 2008; Turner, 2005).

Research Reviews of Critical Thinking in Nursing

Simpson and Courtney (2002) conducted a literature review exploring how critical thinking is presented in nursing education. Encompassing a period from 1989-2000, the literature search found a scarcity of research evaluating critical thinking. This lack of attention was underscored by the complete absence of any evaluation tools designed for the purpose of assessing critical thinking in nursing.

Studies of nursing students' critical thinking skills often rely on the California Critical Thinking Skills Test (CCTST) (Profetto-McGrath, 2003; Soukup, 1999). The CCTST was designed as a standardized assessment tool that focused on core critical thinking skills at the higher education levels. The 34 items are derived from a 1990 Delphi Report, a consensus of the American Philosophical Association (Profetto-McGrath, 2003). The Delphi Report defined critical thinking as "purposeful, self-regulatory judgment which results in interpretation, analysis, evaluation, and inference as well as explanation of the evidential conceptual, methodological, criteriological or contextual considerations upon which that judgment is based" (Simpson & Courtney, 2002, p. 92). The report further defined the ideal critical thinker as one who continually sought out new information and questioned the information found by honestly confronting his or her personal biases with a willingness to consider alternative views that were clear and organized. The ideal critical thinker was also "persistent in seeking results which are as precise as the subject and the circumstances of inquiry permit" (p. 92). The Delphi definition of critical thinking is clearly embedded in Paul's framework (Paul, 2005; Paul, Elder, & Bartell, 1997a).

Simpson and Courtney (2002) concluded that the body of literature "demonstrated that critical thinking is necessary not only in the clinical practice setting but also as a daily experience in nursing education programs to develop nurses' critical thinking abilities" (p. 96). In addition, they observed that nurse educators used a repertoire of techniques to promote the development of critical thinking skills, but there was no apparent evidence of explicit instruction in critical thinking as Paul and his colleagues advocated (Paul, 2005; Paul et al., 1997b).

Turner (2005) conducted a detailed review, stratifying the references into two 11-year periods, 1981-1999 and 1992-2002, in order to discern any changes in the concept of critical thinking and its integration into nursing education and its practice. The search revealed that while critical thinking was not a key search term before 1989, there were several relevant references. References from the earlier period tended to use definitions of critical thinking derived from Watson and Glaser (1964). With the publication of the Delphi Report in 1990, the Delphi definition became the definition of choice by the early 1990s and onward, appearing in 13 citations in the relevant literature. Paul's definition was the second most popular, cited by eight references.

According to Turner (2005), the usefulness of a theory hinges on knowing its degree of maturity. Furthermore, she contends that to be operationalized and defined, a concept must be mature in terms of being "well-defined, has clearly described characteristics, delineated boundaries, and documented preconditions and outcomes" (Morse, Hupcey, Mitcham, & Lenz, 1996). Turner's analysis of the literature stated, "The concept of critical thinking in nursing is only partially mature" (Turner, 2005). Although it is well defined and has clear characteristics, which tends to indicate maturity, it does not have "clear boundaries, antecedents or consequences," which signifies its relative

immaturity (Turner, 2005, p. 277). The analysis did not show evidence of clear boundaries for several key terms, such as critical thinking, problem solving, diagnostic reasoning, clinical decision-making, clinical judgment, and nursing process.

An interesting point is brought up by the fact that the boundaries became more ambiguous with the transfer of critical thinking from nursing education to nursing practice. Turner (2005) calls for future research, suggesting that the areas of immaturity might present obstacles to understanding and conveying the meaning of critical thinking, hampering its evaluation in education and practice. Toofany (2008) points out that minimal research exists on the impact of inquiry-oriented learning on the critical thinking capabilities of nursing students when compared to the sizable body of research completed in medical education.

Conceptual Models of Critical Thinking in Nursing

Redding (2001) outlined a conceptual model for elucidating the relationship between the factors contributing to critical thinking as displayed in clinical decisions. The author proposes the model as a framework for teaching critical thinking to nursing students. The multidimensional model includes personal attitudes and dispositions toward critical thinking, cognitive skills, and competencies, existing intellectual and professional standards for critical thinking, domain-specific knowledge, and experience.

The attitudes and dispositions are drawn from the California Critical Thinking Disposition Inventory (CCTDI). While the CCTST evaluates critical thinking skills, the CCTDI focuses on the characteristics that predispose an individual toward critical thinking (Profetto-McGrath, 2003). The CCTDI encompasses: 1) analyticity, feeling compelled to apply reason and evidence and predisposed to anticipate results; 2) open-mindedness, tolerating divergent perspectives and willing to contemplate alternatives; 3)

truth-seeking, courageously seeking optimum knowledge even if challenges one's preconceptions, interests, or beliefs; 4) systematicity, appreciating organization, focus, and diligence in approaching all types of problems; 5) self-confidence, trusting one's personal reasoning skills for solving problems; 6) inquisitiveness, enthusiastically seeking knowledge and learning explanations; and 7) maturity, using prudence in judgment.

A framework for understanding the students' critical thinking capabilities cannot ignore the attributes they bring with them to the class (Redding, 2001). Therefore, dispositions are an integral component of the model. Redding argues that instruments such as the CCTDI and CCTST should be used to recruit nursing students whose existing critical thinking capabilities make them good candidates for the professional nursing practice. In addition, the instruments could be used as tools to screen entering nursing students by targeting the students whose intellectual development would most benefit from interventions tailored to develop critical thinking skills and dispositions. Redding acknowledges that while interventions to promote critical thinking skills have empirical support, less is known about facilitating critical thinking dispositions. She proposes this as an area for future research. While this study does not address that need, an assumption could be made that the ability to successfully synthesize Apply Evolve case studies is an indicator of a potential nurse's critical thinking ability.

Paul and Heaslip (1995) analyzed the relationship between critical thinking and intuitive practice in the development of professional expertise. The role of the educator in fostering nursing students' critical thinking aligns with the principles of Socratic questioning and dialogue (Paul et al., 1997a; Paul, 2005; Paul & Elder, 2007). Intuitive knowledge refers to a student's knowledge of nursing acquired "by learning to describe

accurately, in precise nursing language, the common patient responses in nursing care situations" (Paul & Heaslip, 1995, p. 42). With experience, a nurse ideally develops an in-depth understanding of "the total patient care situation" (p. 42). In expert nurses, intuitive knowledge combines with finely honed skills to concentrate contemplation of what is "critical" and "problematic." The synthesis allows expert nurses to strike an appropriate balance between intuitive knowledge and conscious reasoning in each patient's care situation. Critical thinking is essential for overcoming biases in judgment.

Paul and Heaslip (1995) delineated several strategies that nurse educators could use to facilitate their students use of nursing reasoning while learning course content. The authors advise teachers to cover less content to allow for the development of a deep and accurate understanding of the new knowledge being presented, concentrate on the basic and overarching nursing concepts, devise specific strategies for developing their students' critical reading, writing, speaking, and listening skills, and make Socratic questioning an integral part of their classes' routine.

Nurse Educators' Perspectives and Critical Thinking Practices

Jones and Brown (1991) surveyed faculty from ADN, baccalaureate (BSN), masters, and doctoral programs in nursing in order to explore their interpretation of the concept of critical thinking. While the faculties valued the ability to think analytically and explore alternative options, their definition of critical thinking aligned with problem-solving rather than creative or divergent thinking. In effect, "Critical thinking was usually operationalized as a rationale-linear process, as a function of deductive logical thinking" (Jones & Brown, 1991, p. 532). Interestingly, virtually all of the educators (97%) were certain that critical thinking had already been integrated into their teaching even though

their concepts of critical thinking were rigid if not paradoxical. Their responses paralleled those of the California faculty who taught prospective teachers (Paul et al., 1997b).

Jones and Brown (1991) critiqued the educators' conception of critical thinking, noting that they construed critical thinking in its strictest sense and were unaware of its relationship to creative thinking (Paul, 2005; Paul & Elder, 2006). Jones and Brown (1991) found the linear, analytical emphasis incongruent with the circumstances of clinical nursing practice:

> Decision-making in clinical nursing practice, in reality, is more often composed of contextually defined value judgments. The problems of everyday nursing practice are rarely settled in a rational, linear manner. More often, nursing practice is governed by negotiation between alternative points of view, contradictory lines of reasoning, and the realities of situational contingencies. It is not, as proponents of the nursing process maintain, a movement from a question through a series of operations to a final absolute answer (p. 533).

In contrast to the perspectives of the professors, Jones and Brown's (1991) concept of critical thinking in nursing strongly reflects Paul and Heaslip's (1995) model of expert nursing practice.

Sellappah, Hussey, Blackmore, and McMurray (1998) explored the use of questioning techniques to facilitate the development of critical thinking and decision-making skills in a sample of clinical teachers at an Australian university. All 26 of the clinical teachers were RNs, registered midwives (RMs), or had a specialist's credentials, either as their sole qualification or in conjunction with an education degree. The university program was a three-year undergraduate-nursing program. The study focused on questions presented at two post-clinical conferences. Sellappah et al. (1998) sorted

the querys asked by the teachers according to whether they were low-level questions (information, knowledge, comprehension, and application) or high-level questions (analysis, evaluation, and synthesis).

Observations showed that the clinical teachers primarily asked low-level questions that failed to stimulate critical thinking. Sellappah et al. (1998) speculate that the teachers were never trained in either Socratic questioning or similar strategies, or alternately, they assumed that presenting questions of any type would effectively ensure that students acquired essential knowledge and were capable of applying it at a higher level. Based on the findings of Paul et al. (1997b) both explanations are probable. Clinical teachers with education credentials posed predominately low-level questions and their clinical experience had no impact on the type of questions presented (Sellappah et al., 1998).

Sellappah et al. (1998) noted that as students advanced from the fourth to the final semester they are presented with increasingly intricate patient care scenarios, which should result in a greater number of high-level questions. However, this was not the case. The researchers state, "To facilitate a chain of reasoning, questions need to be asked in a logical format, either deductively or inductively" (p. 146). While some teachers did pose different types of questions, the process was typically found to be random rather than organized. Sellappah et al. (1998) noted the existence of empirical evidence that clinical teachers trained in questioning ask substantially more high-level questions. Socratic questioning is the predominant mechanism for provoking critical thinking across disciplines (Paul & Heaslip, 1995; Paul et al., 1997a; Paul, 2005; Paul & Elder, 2007).

Zygmont and Schaefer (2006) used the CCTST and the Learning Environment Preferences (LEP) to investigate the critical thinking abilities of nurse educators from 37

programs offering all types of degrees with the exclusion of doctorates. There was considerable variation in the faculty members' scores on critical thinking. On average, they displayed substantially higher critical thinking abilities than a typical senior in a baccalaureate program did. However, the mean scores of the faculty were comparable to nursing students pursuing graduate degrees. Zygmont and Schaefer (2006) suggest that critical thinking abilities might progress over time, built on experience as well as education.

