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The Utilization of NCLEX Predictor Assessments and the Effect on NCLEX Success Rates in Nursing Programs Within the State of Pennsylvania

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THE UTILIZATION OF NCLEX PREDICTOR ASSESSMENTS AND THE EFFECT
ON NCLEX SUCCESS RATES IN NURSING PROGRAMS WITHIN THE STATE OF
PENNSYLVANIA

A Dissertation

Submitted to the School of Graduate Studies and Research

In Partial Fulfillment of the

Requirements for the Degree

Doctor of Education

Victoria Marie Hedderick

Indiana University of Pennsylvania

May 2009

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Abstract

Title: The Utilization of NCLEX Predictor Assessments and the Effect on NCLEX Success Rates in Nursing Programs Within the State of Pennsylvania

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In response to the nursing shortage, nursing education programs are increasing enrollment and utilizing best practice strategies within the curricula to produce graduates prepared for success with their first attempt on the NCLEX–RN. The use of NCLEX predictor assessment products frequents the literature as a tool used by nursing education programs to assess student readiness for NCLEX-RN.

The purpose of this mixed quantitative and qualitative study was threefold: to identify the frequency of use of NCLEX Predictor Assessments in the state of Pennsylvania; to identify how the programs' utilized NCLEX predictor assessments within their curricula and the associated impact on NCLEX success; to compare programs with high and low NCLEX performance based on adherence to concepts of organizational change theory.

The data for this study was derived from three sources. The quantitative portion of the data was collected via an electronic survey distributed to all nursing education program leaders in Pennsylvania. The NCLEX-RN first-time success data published by Pennsylvania State Board of Nursing was used for both qualitative and quantitative data. The data from the qualitative inquiry was collected using a case study interview guided approach.

The quantitative inquiry of the study found that the rate of utilization of NLCEX predictor in Pennsylvania is significant. Results also showed, there was no statistical significance to the product type, variables of implementation or associated policies when compared to NCLEX success rates, with the exception of a policy on mandatory formalized remediation for high risk students. The qualitative evidence indicated that programs with high NCLEX performance consistently employed behaviors and strategies consistent with maximal level of adherence to Senge's Concepts of Shared Vision, Mental Modeling, Team Learning and Systems Thinking when compared to low NCLEX performers. The study affirmed the need for nursing education programs to utilize student performance data from the NCLEX predictor assessments to make evidence-based decision regarding curriculum and policy revisions. Also, affirmed was the need for global faculty buy-in and commitment to ongoing education of the assessment product.

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CHAPTER 1

THE PROBLEM

Introduction

The nursing shortage is a national crisis with many factors that contribute and perpetuate the ongoing issue. The literature frequently identifies the aging of America's baby boomers as being a significant factor. As boomers get older, their need for healthcare increases, thus requiring more healthcare events and more nurses to care for the increased number of events. Also, a large number of the current nurse workforce are themselves part of the boomer era. In 2004, the average age of a Registered Nurse (RN) was 46.8 years (Health Resources and Services Administration, 2004). Thrall (2005) reported that more than a quarter of the RN workforce is 50 years or older.

As the nursing shortage continues, experts look to evaluate the number of individuals entering the pipeline for the profession of nursing. The American Association of Colleges of Nurses (2004) reported the current nursing program enrollment is not adequate to keep pace with the projected demand. Retention of the current nurses is also an area to explore. Beurhaus, et. al. (2005) cited issues, such as quality of work life, quality of care, and the amount of time nurses spend with patients are all catalysts for nurses to leave the profession. Job dissatisfaction related to large patient assignments and emotional exhaustion are also contributors to the shortage (Aiken, Clarke, Sloane, Sochalski & Silber, 2002). The issue of retention is relevant to the new nurses as well. Kovner (2007) reported 13% of newly licensed nurses left their initial positions in less than one year.

The breadth of the nursing shortage reaches far beyond the scope of hospitals in search of nurses and it affects society in many ways. The shortage affects issues related to the public at large, health care employers and nursing education programs. The American public experiences the effects when accessing patient care in the various healthcare agencies. The limited supply of nurses has been linked to delays in care, increased communication problems, and increased wait times for surgery and procedures (Buerhaus, et al. 2005).

Healthcare institutions are eager to address the shortage issue to ensure quality of care as well as manage financial costs to the institution and the consumer. The shortage has forced many institutions to offer significant financial and benefit incentives to attract and retain nurses, thus increasing health care costs. In support of needing more nurses, Needleman, Buerhaus, Steward, Zelevinsky (2002) reported that by improving RN-to-patient staffing ratios, organizations can decrease the incidence of pneumonia, urinary tract infections, cardiac arrest, shock, and other adverse healthcare outcomes, which affect quality of patient care and also drive up costs.

Nursing education programs have also experienced the effects of the shortage. In attempts to increase the number of nurses, many programs have expanded enrollment. Although the idea of expanding a nursing program sounds positive, it is not without its own issues, including shortage of nursing faculty, competition with other nursing programs for clinical sites, and additional costs to the universities for the added resources. The American Association of the College of Nursing (2004) reported programs across the country had turned away more than 26,000 qualified applicants, primarily due to faculty shortages. To maximize resources, nursing programs need to

manage attrition rates. To do so, nursing programs scrutinize applicants based on past academic performance and results on college entrance exams. The scrutiny is to attempt to predict students who will likely be successful with the rigor of a program and persist through graduation. In addition, nursing programs are implementing best practice strategies to improve the success of the students through the program as well as upon graduation when the student takes the national licensure exam. The measurement of success for a nursing program is based on the ability to produce graduates who are successful with the passing of the licensure examination, entitled National Council Licensure Examination –Registered Nurse (NCLEX-RN) on the first attempt. Passing the NCLEX-RN on the first attempt is referred to in the literature as NCLEX success.

This study explored the effects of a specific strategy utilized by nursing education programs to improve NCLEX-RN success. This chapter will identify the statement of the problem, purpose of the study, theoretical framework, research questions, definition of terms, significance of study and assumptions of the study.

Statement of Problem

The national nursing shortage is expected to continue for the foreseeable future. The 2004 National Sample Survey of Registered Nurses (NSSRN), which was conducted by the Health Resources and Services Administration (HRSA) (2004), indicated that in 2004 there were 125,000 vacant RN positions in the United States. The NSSRN researchers further calculated the vacancy rate will increase fourfold within the next 20 years (HRSA, 2004). The National Center for Health Workforce Analysis (2004) also indicated the disparity between supply of nurses and demand will

continue to grow. The data revealed the shortfall of nurses in 2010 predicted to be 17%; 2015, 27%; and 2020, 36%. The authors further indicated the reason for the increased demand is a result of aging baby boomers and increasing difficulties of acquiring new nurses to the profession. An online survey conducted by the American Nurses Association revealed more than 82% of nurses over the age of 40 planned to retire in the next 20 years (Center for the American Nurse, 2003). Hatcher et al. (2006) summarized approaches from the workforce experts as: attract nurses back to the bedside who have left the workforce, increase the number of enrolled students and retain through graduation, and lastly, retain new graduate nurses and all nurses through all stages of their professional careers.

The nursing shortage has provided a challenge to employers in the healthcare industry as well as nursing education programs. Employers' efforts have been focused on improving the nurses' working conditions. The Joint Commission on Accreditation of Healthcare Organization (JCAHO), the nation's leader in providing voluntary certification of quality to healthcare agencies, published a report that suggested areas of focus for employers. The strategies in the report to improve retention of RNs indicated employers should offer enhanced orientation programs, team-training, utilization of career ladders, create a positive culture for retention with reflective policies, and lastly, provide RNs the authority and responsibility they need to perform their role (JCAHO, 2002).

Nursing education programs need to also respond to the nursing shortage. Donley (2005) stated nursing programs cannot possibly address everything about nursing in the curriculum due to its complex nature. Donley further reported curricula

must help students enhance their cognitive skills, such as methods of reflection, critical thinking, problem solving, analysis, synthesis, and ability to evaluate the structure, process and outcomes of care.

All accredited nursing education programs need to produce graduates at their optimal capacity to begin to keep pace with the shortage. Prospective Registered Nurse (RN) students have multiple options to select from to acquire their education. The tracks in the educational programs include: Diploma, Associate Degree, and Baccalaureate Degree. Within the baccalaureate program there are options of a traditional four-year program or an accelerated program for students who have previously acquired a baccalaureate in another discipline. Lastly, individuals who are currently Licensed Practical/Vocational Nurses (LPN, LVN) can follow the track of LPN – RN that provides the graduate either an associate or BSN degree, depending on the program structure. Despite the varied options to acquire nursing education, all successful graduates will acquire a certification from their nursing education programs indicating their eligibility to apply for the National Council Licensure Examination (NCLEX). The NCLEX is a national certification examination designed to test knowledge, skills, and abilities essential to the safe and effective practice of nursing at the entry level (National Council of the State Board of Nursing, 2007). Once the student passes NCLEX in a given state, the student becomes a licensed RN and is permitted to practice in that state.

Within each state, the State Board of Nursing continually monitors the many variables of each nursing program, including curriculum, faculty requirements, clinical sites, facilities, policies, etc., which vary based on program type. All factors monitored

by the state are significant; however, the NCLEX pass rates are an integral factor in granting continued state approval. Each state has a defined threshold the nursing programs must attain to maintain approved status. If a program falls below a state's threshold, a mandated remediation or corrective plan of action must be submitted. Consequences of a program not adhering to a correction plan or demonstrating improvement may include a probationary period or potentially a loss of accreditation from the State Board of Nursing. Without the state's accreditation of a nursing program, the program's graduates are not eligible to take the NCLEX exam. In addition, without state accreditation, the existence of the nursing program would be in jeopardy. Programs with low pass rates are subject to additional consequences affecting the program's reputation, which in turn, impact enrollment and funding (Norton, Relf, Cox, Farley & Tucker, 2006).

In the state of Pennsylvania, the Pennsylvania Code indicates the threshold rate of first time attempts on NCLEX-RN, for approved nursing education programs, is 60% (Pennsylvania Code, Chapter 12.26). However, in 2008 it was proposed that the threshold be increased to 70% for the first year of implementation then increased to 80% the following year. At the time of this study, the Pennsylvania Code remains at a 60% threshold.

The National Council of State Boards of Nursing (NSCBN) (2007) calculated the national rate of first time NCLEX-RN success for individuals educated in the United States as ranging between 85.3%-88.1% for 2004–2007. In the state of Pennsylvania, the average of first time NCLEX-RN success was consistent with the national rates, ranging between 84.1%–88.01% for the same 3 year period. For that

same period, the national average increased each year as published rates for 2004, 85.3%; 2005, 87.3%; and lastly, in 2006, 88.1%. However, in 2007 the average decreased to 85.74%. The decrease was most likely related to the revised test plan implemented in spring of 2007. Historically, the year a test plan is revised there is a drop in success rates. The test plan is revised every 3 years. Prior to 1988, the success rate was 91% and in 1989 the NCSBN initiated an increase in the passing standard, which resulted in a lower pass rate of 84%. The NCSBN (2007) reviews past results, data addressing current practice expectations, and revises the examination to reflect the practice changes. As a result, it is paramount that the nursing programs revise curricula and employ educational best practices to continue graduate success with NCLEX.

Nurse education programs continually assess student performance of the theory content throughout the curriculum in traditional methods, including examinations, written assignments, as well as verbal presentations. In the field of nursing, educators must also assess the student's ability to apply the theory in the clinical setting. This is completed predominately by observation and interaction with students while they provide care to patients. Despite the student's grades in theory and clinical, the ultimate measure of success comes when the student passes NCLEX. The literature indicates there are many factors that may predict a student's success with NCLEX, including grade point averages (GPA), admission criteria, progression practices, and NCLEX-RN predictor assessments (Norton et al., 2006). Further literature explores the impact of the faculty on NCLEX success in areas of turnover, degrees, full or part-time status, teaching experience, clinical experience, and certification. The variables are endless as to what predicts an individual's success. In recent years, there has been

an increase in the number of programs that utilize outside objective assessments to predict a nursing student's success with NCLEX. The predictor assessments are purchased from an outside vendor that provides a NCLEX-style assessment to predict students' first time success with NCLEX after graduation. The assessment products generally include one of two formats. The first format is an end of program evaluation. This format includes a distribution of a comprehensive NCLEX-style test to students who are either in their last semester or last year of a nursing program. The second format is a curriculum-infused format. This format includes NCLEX style assessments at the end of all nursing courses as well as a comprehensive end of program assessment. The utilization of NCLEX predictor assessments vary from school to school. Spector & Alexander (2006) identified NCLEX predictor assessments as most valuable when students are assessed throughout the curriculum and with a remediation plan to support the students.

The impact of first time success with NCLEX is high stakes for nursing programs since their state accreditation is contingent upon meeting the minimum threshold. It is equally important for employers in the healthcare industry as well. Frequently, employers hire the graduate nurse before they take NCLEX. As a result, a failure on NCLEX can result in a loss or delay in the orientation or potentially a more traumatic loss of employment or position. The utilization of NCLEX predictors has the potential to ease the burden on nursing programs as well as employers.

Purpose of Study

The purpose of this study was threefold. From a quantitative approach, the researcher first identified the frequency of use of NCLEX predictors in nursing

programs in Pennsylvania. Second, the researcher identified how the programs in Pennsylvania utilized the various NCLEX predictor assessments within their curricula and the impact on the program's NCLEX success. Lastly, from a qualitative approach, the researcher compared programs with consistently high and low performance with NCLEX. The basis for comparison focused on how the program utilized and implemented the NCLEX predictor assessments between the high and low successful programs. Also, what were the leaders' perceptions of the factors that affected NCLEX outcomes? The qualitative evaluation was guided by organizational change theory, specifically Senge's (1999) concepts of Shared Vision, Mental Modeling, Team Learning and Systems Thinking. The researcher anticipated that faculty and administrators of nursing programs will utilize these findings to revise and strengthen their programs to increase the students' first-time success with NCLEX upon graduation.

Theoretical Perspective

As a rule, the academic world is steeped in tradition and autonomy. Change in educational settings is difficult and nursing education programs are no exception to this rule. Although there are programmatic evaluations, few disciplines experience the level of external accountability as nursing. The State Board of Nursing (SBN) monitors the NCLEX success rates for each accredited program in the state. State accreditation is revoked when thresholds are not met. In addition to the state's review, nursing programs submit to an accreditation process by either the National League of Nursing Accreditation Commission (NLN-AC) or the Collegiate Commission Nurses Education (CCNE). Accreditation by these organizations is required by nursing

programs so their graduates can pursue advanced degrees. Both NLN-AC and AACN consider NCLEX pass rates as an integral component to accreditation.

To force the issue of accountability further, there are many external factors, such as fiscal constraints, increased drive for research productivity, student/faculty ratios, globalization, technology, and performance standards (Altbach, 1999). When a nursing program fails to recognize and respond to the shift, performance is likely to decline. The consistent performance outcome, by which all nursing programs are judged, is their graduates' first time NCLEX success rates. Therefore, it is paramount that nursing programs continually assess and improve aspects of their programs that contribute to NCLEX success.

The concept of organizational change frequents the literature in multiple domains. In the business arena, organizational change is associated most frequently with the movement toward quality and improved production. Deming (as cited in Walton, 1986) identified fourteen points and seven deadly diseases for organizations to consider when embarking on organizational change or the goal of quality. From the perspective of individual leaders, Covey (1989) identified seven habits of highly effective leaders. He identified the first three habits as dealing with self-mastery, which moves a person from dependence to independence. He refers to them as "private victories" essential to character growth. Covey identifies the first three habits as: 1. Be Proactive, 2. Begin with the End in Mind, and 3. Put First Things First. These habits are paramount in setting the stage for successful leadership. Leaders in nursing education need to be proactive to the nursing shortage and keep the end goal of

NCLEX success in mind while simultaneously identifying the needs of the students and the university.

Collins (2001) studied 28 companies over a five-year period and identified the stages that propelled the top companies from good performers to great performers. Collins identified leadership strategies utilized by organizations that propelled performance of the companies. The three main stages of the framework include: Disciplined People, Disciplined Thought, and Disciplined Actions. Collins identified that making good decisions and executing them diligently, clearly separate the “Good from the Great”. Nursing programs are striving continually to go from good to great and have exceptional pass rates of 100%.

Senge (1990) identified five disciplines key to organizational learning, including personal mastery, shared vision, mental models, team learning and systems thinking. Senge defines the disciplines as:

- “Personal Mastery is the practice of articulating a coherent image of your personal vision” (Senge, 1999, p. 7).
- “Shared Vision is a collective discipline establishing a focus on mutual purpose” (Senge, 1999, p. 7).
- “Mental Models is a reflection and inquiry skill focusing around the development and awareness of attitudes and perceptions” (Senge, 1999, p. 7).
- “Team Learning is a discipline of group interaction...that transforms collective thinking and mobilizes the energy into action to achieve common goals” (Senge, 1999, p. 7).

- “Systems Thinking identifies the ability to learn and understand interdependency and change” (Senge, 1999, p. 7).

Senge (1999) furthered his focus of educational change specific to the concept of sustaining the momentum in learning organizations, focusing on the challenges of getting change initiated through redesign and rethinking. Consistent with many theories of change, Senge also identified the need to build a collective vision. Senge’s discipline of personal mastery sought to articulate a coherent image of a vision. Furthermore, the shared vision discipline expounds on the leader’s personal vision and creates a common vision or purpose throughout the organization. This discipline takes an opportunity for improvement from one person’s idea to an image shared by all to create a drive by all to create principles that guide practice. In nursing education, that element may include a shared vision of NCLEX success on behalf of the program’s leader, faculty, and students. Based on Senge’s theory, this shared vision should guide all of a nursing program’s programmatic decisions.

In addition to the discipline of shared mastery, team learning is also key when implementing new strategies. This discipline takes the members’ shared vision, and through a series of skillful decisions, creates tangible mechanisms to implement the vision. This may include the creation of policies, guidelines and curriculum revisions that support the shared vision. Initially, this may be completed through pilot groups or as part of a phased-in approach. This provides an opportunity for the faculty to identify issues and resolve them before a more global implementation.

The discipline of systems thinking is a higher level of evaluation. It requires the ability to understand the interdependency of various forces and how they may shape

the outcome or consequences of the whole. Consider the old adage, if one part is fixed then it may create problems elsewhere. When organizations subscribe to that adage they rarely implement change for fear of creating other problems. In a systems thinking approach, one assumes interdependency results in both planned and unplanned consequences. However, by using systems thinking, the group works to anticipate or evaluate the consequences and minimize the untoward aspects. This process generally takes time to lead to growth and stability and is not without significant effort. However, it requires the unrelenting support of the shared vision.

This study evaluated the impact of Senge's (1990) disciplines of Shared Vision, Team Learning, and Systems Thinking and if these concepts impacted the successful implementation of NCLEX predictor assessments within nursing education programs. To complete the evaluation, the researcher conducted qualitative interviews with nursing program leaders who utilize NCLEX predictor assessments. The participants included programs that demonstrated a consistently high rate of NCLEX success and programs that demonstrated a lower level of success. The comparison identified in Senge's disciplines were relevant in implementing NCLEX predictor assessments for a successful outcome.

Research Questions

1. What is the frequency utilization rate of NCLEX Predictor Assessments in Pennsylvania-accredited nursing programs collectively and by program type (Diploma, Associate, Baccalaureate, Accelerated and LPN-RN)?
2. What is the difference in NCLEX pass rates when comparing programs that utilize NCLEX predictor assessments with programs that do not?

3. What is the effect of how programs use NCLEX predictor assessments on NCLEX success?
4. What is the perception of program leaders as to what factors specific to the utilization and implementation of NCLEX assessment products, influence their program's NCLEX success?

Definition of Terms

A graduate nurse (GN) is a nursing student who has successfully completed requirements for graduation from an accredited nursing program in the state of Pennsylvania and is eligible to take the NCLEX-RN exam.

Diploma Nursing Degree Programs are typically hospital-based educational programs that emphasize nursing knowledge and skills.

Associate Nursing Degree Programs consist of two or three years of basic college-level courses in the supporting sciences and nursing curriculum.

Baccalaureate Degree Programs consist of a four-year academic degree with sciences and principles of nursing.

Accelerated or Second Degree Programs require students to have previously attained baccalaureate degree in another discipline, thus, focus of study is streamlined nursing content. Upon completion, a graduate is awarded a baccalaureate degree.

LPN-RN Programs require the student hold a valid license as Practical or Vocational Nurse. The course of study focuses on either the Baccalaureate Degree or the Associate Degree depending on the specific program.

RN-BSN Programs are designed to further the education of current RNs that attained their initial education via a Diploma, Associate or LPN-RN Associate Degree Program.

RN-BSN programs focus content on the additional courses that will complete a baccalaureate degree.

National Council Licensure Examination- Registered Nurse (NCLEX –RN) is the examination constructed and administered by the National Council of State Board of Nurses. The purpose of the exam is to ensure public protection insofar the candidate meets competencies needed to perform safely and effectively as a newly licensed, entry-level nurse.

NCLEX Predictor Assessments refers to the products utilized by nursing programs to assess students' readiness and ability to pass NCLEX.

Curriculum-Infused NCLEX Predictors refers to the format that includes NCLEX-style assessments at the end of all nursing courses as well as a comprehensive end of program assessment.

End-of-Program NCLEX Predictors refers to the format that includes the distribution of a comprehensive NCLEX-style test to students who are either in their last semester or last year of a nursing program.

NCLEX Success indicates students who pass NCLEX at the first attempt.

Shared Vision is a “collective discipline establishing a focus on mutual purpose”

(Senge, 1999, p. 7).

Mental Model is “a reflection and inquiry skill focusing around the development and awareness of attitudes and perceptions” (Senge, 1999, p. 7).

Team Learning is a “discipline of group interaction...that transforms collective thinking and mobilizes the energy into action to achieve common goals” (Senge, 1999, p. 7).

Systems Thinking “identifies the ability to learn and understand interdependency and change” (Senge, 1999, p. 7).