In analyzing the subscales of the CCTST, Zygmont and Schaefer (2006) proposed that the scale might not adequately capture the critical thinking skills required by professional nursing practices. This reinforces the argument in favor of constructing instruments specifically designed to assess critical thinking in nursing (Redding, 2001; Turner, 2005). While conceding that this might account for the sizable variations they observed in critical thinking scores, Zygmont and Schaefer (2006) point out that students taught by faculty with inadequate critical thinking skills are at an educational disadvantage. Paul et al. (1997b) made similar observations, although according to their analysis, few students are exposed to professors with highly developed critical thinking skills.

None of the educators attained Position 5 on the LEP, which is the highest level of critical thinking where relativism is accepted as a mode of perceiving and analyzing information (Zygmont & Schaefer, 2006). However, three-quarters of the educators reached the transitional Position 4/5, signifying that they were at a developmental stage that could promote their mastery of critical thinking. An intriguing finding was that respondents who reported having informal or formal training in critical thinking were less likely to reach Position 4, suggesting that critical thinking could be a habit of the mind

and is not resultant of an educational program (Zygmont & Schaefer, 2006). However, the techniques proposed by Zygmont and Schaefer (2006) for fostering critical thinking skills are consistent with the philosophy of encouraging inquisitiveness, lifelong learning, and creative thinking. Paul (2005) decries the relegation of critical thinking skills to a separate course or training program, arguing that critical thinking needs to be infused within all aspects of teaching. Given the narrow concept of critical thinking expressed by the nurse educators surveyed by Jones and Brown (1991), it is probable that few faculties had training that genuinely promotes critical thinking. Therefore, if students are exposed to critical thinking case studies throughout the nursing curriculum, their critical thinking skills could be enhanced.

Zygmont and Schaefer (2006) recommend that faculties use a variety of strategies to facilitate critical thinking, including assignments that encourage reflective thinking and active learning, although active learning might not automatically result in improved critical thinking skills (Paul et al., 1997b). The authors also recommend establishing a college or program benchmark for critical thinking based on a faculty norm, adapting it accordingly as faculties begin to include more critical thinking in their instruction (Zygmont & Schaefer, 2006).

Del Bueno (2005) notes that across educational programs and qualifications, only about one-third (35%) of new RN graduates meet the entry-level expectations for clinical judgment. This figure is virtually identical to findings reported by the author more than a decade ago. She contends that, "a highly probable cause is the emphasis on teaching more and more content in the nursing education curricula rather than a focus on use or application of knowledge" (Del Bueno, 2005, p. 281). This approach is antithetical to Paul and Heaslip's (1995) recommendations for teaching nursing students

to think critically. The strategies Del Bueno (2005) advocates, such as questioning activities that involve the application, analysis, and synthesis of knowledge to nursing care situations either individually or in groups, are congruent with the purposes of computerized case studies (Elsevier, 2008).

Based on these studies, the level of complexity of the faculty's definition of critical thinking varied considerably. However, there were common elements in the basic concept inherent to the critical definitions based on the nurse educator's perspective. Teaching critical thinking skills, irrespective of format, explicitly in nursing and modeling them with various techniques are all potentially successful strategies for creating better comprehension and synthesizing of case studies.

Nursing Students' Critical Thinking

Soukup (1999) explored nursing students' development of critical thinking skills over the two years of an associate degree program. The sample consisted of 48 students randomly selected from two cohorts of students that graduated in 1997 and 1998, using 24 students from each graduation class. The site of the study was a Madison Area Technical College (MATC) campus in Wisconsin. The MATC Philosophy of General Education includes critical thinking as one of its nine core abilities, the other eight consisting of Communication, Ethics, Global Awareness, Mathematics, Science and Technology, Self-Awareness, and Social Interaction (Soukup, 1999). According to the MATC definition, students demonstrated critical thinking by using a variety of perspectives to: 1) demonstrate observation skills; 2) identify a problem to be solved, a task to be executed, or a decision to be made; 3) display personal, professional, and academic integrity; 4) acknowledge their responsibility to personal, professional, educational, and natural environments, making informed decisions based on that

responsibility; and 5) exhibit behavior consistent with the ethical standards within a profession or discipline.

All participants took the CCTST at the onset and completion of their nursing program (Soukup, 1999). The first cohort of nurses began the degree program in the wake of a consensus by the MATC Associate Degree Nursing Advisory committee that critical thinking skills were a requisite area of competency, while the second cohort entered after critical thinking was deemed a major content theme for all four semesters of the nursing degree program.

The second cohort of students demonstrated significant gains in critical thinking based on their total CCTST scores (Soukup, 1999). The patterns varied between groups on different components of improvement. Neither group showed significant changes in Analysis, Inference, or Deductive Reasoning. Both groups showed evidence of improvement in Evaluation and Inductive Reasoning, although the effect was more pronounced for the first group on Evaluation and for the second group on Inductive Reasoning. The study was undertaken with the goal of using the student data to improve the integration of critical thinking into the nursing curriculum and assess the usefulness of the CCTST for the purpose. The CCTST proved to be a viable instrument for assessing the critical thinking skills of nursing degree candidates, but it is not a viable tool for use in this current research design.

Profetto-McGrath (2003) used the CCTST and the California Critical Thinking Disposition Inventory (CCTDI) to examine the critical thinking skills of 228 purposively sampled BSN students enrolled at a Canadian university. The study was designed to include participants representing all four years of the nursing program, although senior students composed the largest proportion. In the participants' opinions of critical thinking

and logic, 46% viewed both as "extremely important," 39% rated them as "more important than most things," and 14.5% saw them as "helpful" but not of high priority (Profetto-McGrath, 2003, p. 573). In terms of their CCTDI scores, Profetto-McGrath found it reassuring that the overwhelming majority of the students (85.5%) displayed relatively high predispositions toward critical thinking. The highest mean score was for inquisitiveness. The author finds this extremely positive, stressing that it is important that nurses maintain a lifelong commitment to seeking knowledge.

There were no significant differences in critical thinking between students at different years of the nursing program. Profetto-McGrath (2003) noted that this contrasted with a previous study, which reported substantially higher levels of critical thinking in fourth year students. Although there was some evidence of intellectual growth, most of the students were concentrated in the lower levels of development. The author proposed that cognitive development unfolds over a greater length of time than a four-year undergraduate program. At the same time, she also recognizes the role of instruction and teachers' attitudes, calling on nurse educators to promote students' critical thinking skills via strategies, such as reflective journals, analytical and position papers, debating, role modeling, Socratic questioning, concept maps, simulation with case studies, and research projects. These are the type of activities recommended by Paul (2005) as well as by numerous nursing literature sources (Clayton, 2006; Comer, 2005; Hsu, 2004; Kennison, 2006; Toofany, 2008; Zygmont & Schaefer, 2006).

Giger and Davidhizer (1990) explored the differences in conceptual and theoretical approaches to nursing care with a convenience sample of 167 second-semester senior BSN students and 176 fourth-semester ADN students enrolled at six Indiana nursing programs. The researchers found that the BSN students were more

involved with research methodology, teaching, and individual, group and community assessment, while the associate degree candidates were more focused on the practical and technical elements of nursing care.

Describing the BSN students as more "process-oriented," Giger and Davidhizer (1990) felt that the four-year program more adequately prepared students to make nursing diagnoses, implement the nursing process, and evaluate the impact of nursing interventions across different situations. According to this depiction, the BSN students are better prepared to pass the NCLEX-RN (Davenport, 2007; Morrison, Free, & Newman, 2002; Schwarz, 2005; Sifford & McDaniel, 2007) and meet competency expectations for novice nurses (Del Bueno, 2005). This is one rationale for separating the ADN and BSN students in the analysis portion of this investigation.

Interventions and Strategies to Improve Critical Thinking in Nursing

Forneris and Peden-McAlpine (2007) examined the effectiveness of a reflective contextual learning intervention (CLI) for enhancing the critical thinking skills of novice nurses. The intervention was grounded in the theoretical and philosophical principles of the learning theorists Freire, Mezirow, Argyris, Schon, Brookfield, and Tennyson. Some of these theorists were cited by professors who articulated an understanding of critical thinking (Paul et al., 1997b). Forneris and Peden-McAlpine (2007) report the underlying rationale, saying:

> These theorists all share similar perspectives on thinking in practice to achieve a coherent understanding by developing learners' ability to discern what is relevant and meaningful, given the context of the situation, and thereby to move beyond the simple application of facts and rules to achieve situational understanding and transform practice (p. 412).

The CLI was implemented at a hospital with an established preceptorship program for novice nurses (Forneris & Peden-McAlpine, 2007). The qualitative study focused on six BSN graduates within the first month of employment. Over six months, all participants maintained journals and participated in small group sessions apart from their orientation. The CLI consisted of four components: 1) narrative reflective journaling; 2) individual interviews in which coaching was used to facilitate critical thinking conducted a three-month intervals; 3) preceptor coaching for three months to promote contextual learning as well as the integration of critical thinking into daily professional practice; and 4) group discussions led by a facilitator who coached the new nurses on the understanding and application of critical thinking in nursing practice.

Analysis of the narratives derived from the new nurses' journals, interviews, and group discussions showed that the CLI effectively helped cultivate critical thinking skills in the context of actual nursing practice (Forneris & Peden-McAlpine, 2007). According to Benner, the development of critical thinking competences in nursing practice generally takes two to three years. The CLI accelerated the process by providing a framework for organizing and contextualizing knowledge.

Schwarz (2005) contends that nurse managers who hire new graduates before passing the NCLEX-RN have an obligation to support their successful licensure. She recommends immediately placing new graduates in clinical situations to bolster their knowledge, critical thinking, and clinical skills, and engage them in collegial discussions. She recommends staying attuned to nurses who may be at risk of failing the examination and structuring individual or group interventions for those who fail. The CLI is a proactive intervention that can effectively prepare new graduates for passing the NCLEX-RN while enhancing their professional competence (Forneris & Peden-McAlpine, 2007). Again,

perhaps nursing students would be more ready for clinical practice when extensive critical thinking is needed if critical thinking case studies were applied throughout the curriculum.

Khosravani et al. (2005) explored the use of collaborative learning groups to promote critical thinking skills in senior BSN students. The study involved 60 students in a community health course randomly assigned to the group format or a control condition involving clinical conferences and home visits. Students in both conditions were divided into four subgroups composed of seven or eight students. Students in the experimental groups (two groups of seven and two groups of eight students) participated in 8-10 twice-weekly sessions devoted to discussing topics related to family health. The group leader queried all group members on their views of each topic so the discussion reflected a variety of perspectives. Each group member presented ideas on the roles of the community health nurse, which brought up different elements of community health care, potential problems, and discussion of prospective solutions. All participants were asked to justify their reasons or arguments.

Critical thinking skills were assessed through a questionnaire designed according to the nursing process steps of Assessment, Diagnosis, Planning, and Evaluation (Khosravani et al., 2005). The students were evaluated based on their skills in seeking information, diagnosis, clinical reasoning, clinical judgment, prediction, and creativity, with clinical reasoning and clinical judgment, respectively, having the heaviest impact on scores. While students in both conditions had equivalent scores on seeking information, students participating in the discussion groups outperformed their peers in all other areas. The use of dialogue and discussion in small groups emerged as an excellent method for fostering the nursing students' critical thinking capabilities. Critical thinking

case studies are an excellent way of encouraging dialogue and discussions in small groups and many faculties use them in that way during class and tutoring sessions.

Case Study Utilization in Health Care and Nursing

The availability of instructional technology allows for more innovative teaching strategies in the classroom. Since introduced by Knowles (1984), educators have recognized the value of using adult learning principles in preparing class activities. Knowles (1984) wrote that adult learners want to be self-directed and see the usefulness of the content they are learning. When experiences are applied to learning activities, adult learners enjoy active participation, which has been shown to help retain what they have learned.

Colgrove, Schlapman, and Erpelding (1995) describe the "experiential learning" approach where students take an active part in learning. Case studies provide an opportunity to incorporate these ideas, in addition to providing learning opportunities that motivate with active involvement. Experiential learning provides a means for applying problem-solving skills and allowing for decision-making in a non-threatening, non-harmful environment. Case studies allow students to experience actual client situations that may not be available or practical to provide in a clinical setting. Case studies promote development of critical- thinking skills by giving the opportunity for direct exploration of data and seeing the outcome of the care plan. Fostering critical thinking skills is paramount because students are challenged to think critically while still in a classroom setting and can then translate those skills into a clinical care setting (Colgrove, Schlapman, & Erpelding, 1995).

According to Toomey (2003), the use of case studies as a teaching and learning experience can be traced back to the Medical Society of New Haven in 1788, introduced

into Harvard Law School in 1871, and then used with the first class to graduate from Teachers College in 1930. In her article, Toomey (2003) concludes, "case studies provide a process of participatory learning that facilitates active and reflective learning and results in the development of critical thinking and effective problem-solving skills" (p. 34). Pimple (2007) investigated studies to teach research ethics, in which he describes case studies as "stories, and narrative, the telling of stories as a fundamental human tool for organizing, understanding, and explaining experience" (p. 1). In his study report, he concludes that using case studies, while not the only technique of teaching responsible science, is one of the best.

In an athletic therapy class, Perkins (2003) used case study to allow her students to follow an injury from onset to return to activity. She noted that differential diagnoses allowed the students the opportunity to show the analytic process involved in assessment and diagnosis. Perkins concluded that the case study method of research instructs students on organization, attention to detail, critical thinking, and professionalism—all-important aspects in the athletic training profession.

In a clinical laboratory class, Hoag, Lillie, and Hoppe (2005) conducted research in a university-based course in clinical immunology and serology to assess the effectiveness of case-based instructional modules on student critical thinking, class attendance, and satisfaction as well as basic student opinion on case formats. Using the Mann-Whitney test, student performance on five critical-thinking, multiple-choice examination questions was analyzed, as was the percentage of students attending on case days versus lecture days. Students' ratings on course evaluations were analyzed using *t*-tests, comparing semesters with and without intervention. Sixty-seven students experienced the intervention, and fifty-six students were in the baseline cohort. The

results show that student performances on critical-thinking exam questions were similar in both groups. Student attendance was significantly higher (95.6%) on case days versus lecture days (80.3%; p <0.0001). Hoag et al. (2005) concluded that although case studies did not significantly improve student performance on critical thinking questions, this method still proved to be a valuable instructional method.

DeYoung (2003) proposed learners can apply their background knowledge as well as new learning to solve problems in case studies. The case study learning approach facilitates problem-solving, decision-making, critical thinking, self-directed learning, self-evaluation, interpersonal communications, as well as retrieval access and use of information (Amos & White, 1998; Bentley, 2001; Dowd & Davidhizar, 1999). Sandstrom (2006) used the case study method to teach her nursing students about diabetes and other chronic illnesses. She presented three types of case study experiences and used a framework for evaluation of case-based instruction. The framework related to the case studies including the problem to be solved, with the teacher modeling expert problem-solving and encouraging the students to actively participate, providing assistance as needed. Sandstrom (2006) concluded that case studies allow students to see various views of the situation, and they enjoyed the ability to analyze the clients' situations in a safe environment.

The case study approach shows that there may be multiple correct solutions for clinical problems. When case studies are shared in the classroom setting, the instructor provides a method for immediate feedback. Student groups can also develop cooperative learning strategies through guidelines in writing their own case studies (Colgrove, Schlapman, & Erperling, 1995). This approach fosters creative thinking as

well as promotes group and individual responsibilities for learning and sharing knowledge with peers.

There have not been many studies into the literature on case studies in nursing; however, the use of technology to implement a case study approach to learning has many benefits. These benefits include using an interactive approach where students can take an active part in their own learning and sharing with classmates, and a critical thinking approach, used to analyze data to determine actions and the facilitation of group interaction. The case study approach to learning can enhance the approach and improve the ways information is shared in the classroom setting.

Evolve Apply Case Studies and Critical Thinking in Nursing

In addition to aiding individual NCLEX-RN candidates, Evolve Apply case studies could be used by groups of students working on different cases or integrated into the nursing curriculum to promote critical thinking skills (Elsevier, 2008). Discussing a case's relevant topics in small collaborative groups effectively enhances the nursing students' critical thinking skills (Khosravani, Manoochehri, & Memarian, 2005). The emphasis on critical thinking in reform of the nursing curriculum coincided with the higher standards of competency on the NCLEX-RN (Jones & Brown, 1991). Since then, the infusion of critical thinking skills into nurse education and professional practice has occupied a prominent place in the literature (Daly, 1998; Del Bueno, 2005; Redding, 2001; Simpson & Courtney, 2002; Turner, 2005; Zygmont & Schaefer, 2006).

Paul and Heaslip (1995) present a compelling case for critical thinking in nursing expertise. The authors stress the vital importance of "consciously practicing reasoning skills in nursing" (p. 43). In a study of California higher education faculty, Paul, Elder, and Bartell (1997b) found that faculty members were certain that their classes had been

suffused with critical thinking, yet few could articulate precisely what critical thinking meant or what strategies they employed to facilitate it. Many had ambiguous conceptions of critical thinking, or alternately reduced it to a one-dimensional construct within a single discipline. Jones and Brown (1991) found that nurse educators narrowly construed critical thinking as linear problem solving.

Paul and his colleagues argue that critical thinking must be integrated thoroughly and diligently into the higher education curriculum (Elder & Paul, 2001; Paul et al., 1997a, 1997b; Paul, 2005; Paul & Elder, 2007). Paul's model of critical thinking provides a framework for the explicit instruction of critical thinking skills consistent with the principles of Socratic questioning (Paul et al., 1997a; Paul, 2005). Even at the high school level, the use of Paul's model has successfully stimulated students' critical thinking skills (Crook, 2006). Consistent with Paul's assertion that creative and critical thinking are complementary components of intellectual thought (Paul & Elder, 2006), the model was effectively used to teach critical thinking in art, music, and physical education as well as science, mathematics, literature, and history (Crook, 2006). Jones and Brown (1991) point out that the rational-linear process espoused by nurse educators is incongruent with the intricate realities of professional nursing practice.

Stuenkel (2006) asserts that, "In light of the nursing shortage, schools of nursing need to prepare new graduates as efficiently and expediently as possible—without lowering standards" (p. 207). Uyehara, Magnussen, Itano and Zhang (2007) declare that, "Every nursing student should be viewed as a potential registered professional nurse and a much-needed asset for the nursing profession" (p. 37). From the perspective of Paul and Heaslip (1995), critical thinking is a prerequisite for the development of intuitive, expert professional nursing practice.

Several authors who emphasize the importance of critical thinking in nursing education invoke Paul in the context of formulating a cohesive framework for teaching and fostering critical thinking (Daly, 1998; Redding, 2001; Simpson & Courtney, 2002; Turner, 2005). The HESI specialty and exit examinations are based on Paul's critical thinking model and Bloom's taxonomy, along with classical test theory (Morrison et al., 2006).

The Evolve Reach Exit Examination – Historical Perspective

Researchers have systematically sought insight into salient predictors of students' performance on the NCLEX-RN (Waterhouse & Beeman, 2003). The adoption of a computerized test has a number of advantages including superior efficiency in evaluating a candidate's level of competency, shorter examination time, year-round testing, and a less anxiety inducing test environment (Schwarz, 2005). Another technological advantage has been the development of computerized NCLEX-RN preparation programs, which provide students with immediate feedback and a prediction of an examination's success. The Evolve Reach Exit Examination (E^2) powered by HESI (Health Education Systems, Inc. and previously known as HESI) has been found to be highly reliable for predicting NCLEX performance for students across preparation programs (Lauchner et al., 1999; Morrison, Adamson, Nibert, & Hsia, 2006; Newman et al., 2000; Nibert et al., 2006; Nibert & Young, 2001). Progression policies and remediation programs based on HESI data have effectively increased the number of students passing the NCLEX-RN (Morrison et al., 2002; Sifford & McDaniel, 2007).

Each edition of the E^2 is derived from databases of questions composed for HESI by nurse educators and clinicians throughout the country (Morrison et al., 2002). In developing their questions, the writers utilize a model for formulating critical thinking test

items. The E^2 has been praised consistently for a design that stimulates students' critical thinking (Lauchner et al., 1999; Newman et al., 2000; Nibert et al., 2002).

Evolve Apply case studies, used by many students as a tool for passing the NCLEX-RN, provides students with real world clinical nursing situations in a multimedia format (Elsevier, 2008). All (100%) of Evolve Apply case questions are based on clinical applications and 85% involve critical thinking (Elsevier, 2008). Students are provided with a rationale for correct and incorrect answers. A review based on the first answer the student selects for each item targets students who require additional help.

The Evolve Reach Exit Exam

Waterhouse and Beeman (2003) noted that the introduction of the computerized NCLEX-RN in 1998 added another factor to a predictive model, namely whether students had adequate experience with computerized tests to defuse test anxiety. While most students now have ample experience with computerized tests, the E^2 has several advantages, as alluded to in the introduction of this chapter (Lauchner et al., 1999). First, it might be used as a tool for curriculum outcome evaluation. Second, the test items involve application and analysis cognitive levels that facilitate critical thinking skills. Third, students are given feedback, including rationales for incorrect answers. This transforms the test preparation into a learning experience. Fourth, the scores on the E^2 compare students' responses on more than 50 different nursing topics with all students who had previously answered the test items.

In addition to the E^2, Evolve powered by HESI produces specialty examinations designed to evaluate the students' knowledge and capacity to apply nursing concepts in a given content area (Morrison et al., 2006). Teachers frequently use HESI specialty

exams for their final examinations. To reiterate, both specialty and exit exams have a foundation in both classical test theory and critical thinking theory.