Significance of Study

Nursing programs are continually under pressure by university administration due to the increased expenses of nursing when compared to other sciences and other non-science majors. The faculty expense is significant due to the required clinical component and the required faculty-to-student ratio restrictions. In addition, programs require a nursing laboratory that is current and reflective of contemporary clinical settings. As a result, administrators expect nursing programs to perform efficiently and produce successful graduates, measured by the outcome of NCLEX pass rates. Thus, nursing programs are under the scrutiny of the program administration as well as the state. Programs that implement a curriculum change or require NCLEX predictors need to prove the overall value to the student and program. NCLEX predictor products are the current method utilized in the nursing academia to assess students' NCLEX readiness and to provide direction for remediation. This study evaluated the utilization of NCLEX predictors and their impact on NCLEX success.

Redman (2001) states most deans and department heads enter their roles inadequately prepared for leadership. This is true of nursing education administrators as well. Leaders need to keep their eyes on the vision, continually assessing the reality of current performance. Leaders in nursing education continually view the global issue of the nursing shortage and simultaneously assess their programmatic need of producing graduates who are successful with NCLEX. The leader and organization's

ability to envision, organize and execute various programmatic and curriculum changes is necessary to attain the goal of successful graduates.

Limitations of the Study

1. The participants included nursing programs in the state of Pennsylvania and may not be completely reflective of all states. Therefore, generalizing the outcome will be subject to the conditions of the associated variables. Presenting the results with sufficient detail to identify nuances specific to Pennsylvania and participants provided information to the reader that identifies the similarities for comparison. Also, the results provide an opportunity for nursing programs to compare when applicable.
2. The survey method of data collection inherently has limitations of participation that is controlled by the participants' desire to respond. Therefore, the results reflect only those nursing programs/leaders that participated.
3. Pennsylvania NCLEX-RN rates are reported by school, not by program type. Many schools have more than one program type within their school. As a result, the aggregate NCLEX-RN rate for the schools was used for analysis.

Summary

The scope of the national nursing shortage reaches far beyond healthcare agencies. Educational institutions offering nursing education programs are diligently working to increase the number of qualified graduates to address the nursing shortage. The volume of graduates is only one consideration to increasing enrollment. While increasing enrollment, nursing education programs must validate the ability to maintain quality. The outcome performance for which each nursing program is measured is

NCLEX-RN success rates. Each state monitors the rates for levels of acceptable performance. As a result, nursing programs consistently strive to keep pace with the changing NCLEX-RN Test Plan by revising curricula and employing best practice educational strategies. The research identifies many factors used to predict students' success with NCLEX-RN including demographic variables, admission criteria and performance within the program. The use of NCLEX predictor assessments has become a tool employed by many programs as a means to predict NCLEX success.

The purpose of this study was to identify the frequency of use of NCLEX predictor assessment products in nursing programs in the state of Pennsylvania and to evaluate if the manner of implementation of the predictor assessment product had an impact on NCLEX success rates. The theoretical framework for the study was Peter Senge's (1990) Organizational Change Theory, more specifically, the disciplines or concepts of Shared Vision, Mental Modeling, Team Learning, and Systems Thinking.

The significance of the study was supported by the internal and external pressure placed on nurse educators to graduate students who pass NCLEX-RN, on the first attempt. The use of NCLEX predictor assessments is considered a best practice strategy in the literature. This study evaluated the impact of various forms of implementation of NCLEX predictor assessment products and analyzed the relationship of NCLEX success. This study can be used as a guide to nurse educators, specific to strategies of implementation of NCLEX predictor assessments, which are linked to achievement of high outcomes of NCLEX success.

CHAPTER II

REVIEW OF RELATED LITERATURE

Introduction

Chapter II reviews literature germane to this research study. The literature review was subdivided into sections addressing NCLEX–RN, NCLEX success predicting factors, NCLEX predictor assessment products, utilization of NCLEX predictor assessments, success rates, change, resistance to change, change theories, organizational change, change in educational organizations, change in nursing education, leadership, educational leadership, and lastly, nursing education leadership.

NCLEX-RN

Graduates of state accredited nursing programs receive a certification from the nursing program indicating they are eligible to apply for the National Council Licensure Examination–RN (NCLEX-RN). The NCLEX-RN is a product of the National Council of State Boards of Nursing (NCSBN). The NCSBN is a non-profit organization that includes the boards of nursing from 50 states, the District of Columbia and four territories in the United States. The purpose of the NCSBN is to bring all members together to act and council on areas of common interest to all, including public health, safety and welfare, and the development of licensing examination in nursing (NCSBN, 2008). Although the council provides work in the areas of research, education, nursing practice, policy and government actions, the areas of focus for this study is the creation and implementation of the NCLEX-RN.

The first NCLEX-RN was administered in July of 1982 (Arathuzik & Aber, 1998). The exam’s evolution over time included the implementation of a pass-fail

scoring system in 1988 and Computer Adaptive Testing in 1994. The exam framework and test plan are revised every three years, the revision based on practice analysis of newly licensed nurses. For test plan April 2007, more than 6,000 newly licensed nurses identified more than 150 nursing care activities. The NCSBN evaluates the nursing activities for frequency, priority, impact on client safety, and the client care setting where the activities are preformed. The analysis is the guide that sets the framework for entry-level practice and is incorporated in the development of the NCLEX Test Plan (NCSBN, 2007).

The NCLEX-RN is the states' certification examination designed to test knowledge, skills, and abilities essential to the safe and effective practice of nursing at the entry level (Pennsylvania State Board of Nursing, 2005). Upon successful completion of NCLEX, the graduate becomes a licensed RN and is permitted to practice in the state. A majority of states offer reciprocity.

Within each state, the State Board of Nursing continually monitors the NCLEX pass rates of all nursing education programs as an integral factor in granting state approval status. Each state's board of nursing further defines thresholds that nursing programs must attain to maintain approved status. In Pennsylvania, if a program falls consistently below a set level of 60%, a remediation plan is required. Additional consequences continue if the pass rate does not respond to the remediation plan. Consequences may include a probationary period as well as a loss of accreditation from the State Board of Nursing. Without the state's accreditation of a nursing program, the program's graduates are not eligible to take the NCLEX exam. In addition, without state accreditation, the existence of the nursing program would be in jeopardy.

NCLEX –RN Success Predicting Factors Research

To become eligible for the NCLEX-RN, students must graduate from a state-approved nursing program. The types of education nursing programs include: Diploma Program, Associate Degree, Baccalaureate Degree, Accelerated/Second Degree, LPN-RN, RN-BSN. A Diploma Program is typically a hospital-based two – three year educational program with emphasis on nursing knowledge and skills. An Associate Degree Program consist of two years of mixed technical skills and college-level courses in the supporting sciences. The Baccalaureate Degree programs consist of a four year academic degree with sciences and principles of nursing. Accelerated or Second Degree programs are directed toward students with a baccalaureate degree in another or related discipline and the programs are streamlined to focus on nursing content. Accelerated Degree students are awarded a baccalaureate degree. A LPN-RN program requires the student hold a valid license as Practical or Vocational Nurse. The course of study will focus on the path of either the Baccalaureate Degree or the Associate Degree depending on the specific program. Lastly, RN-BSN Programs are designed to further the education of current RNs that attained their initial education via a Diploma, Associate Degree Program or a LPN-RN associate program. RN-BSN programs focus content on the additional courses that will complete a baccalaureate degree. All are deemed as appropriate educational options in the state of Pennsylvania.

Regardless of the type of nursing education program, all graduates take the same NCLEX-RN for licensure. As a result, the area of NCLEX success is of value to all nursing educational programs. The researched literature identifies both broad and narrow evaluations of factors that impact the NCLEX success rates within various

nursing programs. However, the broad or multidimensional studies significantly outnumber the narrow or uni-dimensional. Factors explored include academic predictors, such as Grade Point Average (GPA), grades in various courses within the curriculum, progression criteria, clinical experiences, admission criteria, remediation, and more recently, assessment predictor assessments. In addition, non-academic aspects of NCLEX success have been explored, including critical thinking skills, English as primary language, age, gender, and race. More global evaluations include the impact on faculty education and experience, curriculum, and pedagogical practices.

Research focusing on cumulative grade point averages (GPA) and a positive link between NCLEX Success includes Arathathuzik & Aber (1998), Beeson & Kisssling (2001) and Washington & Perkel (2001). More recent studies include Marshall (2006), who identified that GPA in general education courses was the best predictor of NCLEX success among 314 graduates from an AD program. Consistently, Simon (2006) concluded that course grades from clinical and foundational science courses correlated with NCLEX readiness. Harris' (2006) evaluation of cumulative GPA, admission GPA, gender, age, and marital status as predictors of NCLEX success concluded mature students, as well as those with elevated GPA on admission and cumulatively, had a higher level of predictability with NCLEX success. Turner (2005) completed a longitudinal study of West Virginia nursing programs over a nine-year period. The study investigated the relationship between mean student program scores on standardized tests, program attendance policies, grading scales, policies on repeating nursing courses, faculty issues such as turnover, degree, teaching experience, clinical experience, part-time status, national certification, and the student's success on

NCLEX. Results from Turner's research indicated significant positive relationships existed between mandatory classroom attendance policies, mandatory clinical attendance policies, number of times students permitted to repeat nursing courses and the number of years of faculty's clinical experience and the students' NCLEX success rates. Consistently, Nnedu's (2000) ex post facto study of graduates from three southeastern baccalaureate programs identified grades in a selected nursing course of psychiatry were the best predictors of NCLEX success whereas grades in nursing of children offered the least predictability. Consistent with previous research, Nnedu also concluded older graduates have higher pass rates and that gender has no effect on pass rates.

Literature supports the correlation of various NCLEX predictor assessments and successful performance on NCLEX. Stork (2004) concluded students with higher GPA and higher scores on the Mosby AssessTest were more likely to pass NCLEX-RN than those with lower GPA and Mosby scores. Burckhardt (2004) examined the relationship between scores on Kaplan Readiness Test and the probability of passing NCLEX, concluding a predictability rate of 93.9%. Treas (2006) concluded the Assessment Technology, Inc. (ATI) RN Comprehensive Predictor Assessment accurately predicted NCLEX success at a rate of 81.5%. Furthermore, Lewis (2005) concluded that the Health Education System, Inc (HESI) Exit Exam accurately predicted NCLEX success at a rate of 97.8%. Endres' (1997) retrospective study evaluated NCLEX success of African Americans, foreign-born and white baccalaureate graduates on nine variables, including admission grade point average, medical-surgical nursing GPA, nursing GPA, cumulative GPA, percentile rank on Mosby AssessTest,

age at time of NCLEX, number of semesters needed to complete curriculum, licensed vocational nurse status, and the number of nursing courses that resulted in grades of D or F. The retrospective study revealed students with Mosby AssessTest percentile rank below 21 or a D or F in any nursing course were most likely to fail NCLEX. Barkley, Rhodes and Doufour (1998) indicated scores on the National League of Nursing Achievement Test (NLN-AT) predict NCLEX success. Further multidimensional research of Hardin (2005) also suggested associate degree graduates with higher GPAs on admission and graduation, as well as cumulative GPA in science and nursing courses, and lastly, passing grades on mid-curricular and exit assessments from the HESI scores had a higher NCLEX success rate. A series of research studies have been conducted that found the HESI Exit Exam (E²) to be accurate in predicting success on NCLEX-RN (Daley, Kirkpatrick, Frazier, Chung, & Moser, 2003; Newman, Britt & Lauchner, 1999; Nibert & Young, 2001).

Progression policies and the impact on NCLEX success are also an area of study. The utilization of progression policies in nursing programs is not new; however, the utilization of progression policies that rely predominantly on NCLEX predictor assessments is a source of heated debate. Mosser, Williams and Wood (2006) evaluated two baccalaureate programs with progression policies. Both programs noted an increase in NCLEX success since implementing progression policies with elements of minimal course grade acquisition and a specified threshold on ATI Course Predictor Assessments. Nibert, Young and Britt (2003) reviewed 45 programs with progression policies and identified that students who did not meet minimal HESI E² scores either failed a key course, were denied eligibility for graduation, or approval to take NCLEX.

Lewis' (2005) retrospective research noted significant difference existed between HESI E² scores of students in nursing programs with benchmark policies than those in programs without progression policies.

Conversely, Spurlock and Hanks (2004) questioned the ability of HESI E² to predict NCLEX-RN failures, therefore, recommending the programs consider multiple aspects for progression beyond the HESI E². Specter & Alexander (2006) indicated that progression or exit exams are valuable tools in predicting NCLEX success, however, they identified that a comprehensive assessment program throughout the curriculum with adequate remediation was paramount in providing a global identification of readiness for NCLEX.

The research review indicates that NCLEX success has been studied from a variety of approaches as well as variables. However, the majority of the research has focused on the individual graduate versus the nursing program at large. The focus of this study differs from past research in that it will seek to investigate the specific practice of utilizing NCLEX predictor assessments and the interactional effect on first time NCLEX success from the perspective of the nursing programs collectively versus the individual graduate or individual program. Furthermore, this study asked if the program's strategies for organizational change impact the utilization of NCLEX predictor assessments and first time success on NCLEX.

NCLEX Predictor Assessment Products

Nursing programs and students alike are striving continually to attain the ultimate goal of NCLEX success. It is a frequent practice in nursing programs to utilize an external objective evaluation of students' likelihood to pass NCLEX. The NCLEX

assessments mimic the current NCLEX Test Plan in regard to content, style, and electronic format. The NCLEX predictor assessments are purchased from an outside vendor that provides a NCLEX-style assessment to predict the students' first time success with NCLEX after graduation. The assessment products include one of two formats. The first format is a comprehensive end of program evaluation or exit assessment. This format includes a distribution of a comprehensive NCLEX-style test to students who are either in their last semester or last year of a nursing program. The second format is a curriculum-infused format. This format allows nursing educational programs the opportunity to include assessments at the conclusion of key courses in their programs as well as a comprehensive end of program assessment.

Although the concept and goal of NCLEX predictor assessment has been identified above, there are multiple vendors that offer the various assessment products. For the purpose of the study, the author discussed NCLEX predictor products that are utilized in group format by nursing education programs versus individual consumers. Assessment products have evolved with the technology boom. The earlier products available were pencil and paper tests that were proctored by faculty and mailed to the vendor for scoring. The vendor would return the results with individual as well as group analysis. The intent of the group report was for faculty to utilize the group results for potential programmatic and curricular changes to address areas of opportunity for improvement. The intent of the student reports was to aid the student in identifying areas that require remediation in preparation for NCLEX as well as increase confidence in areas of success. Although vendors now offer an electronic version of NCLEX predictor assessments, the intent remains the same for both group

and individual results. The vendors also offer their products to individual students as well as collective institutional or nursing education program for purchase. This research focused on the predictor products utilized by nursing programs versus individuals.

At the time of this research, the NCLEX predictor vendors that were available for nursing education programs in the literature and via electronic search include: Arnett Development Corporation (ADC), Assessment Technology Incorporated (ATI), Educational Resources, Inc (ERI), Health Education Systems (HESI), Mosby's AssessTest, and the NLN-Achievement Tests (NLN-AT). The similarities of all the companies' products are that they all follow the current NCLEX Test Plan and provide both the student and the educational program with individual and aggregate outcomes. In addition, all companies, except Mosby's AssessTest, offer an array of electronic products in addition to the comprehensive NCLEX predictor, such as programmatic entrance assessment, testing strategies, and remediation programs. Arnett, ATI, HESI, and NLN-AT offer global packages that can be tailored to the programs' curricula to include specialty or course-specific assessments, as well as, the comprehensive predictors. All vendors offer tests in either paper and pencil or electronic format. Arnett and Mosby AssessTest offers Computer Adaptive Testing (CAT), which is utilized on NCLEX. CAT is a process of re-estimating the responder's ability based on response to previous question. CAT follows an algorithm to estimate the responder's ability of above or below the standard of passing (NCSBN, 2008).

Utilization of NCLEX Predictor Assessments

Reiter, Young & Adamson (2007) identified that utilizing exit exams may be an effective predictor of workplace competency for health care organizations attempting to address the increasing cost of orienting new graduates. In the realm of nursing education programs, the practice of implementing a NCLEX predictor into the curriculum has increased in recent years as nursing programs attempt to produce more graduates in response to the nursing shortage. However, what products and how the products are utilized varies significantly between nursing education programs. Various State Boards of Nursing have published recommendations to encourage the use of NCLEX predictor tools as an outcomes measurement. State Boards of Nursing, including Oklahoma and California, recommend nursing programs track students' performance on predictor assessments as one of the components of a systematic program evaluation (Kimmel, 2008). Holstein, Zangrilli, & Taboas (2006) suggest NCLEX predictor assessment programs can support the mission and goals of the nursing program by utilizing the assessment programs as part of a continual evaluation and opportunity to improve the quality of the nursing program.

How nursing programs utilize and incorporate the predictors into their curricula is linked to their intended purpose. The majority of the research on the utilization of NCLEX predictors focuses on individual products and individual nursing programs. The most frequent utilizations include:

- identification of high-risk students to implement remediation prior to graduation;
- culminating assessment of student's ability that may be required to qualify for graduation;

- link student results to a goal benchmark level, and designate a percentage toward course(s) grade based on attainment of benchmark; and
- link student results to a goal benchmark for progression to next course or level in the program.

The literature supportive of the trend of utilizing NCLEX predictor products is increasing. However, this researcher had not located any studies that included a global evaluation of vendor or utilization with NCLEX outcomes. Most studies focus on one product and one nursing program. This researcher evaluated the global perspective of products and their utilization with NCLEX outcomes in the state of Pennsylvania.

Success Rates of Nursing Programs in State of Pennsylvania

Over the years of 2004–2007, the success rates for first time NCLEX candidates in Pennsylvania have been fairly consistent with the increases and decreases of national results (see Table 1). Over the years of 2004 – 2006, the rates increased nationally every year, as did Pennsylvania’s rates. However, Pennsylvania was consistently 1- 1.3% below the national rates.

Table 1. *Comparison of Pennsylvania and National NCLEX-RN Pass Rates for 2004–2007*

	2004	2005	2006	2007
Pennsylvania	84.10%	86.01%	87%	82.53%
United States	85.10%	87.18%	88.11%	85.74%

In 2007, the national rates decreased to 85.74% and Pennsylvania’s rates decreased to 82.53%. In April of 2007, a revised test plan was implemented. The NCSBN revises the test plans every three years based on a review of current practice for entry level

nurses (NCSBN, 2008). The decrease in success is consistent with past patterns of implementation of a revised test pattern as noted in 2004, when the national rate was 85.4% and in Pennsylvania 84.1%.

Change

Merrium-Webster (2008) define the verb change as “to make different” or “to replace with another”(¶ 2). Will Rogers’ (nd) comments on change included, “Even if you are on the right track, you will get run over if you just sit there” (¶ 6). Change is the nature of the universe and is inevitable. Despite that, change is pervasive and necessary in everyone’s life; it is a frightening concept because it takes one from an area of comfort to an area of the unknown or potential unrest. Hahn (1991) stated change is a difficult process to handle and leaders need to resolve basic conflicts about change, including: change versus tradition, self-fulfillment versus participation, and decentralization versus integration.

Change is constant, without it there is stagnation and eventually death. This is true of the human body and mind and is also prevalent in the literature regarding programs and organizations. All need to adapt in response to the ever-changing environment or death and extinction occur. Researchers studying change classify it as a particular type based on the cause of change. Owens (1987) identified the major classifications of change as planned and unplanned. Owens’ defined planned changes as a deliberate attempt to direct change within a set of predetermined goals and values. He further defined unplanned change as enforced change, unanticipated and often forced on a school system or an organization.

Lipham, Rankin & Hoeh (1985) identified the types of change as enforced, expedient or essential. Enforced change is a product of external forces. If not for the external forces, the change would not have occurred. In an education environment, examples of enforced change include state and federal mandates or community pressures. Expedient change results from meeting immediate concerns from an external or internal source. It is typically short-term or reactionary in nature. An educational example is a last minute change in a school budget or change in guidelines related to a negative student experience. Lastly, essential change comes from internal sources and is driven by the ability to self monitor a system and work toward continuous performance improvement.

Resistance to Change

The reasons for resistance to change are abundant. According to Razik & Swanson (2001), change should be viewed as both an intellectual and psychological process. It is the psychological perspective of change that stimulates resistance out of a perceived interference with self-esteem needs, social status, and relationship of fulfillment. Resistance to change is an emotional behavioral response to real or imagined threats to one's equilibrium or routine (Kreitner & Kinicki, 1980; Stanislaw & Stanislaw, 1983).

Researchers have identified sources or barriers of resistance. Harvey (1990) reported sources of resistance, including: lack of ownership, lack of benefits from change, feelings of loneliness in dealing with the change, and conflict with existing norms. Watson (1969) stated change is resisted if it does not adhere to pre-established norms and values, which are products of an organization's culture. Basom & Crandall

(1991) studied barriers specific to change in schools and identified seven common barriers: discontinuity of leadership, managers' fears that change was unmanageable, lack of training in management regarding change, following a top-down decision making model, socialization and conditioning of school staff, unresolved competing visions, and inadequate time and resources.

The barriers to change can be decreased significantly when the barriers are identified in the planning phase. Fullan (1982) reported four characteristics to successful change: demonstrate a necessity for change, clarity of purpose, complexity, whether the change is worth the expanded effort, and practicality, implementing into practice.

Change Theory

The literature review of change is similar to change itself, for it is never ending and it subdivides quickly. The various aspects of change, include: factors affecting change, change agents, change strategies, resistance or barriers to change and psychological aspect of change. Further subdivision occurs in evaluating change in the various domains of: communication, decision-making, ethics, culture, psychological, and social.

Change theory started in the domain of social psychology. The theorist and work identified most frequently in the literature on change theory is Kurt Lewin's (1951) Three Step Change Theory. Lewin identified the steps of change as: 1. "Unfreezing", which is the existing situation to demonstrate the need for change and dismantle the existing mindset; 2. "Moving", which is where the actual change takes place and occurs by encouraging people to make plans for the change, acquiring

acceptance and piloting the change; and 3. “Refreezing”, which is the process of crystallizing the new ideas, integrate and stabilize change as part of value system and identify forces that support or resist change. Lewin (1943) is well known also for his expanded work in the arena, Force Field Analysis. His model illustrates the effects of forces that either promote or inhibit change. More specifically, driving forces promote change, and conversely, restraining forces oppose change (Robbins, 2003). Lewin’s work was the starting ground for many other theories of models that expounded upon his work, including Leppitts, Watson and Westley (1958) and Schein (1992).

Of Lewin’s protégés, Leppitts, et al. (1958) extended Lewin’s work by creating a seven-step theory focusing more on the role and responsibility of the change agent than the change itself. A change agent is an individual or group of individuals assisting in the planning and implementation of a change. They identified the steps as: 1. diagnose the problem, 2. assess motivation for change, 3. assess resources and motivation of the change agent, 4. choose progressive change objects, 5. clearly define the role of the change agent, 6. maintain change, and 7. gradually withdraw the change agent as the culture reshapes to embrace the change. When change is initiated it is the change agent who is close to the situation and provides guidance to others. The change agent continually exchanges information throughout the process. Leppitts, et al. (1958) identified that if change was spread throughout neighboring systems or areas affected immediately, then the change was more likely to be stable.

Schein’s (1992) direction focused on the impact of group culture on change. He defined organizational culture as a pattern of shared basic learned assumptions of a group through problem solving of both internal and external circumstances. In

addition, the cultural assumptions have proven effective and valid, thus, new members assimilate into the cultural assumptions. The three levels of culture he identified were artifacts, espoused values, and basic underlying assumptions. Schein indicated that unless culture is considered, it can be a primary source of resistance to change. If managers are not conscious of the culture, then the culture will manage the change instead of the manager directing the change (Schein, 1992).

Reddin (1970) focused on both the psychological as well as the aspect of human nature regarding change. He noted many times the change was not successful when the emphasis of change was on the outcome. Reddin expressed individual needs must be at the center of change to accomplish a systemic outcome. He identified that concerns regarding change were among three broad categories: 1. How will the change affect the individual?, 2. How will the change affect the relationships with others?, 3. How will the change affect the individual's work? Reddin suggested when acquiring buy-in from individuals, the core issue of focus should be on the needs of the individual, instead of the change. If the individual feels comfortable and secure with the impact of change to themselves, they can think of the change on a broader scope. Using Reddin's model, Sergiovani & Strarratt (2002) identified that teachers may not verbalize their concerns in these categories. Instead, they are likely to identify issues with a more global argument of whether or not the change makes educational sense.

Another social view of change is that of Roger's (1983), who views change as a Diffusion of Innovation. His work focused on societal change in which he identified diffusion that required four main elements: an innovation or ideas, communication of the innovation through certain channels, the communication occurs over time, and the

communication occurs to the affected members in the social system. The premise for Roger's view focused on effective communication throughout the process as well as throughout the organization. He further expanded communication to surrounding elements in society. The sharing of information requires two-way communication to address issues or concerns as swiftly as possible.

Organizational Change

As difficult as individual change may be within an organization, it pales in comparison to change on a global scale. The complexities associated with even the smallest change in a remote part of an organization reverberate throughout the entire company. The ability to orchestrate change within an organization effectively is a necessary leadership skill. Therefore, the concept of organizational change frequents the literature in multiple domains. The number of theories or models on organizational change is similar to the almost endless volumes of self-help books. This review focused on several noteworthy models, but it is certainly not an exhaustive review of organizational change.

Beckhard & Harris (1977) created a formula approach to organizational change to address the need for managers and employees to unite efforts for accomplishing complex change. The formula of $D \times V \times F > R$ represents the components required for effective change to include: D – Dissatisfaction with current situation, V – Vision for the future after addressing current problems or issues, F – First or next steps toward an achievable vision, and R – Resistance to Change. The formula requires all aspects to the left must be present to overcome resistance to change. This model merges both an employee engagement approach with an employer outcome-oriented approach.

Beckhard and Harris' model was one of the first models that incorporated the employees in the organizational change process.

In the business arena, organizational change is most frequently associated with the movement toward quality and improved production. Deming (as cited in Walton, 1986) identified fourteen points and seven deadly diseases for organizations to consider when embarking on organizational change or embarking on the goal of quality. Collins (2001) studied twenty-eight companies over five years and identified the stages that propelled the top companies from good performers to great performers. The three main stages of the framework included: Disciplined People, Disciplined Thought, and Disciplined Actions.

Kotter (1990) outlined the Change Phase Model of Leadership, which includes eight steps. Kotter further explained it is key that the steps follow the identified sequence. 1. Establish a sense of urgency, 2. Create a coalition, 3. Develop a shared vision, 4. Share the vision, 5. Empower people to clear obstacles, 6. Secure short term wins, 7. Consolidate and keep moving, and 8. Anchor the change. Kotter indicated that creating the sense of urgency is paramount for identifying the need for change. Without a perceived need for change all efforts are useless. Creating coalitions and visions are not new to change, but empowering members to identify and remove obstacles provides a sense of inclusion that fortifies the shared vision. Kotter suggested the leaders' need to identify and celebrate small accomplishments throughout the process, providing validation to efforts as well as incentive to continue.

Rogers (1983) expounded upon his Diffusion of Innovation Theory and identified the Innovation Adoption Curve model that classified adopters of innovation

(change) into various categories. By identifying the type of adopters in an organization, a leader can strategize “the how” to enhance or accelerate change. The categories of adopters, include: Innovators, Early Adopters, Early Majority, Late Majority and Laggards. Rogers’ model is also called Multi-step Flow Theory.

Kanter’s (1988) Innovation Model supported that both the structural and social conditions of the innovation process should be divided into major tasks. The four central tasks, include: Idea generation, Coalition building and building allies, Idea realization into tangible and concrete actions for implementation, and Transfer onto organizational practice. Kanter’s model provided a global framework for planned change within an organization. The intent of her model is that change is not a top-down approach. To be successful with innovation, Kanter suggested the need for change must be prevalent and shared with those implementing and affected by the change.

Change in Educational Organizations

The domain of education also provides a perspective on organizational change. The need for educational change generally follows changes in economics, society, and culture. Duke (2004) defined educational change as “a change intended to alter the goals of education and to improve what students are expected to learn, how students are instructed and assessed and how educational functions are organized, regulated, governed, and financed” (p. 30). Duke also shared that educators and the nature of bureaucratic schools are criticized often for high resistance to new ideas that improve practice. Tyack & Cuban (1995) concurred and stated more energy is spent on talking about the need for change in education than acting upon the change. They further

identified that the discussions are an inevitable result of conflict of values and interests. Sarason (1971) identified the reason for the limited educational change is that many reform initiatives fail to address the existing regularities in the schools, thereby, criticizing reform failures and ironically ensuring the basic model of educational operation continues.

Despite the debate regarding the speed or completion of change in education, change is necessary in education as in any organization. There are many examples of both major and minor changes in education. A hallmark example of global change was the outcome of the 1954 Brown versus the Board of Education hearing of Topeka, Kansas, which led to the desegregation of schools based on race. As with most change in education, the civil rights movement was consistent with the activities in society at that time. The desegregation of schools was far from swift, and in the opinion of many, still not complete. However, this change sparked a cascade of revisions in policy and funding on every level of the educational system.

Identifying an idea or need for change is the easy part of change. Implementing and sustaining change is a laborious process that requires commitment and support from all parties. Scott (2002) stated educational organizations, which are successful at navigating continuously changing environments have a deep understanding that change is not an event, but an ongoing process of organizational and individual learning.

Gardner (1995) focused on the cognitive approach to leadership and identified four principles of human development regarding effective leaders. The first factor, human primate status, organizes society into hierarchies. Second, early socialization defines one's self definition and societal group identification, which develop a leader's

personal, social and moral identities. The third principle focuses on the mind of a five-year old, which defines one's interest in understanding the world in which one lives or theories of the world. The last principle focuses on the attainment of expertise in various domains through the process of education.

Havelock's (1973) Linkage Model focused on the process of educational change. His perspective is that there are two systems: a user system and a resource system. A basic premise of this model suggests a transfer or link of information from the resource system to the user system. Havelock also included the importance of building a strong relationship between the change agents and their clients. His stages to accomplish the educational change in an organization include: 1. Build relationships, 2. Diagnose, 3. Acquire relevant resources, 4. Choose the solution, 5. Gain acceptance, and 6. Stabilize the innovation and generalize self-renewal.

Hargraves's (1997) perspective on educational change included the concepts of broadening the scope beyond the traditional classroom and teachers. His works included a deeper and wider search of successful educational social change. Senge, et al. (2000) identify four guidelines for successful organizational change in schools. First, introduce organizational learning on the levels of classroom, school, and community to build allies in all key areas. Second, focus on one or two new priorities for change. Multiple simultaneous change projects become overwhelming and directs the focus of attention to the area of importance. Lastly, involve everyone in the learning and change.

Senge (1990) identified five disciplines key to organizational learning, including personal mastery, shared vision, mental models, team learning, and systems thinking. Senge defines the disciplines as:

- “Personal Mastery is the practice of articulating a coherent image of your personal vision” (Senge, 1999, p. 7).
- “Shared Vision is a collective discipline establishing a focus on mutual purpose” (Senge, 1999, p. 7).
- “Mental Models is a reflection and inquiry skill focusing around the development and awareness of attitudes and perceptions” (Senge, 1999, p. 7).
- “Team Learning is a discipline of group interaction...that transforms collective thinking and mobilizes the energy into action to achieve common goals” (Senge, 1999, p. 7).
- “Systems Thinking identifies the ability to learn and understand interdependency and change” (Senge, 1999, p. 7).

Senge (1999) furthered his focus of educational change specific to the concept of sustaining the momentum in learning organizations, focusing on the challenges of getting change initiated through redesign and rethinking. Consistent with many theories of change, Senge also identified the need to build a collective vision. Senge’s discipline of personal mastery seeks to articulate a coherent image of a vision. Furthermore, the shared vision discipline expounds on the leader’s personal vision and creates a common vision or purpose throughout the organization. This discipline takes an opportunity for improvement from one person’s idea to an image shared by all to create a drive by all to create principles that guide practice. In nursing education, that

element may include a shared vision of NCLEX success on behalf of the program's leader, faculty and students. Based on Senge's theory, this shared vision should guide all programmatic decisions for a nursing program.

In addition to the discipline of shared mastery, team learning is also key when implementing new strategies. The team learning discipline takes the member's shared vision, and through a series of skillful decisions, creates tangible mechanisms to implement the vision. This may include the creation of policies, guidelines and curriculum revisions that support the shared vision. Initially, this may be completed through pilot groups or as part of a phased-in approach. Team learning provides an opportunity for the faculty to identify issues and resolve them before a more global implementation.

The discipline of systems thinking is a higher level of evaluation. It requires the ability to understand the interdependency of various forces and how they may shape the outcome or consequences of the whole. Consider the old adage, if one part is fixed, it may create change or problems elsewhere. When organizations subscribe to that adage they rarely implement change for fear of creating other problems. In a systems thinking approach, one assumes interdependency results in both planned and unplanned consequences. However, by using systems thinking, the group works to anticipate or evaluate the consequences and minimize the untoward aspects. This process generally takes time to lead to growth and stability and is not without significant effort. However, it requires the unrelenting support of the shared vision.

Change in Nursing Education

Nursing education, like all other aspects of life, has experienced change to survive. Prior to Mary Nutting, who in 1906 was a champion for nursing education reform, the majority of nursing education was conducted as on-the-job training in a hospital (Reilly, 1990). In the 1930s, hospital-based diploma training was the primary source of formal nursing education. During the post World War II era, nursing standards were scrutinized and nursing education began to migrate to colleges and universities (Herrman, as cited in LeMaire, 2002). With the onslaught of baby boomers in the 1960s, the options of college or university-affiliated associate or baccalaureate degrees increased. In 1965, the American Nurses Association unveiled their position paper identifying entry into nursing practice should begin at the baccalaureate level for professional nurses and the associate level for technical nurses (ANA, 1965). The ANA hoped the position paper would take nursing from the status of vocation to that of profession, thus the shift in verbiage from “nursing training” to “nursing education”. Ironically, the debate of entry level practice requirement continues today well into the 21st century. Although diploma programs in many states have dwindled, if not discontinued, Pennsylvania has the highest number of diploma programs at 22 (Pennsylvania State Board of Nursing, 2008).

The global changes facing current nursing education programs today are similar to those of other higher education programs. The changes unique to nursing education are the nursing shortage and faculty shortage. The nursing shortage increases competition for both admissions and expectations of graduates. Managing the faculty

shortage has forced nursing education programs to limit enrollment, which hastens the nursing shortage further.

In addition, nursing education also faces the same opportunities for change as higher education as a whole: state and federal policy, limited funding sources, increasing expenditures, increased accountability, and technology. Similar to higher education, the majority of research in nursing education research is abundant in the areas of curricula issues and instructional methods, yet sparse on the element of change itself.

Since the majority of nursing education occurs in higher educational settings, such as college or universities, nursing education also has the same issues in relation to resisting change. The added elements of faculty academic freedom and the debate of teaching versus research tend to increase the resistance to change (Kerr, 1994).

Leadership

The concept of leadership means something different to everyone. Stogdill (1974) stated “..there are almost as many different definitions of leadership as there are people who have attempted to define it” (p. 7). Northhouse (2004) defined leadership as “a process whereby an individual influences a group of individuals to achieve a common goal” (p. 3). Despite the multiple definitions, most scholars agree leadership is a relation between leaders and followers. In addition, all concur successful leaders must possess the ability to impact effective change within an organization. How that relationship is defined and what identifies a successful leader is where the debate begins. Literature demonstrates there are several theories or approaches to leadership, including: Trait, Skill, Style, Situational, Transactional, and Transformational. Trait

theories, are referred frequently as “great man” theories since they focused on distinguishable personal characteristics or innate qualities that separate leaders from followers such as: height, weight, energy, superior judgment, knowledge level, verbal capacity and interpersonal skills to name a few (Bass, 1990). Northhouse (2004) distinguished the difference between Skill and Style approaches. He stated a Skills approach to leadership emphasizes the leader’s capability whereas the Style approach emphasizes the behavior of the leader. In Situational leadership theories, Hersey & Blanchard (1988) implied that leaders consider all elements of the environment and adjust their styles to meet the specific situation at hand. Burns (1978) defined transactional leadership as an exchange in which both leaders’ and followers’ needs are met through goal task situations. Transformational leadership “is the process by which leaders and followers raise one another to higher levels of motivation and morality” (Burns, 1978, p. 20). Another area of clarity is the difference between leadership and management. Razik & Swanson (2001) stated the difference eloquently as, “Leadership is the process whereby leaders and followers intend mutually agreed upon changes, whereas, management involves an authority relationship between managers and at least one subordinate that is intended to meet a specific goal” (p.326).

Again, the most researched models are from the domain of business. Peter Drucker (1954) was one of the first to provide advice to leaders on how to set objectives and develop strategic plans. He outlined a model of Management By Objectives (MBO) as a means to articulate a goal for each employee and match it with the objective of the organization. This requires other key principles of participative

decision-making on all levels, setting time lines and evaluating performance and providing feedback on the performance.

Covey (1990) identified seven habits of highly effective leaders as: 1. Be proactive, 2. Begin with the end in mind, 3. Put first things first, 4. Think win-win, 5. Seek first to understand and then to be understood, 6. Synergize, and 7. Sharpen the saw. Covey focused on the restoring ethics in leadership, thus initiating an ethical focus of change in an organization. Later, Covey added an eighth step to include, find your voice and inspire others to find theirs.

Kouzes & Pozner (1987) identified that leaders are at their personal best when they demonstrate five practices: challenging the process, inspiring a shared vision, enabling others to act, modeling the way, and encouraging the heart. Gilmore (1988) suggested successful leaders: incorporate a new vision, reorganize effectively, cultivate productive work alliances, manage the pace of organizational change, and prepare the organization for future transitions.

The purpose of the qualitative portion of this study was to define what the study's program leaders perceive as factors specific to NCLEX predictor assessments utilization and implementation that influence NCLEX success. As a result, a thorough understanding on leadership factors and models is relevant.

Educational Leadership

The educational system is very complex, with many internal and external pressures and stakeholders. Educational leaders need to develop, communicate and implement the organization's vision. Razik & Swanson (2001) identify successful

leaders in education must provide direction for the future while simultaneously managing the present systems to ensure smooth daily operations.

Senge et al. (2000) encouraged all educational leaders to take the opportunity with all levels of the organization to identify “guiding ideas” or concepts that define what the organization stands for and what its members desire to create (p. 312). This exercise assists the members in creating a shared vision tied to the organization’s identity and core purpose. The core beliefs are the measuring stick in regard to all aspects of change and everyday activities. Core beliefs keep the organization true to itself while building a common unity among its members.

Losco & Fife (2000) identified academic leadership as a long distance run versus a sprint. “The nature of academia includes the tradition of shared governance, academic freedom, consensus-based decision-making and carefully drawn change” (p. 161). These aspects are indeed a challenge to those in higher education leadership positions, particularly for those in public universities. Despite the challenges for university presidents, the American Council of Education (2007) revealed the average tenure for university presidents has been steadily increasing since the mid 1980s. Tenure average for 2007 is 8.5 years, up from 6.6 years in 2001.

The study by the American Council of Education (2007) also revealed data to identify the number of women university presidents. Women presidents increased from 8% in 1986 to 29% in 2007. Christman & McClellan (2008) conducted a study of women in university leadership roles. They concluded resilient women leaders shift into multi-dimensional gender roles and traverse conventional borders to be successful in their roles.

Deans in a university are referred to frequently as the middle man. They need to sell the vision and ideas of the university president to the faculty level. Wepner, D'Onofrio, & Wilhite (2008) conducted a study of educational deans and their approach to solving leadership problems. The study revealed the deans utilized the four dimensions of leadership including intellectual, emotional, social, and moral with intellectual as the main dimension. Also noted was that the deans utilized the theme of denying problems more frequently than other themes.

Many universities follow the tradition of shared governance, where faculty leadership assists in identifying academic priorities and ensuring academic control over research. Kerr (1994) reported faculty loyalties have shifted from the university that employs them to the various research and professional associations. This shift makes it difficult for leadership to create the collective vision for a university, and as a result, orchestrate change.

Nursing Education Leadership

Farley, as cited in *National League of Nursing's Patterns in Nursing* (1986), stated "to be successful in nursing education, we must recognize the need for change; we must develop the ability to implement change; and we must ourselves adapt to change" (p. 143). She further identified that many times faculty do not see the need for change, spend significant time and energy resisting it, and as a result, are not ready when it occurs. Based on Farley's comments, one might concur nursing faculty and leadership are not different from other educators and educational leaders on the aspect of change.

The amount of research focusing specifically on nursing education leadership is limited. Similar to educational leadership, the majority of research for nursing education focuses on students, student-faculty interactions, curriculum, faculty self-efficacy and programmatic implementations. However, Reese (2004) conducted an evaluation of program directors for associate degree programs and the impact of empowerment strategies. Results indicated leaders use both transaction and transformational leadership behaviors and feel empowered in their roles and are satisfied with their jobs. A similar study by Chen and Baron (2006) assessed both the directors and the faculty and found Taiwan's nursing directors most frequently displayed transformational leadership and that the faculty members were moderately satisfied with their jobs.

Kippenbrock, Fisher & Huster (1994) evaluated the role of the nursing departmental chairperson. The roles identified most frequently included: planning of academic programs and courses, ensuring academic standards, determining departmental goals, and scheduling of courses. Other roles identified included budget preparation, salary negotiations and obtaining research funding. Despite the leadership title, the participants were more satisfied with their role of teaching than leadership. In addition, participants identified they had significantly more preparation in the academic aspect of their role than the administrative portion. They also identified their future successors would require more experience in fiscal and human resources issues as a result of the changing role of chairpersons.

Tod-Gray (2008) conducted a study to explore the ethical dimensions of leadership in nursing education. This study was founded in moral leadership concepts.

The findings revealed the themes of: integrity, justice, wrestling with decisions in light of consequences, and the power of information. The themes correlated with values that directed the leaders' actions as they conducted their roles, thus concluding moral leadership is evident in nursing educational leadership.

Summary

Many external factors require a shift in thinking regarding nursing education, such as globalization, technology, the economics of education, performance standards, etc. When a nursing program fails to recognize and respond to the shift, performance is likely to decline. The consistent performance measurement by which all nursing programs are judged is their graduates' first time NCLEX success rates. To date, the majority of research predicting students' NCLEX success is focused on student-specific information, such as: high school GPA/rank, grades in science and nursing courses and amount of course repeats. Research focusing on the nursing program components includes the factors of: admission criteria, curriculum, attendance policies, remediation opportunities and progression policies. Recent best practice behaviors in nursing education lean toward the inclusion of a process to objectively evaluate and predict the students' ability to pass NCLEX. A best practice component is the inclusion of NCLEX predictor assessments in nursing programs. There are many products available as well as multiple options for implementing an NCLEX predictor aspect. The research to date in this area focused on individual programs and the impact of adding a NCLEX predictor to an individual program. However, an area with limited research is the evaluation of multiple programs and the impact of including NCLEX predictors in a nursing program, more specifically, Does the utilization of a product

impact a program's NCLEX success? This study evaluated the impact of a program's utilization of NCLEX predictor assessments on the program's NCLEX success.

Similar to other domains in education, nursing programs and activities can be steeped in tradition. Professors are comfortable teaching the content in a manner in which they, themselves, were taught or in a manner in which they are comfortable, thus change is rarely welcomed. Nursing program leaders are no different from other leaders. They need to inspire vision and change to keep pace with consumer expectation as well as performance criteria of outside accreditation bodies and the state's board of nursing. At the same time, leaders in nursing education are expected to be experts in their areas; however, few ever receive education or training for the leadership role (Redman, 2001).

Organizational change and its implementation require significant persistence and fortitude on behalf of a leader and the members. The models of how to approach organizational change are abundant, yet several consistent themes emerge, regardless of the domain. The prevalent themes include: identification of a need for change, create a shared vision of the change as well as process for change, and provide resources to plan, implement and support the change. These themes are consistent with components of Senge's (1990) disciplines: Shared Vision, Mental Models, Team Learning and Systems Thinking. These themes are key components to organizational change as well as this research study. In the qualitative portion of this study, the researcher interviewed nursing leaders of programs with consistently high and low NCLEX success rates and evaluated how those programs relate to the key concepts of

organizational change specific to the implementation and utilization of NLCEX
predictor assessments.

CHAPTER III

RESEARCH METHODOLOGY

Introduction

Historically, research pertaining to NCLEX success has focused on the various factors that contribute to NCLEX success rates within individual nursing programs, including: admission criteria, Grade Point Average (GPA), progression criteria, clinical experiences, curriculum design and NCLEX predictor assessments, etc. This study focused on the specific variable of NCLEX Predictor Assessments related to frequency of use, methods of utilization and implementation. Furthermore, the researcher identified how each of these variables relates to the programs' NCLEX success.