Lauchner et al. (1999) examined the validity of the E^2 in a sample of 2,809 RN and practical nurse (PN) candidates who took the exam one to four months before graduation. Participants were drawn from 54 RN programs (35 ADN, 17 BSN, and 17 diploma) and eight PN programs. The HESI exam proved highly accurate in predicting student outcomes on the NCLEX, both RN and PN. In fact, Lauchner et al. (1999) reported that the predictions were so close to the students' actual outcomes that there was virtually no possibility the results could have happened by chance. This occurrence was consistent among all programs. The only cases where accuracy was compromised were programs where the exams were treated solely as a learning experience and were not monitored. Thus, the goal in this study was formulated to investigate whether case studies were ever monitored or consequences applied.

In addition to its predictive validity, Lauchner et al. (1999) praised the HESI exam for providing students with immediate feedback, rationales for incorrect items, and experience taking a computerized test. Another benefit was that students at risk for failing the NCLEX were encouraged by the summary report to seek additional preparation or remediation to enable them to pass the licensing exam on the first try. The probability of passing decreases with repeat examinations (NCSBN, 2008).

Evolve Exit Exam and Evolve Case Studies

Mihal (2006) conducted a study to determine if the utilization of standardized case studies, specifically those offered to schools of nursing by the HESI (Health Education Systems, Inc.) company were effective in improving scores on the HESI Exit Examination. This study also sought to determine if the length of time a school of nursing

used the case studies had any impact on the HESI Exit Examination results. An ex-post facto research design was employed using a convenience non-probability sample. The sample was taken from the population of 378 member schools of nursing with RN programs who were clients of HESI, Inc. in 2004. These schools represented 22,785 nursing students.

Mihal (2006) used a *t*-test for two independent samples to conduct her findings wherein the mean HESI score of the students attending schools with case study access were compared with the mean HESI scores of students attending schools without access to the case studies. There were a total of 1,544 students at 34 schools of nursing who had the Case Study License, their mean HESI Exit Exam score was 896.71. This compared with 21,241 students at 344 schools which did not have the Case Study License. Their mean was 859.88. A comparison of these means resulted in a finding of $t = 9.979$ significant at the $p=.000$ level. According to Mihal, this finding suggests that there is a positive link between the utilization of the HESI Case Studies and the scores on the HESI Exit Exam.

Summary

Each year, a substantial number of students pursuing nursing degrees successfully graduate from their programs but fail the NCLEX-RN. This occurrence has negative consequences at all levels. The U.S. faces a nursing shortage of unprecedented magnitude (Goodin, 2003). At the individual level, failing the NCLEX-RN can have devastating psychological and emotional effects. At the program level, the annual pass-fail rate on the NCLEX-RN is widely held as a benchmark of program accountability (Aucoin & Treas, 2005; Davenport, 2007; Frith et al., 2006; Lauchner et al., 1999; Newman et al., 2000; Siktberg & Dillard, 2001).

Based on this literature review, Paul's model of critical thinking appeared to be a good choice for integrating a rich and practical concept of critical thinking into the nursing curriculum. It is based solidly in theory and drew both on philosophical and psychological approaches to critical thinking. This provides an effective medium for teaching nursing students how to analyze case studies while enhancing their critical thinking abilities. Nursing students must develop the ability to make guided decisions based on sound and rational bases to guide their clinical judgment and decision-making skills. Critical thinking skills are indispensable components for clinical nursing practice. Nurses must possess a high level of critical thinking skills as students and practicing clinicians; development of critical thinking should be used as a lifelong learning goal that is not exclusive to the nursing profession.

The case study approach to learning has many benefits in nursing. Case studies provide an interactive approach by which students can take an active part in their own learning; they provide a critical-thinking approach where students can analyze data to determine real-life actions. Various researchers have examined other predictors of NCLEX-RN success, but the results have been found to be inconclusive. No studies have shown whether or not utilizing Evolve Apply case studies within the curriculum and placing consequences such as grades, course, and clinical passages as having an impact on the E^2 scores and consequently NCLEX-RN. This study determined whether using Evolve Apply standardized case studies improved baccalaureate and associate degree nursing students' scores on the E^2. Evolve Apply case studies can enhance nursing students' critical thinking and better prepare them for success on the NCLEX-RN.

CHAPTER III

PROCEDURE FOR THE COLLECTION AND TREATMENT OF DATA

A non-experimental descriptive design was used to examine whether the utilization and consequences after completion of Evolve Apply case studies among registered nurse students increased their scores on the Evolve Reach E^2. Data were exported from the Elsevier database into a spreadsheet. The schools usual report of scores on the exit examination was accessed and the report from the Case Studies Implementation Survey. This chapter presents the setting, sample, protection of human subjects, instruments, data collection, and the treatment of the data.

Setting

This research used standardized Evolve Reach E^2 scores from Associate Degree and Baccalaureate nursing programs across the United States that use Evolve Reach case studies as well as schools that do not use the case studies and are clients of Evolve Elsevier. The last data used is the administrators' responses to the Case Studies Implementation Survey (CSIS) questionnaire. Elsevier in Houston, Texas, USA, houses both datasets in an existing database. There was no direct participation by the students. In order to protect the confidentiality of Elsevier's member schools, all data was de-identified before the researcher's receipt of the data.

Population and Sample

For the purposes of the study, purposive sampling, a form of non-probability sampling, was used. According to Trochim (2001), in purposive sampling, the researcher samples with a purpose in mind from one or more specific and predefined groups,

believed to be representative of the larger population of interest. Trochim (2001) noted that one of the benefits of purposive sampling is that it can be very useful for situations in which the researcher wants to reach a targeted group that otherwise might not be readily available. The sampling frame included 31 nursing schools that utilized the Evolve Apply standardized case studies and the Evolve Reach E^2 and 36 nursing schools that did not utilize case studies but used the Evolve Reach E^2 from September 1, 2006 through December 31, 2007. The sample is representative of the student population for Associate and Baccalaureate degree nursing programs that are clients of Elsevier. Inclusion criteria consisted of nursing schools that used the Evolve case studies and the Evolve E^2 throughout the United States.

Protection of Human Subjects

Human subject approval was obtained from the Texas Woman's University Institutional Review Board in Houston, Texas (Appendix B). Approval for access to the Elsevier database including exam scores was obtained (Appendix C). The research used responses from the questionnaire sent to the schools using case studies and E^2, and standardized exam scores, which are housed at Elsevier in an existing database. The research was conducted in a retrospective manner and the researcher knew no identifying information. Students' names were not revealed, and in order to protect the confidentiality of Elsevier's member schools, the researcher did not know the names of the schools in the study.

Instruments

Evolve Exit Exam (E^2)

Elsevier's Evolve Exit Examination powered by HESI is "a 150-item comprehensive exam that is designed for administration near the completion of the

curriculum to measure student preparedness for the NCLEX-RN" (Morrison et. al, 2006, p. 41S). The test items are written using a critical thinking model that requires clinical nursing judgment to determine the correct responses (Morrison et al, 2006). Item writers are selected annually based on clinical expertise, recommendation of school administrators and faculty, and the approval of senior level Elsevier Review and Testing personnel. Approved item writers submit original items via a secured electronic database for review by the internal staff of Review and Testing. The Evolve Reach exam's reliability is established by conducting an item analysis each time that the exam is administered.

The E^2 exit examination is taken at the completion of the nursing program. The reliability estimates are based on calculating the point biserial correlation coefficient from prior usage of questions varying from 180 to 47,320 uses (Morrison, Adamson, Nibert, & Hsai, 2006). The overall reliability was calculated with the KR 20 which is $r = .90$ (M. Yoho, personal communication, April 16, 2008). Content validity was accomplished by using expert nurse clinicians to write and evaluate the test items. Construct validity reflects that the test items are written according to nursing practice as defined by the NCSBN and NCLEX test plans (Morrison, Adamson, Nibert, & Hsai, 2006; NCSBN, 2008). Criterion-related validity is demonstrated with research studies which have shown predictive accuracy in E^2 scores to the NCLEX-RN scores, ranging from 96.36% to 98.30% (Lauchner, Newman, & Britt, 1999; Newman, Britt, & Lauchner, 2000; Nibert & Young, 2001; Nibert, Young & Adamson, 2002; Lewis, 2005).

Case Studies Implementation Survey (CSIS)

The second instrument for this study was a survey designed to collect information on the methods in which Elsevier's Evolve Apply Cases were used at each

school. The researcher developed the Case Studies Implementation Survey (CSIS); Elsevier gathered the data using the questionnaire and it was sent to all schools that were clients of Elsevier using the Evolve Case Studies and E^2 at the time of the study. The information is housed in the Elsevier database. Initially, Elsevier sent the survey out electronically. A follow up electronic survey was sent out to the non-respondents. Finally, Elsevier sent the survey out as a hard copy via U.S. Postal Service mail for the schools not replying electronically. Each school that responded was given a case study for participating in the survey.

Data Collection

Data were drawn from the Elsevier exam and case study databases, which consisted of student exam scores and data on the utilization of the case studies by nursing schools from the CSIS. Placing only exam scores and data regarding utilization of the case studies onto a spreadsheet protected the schools and the students confidentiality. Data were received from Elsevier formatted in Excel® in spreadsheets using blinded study identification numbers, exam scores and CSIS data responses about the utilization of the case studies.

Pilot Study

A descriptive study design was used to examine whether the utilization and consequences after completion of Evolve case studies among baccalaureate and associate degree registered nurse students increased their scores on the Evolve Reach E^2. Data used included the scores of 60 schools of nursing. These included 30 schools that used case studies and 30 schools that did not use case studies. Data were then exported from the Elsevier database from responses to the CSIS questionnaire and E^2 scores for associate-degree and baccalaureate-degree programs throughout the United

States who were customers of Elsevier E^2 and Apply case studies during the fall 2006 semester.

The pilot study demonstrated that the Elsevier Apply case studies improved students' scores on the Evolve exit examination score, with a mean score for case study users of 874.86 (*SD* = 117.83) and non case study users with a mean score of 838.60 (*SD* = 131.22). The longer the duration of time that the case studies are used within a course, the higher the E^2 scores were achieved. Hence, the use of Evolve Apply case studies throughout the curriculum as a teaching strategy was not demonstrated in this pilot study. Additionally, placing consequences on case study use provides higher scores on the Elsevier exit exam E^2, which predicts higher NCLEX-RN passage rates.

Treatment of Data

Data were analyzed by examining each research question. For the first research question - Does the utilization of Evolve case studies significantly increase baccalaureate and associate degree registered nurse student scores on the Evolve Reach E^2 as compared to students who do not use Evolve case studies? A two-way ANOVA was performed to compare E^2 scores between baccalaureate and associate degree students attending nursing schools that used the Evolve case studies and students in baccalaureate and associate degree nursing schools that did not use the Evolve case studies.