This research study was categorized as a non-experimental, mixed quantitative and qualitative design. Gall, Gall & Borg (2003) defined quantitative research as grounded in the assumption that features of an environment constitute an objective reality that is constant across time and settings. Denzin & Lincoln (1994) defined qualitative as involving an interpretive, naturalistic approach that can be conducted in a multi-method focus. The intent of this research is two pronged. The quantitative data evaluated the impact of NCLEX predictor assessments (Feature) of an objective reality (NCLEX success) in various settings (nursing programs, utilization of predictor assessments). In addition, the qualitative data identified themes of organizational change theory and provided insight as to the impact of how programs utilize and implement NCLEX predictor assessments and what connection that may have with NCLEX success.

Research Design

This study had a complementary quantitative and qualitative research approach. Gall, Gall & Borg (2003) identified that by using strategies of both quantitative and qualitative approaches, the complimentary roles of discovery and confirmation will provide both a global and in-depth evaluation of the topic. The quantitative approach evaluated the impact of NCLEX predictor assessments in accredited programs in the state of Pennsylvania. More specifically, the survey evaluated the frequency, method of utilization of NCLEX predictor assessments and the interactional affects on NCLEX success rates. Secondly, this study used a case study approach to further identify themes consistent to organizational change theory. Specifically, it evaluated the program leaders' perception of factors related to utilizing and implementing NCLEX predictor assessments products and their perceived impact on NCLEX success.

The quantitative data was collected through two distinct methods. The first method is via an electronic survey. A survey was distributed to the 87 approved nursing schools in Pennsylvania that met the criteria for inclusion. The questions on the survey attempted to acquire the program specific data, including program utilization of NCLEX predictor assessment products. The dependant variable in this study was the NCLEX first time success rates and the independent variables included: a) type of nursing program, b) name of NCLEX predictor product, and c) utilization of the NCLEX predictor products within the program. The second method of quantitative data collection was the retrieval of average NCLEX Success rates for years 2004 through 2007, from the Pennsylvania State Board of Nursing (PSBN). PSBN publicly reports the annual results of each nursing program's NCLEX success rates. The annual

programs' success rates were averaged over the four year period and were included in analysis for interactional effect based on participants' responses regarding frequency and utilization of NCLEX predictor assessments. The programs' average NLCEX result rate was ranked as either High, Medium or Low performer. High performers' averages ranged from 90-100 percent. The range for medium performers was identified as 80-89 percent, and programs 79 percent or lower were considered low performers. The ranking was based on proposed change in the Pennsylvania Code identifying an increase from 60-70% as minimum threshold for NLCEX pass rates. In addition, the proposed code revision also indicates that one year after implementation of the 70% threshold, it will further increase to 80%. At the time of this writing the current Pennsylvania Code indicates a 60% pass rate in the minimal threshold and that programs dropping below will be placed on provisional status (Pennsylvania Code, Chapter 12.26).

The qualitative data was collected through survey interviews, which supplemented the data collected by the quantitative survey. The survey type included participant construct interview. LeCompte, Preissle & Tesch (1993) indicated that a participant construct interview is used to learn how participants structure their physical and social worlds. In this study, the researcher wanted to learn how the nursing programs structured their NCLEX predictor assessment implementation. Furthermore, the researcher evaluated if the implementation was consistent with organizational change theory and if it influenced NCLEX success. A case study approach was used to collect interview survey responses. Yin (1994) identified case studies as appropriate to investigate a phenomenon for which the boundaries between the context and the

phenomenon are not clearly evident. In the analysis phase, the case study responses were compared to NCLEX success rates for programs of both high and low NCLEX success. The researcher analyzed the data for recurrent themes consistent with disciplines of Senge's (1990) organizational change theory.

The telephone survey format was a general interview guide approach, which consisted of an outline of identified topics explored with participants. The surveys were conducted via telephone based on geographical dispersion throughout the state of Pennsylvania. The method maintained consistency in format, despite proximity to researcher. All telephone interviews were recorded to allow for later transcription and data analysis. All participants of the telephones surveys were informed of the recording and permission was obtained.

Research Instrument

The instruments for data collection were as noted above in two formats, quantitative and qualitative. The quantitative format included a 14-item electronic survey (Appendix A). Best & Krueger (2004) identified the use of internet for data collection as an emerging opportunity for improved access to targeted populations because it permits an array of designs, facilitates alternative question format and sequencing options as well as expedient use of time for transmitting and receiving data versus conventional modes. Fink (2003) defined a survey as a system for collecting data from or about people to describe, compare or explain their knowledge, attitudes, and behaviors. In this study, the intent of the electronic survey was to ascertain the nursing programs' utilization of NCLEX predictor assessment products during the academic years of 2003–2004 to 2006–2007. Therefore, a survey format was an

appropriate method to collect the data. The survey was distributed to the individual listed as the program leader of the approved professional nursing program as identified on the PSBN web site (2008). Nursing programs utilized in the survey pilot were not included in the sample to avoid reactive effects.

The survey included two sections. The first section of demographics acquired information regarding: types of nursing programs and current approval status with the state of Pennsylvania. The second section inquired as to the method of utilization of NCLEX predictor assessments during the identified academic years. Detailed questions included: vendor/company name, length of product use, utilization of product (end of program and/or curriculum infused), and purpose of NCLEX predictor program (identification of high-risk students in need of remediation, culminating assessment of student's ability, requirement to successfully pass or to qualify for graduation, and lastly, linked to course(s) grade).

The second portion of the data collection instrument addressed the qualitative inquiry and followed the Case Study Interview Guide (Appendix B). The interview guide provided a means to record responses manually and to ensure continuity of questions with each participant (Creswell, 1998). Specifically, the interview guide identified the opening and ending comme asked. The researcher conducted three separate validity reviews of the electronic survey (demographics and NCLEX predictor assessment utilization), including: content, face and criterion validity prior to distribution to the study participants. Content validity addressed the extent the instrument was thoroughly and appropriately assessing the characteristics to measure based on established theory whereas face validity addressed how an instrument

appeared on the surface (Fink, 2003). Fink further defined criterion validity as a comparison of response to future responses or performance.

First, the researcher utilized the services of the Applied Research Lab (ARL) of Indiana University of Pennsylvania to assist with the construction and formatting of the survey for electronic distribution as well as data return. In addition, the ARL saw that the expected response data were useful and in a form consistent with statistical analysis to address formatting issues.

Second, the researcher utilized a group of current nursing program faculty with experience using NCLEX predictor assessments. The charge of the group was to review the survey for content validity. The researcher provided the group with background information on the study, including purpose, research questions, and intended plans for methodology and analysis. The members were asked to match each survey question with the various concepts of Senge's (1990) theory. The results from the group indicated complete agreement between the survey questions and Senge's theory concepts.

Third, the researcher piloted the survey on four nursing programs to evaluate criterion validity. The pilot participants included chairperson/director representation from diploma, associate and baccalaureate programs. The pilot participants included programs that utilize NCLEX predictor assessment products, thus a telephone call was utilized to inquire the programs' use of a predictor assessment product. In an effort to minimize the impact of final population, the participants/programs selected were either out of state or no longer in the direct leadership role. The purpose was to validate and inquire as to the following: ease of use, readability, length of completion time,

availability of data by chairperson/director, format of requested data, likelihood of completion and consideration of survey delivery method (electronic or postal mail distribution). The results from the piloted participants/programs were not included in the study. Moreover, pilot participants were requested to return responses within two-weeks of distribution, which was accomplished.

The nursing programs that provided review of the tool were not utilized as participants in the study. Upon receipt of the pilot surveys, the researcher reviewed the comments that have had necessitated revisions in format or questions. Two changes were identified. The first change included shortening the intended email letter, since each participant was to receive a letter via U.S. Postal service outlining the study. The second change included clarifying the difference between end of program and curriculum-infused formats. The researcher concurred with the recommended changes and they were implemented for the distribution of the final survey and email contact information.

Finally, to ensure the survey was comprehensive to the purpose of the study, the researcher created a matrix comparing survey items (quantitative-electronic survey and qualitative-interview survey) to the research questions. The intent of this process was two-fold: 1. to validate that all aspects of the research questions were addressed on the survey, and 2. to demonstrate what research question each survey item reflected in regard to evaluation of findings (Appendix C).

Completion of revisions from the survey pilot were completed and revalidated with Applied Science Lab to ensure maintaining statistical appropriateness. Upon completion of the revisions, the researcher submitted a final dissertation proposal to

chairperson and dissertation committee for approval, which was granted. The researcher submitted a proposal to the Internal Review Board (IRB) of Indiana University of Pennsylvania. The IRB approved the proposal and permission was granted to go forward with the study as outlined. Upon approval from the IRB, the Applied Research Lab utilized the contracted services of Student Voice to construct the electronic survey and format according to data collection and analysis specifications.

Subjects/Participants

The subjects of this study included state approved nursing schools in Pennsylvania as indicated by the Pennsylvania State Board of Nursing Website of Board Approved Nursing Programs (2008). The process utilized in subject selection included acquiring a list from the Pennsylvania State Board of Nursing and identifying the individual in the leader role for each school. Each school within the state was separated by the independent variable of program types (Diploma, AD, BSN, LPN-RN). The entire population of approved nursing schools in the state of Pennsylvania was initially included. There were 87 nursing schools that met the criteria for inclusion. Data was collected for academic years of 2003–2004 and 2006–2007. Characteristics of the subject population included:

1. Program types: Diploma, Associate, Baccalaureate, Accelerated and LPN-RN Programs; and
2. Program must be accredited programs by the Pennsylvania State Board of Nursing from academic year 2003-2004 to present.

The participants of the qualitative portion of the study were determined by a three step process. First, following the completion of the electronic quantitative survey

portion of the data collection, the researcher reviewed the average NCLEX success performance rates for years 2004–2007 and identified the top two performers and the lowest two performers, of all study participants. Further discrimination of participants included identifying the participants who responded “yes” to the electronic survey question addressing willingness to participate in a follow-up telephone survey. Lastly, the researcher validated that each of the participants utilized NCLEX predictor assessments in their program. Based on the above criteria, the participants for case study telephone interviews included two programs in the High performing rank (95% and 92.47%) and two programs in the Low performing rank (70.47% and 73.22%).

Data Collection Procedures

The nursing programs that met the criteria or characteristics as identified above were invited to participate in the study. The participation was voluntary. Following approval from the IRB of Indiana University of Pennsylvania, a letter was mailed, by US Postal Service, to all participants two weeks prior to the distribution of the electronic survey instrument (Appendix D). The letter outlined the purpose and intent of the study and to request the subjects’ participation. Also, the letter addressed confidentiality and the use of the electronic source for data collection. The purpose of utilizing a postal interaction was to enhance the return rate by enticing the participant to respond to the electronic survey and not delete the survey as a spam mailing.

Two weeks after the postal introduction letter was mailed, the electronic survey was distributed electronically by Student Voice. Each email was sent individually to the identified program leader versus a group email so that others could not scroll the “To” section and identify other participants. The email contained brief information

referencing the mailed letter reintroducing the researcher, the purpose of the study, and validation of authorization by the IRB of Indiana University as well as contact information for the researcher and the dissertation Chairperson (Appendix E). Assurance of confidentiality was addressed. Instructions for completion of survey were included at the beginning of the survey as well as request for study results upon completion.

The electronic survey was distributed to all participants. There were two electronic surveys returned as undeliverable. The researcher made telephone calls to verify program leader and email address for those returned. Upon acquisition of correct information, the electronic surveys were resent using updated information. There were four program leaders who responded via email that they preferred the survey was completed by another member of their team who was more versed in the operations of NCLEX predictor assessments for their program. The survey, along with background information, was forwarded to those individuals.

One week after the surveys were distributed electronically, an electronic reminder was sent to all who had not responded. A second electronic reminder was distributed at the end of the second and third week for those who had not responded. After a one-week delay from the last request, the data collection ceased for the electronic survey quantitative portion of the study.

Following the completion of the electronic survey, the researcher finalized the list of potential participants who met the criteria for the qualitative interviews. Participants were contacted by phone and email to schedule the telephone interviews. Interviews were conducted on the mutually agreed upon date and time. All interviews

were recorded with permission from the participants. In addition, all interviews were conducted using the prepared Case Study Interview Guide Tool (Appendix B).

Upon completion of qualitative data collection, the recorded interviews were transcribed. After the analysis of data, the researcher emailed a summary to each interviewee, which contained a summary of their responses. The intent was to provide each with an opportunity to identify or minimize misrepresentation or misinterpretation. If no response was received from the email, a follow-up phone call was made to each interviewee instructing them to contact the researcher if they had issue with their interview summary. One interviewee responded in agreement of summary. Responses were not acquired from the remaining three participants.

Protection of Human Subjects

To ensure protection of human rights, this study was reviewed and approved by the Indiana University of Pennsylvania's Internal Review Board (IRB). The researcher did not nor will not identify the participants in any manner that could identify the students, program leaders or nursing program. The nature of the quantitative data focused on aggregate nursing program performance versus individual, therefore, anonymity of individual students, leaders and program was inherent. To maintain anonymity for participants of the qualitative interviews, data that could potentially identify the nursing program was used in aggregate instead of individual to minimize identification of participants.

Conducting Data Analysis

This dissertation was a mixed quantitative and qualitative research design that sought to evaluate the global research question, "What is the relationship in nursing

programs that utilize NCLEX predictor assessments and first time NCLEX success?”

More detailed research questions included:

Research Questions

1. What is the frequency utilization rate of NCLEX predictor assessments in Pennsylvania-accredited nursing programs collectively and by program type (Diploma, Associate, Baccalaureate, Accelerated and LPN-RN)?
2. What is the difference in NCLEX pass rates when comparing programs that utilize NCLEX predictor assessments with programs that do not?
3. What is the effect of how programs use NCLEX predictor assessments on NCLEX success?
4. What is the perception of program leaders as to what factors specific to the utilization and implementation of NCLEX assessment products, influence the program's NCLEX success?

Analysis Plan

Analysis was conducted on both the quantitative and qualitative portions of the study. For the quantitative portion, the researcher, along with the ARL of Indiana University of Pennsylvania, conducted an analysis of the quantitative data using the *Statistical Package for the Social Sciences* (SPSS 17.0 for Windows) computer program. The analysis was conducted in a manner to address each research question. A frequency analysis was conducted to address research question number one regarding the frequency of utilization of NCLEX predictor assessments in Pennsylvania. Descriptive statistics, such as the mean, were also conducted to summarize and analyze the data. The data was aggregated as well as separated by type of nursing program.

Further data analysis included the statistical method of Chi Square testing. A Chi-square tests the independence of two categorical multi-variant variables (Huck, 2004). Research question two evaluated the categories of NCLEX predictor usage (yes or no) to the level performance on NCLEX (High, Medium and Low). Additional analysis was conducted to determine if program type impacted the level of NCLEX performance.

Research question three evaluated the difference of NCLEX pass rate performance (High, Medium and Low) to programs utilizing NCLEX predictors and the two dimensions of implementation processes and policies associated with predictor assessments. Dimension one included analysis of usage by various implementation variables, such as: vendor type, length of time using predictor, curriculum infused and end of program. All variables were compared to the schools' level of NCLEX performance for identification of statistical significance. The second dimension analyzed the impact of various policies employed by the schools and the relation to NCLEX performance level. The policies were subdivided based on the method of administration of predictors, including curriculum infused or an end of program approach. Policy variables for curriculum infused included: identification of high risk without formalized follow-up, formalized mandatory remediation, attainment of a benchmark required to pass the course, attainment of a benchmark to progress to the next level within the program, percentage of course grade linked to student performance, and lastly, use of more than one of the policies related to infusion in the curriculum. The policy variables associated with end of program approach and

attainment of benchmark included: mandatory remediation, requirement for graduation, link to course grade and linked to more than one of the end of program policies.

Analysis for research questions two and three were conducted using the statistical test of Pearson Chi-Square. The outcome was compared to the Chi Square table within the set degrees of freedom to identify the p-value. The p-value identifies whether to accept or reject the null. The p-value of .05 was utilized to identify statistical significance.

Analysis of the qualitative interview portion was conducted using both within-case analysis on each of the individual cases and a cross-case analysis to compare all four participants. The researcher conducted within-case analysis to include descriptive, analysis of themes and assertions evaluations (Stakes, 1994). Merriam (1998) indicated the elements of within-case analysis provide a rich analysis of the context of the case. Following the within-case analysis, the researcher further evaluated the data by cross-case analysis that compared the descriptive and emerging themes for commonality and differences among the participants (Creswell, 1995).

Analysis of the qualitative interview portion was conducted using both within-case analysis on each of the individual cases and a cross-case analysis to compare all four participants of each of Senge's (1990) concept, including: Shared Vision, Team Learning, Mental Modeling and Systems Thinking. A matrix was used to indicate three levels of functioning performance for each Senge concept. The level titles of minimum, moderate or high level of functioning were selected. The participants' responses to the corresponding questions were assessed and identified as one of the three levels of function. The minimal level functioning was defined as either lack of evidence or

beginning effort toward concept. Responses identified as moderate included examples with narrow focus or casual actions. The high level of function included responses of action both broad and deep and expanding to include integration of other concepts. A matrix identifying the specific criteria for each level for each function can be located in Appendix F.

Findings were interpreted and reported using descriptive and inferential statistics. In addition, the findings were depicted with various tables and graphic presentations to present the data further.

Summary

This study was a non-experimental, mixed quantitative and qualitative design. The population of the study included leaders of approved nursing education programs in the state of Pennsylvania. The data were collected from the individuals identified as the leaders of the nursing programs.

The quantitative aspect evaluated the frequency of use of NCLEX predictor assessments. The quantitative aspect also identified the various methods of implementation associated with NCLEX predictor assessments and the interactional effects on NCLEX success rates. An electronic survey tool was constructed to address the items of inquiry. Appropriate reliability and validation assessments were conducted on the survey tool. Participants were invited to participate in the study, via a letter which described the study's purpose, adherence to confidentiality, and request to participate. The participants then received access to the 14-item electronic survey addressing the frequency of use of predictor assessments as well as methods of implementation and associated policies.

The researcher calculated the average NCLEX-RN success rate for each nursing program based on the data published on the Pennsylvania State Board of Nursing web site. The data included the first time pass rates for each nursing program from 2004 through 2007. Using the calculated average, each program was then categorized as a high, medium or low NCLEX performer, based on their performance. The NCLEX performance categories were used to conduct the analysis of statistical significance comparing the various methods of implementation of NCLEX predictor assessments and the NCLEX success rates.

The intent of the qualitative approach was to evaluate if the programs' adherence to Senge's (1990) concepts of organizational theory, specific to implementation of NCLEX predictor assessments, impacted NCLEX success. A case study interview guide was constructed to address adherence to Senge's concepts. Appropriate validity and reliability studies were conducted on the tool. Four participants were identified as the two highest and two lowest NCLEX performers that responded to the electronic survey. Using a case study approach, all four participants were interviewed via telephone. The questions were linked to four of Senge's concepts including; Shared Vision, Mental Modeling, Team Learning, and Systems Thinking. Using a Within-Case analysis of participant's responses, the content of the responses were categorized as; minimal, moderate or maximal adherence to Senge's concepts. A Cross-Case analysis was employed to identify themes regarding adherences to Senge's concepts and connection to NCLEX success performance.

CHAPTER IV

RESULTS AND ANALYSIS OF DATA

Introduction

This chapter presents the results of the study. The purpose of the study was threefold. The first purpose was to identify the frequency of use of NCLEX predictors in nursing programs in Pennsylvania. The second had two objectives: 1. To identify if programs using NCLEX predictor assessments performed higher than those that did not, 2. To identify how the programs in Pennsylvania utilize the various NCLEX predictor assessments within their curricula, and if that impacts the program's NCLEX success. Lastly, from a qualitative approach, the purpose of the study was to compare programs with high and low NCLEX performance and identify the leaders' perceptions of the factors that affected NCLEX outcomes based on organizational change theory, specifically Senge's (1990) concepts of Shared Vision, Mental Modeling, Team Learning and Systems Thinking.

Results originated from a mixed designed study including both quantitative and qualitative approaches. In this study, an electronic survey provided data to ascertain the nursing programs' utilization of NCLEX predictor assessment products during the academic years of 2003–2004 through 2006–2007. The electronic survey included two sections. The first section included demographic information regarding: types of nursing programs and current approval status with the state of Pennsylvania. The demographics were used to analyze the data from the identified variable of type of program including Diploma, Associate, Baccalaureate, Accelerated and LPN-RN. Furthermore, the demographic of program type was used to collect data from each

specific program type within each school. Many schools had more than one program type (i.e. Baccalaureate and LPN to RN). The electronic survey was designed to request and collect data for each type of program within the institution.

The second section of the survey focused on the method of utilization of NCLEX predictor assessments during the identified academic years. Detailed questions included: vendor/company name, length of product use, utilization of product (end of program and/or curriculum infused), policies associated with use of NCLEX predictor program for both curriculum infused and end of program. The data were used to compare the impact of the method of utilization on each program's NCLEX performance. The individual school's performance was categorized as High, Medium or Low based on their average success for the years of 2004–2007. Data were analyzed using the Statistical Program for the Social Sciences (SPSS 17.0 for Windows).

The qualitative portion of data collection was designed to inquire how a program identified the process for initiating an NCLEX predictor assessment and if the identification of need and implementation of each program was consistent with Senge's (1990) organizational change theory.

The research questions for the study were:

1. What is the frequency utilization rate of NCLEX predictor assessments in Pennsylvania-accredited nursing programs collectively and by program type (Diploma, Associate, Baccalaureate, Accelerated and LPN-RN)?
2. What is the difference in NCLEX pass rates when comparing programs that utilize NCLEX predictor assessments with programs that do not?

3. What is the effect of how programs use NCLEX predictor assessments on NCLEX success?
4. What is the perception of program leaders as to what factors specific to the utilization and implementation of NCLEX assessment products, influence their program's NCLEX success?

Description of the Participants

Based on the number of approved Registered Nursing Education schools in the state of Pennsylvania as of April, 2008, 87 electronic surveys were distributed to the leaders of schools meeting the criteria for inclusion. Leaders from 53 schools responded to the electronic survey, resulting in an initial response rate of 61%. Three of the schools' respondents did not complete all aspects of the survey, thus, complete usable data were from 50 school respondents or a 57% rate.

Many nursing schools have more than one program type within their approved school. In an effort to keep the data pure by program type (Diploma, Associate, Baccalaureate, Accelerated and LPN-RN), each participant was asked to complete the survey for each program type. Thus, if a school had programs for BSN, LPN-RN and Accelerated, its respondent completed the survey three times, one for each program type. As a result, within the 50 schools that responded many had more than one program type, thus resulting in 85 programs. The initial breakdown of participants' program type included Traditional BSN, 24%; AD, 20%; Diploma and Accelerated/2nd Degree, both at 16%; LPN-RN, 11%; and Other, at 13%. The respondents identifying their program type as "Other" were requested to specify or define their program type further. There were 11 programs identified as "Other". The definitions provided by

the respondents included: seven RN to BSN, one ADN to BSN, one RN to BSN to MSN and two LPN to RN. The LPN-RN program types were recoded from “Other” to the LPN-RN program type, thus revising the LPN-RN program type count from 9 to 11 and the “Other” program type from 11 to 9. Table 2 details the descriptive statistics of the demographic variable of respondents regarding type of programs after recoding the two “Other” program type to LPN-RN.

Table 2. *Demographic Data for the Types of Nursing Programs*

Program Types	Count	Frequency
Traditional BSN	20	24%
Associate Degree	17	20%
Diploma	14	16%
Accelerated/2 nd Degree	14	16%
LPN-RN	11	13%
Other	9	11%
Total	85	100%

Research Question 1

The first research question was “What is the frequency of utilization rate of NCLEX predictor assessments in Pennsylvania accredited nursing programs collectively and by program type?” This question was asked on the electronic survey for all program types. From a collective perspective, 71 of the 85 program study respondents or 83.5% identify that they utilize a NCLEX predictor assessment product

in their programs. Table 3 depicts the frequency of utilization of NCLEX predictor assessments by program type.

Table 3. *Frequency of Utilization of NCLEX Predictor Assessments by Program Type*

Program Type	Count	Total Respondents	Frequency
Diploma	14	14	100%
Associate Degree (AD)	16	17	94%
Traditional BSN	19	20	95%
Accelerated/2 nd Degree	12	14	86%
LPN-RN	9	11	82%
Other	1	9	11%
Total	71	85	83.5%

Further breakdown of the utilization of participants by program type reveals the majority of program types, with the exception of the “Other” program type, had high utilization rates. It is logical that the “Other” program types do not utilize NCLEX predictor assessment products since the students in the RN to BSN, ADN to BSN, RN to BSN to MSN are already RNs. The intent of NCLEX predictor assessment is to evaluate the students’ likelihood of passing NCLEX. For students who are already RNs the point is moot. The rate of utilization of NCLEX predictor assessment was substantially higher at 92.10% when the “Other” program types were excluded. Table 4 displays the collective utilization of NCLEX predictor assessments comparing all respondents with respondents preparing students to take the NCLEX.

Table 4. *Frequency of Utilization of NCLEX Predictor Assessments by Purpose of Nursing Program*

Purpose	Count	Respondents	Frequency
All Respondents	71	85	83.5%
Respondents preparing students to take the NCLEX	70	76	92.10%

In summary, the utilization of NCLEX predictor assessments for responding Registered Nursing education programs in the state of Pennsylvania was significant. The overall frequency of utilization of 83.5% is high. If the programs identified as “Other” were extracted, the frequency rate increased to 92.1%.

Research Question 2

The second research question asked, “What is the difference in NCLEX pass rates when comparing programs that utilize NCLEX predictor assessments with programs that do not?” Analysis of response to this question was completed by aggregate and by program type. The analysis was conducted by aggregating all respondents, regardless of program type, to assess the impact the practice of using NCLEX predictor assessment products had on NCLEX performance. In addition, responses to the question were further analyzed to evaluate if program type impacted on NCLEX performance. Inferential statistics, Chi Square specifically, were conducted to answer this question. A Chi Square analysis ascertains if the differences among frequency are statistically significant. For each analysis a p value of $\leq .05$ was considered as statistically significant.

The analysis of response to Question 2 focused on the aggregate evaluation of the use of NCLEX assessment predictors and the impact on NCLEX performance. As

the study was designed, the researcher intended to identify frequency use of NCLEX predictor assessments. As noted in review of analysis of question one, the number of respondents that did not use NCLEX predictors was only six. Therefore, the responses did not total a number sufficient to provide reliable statistical comparison to those programs that did use NCLEX predictor assessments. Further dissemination by program type revealed the same issue of small sample size eliminating statistical relevance of analysis. However,

Research Question 3

Research Question 3 inquired, “What is the effect of how programs use NCLEX predictor assessments on NCLEX success?” The corresponding survey questions were classified in two dimensions. The first dimension related to aspects of implementation of a NCLEX predictor assessment product included: type or vendor of NCLEX predictor product, length of time using NCLEX predictor assessment product, use of NCLEX assessment product infused throughout curriculum, and use of NCLEX assessment product at end of program. All variables were analyzed for their effect on schools’ performance level on NCLEX.

Analysis of the first dimension of research Question 3, implementation of NCLEX predictor assessments, revealed the following results. For the first variable, associated with specific NCLEX predictor products, the intent was to analyze if a particular NCLEX predictor product impacted the NCLEX performance. Respondents from the 50 participating schools selected the type of product they used. If a school selected more than one product for use, their school was recoded as having more than one product. The recoding was necessary to keep the product identification pure since

it was not possible to determine which product could have potentially had the impact on the NCELX success performance. In addition, the majority of schools identified more than one program type. It is feasible that the various products were used on the different program types within the school. However, the NCLEX results are only available by school and not by program within a school. Therefore, schools with more than one product, as well as more than one program type, were excluded from analysis. As a result, the number of remaining respondents was too low to conduct a statistically sound analysis of the impact of product type on NCLEX performance because when the number of respondents was dispersed among the various product types, they fell below the minimal level of n required for reliable results.

Analysis of the variable associated with length of time using an NCLEX predictor assessment required regrouping of the data. The survey item inquired as to the specific academic year in which the first graduating class had use of the NCLEX predictor assessment product for their entire program. However, upon analysis it was identified that the response options were not consistent among all five program types. For example, on the AD, BSN, and LPN-RN surveys, the response for academic year 2006-2007 was absent. Therefore, the data was regrouped in effort to capture the correct time frames, yet not distort the data. The grouping of the academic years was based on the timeframes of the NCLEX success data used in the study, which was from the academic years of 2003-2004 through 2006-2007. The first grouping identified schools that implemented NCLEX predictor assessments during academic years 2007-2008 through 2011-2012, which represented programs starting NCLEX predictor assessments after the timeframe of the NCLEX success data. Nine of the 45 schools

were in this grouping. The second grouping identified schools that implemented NCLEX predictors during academic years 2001-2002 through 2006-2007, which correlated the students may have only received partial impact or were in the initial class that used NCLEX predictor assessments. The third grouping was comprised of schools indicating academic years of prior to 2000-2001, which included schools that had used NCLEX for the entire program with students and had one graduating class that used NCLEX predictor products.

The intent of the length of time using NCLEX predictors was to identify if pass rates improved with time, and analysis was not conducted on group one with implementation between 2007-2008 and 2011 and 2012, since the NCLEX success rates for this group will be in the future and are outside the scope of this study. The remaining groups one and two were analyzed using Pearson Chi Square to compare length of time using NCLEX predictor assessments and NCLEX success rates. As a result, of eliminating the nine group one schools the number of respondents was 39. The distribution of success rates included: eight schools with high success rates (90-100%), 19 schools with medium success rates (80-89%), and 11 schools with low success rates (79% or less). There were 3 degrees of freedom, resulting in χ^2 value of 2.729 and a p value of .435. Therefore, indicating no significance associating length of time to NCLEX success rates.

Analysis of the variable associated with implementation of products throughout the curriculum had 71 respondents with a distribution of success rate ranges as 15 schools in the high range, 34 in the medium range and 22 at the low range. The Pearson

Chi Square statistical analysis revealed $\chi^2 = 9.492$, and $p = .850$ with 15 degrees of freedom.

The last variable evaluating the impact of implementation of end of program NCLEX predictor assessments revealed that with 73 respondents, the results of the Pearson Chi Square indicated $\chi^2 = 5.345$, and $p = .989$ at 15 degrees of freedom. The distribution of NCLEX success rates for the variable of curriculum infused and end of program included; 15 in the high range, 36 schools in the medium range, and 22 schools in the low range. Table 5 identifies the results of implementation variables on NCLEX performance.

Table 5. *Impact of Implementation Variables on NCLEX Performance*

Variable	N	χ^2 value	df	p- value	n with High Success Rates	n with Medium Success Rates	n with Low Success Rates
Length of Time using NCLEX predictors and impact on NCLEX performance	39	2.729	3	.435	8	19	11
NCLEX predictor assessment used throughout curriculum and the impact on NCLEX performance	71	9.492	15	.850	15	34	22
NCLEX predictor assessment used at end of program and the impact on NCLEX performance	73	5.345	15	.989	15	36	22

The focus of the second dimension of how NCLEX predictor assessments are used was specific to the policies associated with the NCLEX predictor assessment and

students' individual performance. For the purpose of this study, the policies were subdivided in two categories based on product format for method of administration of assessments: infused throughout the curriculum and end-of-program. Therefore, the data were analyzed based on the various policies associated with each category. The policies associated with curriculum-infused NCLEX predictor assessments included: identification of high risk without formalized follow-up, formalized mandatory remediation, attainment of benchmark required to pass course, attainment of benchmark required to progress to next level within program and percentage of course grade linked to student performance, and lastly, use of more than one of the policies related to infusion in curriculum.

The policies associated with the subcategory end-of-program NCLEX predictor assessments included: the use of mandatory formalized remediation, attaining benchmark as a requirement for graduation, attaining benchmark as a link to a final course grade, and the use of more than one of the policies related to end of program assessments.

Results of the impact of curriculum-infused policies did not yield statistical significance, regardless of the distinct policy. The analysis conducted was via a Pearson Chi-Square, and included a sample size of 48 with 2 degrees of freedom for all policy variables. The overall breakdown of success rates for all curriculum infused schools was 11 schools with high success rates (90-100%), 15 schools with medium success rates (80-89%) and, 22 schools with low success rates (79% or less). Although the number of respondents of 48 was appropriate, the limited use of the policies yielded

a low volume which did not meet the minimum cell count values required for accurate statistical analysis.

Schools with policies linking individual student performance on curriculum-infused assessments to the use of identification of high risk students without required formal course remediation revealed $\chi^2 = 1.864$ and $p = .394$. The total number of schools using a policy associated with identification of high risk without formal remediation was four. The distribution of success rate ranges included; zero in the high range, three in the medium range and one in the low range.

Second, schools with policies linking individual student performance on curriculum-infused assessments to the use of formal mandatory remediation identified $\chi^2 = 1.122$ and $p = .571$. The number of schools using a policy of formalized remediation was six and the distribution of success ranges included: one in the high range, two in the medium range and three in the low range.

Third, schools with the policies linking individual student performance to passing the associated course revealed $\chi^2 = 3.435$ and $p = .179$. The number of schools with a policy linking performance to passing was one and that school was in the low range of NCLEX success rates.

Fourth, schools that link individual student performance to curriculum-infused predictor assessments to a percentage of current course grade, revealed $\chi^2 = 2.230$ and $p = .328$. The number of schools using a policy connecting performance to course grade was 6 and the distribution of success ranges included: four in the medium range and 2 in the low range.

Fifth, schools that link individual student performance to curriculum-infused predictor assessments to progression within their program revealed $\chi^2 = 2.247$ and $p = .325$. The number of schools using a policy connecting performance to course grade was one and that school was in the low range.

Lastly, as an assessment of cumulative effect, schools that link individual student performance to curriculum infused predictor assessments linked to more than one of the above policies revealed $\chi^2 = 0.133$ and a p value of 0.945. The number of schools using more than one policy was 12 and the distribution of success rate ranges was three in the high range, five in the medium range and four in the low range. Table 6 summarized the analysis for the use of various policies associated with individual student performance on curriculum infused NCLEX Predictor Assessments and the impact on NCLEX Performance.

Table 6. *Policies Linked to Individual Student Performance on Curriculum Infused NCLEX Predictor Assessments and the Impact on NCLEX Performance*

Curriculum Infused Policy	n	χ^2 value	df	p value	High Success Rates	Medium Success Rates	Low Success Rates
Identification of High Risk without Required Formal Course Remediation.	48	1.864	2	.394	0	3	1
Required Formal Course Remediation	48	1.122	2	.571	1	2	3
Passing Current Course	48	3.435	2	.179	0	0	1
Percentage of Current Course Grade	48	2.230	2	.328	0	4	2
Progression to Next Level of Program	48	2.247	2	.325	0	0	1
Cumulative effect of more than one policy	48	0.133	2	.945	3	5	4

The impact of policies associated with NCLEX predictor assessments administered at the end-of-program and the school's NCLEX performance produced mixed results. Unlike analysis for the curriculum-infused policies, the volume for the end of program policies yielded sufficient numbers to meet required cell counts thus providing reliable statistical results. Schools that used a policy associated with mandated remediation for students not attaining a predetermined benchmark included a sample size of 48 schools. The number of schools using a policy linking student performance to mandatory remediation was 24 and the distribution of success rates ranges included; nine schools with high success rates (90-100%), 11 schools with medium success rates (80-89%) and, 4 schools with low success rates (79% or less). A Pearson Chi Square with two degrees of freedom revealed χ^2 7.721 and a p value of

0.021, indicating a statistically significant relationship between the use of mandatory remediation policies based on end-of-program predictor performance and the schools' NCLEX performance.

The remaining policies associated with end-of-program predictor use did not indicate statistical significance based on Pearson Chi Square results. Policies associated with attaining a determined benchmark on the exit of program predictor in order to graduate, for a sample size of 48 revealed that with 2 degrees of freedom, $\chi^2 = 2.112$, and $p = .348$. The distribution of the ranges of success rates included: three in the high range, three in the medium range and five in the low range. Similarly, policies associated with end-of-program predictors that require attainment of a predetermined benchmark with the outcome linked for course grade did not demonstrate statistical significance. The sample size was also 48 with two degrees of freedom and revealed a $\chi^2 = 4.298$, and a p value of 0.117. The distribution of ranges of success rates included; four in the high range, three in the medium range and one in the low range. Lastly, the collective use of more than one of the policies above was analyzed. A sample size of 48 schools, with 2 degrees of freedom indicated a $\chi^2 = 2.907$, and a p value of 0.234. The distribution of ranges for success rates included: four in the high range, three in the medium range, and two in the low range. Table 7 outlines the results of policies associated with end-of-program use of NCLEX predictors.

Table 7. *Use of End-of-Program NCLEX Predictor Assessments with Various Policies and the Impact on NCLEX Performance*

End of Program Policy	Total n	χ^2 value	df	p value	n with High Success Rates	n with Medium Success Rates	n with Low Success Rates
Linking Student Performance to Mandatory Remediation	48	7.721	2	.021	9	11	4
Linking Student Performance to Requirement for Graduation	48	2.112	2	.348	3	3	5
Linking Student Performance to Course Grade.	48	4.298	2	.117	4	3	1
Use of more than one of the End-of-Program Policies.	48	2.907	2	.234	4	3	2

In summary, the intent of Research Question 3 was to determine if how a school uses NCLEX predictor assessments impacts its overall NCLEX performance revealed limited significance. The only area of significance was found with end of program comprehensive assessments and the use of policies associated with requiring individualized mandatory remediation for students not attaining the predetermined benchmark.

Research Question 4

Reviewing the results of Research Question 4 requires a change in approach from quantitative to qualitative. The intent of this question was to evaluate how a school identified the process of initiating the use of NCLEX predictor assessments and if the identification of need and implementation of its program was consistent with Senge's

(1990) organizational change theory. Further evaluation included how the school's implementation of the various concepts of Senge's theory influence its NCLEX performance.

Selection of the schools for the qualitative interview was first based on the school's ranking among study participants. The schools with the highest and lowest reported NLCEX first time success average for the years between 2004 and 2007 were considered. Further discrimination required the participant to respond affirmatively, indicating willingness to participate in a follow-up study. Lastly, the school was required to be a current user of an NCLEX predictor assessment product.

The telephone surveys were conducted with the individual in the highest direct leadership role of the school at the level of immediate supervisor to faculty and students. In addition, all participants indicated by self report they possessed detailed knowledge about the use of NCLEX predictor assessments for their schools.

The four schools selected on the criteria above included the two highest and the two lowest NCLEX success performers from all study participants. The high performing programs included both a BSN program and a Diploma program. The low performing programs included representation from both AD and BSN programs. The participants were identified as Program High A, Program High B, Program Low A and Program Low B. The assignment of identification is not linked by program type and is known only by the researcher.

Certain demographic responses were reported by aggregate versus by specific program in an effort to maintain confidentiality of the participants. Aggregate information included the participants' regional locations within the state and the

numbers of graduates. Although the intent of the study was to evaluate the high and low end performers in the state, ironically the four schools were from the Northwest, Northeast, Southeast and Southwest regions of Pennsylvania. Among the four participants, the number of graduates who took NLCEX ranged from 30 to 47 graduates annually.

Analysis of the qualitative interview portion was conducted using both within-case analysis and a cross-case analysis to compare all four participants to each of Senge's (1990) concepts: Shared Vision, Team Learning, Mental Modeling and Systems Thinking. A matrix was used to indicate three levels of adherence for each Senge concept. The titles of minimum, moderate or high level of adherence were selected. The participants' responses to the corresponding questions were assessed and identified as one of the three adherence levels. The minimal level functioning was defined as lack of evidence of beginning effort toward concept whereas the responses identified as moderate included examples with narrow focus or casual actions. The high level of adherence included responses of action both broad and deep and expanding to include integration of other concepts. A matrix identifying the specific criteria for each level for each adherence can be located in Appendix F.

With-in Case Analysis: Program High A

To the recollection of the leader, Program High A has always used "some sort" of NCLEX predictor product. The current product is ATI, which is administered as curriculum-infused with the comprehensive assessment during the students' last semester. This school has used the current product for nine academic years. The leader indicated the initial purpose was to increase NCLEX pass rates, which were in the mid

60% range. With the completion of the first graduating class, whose curriculum included the predictor product, the rate increased. For the last 4 years, the school has experienced consistent pass rates above 90%.

According to the leader of Program High A, all decisions regarding the use of implementing a NCLEX predictor assessment into the curriculum and identification of the specific product were group decisions, “Our decision to use the product was initiated by the curriculum committee and voted on by the faculty to proceed.” The group decision making indicated a high level of Shared Vision. The program used multiple resources for evaluation of the current product, including: formal reviews and questioning from current product users, literature review, meeting and demonstration with representatives, and an assessment of the products’ ability to provide high-end benchmark (program specific and national comparisons), and detailed curriculum data. Leader for Program High A stated:

We only found one company that indicated their product had the ability to provide us with the detailed level of course-related and programmatic data to meet our objectives of using the a predictor. We wanted to use it to improve the curriculum and to set specific benchmarks for the students to achieve.

Their participation in product selection demonstrated significant breadth and depth at a maximum function level of Mental Models.

The program experienced faculty resistance from only a few members, “Everyone was supportive, but we had two faculty that were leery and took a wait and see approach.” Demonstrating a proactive response to the few resisters, the program completed independent performance studies from the first-year student performance

data. The faculty analyzed the data, revised curriculum accordingly and then implemented changes to both the administration of the NCLEX predictor assessment and supporting policies. All faculty members were engaged and supportive of the product at that point. Their proactive detailed response to the few resistors strengthened the group process, as well as enhanced the curriculum, thus demonstrated behaviors consistent with maximum level function of Mental Models.

Program High A reported faculty received initial education on the use of the product by the company representative. Consistent ongoing education continues to date, which focuses on the aspects and outcomes beyond the student scores, such as curriculum integration and adherence to NCLEX blue print. The breadth and depth of the program's efforts support the level of maximum Team Learning. The leader of Program High A reported:

We set benchmarks for each course and attached a percentage of grade associated to performance. Also for the comprehensive, students take the assessment at the beginning of their final semester and they need to attain 93%. If unsuccessful, we have a policy that requires they comply with an individualized mandatory formal remediation for four weeks, then they can retake the assessment.

Furthermore, Program High A identified several effective measures to determine outcome attainment, such as NCLEX pass rates, attainment of benchmarking by course and comprehensive assessments, as well as individual and aggregate attainment of benchmarks, progression of critical thinking skills from entry to exit, and curriculum adherence to current NCLEX blueprint. Program High A's use of multiple outcome

measurements and the evaluation of both individual and aggregate data, demonstrated a maximal level of integration of the System Thinking concept.

Based on the results of their outcome measures, Program High A identified many modifications and improvements in curriculum and changes in policy, including: independent identification of benchmarks by course, level and comprehensive assessments (not company recommended); implementation of a formal mandatory four-week remediation program for students not attaining benchmark on the comprehensive; and linking assessment performance to course grades as well as a requirement for graduation. Lastly, Program High A shared future plans, “In the next year we are planning on implementing an earlier identification of high risk at the junior level that would include a policy that mandates the student to take a test taking strategy course.” The evidence of the various policies and curriculum integration supports the rating of maximal use of System Thinking approach.

With-in Case Analysis: Program High B

The leader of Program High B indicated the program has always used an NCLEX predictor product. The current product is ATI, and it is administered as curriculum-infused with the comprehensive assessment during the students’ last semesters. The school has used the current product for approximately five academic years. The leader indicated the initial purpose was to increase NCLEX pass rates. The program has experienced consistent pass rates above 90% for the last 4 years and previous rates were in the high 80% range.

All decisions regarding the use of NCLEX predictor assessment, as well as the identification of the specific product, were group decisions. The leader for Program

High B stated, “Yes, all faculty members agreed that a tool was needed to assess comprehensive knowledge.” This action supports the maximum rating of the Shared Vision concept. The program used multiple resources for evaluation of the current product, including: formal reviews and questioning from current product users, literature review, meeting and demonstration with representatives, and an assessment of the products’ ability to provide high level benchmark and detailed curriculum data. Program leader High B, indicated:

We had an adhoc group survey local schools in the area for pros and cons of their products. We also had a formal evaluation tool that was used to rate each product, including the ability to set benchmarks and provide data for improving our program and courses.