Research question 2 - What consequences do nursing programs attach to the use of the Evolve case studies in the curriculum? Quantitative descriptive analysis was undertaken to determine the categories, frequencies, and percentages of consequences employed by nursing schools using the Evolve case studies.

Research question 3 - Do the variables consequences and validation affect scores on the Evolve Reach E^2 for those students using the Evolve Apply case studies? Two independent *t*-tests were used to compare E^2 scores of students who had consequences attached to case study use to those who did not and to compare E^2 scores of students whose use of case studies were validate versus those who did not.

CHAPTER IV

ANALYSIS OF DATA

The purpose of this descriptive study was to determine if associate degree and baccalaureate student nurse use of Evolve Apply case studies had an impact on scores on the Evolve Reach Exit Examination (E^2) scores, a proprietary examination taken by nursing students to predict success on for the NCLEX-RN. The study further examined how Evolve Apply case studies were used by nursing schools around the United States, including a determination of whether or not schools placed consequences such as grades, course passage, clinical passage and validation on the use of computerized and standardized case studies within the nursing curriculum. No previous studies have investigated the use of Evolve Apply case studies or examined the effect of Evolve Apply case studies on E^2 outcomes. This chapter begins with a description of the sample followed by the findings, with specific attention regarding three hypotheses of the present study. This chapter ends with the summary of the findings.

Description of the Sample

Forty-seven BSN and ADN schools with a total of 3,326 students participated in the study. Approximately twice as many ADN programs participated in the study as BSN programs. Correspondingly, more than half of the student participants were from ADN programs. Approximately one-third of the student participants were case study users. (Table 1).

Table 1

Description of Case Study Use for ADN, BSN, and Total Sample

Type of Nursing Program	Associate Degree *f* (%)	Baccalaureate Degree *f* (%)	TOTAL *f* (%)
Schools			
Case Study Users	9 (27.3)	6 (42.9)	15 (31.9)
Non-case Study Users	24 (72.7)	8 (57.1)	32 (68.1)
Total	33 (100)	14 (100)	47 (100)
Students			
Case Study Users	754 (31.7)	417 (44.0)	1171 (35.2)
Non-case Study Users	1624 (68.3)	531 (56.0)	2155 (64.8)
Total	2378 (100)	948 (100)	3326 (100)

Findings

Case Study Utilization and E^2 Scores

The first research question was, "Does the utilization of Evolve Case Studies significantly increase baccalaureate and associate degree registered nurse student scores on the Evolve Reach E^2 as compared to students who do not use Evolve Case Studies?" A two way ANOVA was employed to answer the question. Group means and ANOVA summary statistics are presented below.

Students who completed case studies had higher Exit Exam mean scores of as compared to students who did not complete case studies. Associate degree nursing students using case studies had a higher mean exit exam score than ADN students not using case studies. Baccalaureate nursing school students who used case studies had a higher mean exit exam score as compared to the BSN students who did not use case studies (Table 2).

Table 2

Means and Standard Deviations of E^2 Scores by Program and Case Study Utilization

Type of School	Case Study Use *M* (*SD*)	Non Case Study Use *M* (*SD*)	Total *M* (*SD*)
Associate	(*n*=754)	(*n*=1624)	(*n*=2378)
	878.5 (131.1)	865.8 (126.8)	869.8 (128.3)
Baccalaureate	(*n*=417)	(*n*=531)	(*n*=948)
	870.0 (151.8)	796.4 (140.9)	828.8 (150.2)
TOTAL	(*n*=1171)	(*n*=2155)	(*N* = 3326)
	875.5 (138.8)	848.7 (133.8)	858.1 (136.1)

Prior to hypothesis testing, a Levene's test assessing equality of error variance was conducted. Because the test was significant (F = 16.382, df = 3,3322, p = 0.000) a more conservative alpha of 0.01 was set to avoid a type 1 statistical error. A two-way analysis of variance was conducted to examine potential interaction between case study

use and program type on E^2 scores. Main effects assessed the difference of E^2 scores of Evolve case study users and non case study users and differences in E^2 scores between associate degree and baccalaureate programs. The two-way ANOVA revealed a significant interaction for case study use and program type ($F(1, 3322) = 33.570$, $p = 0.000$). There was a significant main effect for case study use and E^2 scores, $F(1, 3322) = 67.127$, $p = .000$), and there was also a significant main effect for program type and E^2 scores, $F(1, 3322) = 54.682$, $p = .000$. Table 3 presents the findings of the two-way ANOVA.

Table 3

Two-way ANOVA Summary for Interaction and Main Effects for Case Study Use and Program Type

Source	Sum of Squares	*df*	Mean Square	*F*	Sig.
Case Studies	1194933.246	1	1194933.246	67.127	.000
Program Type	973401.216	1	973401.216	54.682	.000
Case Study x Program Type	597575.823	1	597575.823	33.570	.000
Error	59134930.706	3322	17801.003		
Total	2510932390.000	3326			

The E^2 scores for case study users were higher than non case study users for both BSN and ADN students. A wider gap existed between E^2 scores of BSN case study users and nonusers than were present between ADN users and nonusers. E^2 scores

were higher for ADN students (Figure 2). Effect sizes for the interaction of case studies use by program type was η_p^2 = .010; for the main effect of case study use was η_p^2 =.016, and for type of educational program was η_p^2 = .020. *Interpretation for partial eta squared can be done as percentages of the variance (*Brown, 2008). Approximately 1% of the variance interaction variance is attributable to program type and case study use. The variance for the main effect of case study use is 1.6%, and is 2% for the main effect of type of educational program.

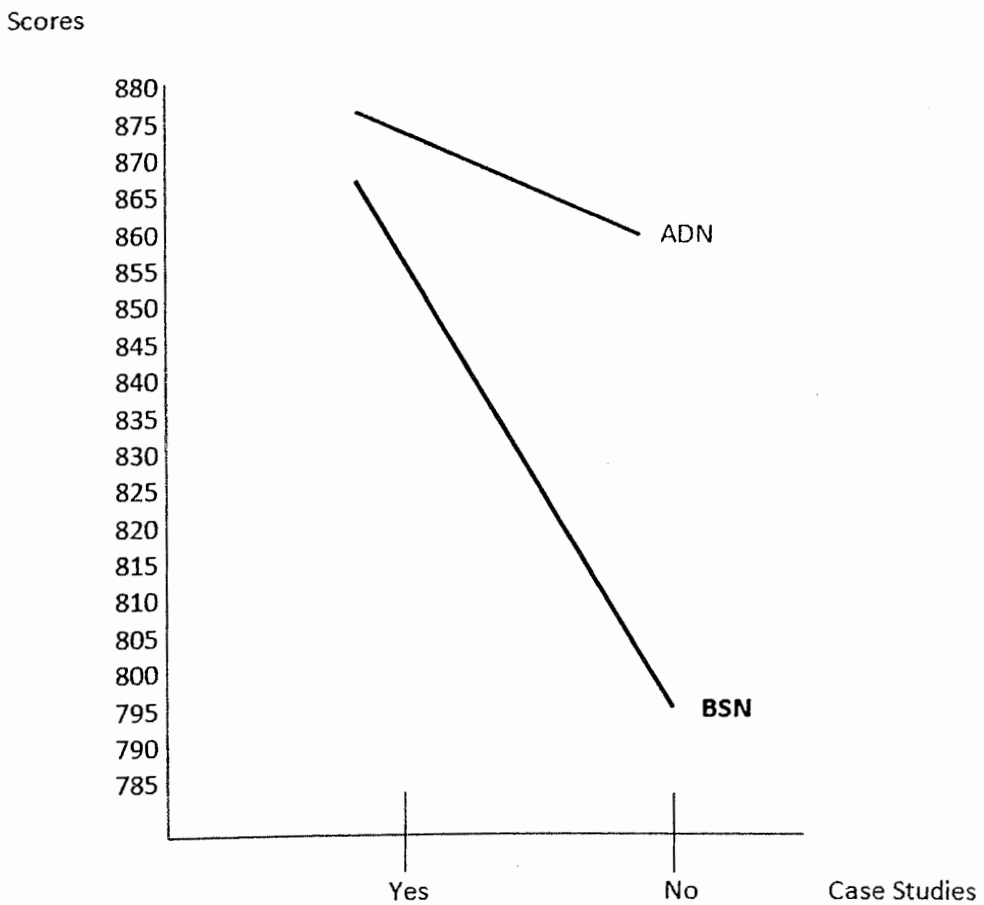

Figure 2. Mean evolve E^2 scores for BSN and ADN nursing students by case study use.

Case Study Consequences

The second research question was, "What consequences do nursing programs attach to the Evolve Case Studies in the curriculum?" Quantitative descriptive analysis was undertaken to determine the categories, frequencies and percentages of consequences employed by nursing schools utilizing the Evolve Case Studies.

Responses of the baccalaureate and associate degree nursing programs using case studies within the curriculum and applying consequences were organized by consequences as follows; pass/fail, grade impact, and remediation. Of the 47 schools who responded to the questionnaire, 15 used case studies in their curriculum. Of these 15 programs, 6 programs (40%) reported having one or more consequences (Table 4).

Table 4

Types of Consequences Attached to Case Study Use

Consequences		Frequency	Percent
Pass/Fail	No	4	66.7
	Yes	2	33.3
	Total	6	100
Impacts Grades	No	4	66.7
	Yes	2	33.3
	Total	6	100
Remediation	No	3	50.0
	Yes	3	50.0
	Total	6	100

Two of the 6 programs (33.3%) schools employed a pass/fail requirement. Two schools (33.3%) reported case study use impacted grades; three schools (50%) reported that Evolve Case Studies were used for remediation.

Consequences, Validation, and Exit Exam Scores

The third research question was, "Do the variables consequences and validation affect scores on the Evolve Reach E^2 for those students using the Evolve Apply case studies?" Of the 15 schools using case studies, 5 (33.3%) schools required validation of case study use which was accomplished by accessing computer records regarding case study use. Descriptive data for consequences attached to case studies is located with the second research question. Two-hundred sixty-five students (22.6%) had their case study use validated while 906 (77.4%) did not.

Mean exit exam scores, standard deviations, and confidence intervals for all the values of all the main consequence variables were utilized. Students having consequences attached to case study use had a mean Exit Exam score of 876.8 (SD = 121.4) as compared to students that had no consequences attached to case study usage, M = 874.9 (SD = 145.3). An independent t-test was conducted to assess differences in having consequences for case studies made on Exit Exam scores (Table 5). Because the Levene's test was significant (F = 8.619; p = .003) indicating the variance of the two groups were not equal, the value for the t-test assuming unequal variances was used. The t- test findings were not significant – indicating no differences in Exit exam scores of students who had consequences attached to case study use and those who did not.