This proactive process demonstrates global as well as programmatic specific aspects, thus supporting evidence of a maximum level of the Mental Model concept.

The program experienced faculty resistance from only a few members, with the majority of the resistance focused on how to integrate into current curriculum as a result of lack of product knowledge. Program leader High B stated, “Although we started with initial agreement, we did have some issues with difficulty integrating into current curriculum which we addressed quickly by education and an alignment of assessments to curriculum.” To address the issue, the program proactively focused on faculty education and integration of the product into the curriculum. As product knowledge improved and as curriculum was adjusted accordingly, the resistance dissipated. This proactive approach of increasing education and the focus of specific concerns demonstrated a maximum level of Mental Model functioning.

Program High B reported faculty was educated on the initial use of the product by the product representative. Consistent ongoing education continues to date, emphasizing correlating data to curriculum. The school designated one individual as the leader to coordinate ongoing data and faculty needs. The purposeful and focused education supports the maximum level of Team Learning.

Program High B identified key measures of evaluating effectiveness, such as NCLEX pass rates, attainment of benchmarks by course, level and comprehensive assessments. As identified by Program High B leader, “Our students must hit a benchmark in each course to pass and go to the next course or level.” The acquired data were used to recommend curricular changes. Program leader High B stated, “We identified benchmarks to be used between courses or levels and then identify areas of struggle and use that information to evaluate the need for revision of a course.” The integration of education and outcome measurements demonstrated a maximum level of Systems Thinking.

Lastly, Program High B identified numerous modifications and improvements in the curriculum and changes in policy, such as: policies requiring attainment of benchmarks for courses; levels and comprehensive assessments; formal committee process for identification on curricular changes based on student performance; coaching for high risk students and a policy indicating “students to pass all ATI successfully”. In addition, they shared future plans to implement a policy indicating high risk students need to complete the formal remediation successfully to permit release of final paperwork to the state regarding eligibility for NCLEX. The evidence

of current changes and policies supporting the curriculum, benchmarking, progression, coaching and remediation all indicate a maximum level of Systems Thinking concept.

With-in Case Analysis: Program Low A

The leader of Program Low A also indicated the program used the current NCLEX predictor product for four years. The current product is ERI and it is administered as curriculum infused with the comprehensive assessment occurring in the last semester of the program. The leader indicated the initial purpose was to increase NCLEX pass rates. The program's pass rates for the last period were in range of 70%.

All decisions regarding the use of NCLEX predictor assessments, including the specific product, were made by the group, thus supporting the maximum level of Shared Vision concept. The leader of Program Low A stated, "There was agreement by all faculty members to use predictor assessments as well as which product to use." To evaluate the selection of the current product, the faculty used formal and informal networking with other nursing programs in the region as well as demonstration with various product representatives. This action demonstrated employment of Mental Modeling on a moderate level.

The program experienced global resistance of faculty at the implementation phase. The resistance was specific to the faculty's lack of confidence that the assessments/test content was not current. The leader of Program Low A shared:

Once we began giving the assessments, based on students' comments faculty became concerned that the tests were not consistent with current content or

updated practice strategies. At that point, when we lost faculty confidence, we stopped holding-up graduation for those not successful on the comprehensive. However, formal remediation continued, based on results of each student. The leader identified a decrease in resistance with the cessation of the strict graduation policy. Yet, faculty continued to struggle with the integration of assessments into the curriculum. The action of changing policy demonstrated a responsive action to faculty regarding confidence in the product, which is consistent with a moderate level of Shared Vision. Yet, the continued struggle of acceptance, coupled with lack of evidence for changing the curriculum, support a minimal level of Shared Vision. This rating was identified as mixed minimal and moderate for Shared Vision.

Program Low A reported faculty was initially educated on the use of the product by the company representative on two occasions. The majority of ongoing sessions continued, but the attendance was “sparse”. The majority of the faculty’s education was conducted by the lead person on faculty. The limited breadth of education and questionable faculty support for education resulted in a minimal level of adherence to the Team Learning concept.

Program Low A shared the use of NCLEX success rates is their measurement of effectiveness suggesting, “At this point we don’t have specific outcome goals associated with the predictor besides NCLEX rates.” The limited evidence beyond NLCEX rates demonstrates minimal level of adherence to Systems Thinking concept.

Program Low A identified modifications of current product utilization, including limiting the number of assessments/tests, due to the limited time and appropriateness of content. This action was in response to student comments of being

“overwhelmed” with the volume and short time span of assessments along with current curricular requirements. A policy requiring remediation for high risk students has been employed recently. The groups’ decision to revise the number of tests is positive, yet this decision was not based on formal data, but on casual comments and observations of students and did not include revision in curriculum, thus performance of a minimal level for Systems Thinking approach.

With-in Case Analysis: Program Low B

The leader of Program Low B indicated the program used the current NCLEX predictor assessment for five years. The current product is ATI and it is administered as curriculum-infused with the comprehensive assessment during the last semester of the program. The leader indicated the initial purpose was to increase NCLEX pass rates. The program’s pass rates for the period within the study were in the 70 percent range.

All decisions regarding the use of NCLEX predictor assessments, as well as the decision for a specific product, were based on group decisions. The leader of Program Low B stated, “Yes, I feel comfortable saying there was collective agreement among faculty for using a predictor product.” The group support demonstrated a maximum level of Shared Vision concept during the planning phase. To evaluate the selection of the current product, the faculty conducted formal and informal networking with other nursing programs in the region as well as demonstration with various product representatives. The leader shared, “Beyond discussions with current product users, we did call and ask specific questions to other programs in the area.” This demonstrates employment of Mental Modeling on a moderate level.

The program experienced global faculty resistance or lack of “buy-in” when stating the various product modules did not fit well into the current curriculum divisions:

All was well in the planning, as the faculty reviewed the content in detail during implementation, they did not feel the assessment modules fit well in our current course sequence or content. They struggled when deciding with what courses the various assessments should be matched.

Although the faculty identified the reason of “fit”, the disconnect between the unified vision of the initial purpose and the global resistance at implementation existed, demonstrating a minimal level of Shared Vision concept.

Program Low B’s leader reported faculty were initially educated on the use of the product by the company representative, which was repeated. Ongoing sessions continue, yet there is not a specific frequency. The majority of faculty education was from the product representative concerning updates to the product. This external focus of education with intermittent occurrence supports the concept of Team Learning on a minimal level.

Program Low B identified that measurements of effectiveness include NCLEX success rates and attainment of benchmarks from level to level by casual observation:

I can’t say we formally analyze the data, but we look for trends in performance in the courses as well as how many progress to next level. Recently, we started a benchmark that the student must attain a specific composite score to pass into next level and we added a coaching component.

The limited, as well as casual versus data driven assessment, supports System Thinking on a minimal level.

Program Low B shared modifications or changes to predictor program, including policies acquiring a benchmark on course assessments to pass the course, benchmarks required to progress to next level of program, and most recently, curriculum analysis and changes in course curriculum. Further improvements included the integration of formal coaching for students unsuccessful with comprehensive predictor. The recent changes demonstrate an initial rating of moderate level, however, the evidence of recent change demonstrates significant movement toward the maximum level of Systems Thinking.

Cross-Case Analysis

The qualitative interview included direct questions focusing on the four concepts of Senge's (1990) Organizational Theory, including: Shared Vision, Team Learning, Mental Modeling and Systems Thinking. This section aggregated the responses from the participants in order of the concepts versus numerical order of the survey questions.

Cross-Case Analysis: Shared Vision Concept

The first qualitative survey question was designed to identify the reason the school sought to initiate the use of current NLCLEX predictor assessments. All four participants (100%) indicated the force behind the decision was to improve or maintain NCLEX pass rates. In addition, three of the four participants (75%) indicated their program had always used an outside independent comprehensive NCLEX predictor assessment. Lastly, a component of question four focused on Shared Vision. Senge's

Shared Vision is defined as “a collective discipline of establishing a focus on a mutual purpose” (Senge, 1999, pg.7). To assess the impact of the element of Shared Vision, the participants were asked to indicate if they perceived the faculty shared the reason for initiating or using an NCLEX predictor assessment. All four participants (100%) indicated affirmative, thus performing at a maximum level of Shared Vision. Table 8 illustrates the level of adherence to Shared Vision by program specific to the element of supporting the purpose of NCLEX predictor assessments during the initial planning phase.

Table 8. Level of Adherence to Shared Vision Concept by Program: Support for Purpose

	Maximum Level	Moderate Level	Minimum Level
Program High A	X		
Program High B	X		
Program Low A	X		
Program Low B	X		

The second question also focused on Shared Vision. The leaders were asked to describe who and how the decision was made to use an NCLEX predictor assessment for their schools. All four participants indicated the decision was a group effort from the faculty at large, or more specifically, from the curriculum committee that made the initial recommendation. Program High A, “Our decision to use the product was initiated by the curriculum committee and voted on by the faculty to proceed.”; Program High B, “Yes, all faculty members agreed that tool was needed to assess comprehensive knowledge.”; Program Low A, “There was agreement by all faculty

members to use predictor assessments as well as which product to use.”; and Program Low B, “Yes, I feel comfortable saying there was collective agreement among faculty for using a predictor product.” Table 9 illustrates the programs’ level of Shared Vision specific to the decision making at the initial planning phase to integrate NCLEX predictor assessment into the curriculum.

Table 9. *Level of Adherence to Shared Vision Concept by Program: Inclusion of NCLEX Predictor Assessments into Curriculum*

	Maximum Level	Moderate Level	Minimum Level
Program High A	X		
Program High B	X		
Program Low A	X		
Program Low B	X		

The third question again looked at the aspect of Shared Vision. However, this question pertained to the decision about specific product use. Again, all four participants (100%) indicated the specific product selection decision was a group consensus. Table 10 illustrates the programs’ level of adherence to the Shared Vision concept specific to the selection of a specific predictor product or vendor.

Table 10. *Level of Adherence to Shared Vision Concept by Program: Product Selection*

	Maximum Level	Moderate Level	Minimum Level
Program High A	X		
Program High B	X		
Program Low A	X		
Program Low B	X		

Question five also assessed the concept of Shared Vision by ascertaining the reaction of faculty to the implementation of NCLEX assessment products. The low performing programs indicated a mixed response. Program Low B shared that although faculty initially shared the same vision of the need for an NCLEX predictor product, there was disparity among faculty on how the various modules would fit into the current curriculum, "...they did not feel the assessment modules fit well in our current course sequence or content. They struggled with deciding with what courses the various assessments should be matched." The faculty continued to utilize the product as the group intended, but it took "significant" time (1-2 years) "for full buy-in of faculty to occur". Program Low A leader reported, "Many were skeptical of the additional workload and needed validation based on their own students' outcomes." The global level of resistance, coupled with the lack of action to rectify, demonstrated a minimum level of Shared Vision regarding implementation.

Statements from Program Low B concurred that although the faculty at large agreed with the rationale of a predictor product, as well as the identification of the specific product, there was "... considerable resistance to implementation by students

and faculty.” Specifically, the resistance was focused on faculty perception that the test was not current, and therefore, they rescinded some initial policies, such as: student’s need to attain a benchmark score to graduate or progress through the curriculum. Once the initial policies were rescinded, faculty resistance diminished. In place of the rescinded policies, an informal remediation process was initiated. The global level of resistance was significant. Although the program took action to resolve, the action originated from casual observations/comments versus hard data. The level of Shared Vision beyond the initial planning phase for Program Low B was identified as Minimal to Moderate.

Programs High A & B both reported initial resistance from a few faculty members whereas the faculty at large were supportive. The resistance was specific to the implementation of integrating assessments and content into the curriculum. Program High B also reported that select faculty members were “...concerned that the associated policies of progression and course grade may be too strict.” However, they did not rescind their policies, instead they “...identified areas of struggle and revised the courses accordingly, which resulted in an increase in student scores.”

Program High A shared initially it had not planned to implement any student performance benchmark policies. However, after the first year it “...completed independent studies or reviews of student performance and collected details for opportunities of improvement in each course. Then we revised our course content accordingly”. In addition, Program High A identified a comfort level for benchmarks which were not initially consistent with the company’s recommendation.

Approximately, a year later the company changed their recommendations and they were ironically consistent with Program High A benchmarks.

In the following years, Program High A implemented policies on progression, inclusion of percent of grade, and requirements for graduation the following year. The leader strongly voiced that she felt the strong lack of resistance thereafter was linked to the fact faculty independently conducted the studies and set their own benchmarks. Comments from Program High A included, “Going forward, faculty were behind the strict policies 100%.”

Programs High A and B experienced limited resistance from few select faculty members. They addressed the sources of resistance, employed proactive plans, and made data-driven decisions, thus demonstrating maximum level of Shared Vision beyond the initial planning phase.

Although all schools indicated some level of resistance from faculty, the low performers indicated the resistance was from faculty at large whereas the high performing programs indicated select faculty. Also, it is evident the high performers took additional steps to integrate the product into the curriculum and increase faculty comfort levels. In addition, the high performers have more policies regarding student performance on NCLEX predictor assessments than the low performers. Table 11 demonstrates the level of adherence to the Shared Vision concept by program for the implementation phase of NCLEX predictor assessments.

Table 11. *Level of Adherence to Shared Vision Concept by Program: Implementation Phase*

	Maximum Level	Moderate Level	Minimum Level
Program High A	X		
Program High B	X		
Program Low A			X
Program Low B		X	

Cross-Case Analysis: Mental Model Concept

Question four related to the schools' use of Senge's theory concept of Mental Model, which he defined as "a reflection and inquiry skill focusing around the development of awareness of attitudes and perceptions" (Senge, 1999, p.7). The participants were asked to identify what resources or processes they employed to identify how the NCLEX predictor product was used in their schools.

Both Programs Low A and B indicated informal networking with other nursing programs, as well as, demonstrations from various product representatives. Program Low B identified a formal detailed assessment with current users. Both low performing programs employed functions at a minimal level of Mental Modeling regarding resource selection based on the evidence of extending data gathering beyond their own programs.

The high performing programs identified the same steps as the low performers, however, they also identified additional resources or steps to their processes of evaluating each product, including: formal review of current literature, formal detailed assessment or survey with current users of the various products, and requested the

companies to conduct an analysis of how their specific product would fit into their current curricula.

Program High A requested the companies to assess what other aspects related to implementation, including identification of benchmarks and policies, which could improve their program's NCLEX success rates. The leader of Program High A shared, "We had each company identify what they recommended each program do in terms of implementation, benchmarks, etc. Also, we wanted to know if their product was able to be customized to our courses aligned with their product assessments." The high performers identified additional resources or more detailed steps to their processes thus demonstrating a maximum level of self-reflection and data-driven focus. Table 12 illustrates the level of adherence to the Mental Modeling concept by program.

Table 12. *Level of Adherence to Mental Modeling Concept by Program*

	Maximum Level	Moderate Level	Minimum Level
Program High A	X		
Program High B	X		
Program Low A			X
Program Low B			X

Cross-Case Analysis: Team Learning Concept

Question six was designed to evaluate Senge's concept of Team Learning, which he defined as "a discipline of group interactions.....that transform collective thinking and mobilizes the energy onto action to achieve common goals" (Senge, 1999, p. 7). The leaders were asked what methods were used to educate faculty about the

specific NCLEX assessment product and if the sessions were well attended. All four programs leaders (100%) indicated planned in-services by the product representative were the initial source of faculty training and that attendance to the initial training was high. All programs (100%) shared that one specific faculty member had been deemed the “leader” for the product. All programs also identified the majority of ongoing education was by the company representative as well as the faculty leader who educated faculty via informal and designated workshop sessions.

Differences were noted in the aspect of ongoing education. Programs Low A and B shared that ongoing education was limited to product representative presenting product updates. The leader of Program Low A stated, “The representative comes to present to faculty but the attendance is sparse. The majority of our ongoing education comes from our faculty member that manages aspect related to the predictor.”

Similarly, the leader for Program Low B stated, “Our ongoing education is presented by the representative. It is done on an as needed basis or if we have a special request. The focus is generally product updates.” However, both Programs High A and B indicated their ongoing education focused on updates from the company representative and education on how to correlate the data from student performance to specific course curriculum and other global measures of effectiveness. The leader of Program High A stated, “The representative shares product advancements and new features. However, typically we conduct workshops to assess how students did in relation to each assessment and how that correlates to our content, the course outlines, as well as the NCLEX Blueprint.” Similarly, the leader of Program High B shared:

Yes we have the representative come and inform us of updates usually 1-2 times a year. But we tend to focus more on how the students performed on each assessment item and if we need to change our teaching strategies, timing of programs, or even our course content and curriculum.

Programs Low A and B did not indicate the ongoing education focused on correlation with outcomes or curriculum. Based on the ongoing education type, frequency, and focus, programs Low A and B employed minimal levels of Team Learning whereas Program High A and B demonstrated maximal levels of adherence to the Team Learning concept. Table 13 illustrates the levels of adherence to the Team Learning concept by program.

Table 13. *Level of Adherence to the Team Learning Concept by Program*

	Maximum Level	Moderate Level	Minimum Level
Program High A	X		
Program High B	X		
Program Low A			X
Program Low B			X

Cross-Case Analysis: Systems Thinking Concept

The focus of questions seven and eight was Senge's concept of System Thinking, which he defines as "the group's ability to learn and understand interdependency and change" (Senge, 1999, p. 7). To evaluate this concept, the leaders were asked what measures were used to evaluate the intended effectiveness of the NCLEX predictor and has your program initiated change as a result of this evaluation?

All programs (100%) identified that they measure effectiveness by annual NCLEX pass rates. Program Low A did not indicate additional evaluation or measurements of effectiveness, “Basically, we look at the NCLEX results.” However, Program Low A did identify changes since current predictor product’s initiation, such as decreasing the number of course-related assessments/tests they administered. The leader for Program Low A stated:

We previously gave the students all the assessment the company had to administer, but the students and faculty complained. They felt that due to our short timeframe of our program it was hard to get all the assessments in and we felt it increased anxiety and decreased performance. Now we only use select or key assessments.

The change to revise the number of assessments was based on casual observations/comments by students and faculty. Also, Program Low A recently implemented a policy stating students must attain a benchmark score to meet graduation requirements. The leader explains, “We started to require students to get a certain score on the comprehensive assessment to graduate.” Program Low A’s initial level of adherence to Systems Thinking was minimal based on the revisions were determined by casual observations. However the evidence of benchmarking for graduation requirements adds an element of data-driven quality resulting in a level approaching moderate adherence level.

In addition, Program Low B assessed NCLEX pass rates, and measured the number of students attaining the benchmark needed for progression from one level to another and makes “casual” identification of trends in various courses. The leader of

Program Low B stated, “Certainly we look at NCLEX scores as a final outcome. We also look at how many students are reaching benchmarks from level to level. We casually look at trends but we do not conduct hard analysis yet.” Program Low B recently identified changes in the last academic year, including a curriculum analysis, resulting in curricular change and the implementation of a “Coaching” program. The leader of Program Low B stated, “We started a coaching program that is directed at students who do not meet benchmarks on the comprehensive. A faculty mentor coaches them in the areas that the student is weak.” The results of the change will not be evident in pass rates for two years. Program Low B’s initial measurement of effectiveness indicated a minimal level of adherence, although recent changes indicate a shift to a more moderate level of adherence to the System Thinking concept.

Program High A shared that in addition to NCLEX pass rates, it consistently evaluated individual and aggregate scores on Critical Thinking Entrance and Exit assessments, course specific assessments and identified opportunities to adjust content/curriculum. Program High A previously indicated it has been using the same NCLEX predictor product for nine academic years and did not implement policy changes until the second year. The leader of Program High A stated:

In our first year, we just collected data and followed implementation advice from the representative. We did not link student results to grades. However, in our second year we used the data to revise course content. We also created policies indicating how we would identify a student as high risk, set benchmarks for each assessment based on our own specific data. Our benchmarks were not all consistent with the company recommendations. Some

were higher and some were lower. However a year or two later the company changed their benchmarks and they ironically were in line with ours. That was affirming.

The leader indicated that shortly after the second year the program implemented policies on progression, and percentage of course grade linked to course specific assessments. Some of the policies have been “tightened” or adjusted based on changing benchmarks and student performance. In addition to course specific policies, Program High A also indicated that “early on” the faculty implemented a policy related to attaining a benchmark on comprehensive assessment to the graduation. The leader for Program High A shared:

Our students take the comprehensive the first few weeks of their last semester of senior year. If they do not hit the benchmark, they must to attend one-on-one remediation for four weeks. Then they can retake the comprehensive. If they are still unsuccessful, the cycle repeats until the semester ends or the student attains benchmark.

In Program High A, students will not be permitted to graduate without attaining the comprehensive benchmark. The leader shared the next step planned for implementation includes a mandate that students who demonstrate consistent poor performance on course-specific assessments take a mandatory one credit course on test-taking strategies.

Program High B also indicated its measurements of effectiveness span beyond NCLEX pass rates and includes individual and aggregate reviews of the student performance by course and level. The leader of Program High B stated:

We look at NCLEX pass rates. Initially, we made most of our observations by looking at trends of course grades and ATI results. However, as student and faculty buy-in improved we started looking with a more critical eye at the data and set benchmarks for progression between levels.

Currently, Program High B does not have a policy regarding graduation requirement. “We do not have a policy regarding comprehension performance and graduation. I suppose that is because we have never had anyone not reach the benchmark. It has never been tested or needed.” In part, the leader identified that lack of policy was due to their proactive measures of remediation, “I also think we have such high success because we perform focused coaching of at risk students early during their progression.” Program High B identified a side benefit included higher course grades and improved buy-in from students. In addition, Program High B indicated with every year of implementation, it added a level of the process such as curriculum infused, then comprehension, and coaching/remediation. It continues to look for any avenue to enhance success, such as individualized computer instruction. Programs High A and B demonstrate overwhelming evidence of maximum System Thinking by identifying multiple measures of effectiveness beyond NCLEX, as well as, implementing curricular change and policies in support of data-driven findings. Table 14 illustrates the programs’ level of adherence to the System Thinking concept related to the identifying monitoring outcome measurements and how the outcomes were used in the program.