Table 5

Exit Exam Scores for Students with and without Consequences for Case Study Use

Treatment groups	*M*	*SD*	*t*	*p*
Consequences (*n* = 338)	876.7	121.4	-.218	.828
No Consequences (*n* = 833)	874.9	145.3		

The students who had to validate usage of case study had a mean Exit Exam score of 836.7 (*SD* = 120.9) versus students who required no validation, *M* = 886.8, (*SD* = 141.7). These results are displayed in Table 6. Due to a significant Levene's test (*F* = 5.663, *p* = .017), the *t*-test for unequal variances was used. The *t*-test findings were significant indicating that students not having their case study use validated by their program had higher E^2 scores that those whose programs validated use. The effect size Cohen's *d* for this finding is 0.35 indicating a medium effect size.

Table 6

Exit Exam Scores for Students with and without Validation for Case Study Use

Treatment groups	*M*	*SD*	*t*	*p*
Validation (*n* = 265)	836.7	120.9	5.699	.000
No validation (*n* = 906)	886.8	141.7		

Summary of the Findings

Data analysis revealed a significant interaction between program type and case study use. Evolve Case Studies utilization is associated with higher scores on the Evolve Exit Examination. Overall E^2 scores for all ADN programs – both case study and noncase study users were higher than those of BSN students. However, the E^2 scores for case study users in both types of programs were similar. Of the 15 schools using case studies, approximately half applied consequences to their use. Types of consequences applied by nursing programs using case studies included pass/fail, grade impact, and remediation. Attaching consequences to case study use did not significantly influence E^2 outcomes. Students whose use of case studies were not validated achieved higher E^2 scores.

CHAPTER V

SUMMARY OF THE STUDY

The purpose of this descriptive study was to determine if associate degree and baccalaureate student nurse utilization of Evolve Apply case studies impacted scores on the Evolve Reach Exit Examination (E^2) scores, a proprietary examination taken by nursing students to predict success on the NCLEX-RN. The study also examined how the Evolve Apply case studies were utilized by nursing schools around the United States, including a determination of whether or not schools placed consequences on the use of computerized and standardized case studies within the nursing curriculum, such as grades, course passage, and clinical passage. Finally, the study evaluated if programs employing case studies required validation of student case study use. In this study, the use of Evolve standardized case studies was shown to have a positive impact on E^2 exam scores and could be a teaching strategy that is used to increase retention and progression in nursing programs. This chapter contains a summary of the research, a discussion of the findings, conclusions and implications, as well as recommendations for further study.

Summary

Using the Elsevier Evolve exam databases, data for this study consisted of student E^2 scores and the responses from the case studies implementation survey that was sent out all nursing schools that were clients of Elsevier using the Evolve case studies and the E^2. The sample consisted of 3,326 students from 47 schools who took the E^2 Examination from September 1, 2006 through December 31, 2007. There were

71% were ADN students and 29% were.BSN students. Case study users comprised 35% of the sample while 65% of the students did not use case studies. Case studies users consisted of 754 (64%) associate degree nursing students and 417 (36%) baccalaureate students. Nonusers of case studies consisted of 1,624 (75%) ADN and 531 (25%) BSN students.

Three research questions were investigated: (a) the influence of use of case studies and program type on E^2 scores, (b) types of consequences schools utilizing case studies attached to student use, and (c) the influence of consequences and validation of case study use on E^2 scores. A two-way ANOVA revealed a significant interaction indicating that use of case studies in concert with the type of educational program improved performance on the E^2 examination. Consequences attached to the use of Evolve Case Studies in the curriculum included pass/fail, impacting grade and remediation and did not influence performance on the E^2. In terms of validation of case study use, students who did not have case study use validated had higher exit exam scores.

Discussion of the Findings

Case Study Utilization and E^2 Scores

Findings of this study revealed that use of case studies improved student performance on the E^2 examination. This finding is congruent with the theoretical underpinnings used by this study. Paul (1992) and Paul and Heaslip (1995) espouse that critical thinking is an important characteristic for successful problem solving. Toomey (2003) indicated that case studies provide reflective learning and thus develop critical thinking and effective problem-solving skills. According to Colgrove, Schlapman, and Erpelding (1995) case studies provide opportunities for experiential learning

allowing for development of problem solving skills. Based on his work, Pimple (2007) suggested that case studies were one of the best teaching strategies. Case studies facilitated organization and critical thinking (Perkins, 2003) and maintained student interest (Hoag et al., 2005). Sandstrom (2006) found that case studies allowed students to examine multiple views of the situation. Case studies used in this study were designed to stimulate the use of critical thinking which subsequently led to improved test performance on the E^2 scores which has questions designed to measure students' critical thinking abilities (Morrison & Free, 2001; Morrison, Smith, & Britt, 1996).

A study by Mihal (2006) that specifically examined whether the use of Evolve case studies had an impact on the Evolve Exit Exam found that nursing schools who had from one to five semesters of access to case studies scored significantly higher (p=0.000) on the Evolve Exit Exam. Findings from this study were congruent with those of Mihal (2005) and found that students who used case studies in both baccalaureate and associate degree nursing programs, had higher Exit Exam scores.

One intriguing finding of this study was that academic program type interacted with case study use. Associate degree programs had higher E^2 scores than baccalaureate programs. Non-case study users in BSN programs had substantially lower E^2 scores than ADN students that were not case study users. Additionally, BSN case study users had a substantial increase in their E^2 scores over those of nonusers The E^2 score difference between BSN and ADN case study users was relatively small. This finding differs from Giger and Davidhizer's (1990) finding that ADN nurses focus on the practical and technical elements of nursing care while BSN students are more process oriented. Their findings suggest that critical thinking elements would be better supported in 4-year nursing programs. However, Redding's (2001) model for critical

thinking suggests that personal attitudes, dispositions, and experiences influence critical thinking skills. It is possible that differences in these characteristics could potentially influence student capabilities beyond educational programs.

Differences in how particular programs approached the importance of Exit Exam success could potentially influence student performance. For example – a 'see how you do on the test' attitude may fail to motivate students to strive for high E^2 scores. Teaching methods may have varied in BSN and ADN programs not using case studies that allowed greater development of critical thinking skills in ADN programs over those found in BSN programs. A limitation of this database is that insufficient information exists to assess program differences.

Consequences Attached to the Use of Case Studies

The consequences reflected policies that schools had attached to student use of Evolve case studies. The findings were very limited because less than half of schools who used Evolve Case studies within the curriculum attached consequences to case study use. Of the 15 schools using case studies, six programs reported consequences associated with case studies. The most common consequences attached to case study use were remediation, impacting grades, or passing or failing a course.

Faculty practices regarding consequences attached to case study use have not previously been reported in the literature. However, the practices found are common mechanisms used in schools of nursing for grading student performance or moving students toward needed remediation. Billings and Halstead (2009) state that evaluation ascertains that students achieve their potential and gain the knowledge and skills that are incorporated in the courses and curricula. The learning experiences should be relevant to the student and be valued in the grading system.

Consequences, Validation, and E^2 Scores

Consequences and validation were investigated in this study based on a recommendation from Mihal's (2006) study. In this study, consequences of case study use were found to be a non-significant factor as an improvement in students' scores on Evolve Exit Exam. Validation of case study use inversely affected the E^2 scores. Students who did not have their case study use validated had significantly higher E^2 scores. One possible explanation for this outcome is that schools with students that had difficulty with academic performance may be more likely to validate case study use and employ a method for improving student performance. Schools with students posting a strong academic performance may be more likely to make case studies available but not feel the need to validate their use. A limitation of this study is that no data were collected regarding how often and the time length for which students had to validate the use of case studies.

Instead of merely examining whether or not use of Evolve case studies are associated with success on the E^2 exam, this study also sought to determine if applying consequences impacted on student performance on this exam. There is some evidence indentified in the literature (Arathuzik & Aber, 1998; Nibert, Young, & Adamson, 2002; Vance, 1997) that remediation or intervention strategies used by some nursing programs to maximize their students' performance on this important test are more effective if consequences are attached.

The findings in this study revealed that applying consequences did not have an impact on students' exit exam scores. One contributing factor may have been that the consequences were insufficient to motivate student performance. A limitation of this study is that no data were collected to determine the weight of the consequences in

grade calculation. While consequences are assumed to be a major focus in motivating performance, Gibbs and Simpson (2004) suggest that a variety of factors beyond grading may influence how particular activities support learning and subsequent student performance. Two of these factors include having an activity that engages students in productive learning and feedback in a timely manner and sufficient detail that it supports learning. Case study use incorporates both of these factors, which may make consequences attached to the use of case studies less important in the general scheme of improving student critical thinking abilities.

In summary, the findings of the current study demonstrates clear benefits for associate and baccalaureate nursing students from the use of the Evolve case which can increase autonomous learning and critical thinking skills. Case study use increased E^2 scores. However, outcomes regarding adoption of a grading system that incorporates consequences for case study performance or uses case validation is less clear.

Conclusions and Implications

Conclusions of this study are:

1. Use of Evolve case studies provides an effective means of increasing E^2 scores among ADN and BSN students.
2. Use of validation measures to monitor case study use yielded lower E^2 scores among nursing students.
3. Common consequences that nursing programs apply to case study use include passing or failing courses, impacting grades, and remediation.
4. Applying consequences to use of Evolve case studies does not impact E^2 scores.

Implications derived from this study are important for nursing education. Nursing programs should incorporate case study use as a strategy to strengthen student performance on the exit examination and subsequently the NCLEX-RN.

Failing the licensure examination adversely affects students, educational programs, and society, and is particularly troubling given the current nursing shortage. Use of Evolve case studies can support academic achievement and provide an additional teaching strategy for nursing faculty. Integrating the case studies which involve critical thinking skills across the curriculum may reduce failure on the Evolve Exit Examination. Assisting students in maximizing their critical thinking skills is essential for meeting academic goals and enhancing lifelong learning as registered nurses.

Recommendations for Further Study

Recommendations for future research focused on examining the relationship between the predictive values of using Evolve case studies in preparation for the NCLEX-RN are as follows:

1. Examine differences between the nature of consequences used by nursing schools, and attaching a weight to them, and the outcome of E^2 scores.
2. Examine the factors associated with case study use including length of access to case studies over the curriculum, number of times students access case studies, and the time length students engage in use of case studies.
3. Compare students utilizing Evolve case studies with students who use other teaching strategies in order to examine difference regarding scores in outcomes. This may allow researchers to determine whether it is teaching strategies that are responsible for improved scores or if it the real world examples provided by Evolve case studies that contributes to students' successful scores.

4. If it is found that the use of Evolve case studies yields higher scores than other test preparation materials, researchers concerned with this line of inquiry may want to focus on delineating the specific components of Evolve case studies in order to determine which are the most beneficial.
5. Conduct a prospective case study trial using experimental methods to control for extraneous variation.
6. Correlate the use of Evolve case studies with NCLEX-RN results and determine which students passed the licensing exam on their first attempt.

REFERENCES

Amos, E., & White, M. J. (1998). Teaching tools: Problem-based learning. *Nurse Educator, 23*(2), 11-14.

Arathuzik, D. & Aber, C. (1998) Factors associated with the national council licensure examination: registered nurse success. *Journal of Professional Nursing, 14*(2), 119-126.

Aucoin, J.W. & Treas, L. (2005). Assumptions and realities of the NCLEX-RN. *Nursing Education Perspectives, 26,* 268-271.

Beeson, S.A., & Kissling, G. (2001). Predicting success for baccalaureate graduates on the NCLEX-RN. *Journal of Professional Nursing, 17,* 121-127.

Bentley, G. W. (2001). Problem-based learning. In A.J. Wolenstein & M. J. Bradshaw (Eds.), *Fuszard's inovative teaching strategies in nursing* (3rd ed, pp. 83-106). Gaithersburg, MD: Aspen.

Billings, D.M. & Halstead, J.A. (2005). *Teaching in Nursing: A Guide for Faculty.* St.Louis, MO: Elsevier Saunders.

Bloom, B.S., Engelhart, M. D., Furst, E. J., Hill, W.H., & Krathwohl, D. R. (1956). *Taxonomy of educational objectives: The classification of educational goals.* New York: David McKay Company, Inc.

Brown, J.D. (2008). Statistics corner: Effect size and eta squared. *JALT Testing & Evaluation SIG Newsletter, 12* (2), 36-41. Retrieved December 1, 2009 from http://jalt.org/test/bro_28.htm

Buerhaus, P., Staiger, D., & Auerbach, D. (2000). Policy responses to an aging registered nurse workforce. *Nursing Economics, 18*(6), 278-284.

Clayton, L.H. (2006). Concept mapping: An effective, active teaching-learning method. *Nursing Education Perspectives, 27,* 197-203.

Colgrove, S.R., Schlapman, N. & Erperling, C. (1995). *Experiential learning. In Fuszard's inovative teaching strategies in nursing* (2nd ed, pp. 9-17). Gaithersburg, MD: Aspen.

Comer, S.K. (2005). Patient care simulations: Role playing to enhance clinical understanding. *Nursing Education Perspectives, 26,* 357-361.

Crook, J. (2006). *West Side High School 2001-2006 NCA Final Documentation Report.* Retrieved March 20, 2008, from http://www.westside66.org/

Daly, W.M. (1998). Critical thinking as an outcome of nursing education. What is it? Why is it important to nursing practice? *Journal of Advanced Nursing, 28,* 323-331.

Davenport, N.C. (2007). A comprehensive approach to NCLEX-RN success. *Nursing Education Perspectives, 28,* 30-33.

Del Bueno, D. (2005). A crisis in critical thinking. *Nursing Education Perspectives, 26,* 278-282.

DeYoung, S. (2003). *Teaching strategies for nurse educators.* Upper Saddle River, NJ: Prentice Hall.

Dowd, S. B., & Davidhizar, R. (1999). Using case studies to teach clinical problem-solving. *Nurse Educator, 24*(5), 42-46.

Elder, L. & Paul, R. (2001). Critical thinking: Thinking with concepts. *Journal of Developmental Education, 24*(3), 42-43.

Elsevier. (2008). *Evolve Apply.* Retrieved March 20, 2008, from http://evolve.elsevier.com/productPages/i_994.html

Forneris, S.G. & Peden-McAlpine, C. (2007). Evaluation of a reflective learning intervention to improve critical thinking in novice nurses. *Journal of Advanced Nursing, 57,* 410-421.

Frith, K.H., Sewell, J.P., & Clark, D.J. (2006). Best practices in NCLEX-RN readiness preparation for baccalaureate student success. *Computers, Informatics, Nursing & Nurse Educator, 24*(Suppl. 3), 46S-53S. Retrieved March 20, 2008, from http://www.cinjournal.com/

Gibbs, G., & Simpson, C. (2004). Conditions under which assessment supports students' learning. *Learning and Teaching in Higher Education, 1*, 3–31.

Giger, J.N. & Davidhizar, R.E. (1990). Conceptual and theoretical approaches to patient care: Associate versus baccalaureate degree prepared nurses. *Journal of Advanced Nursing, 15,* 1009-1015.

Goodin, H.J. (2003). The nursing shortage in the United States of America: An integrative review. *Journal of Advanced Nursing, 43,* 335-350.

Hoag K.A., Lillie J.K. & Hoppe R. (2005). Piloting case-based instruction in a didactic clinical immunology course. *Clinical Laboratory Science, 18,* 213-220.

Hsu, L.L. (2004). Developing concept maps from problem-based learning scenario discussions. *Journal of Advanced Nursing, 49,* 510-518.

Jacobson, L. & Kaufman, K.A. (2004). The National Nursing Education database. *Nursing Education Perspectives, 25,* 264-265.

Jones, S.A. & Brown, L.N. (1991). Critical thinking: Impact on nursing education. *Journal of Advanced Nursing, 16,* 529-533.

Kennison, M.M. (2006). The evaluation of students' reflective writing for evidence of critical thinking. *Nursing Education Perspectives, 27,* 269-272.

Khosravani, S., Manoochehri, J., & Memarian, R. (2005). Developing critical thinking skills in nursing students by group dynamics. *Internet Journal of Advanced Nursing Practice, 7*(2). Retrieved March 20, 2008, from http://www.ispub.com/ostia/index.php?xmlFilePath=journals/ijanp/vol7n2/skills.xml

Knowles, M. (1984). *The adult learner. A neglected species.* Houston: Gulf Publishing.

Lauchner, K., Newman, M., & Britt, R. (1999). Predicting licensure success with a computerized nursing exam: The HESI Exit Exam. *Computers in Nursing, 17,* 120-125.

Lewis, C. (2005). *Predictive accuracy of the HESI Exit Exam on NCLEX-RN pass rates and effects of progression policies on nursing Exit Exam scores.* Unpublished doctoral dissertation, Texas Woman's University, Houston, Texas.

Melander, S.D. (1996). *Review of critical care nursing: Case studies and applications.* Philadelphia: W.B. Saunders.

Mihal, C. (2006). *The Impact of HESI Case Studies on the HESI Exit Examination Scores for Nursing Students Preparing for the National Council Licensure Examination for Registered Nurses.* Unpublished doctoral dissertation, Seton Hall University, South Orange, New Jersey.

Morrison, S. & Free, K.W. (2001). Writing multiple-choice test items that promote and measure critical thinking. *Journal of Nursing Education, 40*(1), 17-24.

Morrison, S., Smith, P., & Britt, R. (1996). *Critical Thinking and Test Item Writing.* Houston, TX: Health Education Systems, Inc.

Morrison, S., Adamson, C., Nibert, A., & Hsia, S. (2006). HESI exams: An overview of reliability and validity. *Computers, Informatics, Nursing & Nurse Educator, 24*(Suppl. 3), 39S-45S.

Morrison, S., Free, K.W., & Newman, M. (2002). Do progression and remediation policies improve NCLEX-RN pass rates? *Nurse Educator, 31,* 94-96.

Morrison, S., Nibert, A. & Flick, J. (2006). *Critical Thinking and Test Item Writing, 2nd ed.*. Houston, TX: Health Education Systems, Inc.

Morse, J.M., Hupcey, J. E., Mitcham, C., & Lenz, E. R. (1996). Concept analysis in nursing research: A critical appraisal. *Scholarly Inquiry for Nursing Practice: An International Journal*, 10(3), 253-277.

National Council of State Boards of Nursing. (2008). *NCLEX examination pass rates 2007.* Retrieved March 20, 2008, from https://www.ncsbn.org/

Newman, M., Britt, R.B., & Lauchner, K.A. (2000). Predictive accuracy of the HESI exam: A follow-up study. *Computers in Nursing, 18,* 132-136.

Nibert, A.T., & Young, A. (2001). A third study on predicting NCLEX success with the HESI Exit Exam. *Computers in Nursing, 19,* 172-178.

Nibert, A.T., Young, A., & Adamson, C. (2002). Predicting NCLEX success with the HESI Exit Exam: Fourth Annual Validity Study. *Computers, Informatics, Nursing, 20,* 261-267.

Nibert, A.T., Young, A., & Britt, R. (2006). The HESI Exit Exam: Progression benchmark and remediation guide. *Computers, Informatics, Nursing & Nurse Educator, 24*(Suppl. 3), 57S-61S. Retrieved March 20, 2008, from http://www.cinjournal.com/

Oermann, M.H. (2004). Reflections on undergraduate nursing education: A look to the future. *International Journal of Nursing Education Scholarship, 1*(1), 41-56.

Paul, R. W. (1992). *Critical thinking: What every person needs to survive in a rapidly changing world.* (Willsen, J. & Binker, A. J, Eds.). Santa Rosa, CA: Foundation for Critical Thinking.

Paul, R. (2005). The state of critical thinking today. *New Directions for Community Colleges, 130,* 27-38.

Paul, R. & Elder, L. (2006). Critical thinking: The nature of critical and creative thought. *Journal of Developmental Education, 30* (2), 34-35.

Paul, R. & Elder, L. (2007). Critical thinking: The art of Socratic questioning. *Journal of Developmental Education, 31*(2), 36-37.

Paul, R., Elder, L., & Bartell, T. (1997a). *A brief history of the idea of critical thinking.* Dillon Beach, CA: Foundation for Critical Thinking. Retrieved December 5, 2007, from http://www.criticalthinking.org/University

Paul, R., Elder, L., & Bartell, T. (1997b). *Study of 38 public universities and 28 private universities to determine faculty emphasis on critical thinking in instruction. Executive summary.* Dillon Beach, CA: Foundation for Critical Thinking. Retrieved March 20, 2008, from http://www.criticalthinking.org/research/Abstract-RPAUL-38public.cfm

Paul, R.W. & Heaslip, P. (1995). Critical thinking and intuitive nursing practice. *Journal of Advanced Nursing, 22,* 40-47.

Perkins, A. A. (2003). The role of the case study in undergraduate education. *Athletic Therapy Today,* November, 11-14.

Pimple, K. D. (2007). *Using case studies in teaching research ethics.* National Academy of Sciences. Paper presented at the Planning Workshop for a Guide for Teaching Responsible Science.

Profetto-McGrath, J. (2003). The relationship of critical thinking skills and critical thinking dispositions of baccalaureate nursing students. *Journal of Advanced Nursing, 43,* 569-577.

Redding, D.A. (2001). The development of critical thinking among students in baccalaureate nursing education. *Holistic Nursing Practice, 15*(4), 57-64.

Sandstrom, S. (2006). Use of case studies to teach diabetes and other chronic illnesses to nursing students. *Journal of Nursing Education 45*(6), 229-231.

Sellappah, S., Hussey, T., Blackmore, A.M., & McMurray, A. (1998). The use of questioning strategies by clinical teachers. *Journal of Advanced Nursing, 28,* 142-148.

Schwarz, K.A. (2005). Making the grade: Help staff pass the NCLEX-RN. *Nursing Management, 36*(3), 38-44.

Shelton, E. (2003). Faculty support and student retention. *Journal of Nursing Education, 42*(2), 68-76.