Table 14. *Level of Adherence to Systems Thinking Concept: Identification and Use of Measurement of Outcome*

	Maximum Level	Moderate Level	Minimum Level
Program High A	X		
Program High B	X		
Program Low A			X
Program Low B			X

Leaders' Perception of Overall Impact of NCLEX Predictor Assessments

Survey question nine inquired about the leaders' perception of NCLEX predictor products. Three of the four participants indicated the predictor assessments coincided with an increase in NCLEX scores. Program High A stated:

Our scores increased significantly with the predictor assessments, from the 65% to consistently around 95%. We are convinced the work we have done to improve curriculum was driven by the student outcomes and we have the high rates to prove it.

Similarly, Program High B, stated, "Most definitely, we have seen steady improvement each year as we make improvements within our curriculum based on the student assessments." Program Low A, indicated, "Yes, although it has been a struggle, we are beginning to see a slight improvement in NCLEX rates. We anticipate the rates will improve with the new changes we recently initiated." The remaining program leader from Program Low B, stated, "We have seen little improvement as of this time." The high performers indicated the aspects most beneficial from the predictors is the

ability to get objective data on the individual students, and aggregate student progress as well as the ability to identify opportunities for improvement in the curriculum.

Summary of Research Question 4

In summary of qualitative data, the data revealed all participants identified the schools' initial purpose of NCLEX predictor assessment was to increase NCLEX pass rates. Also, all participants, regardless of performance, identified maximum functioning of Shared Vision related to the purpose for NCLEX predictor assessments at the initial planning phase and the selection of specific predictor products. As implementation continued, a clear distinction emerged between high and low NCLEX performers. The high performers indicated global support with only a few faculty members resisting, whereas the low performers identified global faculty resistance. Also noteworthy is the response to the resistance. High performers employed a proactive data-driven approach to addressing concerns of resistance issues by increasing faculty education of product as well as various curricular revisions. The low performers rescinded policies or changed curriculum based on casual observations.

Employment of Mental Modeling concepts of product selection revealed high performers stretched the acquisition of key information for decision making beyond the product demonstration and networking with other regional nursing programs. The additional information included requests from companies for information on how they could use the student performance data to revise curriculum and assess program outcomes. As a result, the high performing schools demonstrated a maximum level of adherence to Mental Modeling whereas the lower level demonstrated only moderate level of adherence.

The finding of the Team Learning concept revealed that although all participants conducted initial faculty education with the product representative, clearly the high performers continued with ongoing education that focused on integration of student performance data to identify opportunities for improvement in the curriculum and integrating other aspects of outcome effectiveness. As a result of the evidence, the high performers demonstrated maximum level of adherence to the Team Learning concept and the lower performers demonstrated minimal level.

The concept of Systems Thinking revealed a distinction among the participants. Although all participants utilized NCLEX success rates as a measurement of effectiveness, the high performers employed a large number of effectiveness measurements, including: frequency of attaining benchmarks on course, level progression, and comprehensive assessments. Further assessments by high performers included critical thinking progression throughout the curriculum. All of the measurements of effectiveness were monitored by data. Whereas the low performers either indicated no additional assessments beyond NCLEX pass rates or assessment by casual observation, instead of data driven. As a result, the high performers were identified as functioning at the maximum level and the low performers functioned at a minimal level of Systems Thinking.

Similarly, the evidence of Systems Thinking concept revealed the high performers began revising curriculum and created policies based on student performance data. The policies included benchmarks, progress, and formal mandatory remediation. Also, the high performers identified plans for program assessment and revision based on data including graduation requirements and test taking strategy

courses for high risk students. Conversely, the lower performers did not initially use data, but have recently employed additional strategies or policies for revision. Thus, the level of System Thinking was minimal and approaching the moderate level.

Lastly, the overall aggregate perception from the leaders' indicated a positive response to the use of NCLEX predictors. However, the high performers linked their perception to NCLEX pass rates. The high performers identified their programs had a significant improvement of pass rates since the inception of the predictor assessment product, policies, and curricular revisions. Conversely, low performers indicted either no improvement or limited improvement in NCLEX rates.

In summary of the study's findings, programs that adopted a policy of formal mandatory remediation demonstrated a higher NCLEX-RN success rate than those without a policy. Furthermore, programs that had maximal adherence to Senge's concepts of Shared Vision, Mental Modeling, Team Learning and Systems Thinking also demonstrated high NCLEX-RN success rates then programs that did not consistently employ all elements effectively. This information is valuable to nursing education programs that may be initiating predictor assessments, as well as, programs with low or moderate NCLEX-RN success rates. Implementation of such a policy, as well as objectively reviewing the planning or implementation process for NCLEX predictor assessments may provide an opportunity for nursing programs to experience increased success.

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

Introduction

The nursing shortage has provided a challenge to employers in the healthcare industry, as well as, nursing education programs. The American Association of Colleges of Nurses (2004) reported the current nursing program enrollment is not adequate to keep pace with the projected demand. In response, nursing programs have worked vigorously to accommodate an increase in enrollment, minimize attrition rates and improve curriculum, all in effort to minimize costs as well as produce quality nurse graduates, which is a formidable task indeed. Donley (2005) stated nursing programs cannot possibly address everything about nursing in the curriculum due to its complex nature. Donley further reported curricula must help students enhance their cognitive skills, such as methods of reflection, critical thinking, problem solving, analysis, synthesis, and ability to evaluate the structure, process and outcomes of care. Completing all of the components, let alone objectively assessing students' ability to meet performance measurements, is a challenge.

Each nursing education program has a list of unique programmatic objectives. It is likely that consistent among all schools is an objective to provide a quality education focused on preparing new graduates in the field of nursing. However, simply providing the education and graduating the students is not enough. According to each state, the final measurement of success for a nursing program includes the ability to produce graduates who successfully pass the licensure NCLEX-RN on the first attempt. Passing the NCLEX-RN on the first attempt is referred to in the literature as

NCLEX success. To accomplish this goal, nursing programs are implementing best practice strategies to improve the success of the students throughout the program as well as upon graduation when the student takes the national licensure exam.

One such strategy is the implementation of NCLEX predictor assessments. The assessments provide educators with an objective evaluation of each student's likelihood of passing NCLEX. The predictor assessments mimic the current NCLEX Test Plan in regard to content, style and electronic format. The NCLEX predictor assessments are purchased from an outside vendor that provides a NCLEX-style test. The test results indicate predictor assessment products include one of two formats. The first format is a comprehensive end of program evaluation or exit assessment. This format includes a distribution of a comprehensive NCLEX-style test to students who are either in their last semester or last year of a nursing program. The second format is a curriculum-infused format which allows nursing educational programs the opportunity to include assessments at the conclusion of key courses throughout curriculum as well as a comprehensive end of program assessment.

The study explored the effects of the specific strategies of implementation associated with NCLEX predictor assessments for nursing education programs in the state of Pennsylvania. Stated briefly, how many nursing schools in Pennsylvania are using NCLEX predictor assessments and does how they are using the predictor assessments impact NCLEX performance? The challenge of this research was to address the many variables, including program type, type of product, implementation methods and policy administration and determine if the variables were statistically significant when compared to NCLEX performance. There is no question that nurse

educators have opinions about the impact of such assessments. However, the objective was to determine if opinion and preference are supported by the outcome of the data. The findings of this study were unique and significant because they provided a framework for isolating the NCLEX predictor component of NCLEX success. In addition, this study offers guidance for nurse educators in development and revision of NCLEX predictor assessments used in nursing programs. The ultimate significance of the study is the potential impact it may have on improving NCLEX success rates of nursing programs going forward.

Discussion of Findings

The impact of NCLEX predictor assessments on NCLEX success was enlightening. The study found the majority of nursing programs in the state of Pennsylvania are utilizing NCLEX predictor assessments. The frequency of use for all 85 nursing program respondents indicated 83.5% utilize NCLEX predictor assessments. The frequency of use increased to 92.10% when RN-BSN programs were extracted. The RN-BSN programs had limited need for predictors, inherent in their programmatic objectives, which focus on providing collegiate-level courses to attain a baccalaureate degree, not to pass NCLEX. The RN-BSN students already passed NCLEX upon conclusion of a previous nursing education program. The results of the study demonstrated the utilization of NCLEX predictor products is high in Pennsylvania, thus indicating significant use of a best practice strategy. Holstein, Zangrilli, & Toboasia (2006) suggested the use of NCLEX predictor assessments can support the program's mission and goals as part of a continual evaluation and opportunity to improve the quality of nursing programs.

Although the frequency of use data was encouraging, it was troublesome for Research Question 2, which sought to determine if there was a difference in NCLEX pass rates when comparing programs that utilize NCLEX predictor assessments with programs that do not. Since the number of respondents that do not use NCLEX predictor assessments was very limited, six respondents, in comparison to the number that do use them, the results were not statistically valid due to insufficient volume to conduct a reliable Chi Square result.

The intent of Research Question 3 was to approach predictor assessments from the perspective of evaluating if “how” they are using or implementing the predictor assessment impact NCLEX performance. This question was approached from two dimensions, first in relation to various implementation methods and second by the policies supporting the implementation.

Dimension one of implementation methods included assessment of four variables of product/vendor, length of time using a predictor product and the use of predictor either as curriculum-infused or end of program formats. The intent for identifying a connection between a specific predictor/vendor may provide insight for programs as to identifying the best product to aide in increasing NCLEX success rates. However, findings for the product/vendor type revealed that again the limited number of schools was a factor in acquiring reliable statistics. As the data from the schools were disseminated among the various products, the sample size was too small to be deemed reliable. Therefore, the study was unable to support or refute results of previous studies.

Also in dimension one, the variable of length of time using predictor product was intended to demonstrate if NCLEX pass rates increased in programs using the predictors for a longer period of time. The results indicated no significance in NCLEX performance among schools regardless of how long they had been utilizing the product. This finding provided evidence that although programs are using NCLEX predictor assessments, it is likely they have not utilized the products to meet goals of continual evaluation for improvement of the quality of the nursing programs, as identified by Holstein, Zangrilli, & Toboasia (2006).

Lastly, the intent of both the third and fourth variables of implementation focused on format of administration. The results revealed that regardless if a program used either the curriculum-infused format or the end of program format, there was no significance related to NCLEX performance. This result is significant since the majority of NCLEX predictor products have changed from an end of program format to a curriculum infused format. The change is consistent with the educational principle of ongoing assessment, which permits validation of knowledge as well as provides an opportunity for immediate remediation. These findings indicate that either the educational principle of ongoing assessment is flawed or nursing programs are not consistently providing remediation throughout the program.

The second dimension sought to determine if the use of various policies associated with predictor assessments yielded a correlation in NCLEX performance. The policies were subdivided into the two formats or methods of predictor administration, including curriculum-infused and end of program. The curriculum-infused policy variables included: identification of high risk without formalized follow-

up, formalized mandatory remediation, attainment of benchmark required passing a course, attainment of benchmark required to progress to next level within program and percentage of course grade linked to student performance and lastly use of more than one of the policies related to curriculum-infusion of NCLEX predictor assessments. The Pearson Chi Square p value for all variables was not statistically significant, indicating the policies associated with curriculum-infused format did not demonstrate an impact on NCLEX performance.

The policies associated with the method of administration of an NCLEX predictor assessment at end of program included: the use of mandatory formalized remediation, attaining benchmark as a requirement for graduation, attaining benchmark as a link to a final course grade, and the use of more than one of the policies related to end of program assessments. The results of the Pearson Chi Square test revealed that only one of the policies, formal mandatory remediation, identified significance. Therefore, programs that had policies indicating formal mandatory remediation for students who fell below the identified threshold for the comprehensive assessment have a higher level of NCLEX success than those that do not have such a policy. The finding was consistent with Morrison, Walsh and Newman (2002) who indicated students need formal remediation that is mandated and maintained by faculty since students are unlikely to remediate themselves.

The researcher incorporated an element of qualitative research in the study. The purpose was to ascertain if how the schools approached and responded to the organizational change of NCLEX predictor assessments was linked to NCLEX performance. Peter Senge's (1990) Organizational Change Theory served as the

framework. The two highest and two lowest NCLEX performers responding to the study agreed to respond to questions focusing on their programs' implementation experience. The researcher compared the responses using concepts from Senge's theory including: Shared Vision, Mental Modeling, Team Learning and Systems Thinking. The intent was to evaluate if the schools with higher NCLEX performance followed the concepts of the theory more readily than those with lower NCLEX performance. All responses were collected from the current leaders of the schools and reflect their perceptions.

The cross-case analysis revealed that all programs, regardless of performance, identified the purpose for implementing a NCLEX predictor assessment product was to increase NCLEX success rates. Seventy-five percent of the participants indicated the school had consistently used "some sort" of NCLEX predictor assessment prior to the current product.

The concept of Senge's Shared Vision Concept was evaluated on three components in the planning phase. The leaders responded based on their perception of the faculty. The focus of the first question was if faculty at large share agreement with the purpose of implementing a NCLEX predictor assessment. All participants agreed that in the initial planning phase, the faculty at large concurred with the purpose of an NCLEX predictor. The focus of the second question of Shared Vision was to ascertain who made the decision of how to use the predictor assessment and how was the decision made. The last focus of Shared Vision evaluated who made the decision to use a specific product and how was the decision made. The respondents all indicated the decisions for how to use the predictor assessments in the curriculum, as well as the

selection of the specific product, were made by group processes and also had the support of the faculty. All leaders identified significant group involvement and high level of global support for the intended use as well as the specific product, thus all schools demonstrated a maximum level of Shared Vision in the planning phase.

Another questioner inquired about the concept Shared Vision. However, the focus was shifted to the implementation phase and inquired as to faculty reaction in the form of resistance or buy-in. The results were clearly divided by the levels of NCLEX performance. The schools with high NCLEX performance demonstrated behaviors of maximum level of Shared Vision demonstrated by including limited resistance of only a few faculty. In addition, the high NCLEX performers demonstrated proactive behaviors to address the limited resistance. Furthermore, the high performers identified processes to continually measure outcome performance for the purpose of programmatic and curricular revision. Conversely, the low NCLEX performers identified significant global faculty resistance at the implementation phase and demonstrated either reactionary or casual responses to the resistance or no response at all. The researcher concluded that schools with high NCLEX performance demonstrated Shared Vision at both the initial planning phase as well as through the implementation phase. Also the high NCLEX performers used data-driven outcomes and group problem solving processes to work through any resistance. The high performers demonstrated a higher level of support from the faculty, which is consistent with Jones & Bremner (2008) who indicated faculty support is crucial to successful implementation. Also, the action by the high performers of creating processes or mechanisms to address resistance supports Lewin's (1951) Three Step Change Theory.

In the first step, “Unfreezing”, the need for change is established. In this study, both the high and low performers accomplished this step by acquiring global faculty buy-in at the planning phase. The second step of “Moving” occurs in the implementation phase, and requires the group to make plans for change and to sustain the change. In the study it was clear the low performers did not progress beyond the first step likely due to the global resistance and limited response to the resistance.

Further, discrepancies were identified among the level of NCLEX performers and the adherence to the concept of Mental Modeling. The high NCLEX performers identified the employment of multiple resources which included both a broad focus beyond their program, as well as linking the products’ ability to address programmatic outcomes. This display of inquiry demonstrated both breadth and depth and resulted in a maximal level of adherence to Mental Modeling concept. The low NCLEX performers limited their resources to a narrow focus of networking with schools in their region and demonstrations of the products by the company representatives, which revealed a use of resources at the moderate level. A clear distinction between the high and low performers was that the high performers incorporated the purpose and clear outcome objectives of their NCLEX predictor assessment program into the product search. The researcher concluded the high NCLEX performers’ additional element of incorporating the purpose and outcome objectives into the use of resources for product selection, clearly, indicated a maximum level of adherence to Mental Modeling.

The participants’ adherence to Senge’s (1990) Team Learning concept also revealed significant differences among the NCLEX performance. The low NCLEX performers demonstrated a minimal level of adherence by indicating the faculty

received limited or inconsistent ongoing education of NCLEX predictor product beyond the initial product representative in-service. Conversely, the high NCLEX performers adhered to the concept at the maximal level by providing consistent and timely ongoing product education that was focused on the programs' outcomes and student performance data. Bason & Crandall (1991) indicated that frequently the barriers to change result from lack of training and consistent lack of ongoing education. The researcher concluded the high NCLEX performers demonstrated the maximum level of adherence to the Team Learning concept.

Participants' adherence to Senge's (1990) concept of Systems Thinking also reveals a clear distinction among the high and low NCLEX performers. The high NCLEX performers demonstrated maximal adherence based on their identification of multiple measurement of outcomes as well as employment of continuous improvement concept in the form of revisions to curriculum and policies. The revisions were a result of student performance data on the NCLEX predictor assessments. Conversely, the low NCLEX performers identified either limited or recently emerging curricular changes based on casual observations versus hard data. In this study, the actions of the high performers were consistent with research by Sewell, Culpa-Bondel & Colvin (2008), who identified NCLEX pass rates increase when programs close the gaps in curriculum by way of systematic course analysis. Also integral to the closing of the gaps is the development of a data-driven incremental multidimensional process which supports evidence based decision-making. Thus, this researcher concluded the high performers' ability to close curricular gaps and implement curricular revisions based on outcome data was supportive of maximal level adherence to the Systems Thinking.

Lastly, participants were asked to give an overall perception of NCLEX predictors in their programs. While all participants, regardless of NCLEX performance level, identified NCLEX predictor assessments had a positive contribution to their programs, only the high NCLEX performers indicated a correlation of an increase in NCLEX scores since the inception of the current product.

Significance of Findings

The study was significant because it focused on evaluating a large group of users of NCLEX predictor assessments whereas previous research focused on one school or comparing two schools. Also, the study was significant for it supports that nursing programs in Pennsylvania are employing best practice strategies, regarding inclusion of NCLEX predictor assessments, consistent with nursing literature. The Pennsylvania State Board of Nursing does not require the use of NCLEX predictor assessments, however, based on the data it is apparent the rate of utilization of predictor assessments is high. The researcher can infer it is likely that the frequency of use for predictor assessments is similar in other states that do not mandate inclusion of predictor assessments in the curriculum.

The findings in this study indicated a positive relationship between NCLEX pass rates and the use of a formal mandatory remediation plan. It was clear that formal mandatory remediation programs make a difference in pass rates. Also included in this study was the variable of informal, non-mandatory remediation, which did not indicate any significance in pass rates. This is significant because many schools struggle with the concept of formal mandatory remediation on three fronts. First, the legal issues associated with a mandatory edict may cause fear and trepidation from both staff and

administration. Second, there is a learning curve specific to “how” to approach individualized remediation and identify the appropriate components. Third, there is difficulty in identifying how to acquire faculty resources to meet the needs of a remediation program, in light of already limited faculty and finances. As a result of these issues, many programs shy away from establishing formal mandatory remediation programs and offer informal or non-mandatory remediation, which according to the results of this study is not as effective in improving pass rates. This study indicated that formal mandatory remediation was effective and resulted in positive NCLEX performance. The results of the study may provide additional support to programs to add a formalized mandatory remediation strategy for high risk students to their programs.

The results of the study provided vital information regarding the importance of acquiring global faculty buy-in at the planning phase and maintaining the buy-in throughout implementation. Based on the results of this study, even when resistance existed, the approach of addressing the resistance and providing continual ongoing product education focused on the outcomes was linked to high NCLEX performance. This is important for it demonstrates that a little resistance is to be expected. However, what is really important is how the program responds to the resistance.

Although this research has provided several areas of insight, the most valuable may be the need for programs to move beyond the mechanics of implementing the various predictor assessments and use the student performance data to make changes in the curriculum. If the data indicate that a particular content area repeatedly demonstrates low performance, then an assessment of that content should ensue. Is it

included in the course or curriculum? Does the current resource, text or lecture address the content sufficiently? What changes can be made to improve students' comprehension of the content, such as adding case studies or group discussions?

According to the results of this study, regardless of what product was used or what type of program, the most crucial aspect of the high performers was continual item analysis and associated curricular revision consistent with evidence-based decision making. It is not enough to use a NCLEX predictor assessment product. The programs need to use the data that comes out of the product. Without the piece of continual improvement to curriculum, the adage of "If one does the same thing, one gets the same thing" will hold true and the school will not see a difference in NCLEX pass rates. Therefore, the results from this research can act as a call to action by those programs that indeed use NCLEX predictor assessments, but have not realized an improvement or have reached a plateau with NCLEX pass rates.

Recommendations for Future Research

The results of the study indicated the use of NCLEX predictor assessments was wide spread in the state of Pennsylvania. If the same is true in other states, then additional research on this topic would be of benefit to nurse educators. From this study, the researcher would recommend identifying a feasible and consistent mechanism to acquire NCLEX pass rates by program type within each school. This would be valuable since states only report pass rates by school, not by the various program types within the schools. As a result, much of the data in this study was in aggregate versus program specific. One must question how much information was lost with aggregation.

Also in relation to volume, an expansion of the study beyond the boundaries of one state would likely increase the sample size. The added volume would allow a researcher to discern aspects of this study related to program type and product type for impact on NCLEX performance.

Another opportunity for further evaluation would include an assessment of the individual faculty members versus the leaders' perception. The approach of individuals would provide information to validate if the leader had an accurate perception of the group. Additionally, it could include an evaluation of individual faculty members for their identification of barriers to implementation of NCLEX predictor assessments, thus providing information as to why faculty were resistant and possibly identifying solutions to the resistance.

In the study, there was a clear distinction between high and low performer's use of the student driven data, provided by NCLEX predictors. Valuable information could be provided by evaluating specifically how the high performers use the data to change the curriculum and policies. Items to evaluate may include: level of benchmark for item analysis and frequency of analysis. This type of research would provide opportunity for programs that collect the student data, but are unsure as to how to proceed to make the curricular changes in keeping with evidence-based decision making.

Lastly, the researcher identified that a more detailed approach with specific policies may be insightful. Areas to consider from a policy approach include the specific elements of: level of enforcement, threshold values and methods of remediation. The added detail may yield more definitive results as to the effective

elements of a policy versus the global statement of a policy existence as was asked in this study.

Implications for Practice

The results of this study indicate that although the use of NCLEX predictor assessments was high in the state of Pennsylvania, the associated outcomes vary. The study clearly supports the need to acquire faculty buy-in for a successful implementation. Therefore, programs evaluating their NCLEX performance in regard to the element of NCLEX predictor assessments need to assess the faculty level of buy-in and support. If support is not unanimous, then faculty need to identify the barriers and address each one to the satisfaction of the membership. For without agreement among faculty, on NCLEX predictor products, it is unlikely the schools will ever realize the potential benefits. Also, students' perceptions of the predictor assessments are a result of faculty support.