Sifford, S. & McDaniel, M. (2007). Results of a remediation program for students at risk for failure on the NCLEX exam. *Nursing Education Perspectives, 28,* 34-36.

Simpson, E. & Courtney, M. (2002). Critical thinking in nursing education: Literature review. *International Journal of Nursing Practice, 8,* 89-98.

Siktberg, L.L. & Dillard, N.L. (2001). Assisting at-risk students in preparing for NCLEX-RN. *Nurse Educator, 26,* 150-152.

Soukup, F. (1999). *Assessment of critical thinking skills in associate degree nursing students.* (Report No. CE078538). University of Wisconsin-Stout. (ERIC Document Reproduction Service No. ED430081)

Stuenkel, D. (2006). At-risk students: Do theory grades + standardized examinations = success? *Nurse Educator, 31,* 207-212.

Toomey, A. M. (2003). Learning with cases. *The Journal of Continuing Education in Nursing, 34*(1), 34-38.

Toofany, S. (2008). Critical thinking among nurses. *Nursing Management, 14*(9), 28-31.

Turner, P. (2005). Critical thinking in nursing education and practice as defined in the literature. *Nursing Education Perspectives, 26,* 272-277.

Uyehara, J., Magnussen, L., Itano, J., & Zhang, S. (2007). Facilitating program and NCLEX-RN success in a generic BSN program. *Nursing Forum, 42,* 31-38.

Vance, A. (1997). Strategies to assist students to be successful the next time around on the NCLEX-RN. *Journal of Nursing Education, 36* (4), 190-192.

Waterhouse, J.K. & Beeman, P.B. (2003). Predicting NCLEX-RN success: Can it be simplified? *Nursing Education Perspectives, 24,* 35-39.

Watson, G., & Glaser, E. (1964). *Watson-Glaser critical thinking manual.* New York: Harcourt Brace.

Zygmont, D.M. & Schaefer, K.M. (2006). Assessing the critical thinking skills of faculty: What do the findings mean for nursing education? *Nursing Education Perspectives, 27,* 260-268.

APPENDIX A

Foundation of Critical Thinking Permission

Foundation for Critical Thinking
POB 220 Dillon Beach CA 94929 ph: 707-878-9100 fax: 707-878-9111 cct@criticalthinking.org

Permission Request/Agreement
(To use copyrighted materials)
Please be as thorough as possible.

We recognize our obligations under this agreement:

We request permission to use the following materials: The diagram on Richard Paul's Critical Framework on the "Elements of Thought"

1) We will use them only in the following way In my dissertation as my Theoretical Framework on a study about case study use in Baccalaureate and Associate degree nursing students.

2) We will cite the Foundation for Critical Thinking, authors, and the Foundation for Critical Thinking Website at www.criticalthinking.org on every page in which copyrighted materials are used.

3) We agree to pay a penalty of $100/page for any citation that fails to include the Foundation's website.

4) We agree to fax a copy of the finished material (as it will appear) to the Foundation prior to publication.

5) Length of time needed: Indefinitely – permanent in my dissertation

Signed: Gloria Rose Dated: 3/20/09

Contact Information:
Name: Gloria M. Rose
Title: Doctoral Candidate
Institution: Texas Woman's University
Address: Houston, TX 77030
Fax: 281-240-0018
Phone: 281-989-4298
Email: grose10496@aol.com

Fax this signed request to (707) 878-9111, and we will fax back the permission granted or denied.

Permission Granted: _____

Permission Denied: _____

APPENDIX B

Texas Woman's University IRB Approval

TWU
TEXAS WOMAN'S UNIVERSITY
DENTON DALLAS HOUSTON

Office of Research
6700 Fannin Street
Houston, TX 77030-2343
713-794-2480 Fax 713-794-2488

December 16, 2008

Ms. Gloria Rose
College of Nursing - Robin Britt Faculty Advisor
6700 Fannin Street
Houston, TX 77030

Dear Ms. Rose:

Re: "The Impact of Evolve Case Studies on the Evolve Exit Examination Scores for Baccalaureate and Associate Degree Nursing Students"

The above referenced study has been reviewed by the TWU Institutional Review Board (IRB) and was determined to be exempt from further review.

Any changes in the study must receive review and approval prior to implementation unless the change is necessary for the safety of subjects. In addition, you must inform the IRB of adverse events encountered during the study or of any new and significant information that may impact a research participant's safety or willingness to continue in your study.

Sincerely,

John D Radcliffe

Dr. John Radcliffe, Chair
Institutional Review Board - Houston

APPENDIX C

Agency Permission, Elsevier

October 16, 2007

Robin Britt, Ed.D, RNC, WHCNP
Texas Woman's University
Institute of Health Sciences-Houston Center
6700 Fannin
Houston, TX 77030

Re: Approval for Dissertation Data Collection for Gloria Rose

Dear Dr. Britt:

This letter indicates my unconditional approval for Gloria Rose, doctoral candidate enrolled in the Ph.D. in Nursing Program Texas Woman's University Houston, to collect data for her dissertation study stored within the Elsevier Review & Testing (formerly HESI) computerized database. Ms. Rose will be using Elsevier Apply Case Study data and Evolve Reach Exit Exam scores from academic year 2006-2007. No identifying information, such as student names, will be required for the data analysis. I am pleased that Ms. Rose has chosen to conduct this study of the Elsevier Apply Case Studies to meet her dissertation requirements, and I look forward lending support to the dissertation committee to reading the results of her study. Please do not hesitate to contact me at 713-346-6913, or via e-mail, m.yoho@elsevier.com, if you have any questions regarding this approval.

Sincerely,

Mary J. Yoho, PhD, RN, CNE
Director of Research, Nursing
Elsevier Review and Testing

Elsevier, Inc. 11011 Richmond Avenue, Suite 450
Houston, TX 77042 USA
Tel +1 (713) 346 6900 | Fax +1 (713) 838 0079 | www.elsevier.com |

ELSEVIER

Graduate Student Agreement to participate in Elsevier/HESI Educational Research Projects

Thank you for agreeing to participate in Elsevier/HESI-focused research to meet requirements for your graduate study course(s). Please review the Elsevier/HESI guidelines that pertain to educationally-focused research studies, and sign and return a copy of this form to us prior to handling any Elsevier/HESI data.

(1) All data received by the graduate student for analysis must be maintained in a secure location for the duration of the student's involvement with this study.

(2) The graduate student agrees to maintain the confidentiality of all individual scores identified within any data summary document.

(3) The graduate student recognizes that reporting of Elsevier/HESI-focused research findings are described as aggregate findings only, which is a criterion of educational studies exempt from review of the institutional review boards (IRB) as recognized by the IRBs at most universities. Any reporting of Elsevier/HESI scores pertaining to individual students must be approved by the IRB prior to initiation of any Elsevier/HESI-related project.

(4) Once the final analysis of the data is complete, the graduate student must return all hardcopies of documents to Elsevier/HESI, as well as provide electronic or hardcopies of all spreadsheets or other types of files generated from statistical software packages and/or word processing programs. Any electronic files stored on the hard drive(s) of students' computers must be destroyed once the data have been returned to Elsevier/HESI, and Elsevier/HESI has (1) confirmed receipt of returned hardcopies and/or files; and (2) determined that the files are uncorrupted, accessible on our computer systems, and complete.

(5) The graduate student will receive recognition (depending on the level of involvement with the project) as a research assistant, co-author, or lead author on related manuscripts prepared for publication.

(6) For any questions, contact:

Ainslie T. Nibert, PhD, RN
Vice President, Review and Testing
Elsevier
2656 South Loop W. Suite 690
Houston, TX 77054
800.950.2728, ext. 224
Voice: 713.838.7787, ext. 224
Fax: 713.838.0079
ainslien@hesitest.com

We are pleased that you chose Elsevier/HESI-focused research for completion of your course requirements. Thanks for participating, and we look forward to seeing your results!

Gloria Rose — Graduate Student (Signature)
GLORIA M. ROSE — (Print Name)
9-18-07 — Date

Ainslie T. Nibert — Vice President, Review and Testing
Ainslie T. Nibert — (Print Name)
9/18/07 — Date

APPENDIX D

Case Studies Implementation Survey

1. Does your department have an exit exam program policy?
[ ] Yes [ ] No [ ] Not Applicable

1b. If Yes, what is your benchmark?
[ ] less than 700
[ ] 700 [ ] 800 [ ] 900 [ ] 1000
[ ] 725 [ ] 825 [ ] 925 [ ] more than 1000
[ ] 750 [ ] 850 [ ] 950
[ ] 775 [ ] 875 [ ] 975

2. Does your program use online Evolve Apply Case Studies?
[ ] Yes [ ] No [ ] Not Applicable

2b. If Yes, how do you utilize them?
[ ] Course Grade [ ] Clinical Prep
[ ] Exam Prep [ ] Post- Conference
[ ] Remediation [ ] All of the Above

3. To what extent are Evolve Apply Case Studies used in your program?
[ ] Entire Program [ ] 1st half of program [ ] 2nd half of program [ ] Not required

4. Do you require proof students accessed the case study?
[ ] Yes [ ] No [ ] Not Applicable

5. How long do students have access to the Case Studies?
[ ] less than 1 semester
[ ] 1 semester
[ ] 2 semesters
[ ] 3 semesters
[ ] 4 semesters
[ ] entire program

6. Are there consequences involved in the utilization of Evolve Apply Case Studies?
[ ] Yes [ ] No [ ] Not Applicable

6b. If Yes, select those that apply:
[ ] Pass/Fail course
[ ] Course Completion
[ ] Impacts Grade
[ ] Remediation
[ ] Other *(please explain)* _____
_____
_____
_____

7. Do you require students to re-test?

[ ] Yes [ ] No [ ] Not Applicable

7b. If Yes, how many times?

[ ] 1 time
[ ] 2 times
[ ] 3 times
[ ] 4 times
[ ] more than 4 times

8. Do you require remediation?

[ ] Yes [ ] No [ ] Not Applicable

8b. If Yes, what remediation options do you require?

[ ] Evolve Reach Student Online Exam Remediation
[ ] Remedial course
[ ] Computer-based tutoring
[ ] NCLEX-RN Review Manual
[ ] NCLEX-RN prep book other than the Evolve Reach Manual
[ ] Tutoring
[ ] Re-Test/Different Vendor
[ ] Apply On-line Case Studies
[ ] Repeat Course
[ ] Other *(please explain)* _____

_____

_____

_____

9. How long do you allow students to remediate?

[ ] Not applicable
[ ] 2 weeks
[ ] 4 weeks
[ ] 6 weeks
[ ] Other *(please explain)* _____

_____

_____

_____

10. If students fail, what consequences occur?

[ ] Capstone course failure
[ ] Delay/Deny graduation
[ ] Delay/Deny NCLEX candidacy
[ ] Course failure
[ ] Retake exam

Thank you for taking part in this survey.