Ongoing faculty education is paramount to the success of sustaining positive outcomes of NCLEX predictor assessments, as evident in this study. Although one faculty member may be the lead, it needs to be the responsibility of all faculty members to update their knowledge on product abilities, company recommendation, and associated research. The education will provide faculty with the tools to make evidence-based practice decisions regarding administration of the predictor assessments. The researcher recommends identifying routine workshops or in-services solely with the focus of the NCLEX predictor assessments.

The study highlighted programs with mandatory formal remediation policies experience higher levels of NCLEX success. The researcher recommends every school

using NCLEX predictor assessments should construct a remediation policy for students falling below benchmark. In this study, the focus was end of program remediation, however this researcher feels strongly that the most beneficial remediation is concurrent with curriculum-infused benchmarks as well as end of program. Identifying the high risk students throughout the program and requiring remediation, provides time for the students to acquire previously missed information. It is of benefit since nursing curriculum is designed to continually build upon previous concepts. If a student waits to the end of the program to remediate, he or she misses the opportunity to identify and rectify the area of challenge before getting in over his or her head. A successful remediation program requires faculty to identify associated policies that outline the students' responsibility and potential consequences and identification of the specific methods of remediation. Administrators need to comprehend the benefits of supporting remediation policies in terms of personnel and financial resources as well as support for policy enforcement.

Lastly, the implication for practice that is likely the most underutilized is the need for programs to perform a systematic review of student performance data. Furthermore, use the data to make evidence-based practice decisions to revise curriculum, create or revise supporting policies. The researcher feels strongly that collecting student data, but not analyzing the data for future change is the missing link of schools that use NCLEX predictor assessment products, yet continue to have limited improvement in NCLEX success rates as identified in this study. All schools need to identify specific outcome measurements beyond NCLEX success rates and focus more intently on the comparison of student performance data provided by NCLEX predictor

products. All products offer the school a group as well as individualized view of student performance. The individualized student view should be used for customizing a remediation plan for the student and the group view should be used to conduct item analysis to compare with course and programmatic content. The researcher recommends that the charge of reviewing student performance data be a part of either an existing committee, such as program evaluation or curriculum, or create a subdivision of the existing committees. Furthermore, the timing of the review should either coincide with the close of each semester or at minimum the close of each academic year. Use of such a systematic approach is consistent with the concept of continuous improvement that is vital to the success of nursing programs.

Conclusions

Based on the study's results, the use of NCLEX predictor assessments in the state of Pennsylvania for academic years 2004-2005 to 2007-2008 was high. The significant level of utilization supports that nursing education programs in the state subscribe to best practice strategies.

In addition, results revealed it is not significant what specific product a school chose or what method of administration (curriculum-infused or end of program) employed. However, it was the presence of a policy requiring mandatory remediation for students who do not demonstrate threshold-level performance on the comprehensive predictor assessment that was significant. Programs with formal mandatory remediation policies had higher success rates than those that did not identify a formal mandatory remediation policy associated with end of program comprehensive assessment.

The study also revealed “how” a school approaches organizational change in relation to implementation of a NCLEX predictor assessment was significant in regard to NCLEX performance. Schools that employ strategies consistent with maximum level of adherence to Senge’s (1990) Organization Change Theory including Shared Vision, Mental Modeling, Team Learning and Systems Thinking, had a higher level of NCLEX success. A comparison between high and low NCLEX performers revealed the high performers demonstrated maximum levels of adherence to Senge’s Shared Vision concept by having only a few faculty who were resistant to the planning phase. Furthermore, the high performers took a proactive stance to the resisters by addressing the concerns via increasing faculty education and using a formal data driven approach to revise curriculum during the implementation phase.

A positive correlation between the high performers maximum level of performance of Senge’s concept of Mental Modeling and NCLEX success rates was identified. The high performers performed several measures of inquiry about the various predictor products beyond networking in their own regions. They also evaluated each product’s ability to address and incorporated the school’s purpose and outcome objectives. Also, high performers were also found to include behaviors of maximum level of adherence to the Team Learning concept by conducting initial faculty education specific to the product as well as consistent ongoing education focused on the integration of student performance data, leading to opportunity for curriculum revision.

The last of Senge’s (1990) concepts included in the study was Systems Thinking. The study revealed the high performers incorporated multiple measurements

of effectiveness beyond that of NCLEX pass rates. The high performers consistently assessed frequency of students attaining benchmarks in courses, within the level of progression and on the comprehensive assessments. In addition to collecting the data of effectiveness, the high performers identify opportunities to improve and would revise curriculum and policies accordingly in support of evidence-based decision making practices.

In conclusion, based on the finding of this study, it is recommended that nursing programs using NCLEX predictor assessments implement a policy related to mandatory remediation for at risk students based on results on comprehensive predictors. Educators need to take this information and strive to offer remediation to students at risk in effort to improve individual and programmatic NCLEX success rates. It is likely that creating and implementing an effective remediation program will require significant time and energy on the part of students, faculty and administration. However, this study demonstrates the pay-off, in the form of higher NCLEX success rates, will follow.

Setting outcomes or goals is imperative to success. Fitzugh Dodson (1978) describes stated, “Without goals and plans to reach then, you are like a ship that has set sail with no destination” (p. 72). The results of this study also suggest that nursing programs need to identify specific effectiveness indicators or outcomes specific to their NCLEX predictor assessment and then continually assess student performance on each outcome. Furthermore, educators need to conduct item analyses to identify opportunities to revise curriculum and policies consistent with evidence-based decision making practices, which will enhance students’ success on assessments and ultimately,

NCLEX-RN. Statements from the high performing validate the concept of of continuous improvement. Leader of Program High A, “We are convinced the work we have done to improve curriculum was driven by student outcomes and we have the high rates to prove it.” Leader Program High B agrees, “..we have seen steady improvement each year as we make improvements within our curriculum based on the assessment results.” Following a process of continual improvement will ensure the program does not accept the status quo but consistently strives for 100% pass rates.

Nursing educators and leaders can utilize the results of this study to guide the development of new or revision of an existing NCLEX predictor assessment program. In doing so, nursing programs will have the information necessary to utilize the best practice strategy of NCLEX predictors assessments in a manner that will improve pass rates and expedite the availability of graduates that can provide high quality care and ultimately address the global issue of the nursing shortage.

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Appendix A

Electronic Survey: Utilization of NCLEX Predictor Assessments

I. Demographics:

1. Please select your organization's name from the drop down box.
 - a. *Drop down box of all Nursing programs in PA.*
2. Please indicate all types of undergraduate nursing tracks in your nursing program.
– check all that apply
 - a. Diploma
 - b. AD
 - c. Traditional BSN
 - d. Accelerated or 2nd Degree
 - e. LPN-RN (AD or BS/BSN)
 - f. Other – Please specify
3. Has your program lost certification or received performance sanctions from the Pennsylvania State Board of Nursing since academic year 2003/2004?
 - a. Yes
 - b. No
 - c. Uncertain

II. NCLEX Utilization:

4. Do you utilize a NCLEX Predictor Assessment Product for your nursing program(s)?
 - a. Yes (if more than one program as identified in #2, this question will pop up for each.)
 - b. No (If “No” – end of survey, thanks)
5. Please identify the year of the first graduating class in which your program utilized an NCLEX Assessment Product(s) for the entire length of the program? (*Will pop up for each type, based on response to #2*)
 - a. 2011 – 2010
 - b. 2010 – 2011
 - c. 2009 – 2010
 - d. 2008 – 2009
 - e. 2007 - 2008
 - f. 2006 - 2007
 - g. 2005 - 2006
 - h. 2004 - 2005
 - i. 2003 - 2004
 - j. 2002 - 2003
 - k. 2001 - 2002

- l. 2000-1999
 - m. 1999 – 2000 or prior
-
6. Please identify what product(s) you use in each track of your nursing program, check all that apply. *(will pop up for each program ID in #2)(if use more than one product – Question #8 & #9 will come up for each product identified)*
 - a. Arnett Development Corporation
 - b. Assessment Technology Inc. (ATI)
 - c. Educational Resources Incorporated (ERI)
 - d. Health Education Systems Incorporated (HESI – Evolve Reach)
 - e. Mosby AssessTest
 - f. National League of Nursing Achievement (NLN)
 - g. Other – Please specify
 7. Do you administer an NCLEX predictor Assessment product as a comprehensive or exit exam to the students completing your program?
 - a. Yes
 - b. No
 8. Do you use an NCLEX Predictor Assessment product as a comprehensive or exit exam to identify high risk students?
 - a. Yes
 - b. No
 9. If you use NCLEX Predictor Assessment Products as a comprehensive or exit exam, what effect does student performance on the assessment have? (Check all that apply) *(will pop up for each program ID in #2)*
 - a. Students with inadequate performances are required to undergo a formalized remediation program.
 - b. Student performance is linked to a requirement for graduation.
 - c. Student performance is linked to grade.
 - d. Other: Please specify
 - e. No effect
 - f. Not applicable
 10. So you administer an NCLEX Predictor Assessment product throughout the curriculum with various nursing courses?
 - a. Yes
 - b. No
 11. If you administer the NCLEX Predictor Assessment product throughout the curriculum with various nursing course, what effect does student performance on the assessment have? (Check all that apply)
 - a. Students are identified as “High Risk” with no required follow up.

- b. Students with inadequate performance are required to undergo a formalized remediation program.
 - c. Students are required to attain a benchmark value to pass the course
 - d. Students are required to attain a benchmark value for progression to the next level in program.
 - e. Students performance is linked to a percentage of course grade
 - f. Other: Please specify
 - g. No effect
 - h. Not applicable
12. Do you have program policies/guidelines in place to support the utilization of your NCLEX Predictor Product(s)?
- a. Yes
 - b. No
13. Since implementation of NCLEX Predictor Products for your program, has there been an increase in your program's NCLEX pass rates?
- a. Increase
 - b. Decrease
 - c. No Change
 - d. Not Applicable - The first class utilizing NCLEX Predictor Products has not completed the program/NCLEX-RN.
14. Overall, the utilization of the NCLEX Predictor product has been perceived as positive from faculty?
- a. Yes
 - b. No
15. Would you be willing to participate in a brief follow-up telephone survey interview to expound upon the factors related to the implementation and utilization of NCLEX predictor assessments?
- a. Yes
 - b. No
16. Please provide the following information so that we may follow-up with you regarding the telephone survey:
- Name:
- Phone Number:
17. Best time(s) to call: (Check all that apply)
- a. Morning (8 a.m. – 11 a.m.)
 - b. Midday (11 a.m. – 2 p.m.)
 - c. Afternoon (2 p.m. – 5 p.m.)
 - d. Evenings (5 p.m. – 8 p.m.)

Appendix B

Qualitative Case Study Interview Guide/Protocol

Time of Interview:

Date of Interview:

Interviewer: Viki Hedderick, RN, MSN

Interviewee:

Nursing Program of Interviewee:

Position of interviewee:

Introduction:

Thank you for your willingness to participate in the interview portion of this study. The intent of today's interview is to acquire additional information specific to your program's utilization and implementation of NCLEX predictor assessments. Are you the individual in your organization that is able to best answer detailed question about the utilization and implementation?

If "yes" proceed, If "no" inquire at the possibility of arranging an opportunity to speak with the designated individual.

I want to inform you that I will be recording this conversation for the purpose of transcription and data analysis. I assure that this information will be kept in confidence and will not be presented in any manner to identify you or your program. Do I have your permission to record this interview?

If response is "Yes", *Thank you for your permission to record. Shall we begin?*

Questions:

1. Can you identify, the reason your program sought to initiate the use of a NCLEX predictor assessment product within your curriculum?

1A. Do you feel that the faculty at large shared in this vision initially? Yes / No

1A₁. IF yes, Why?

1A₂. IF no, Why?

1B. Do you feel that faculty at large share this vision currently? Yes / No

1B₁. IF yes, Why?

1B₁. IF no, Why?

2. How was the decision to implement a NCLEX predictor assessment and who made the decision?

2A If by group: Can you elaborate on the membership of that group and how was membership determined?

2B. If an individual: Can you please identify the position of the individual?

2C. Would you say that the faculty at large had a consensus as to the need to change? Yes / No

2C₁. IF no, Why?

3. How was the decision to implement specific NCLEX predictor assessment and who made the decision?

3A. If by group: Can you elaborate on the membership of that group and how membership was determined?

3B. If an individual: Can you please identify the position of the individual?

4. Please describe the resources used in identifying how the product would be utilized in your curriculum?:

4A. Product representative presentation/demonstration
Discussions with current product users
Literature review
Formal/Informal networking with other nursing programs
Based on program purpose & identified outcome measurements
Other

5. What was faculty reaction to the actual implementation of the NCLEX predictor assessment? Was there resistance from faculty? Yes / No

5A. If so, will you identify the reasons for resistance?

5B. Please describe measures the group/individual took to address the resistance.

5C. If no resistance, what would you attribute to their willingness to change?

6. How did the faculty receive initial about the product?

6A. Was the training attended by the majority of the faculty that would use the product?

6B. If no, How were the faculty members informed of the product in regards:

to curriculum

to administration of assessments

6C How do faculty receive ongoing training about the product and predictor concept?

7. What measures or intended outcomes are evaluated to assess effectiveness of the product/predictor program?

7A. How is the evaluation conducted? And by whom?

8. Have there been changes from the initial utilization as a result of the above evaluation? Yes / No

8A. Please describe the changes and how they were identified.
(data/casual observation)

9. Overall, do you feel that the implementation of an NCLEX predictor assessment is a contributing factor to the your program's NCLEX success?

9A. What evidence gives you that impression?

Closing

That concludes my question. I would like to once again thank you for taking the time to participate in this study.

Appendix C

Matrix Alignment of Survey Questions to Purpose

Electronic Survey

Survey Question	Origin/ Component	Purpose
1. Please select your organization's name from the drop down box.	Demographic Information	Provide information as to the name of the program and validate. Validates program on list of accredited PA programs.
2. Please indicate all types of undergraduate nursing tracks in your nursing program.	Demographic Information	Identifies if the different types of tracks within the nursing program. Sets-up the following questions re: NCLEX utilization to determine if there are differences among tracks within the same program.
3. Has your program lost certification or received performance sanctions from the Pennsylvania State Board of Nursing since academic year 2003/2004?	Demographic Information	The research criteria excludes programs that have not had constant state accreditation since 2003/2004. Response will determine inclusion or exclusion of study.
4. Do you utilize a NCLEX Predictor Assessment Product for your nursing program(s)?	NCLEX Utilization (Global)	Addresses research question #1 – What is the frequency of utilization rate of NCLEX Predictor Assessments in PA? Can be further evaluated by Survey Question #2 of types of nursing tracks in nursing program. Also addresses research question #2 that evaluates the difference in NCLEX pass rates for programs that use NCLEX Predictor assessments with those that do not. (NCLEX success rate data – publicly reported and will be used for this question.)
5. Please identify the year of the first graduating class in which your program utilized an NCLEX Assessment Product(s) for the entire length of the program.	NCLEX Utilization	Will establish how long the track/program has been utilizing the NCLEX Assessment. Length of time can impact NCLEX success, utilization of product. (Research Question #3.)

Survey Question	Origin/ Component	Purpose
6. Please identify what product(s) you use in each track of your nursing program. (Check all that apply).	NCLEX Utilization	Addresses Research Question #3. What is the effect of how programs use NCLEX predictor assessments on NCLEX success? Differentiates by track.
7. Do you administer the NCLEX predictor as a comprehensive or exit exam prior to the student completing your program?	NCLEX Utilization (End of Program)	Addresses Research Question #3. What is the effect of how programs use NCLEX predictor assessments on NCLEX success? Identified is utilize End of Program option.
8. Do you use the NCLEX predictor product as a comprehensive or exit exam to identify high risk students?	NCLEX Utilization (End of Program)	Addresses Research Question #3. What is the effect of how programs use NCLEX predictor assessments on NCLEX success? Identifies if used for remediation. Literature identifies that remediation is the key to NCLEX predictor assessment products.
9. If you use the NCLEX predictor assessment product as a comprehensive or exit exam, what effect does student performance on the assessment have? (Check all that apply)	NCLEX Utilization (Student effect/consequences with End of Program)	Addresses Research Question #3. What is the effect of how programs use NCLEX predictor assessments on NCLEX success? Identifies the consequences to the student and if the level of consequences impacts NCLEX success.
10. Do you use the NCLEX assessment product throughout the curriculum with various nursing courses	NCLEX Utilization (Curriculum infused)	Addresses Research Question #3. What is the effect of how programs use NCLEX predictor assessments on NCLEX success? Identifies the use of product throughout curriculum.
11. If you administer the NCLEX predictor throughout the curriculum with various nursing courses, what effect does student performance on the assessment have?	NCLEX Utilization (Student effect/Consequences of Curriculum Infused)	Addresses Research Question #3. What is the effect of how programs use NCLEX predictor assessments on NCLEX success? Identifies the consequences to the student and if the level of consequences impacts NCLEX success.

Survey Question	Origin/ Component	Purpose
12. Do you have program policies/guidelines in place to support the utilization of your NCLEX predictor product(s)?	Senge's System Thinking	Systems thinking includes the use of policies/guidelines to ensure change is continued. Identifies is elements of systems thinking are utilized.
13. Since the implementation of NCLEX predictor product(s) for your program, has there been an increase or decrease in your program's NCLEX pass rates?		Self report of NCLEX Success. Cor-responds to Research Questions 2, 3 & 4. #2. What is the difference in NLCEX pass rates when comparing programs that utilize NCLEX predictor assessments with programs that do not? #3. What is the effect of how programs use NCLEX predictor assessments on NCLEX success? #4.What is the perception of the program leader as to what factors specific to the utilization and implementation of NCLEX assessment products, influence program's NCLEX success.
14. Overall, has the utilization of the NCLEX Predictor Product been perceived as positive from faculty?	Perception of Faculty response to change. Senge's Shared Vision	Identifies faculty buy-in and their willingness to support organizational change.
15. Would you be willing to participate in a brief follow-up telephone survey expounding upon the factors to the implementation and utilization of NCLEX predictor assessments?		Opportunity to identify participants for the qualitative portion of the study (Research Question #4).
16. Please provide the following information so that we may follow-up with you regarding the telephone survey.		Opportunity to identify participants for the qualitative portion of the study. (Research Question #4).
17. Best time(s) to call: (Check all that apply)		Opportunity to identify participants for the qualitative portion of the study. (Research Question #4).

**Interview Survey –
Research Question #4**

Survey Question	Origin/ Component	Purpose
1. What was the reason your program sought to initiate the use of NCLEX predictor assessments within your curriculum?	Vision/Purpose of change	Seeks to set the stage for identifying an individual vision or a shared vision for change.
2. Who was the decision maker for this curricular change?	Shared Vision Mental Models	Seeks to identify if the decision was a group or individual decision. (shared vision). Also seeks to identify awareness of attitudes and perception of the change (mental model)
3. Who made the decision to use “X” product?	Mental Models	Seeks to identify individual or group participation with change.
4. What resources were used to identify how the products would be used in your curriculum?	Mental Models	Seeks to identify if thought and process were involved in decision. Thus supportive of mental models and team learning.
5. From a faculty perspective, what was the major reaction to using the NCLEX predictor assessment products?	Shared Vision Mental Models	Seeks to identify if the group was able to come to consensus around shared vision.
6. What methods ere used to educate the faculty about the product?	Team Learning	Seeks to identify if the faculty was prepared for the change.
7. What measures were used to evaluate the intended effectiveness of the NCLEX predictor assessments?	Systems Thinking	Seeks to identify the group’s ability to identify dependency of change.
8. Have there been changes from the initial utilization as a result of the evaluation?	Systems Thinking	Seeks to identify the group’s ability to identify dependency of change.
9. How do you feel about the implementation of the NCLEX product?	Systems Thinking	Seeks to identify the group’s ability to identify dependency of change.

Appendix D
(Indiana University of Pennsylvania Letterhead)
Mailed Letter to Invite Participation

Dear Nursing Education Program Leader,

I am a doctoral candidate at Indiana University of Pennsylvania in the Administration and Leadership Program. As a fellow nurse educator, I am continuously evaluating my individual efforts and the efforts of my nursing program, to enhance students' NCLEX success. In recent years, the use of NCLEX predictor assessment products has become a popular option with this ongoing struggle. As a program leader, you undoubtedly have wondered if other programs are using the NCLEX predictor assessments. Also, how are they using them within their curriculum and most importantly if they realized a positive impact on NCLEX success. My dissertation research study is designed to evaluate those questions. The information gained from this study will help us to enhance the successful utilization of NCLEX predictor assessments and ultimately NCLEX success, which is a goal that is close to the hearts of all nurse educators and leaders.

The following information is provided to help you make an informed decision whether or not to participate in this study. If you have any questions, please do not hesitate to ask. You are eligible to participate because you are the leader of an approved professional nursing education program in the state of Pennsylvania. If as the leader, you identify a designee that has detailed knowledge of your program's utilization and implementation of NCLEX predictor assessments, please forward this letter and the electronic survey to that individual.

The purpose of this study is to investigate how many programs in Pennsylvania are using NCLEX predictor assessment products, how they are using them in their curriculum and what impact it may have on NCLEX success. Another purpose is to examine the perceived role of the implementation of NCLEX assessment products within various programs. Your responses on the survey will be correlated with your NCLEX pass rates as posted on the Pennsylvania State Board of Nursing Participation web site.

The purpose of this letter is to invite you to participate in this research study and to provide notification of the survey before it is sent to you via email. In the current environment of computer viruses, we are all leery of receiving emails from an unknown entity. I wanted to inform you that in the next 7-10 days you will receive an email identifying me as the sender "Viki Hedderick" and the subject will be identified as "NCLEX Predictor Survey". That email will contain the link to electronic survey which will take approx. 5-10 minutes. to complete. My hope is that you will choose to participate and assist me in identifying best practices regarding the use of NCLEX Predictor Assessments.

I appreciate your consideration for participating in this study. I am confident that your survey responses will contribute to data that will provide rich information on use of implementation strategies of NCLEX Predictor Assessments and NCLEX Success.

Your participation in this study is voluntary. You should be aware that you are free to decide not to complete the survey or to withdraw at any time and that participation or nonparticipation will not affect you or your program. Your decision will not result in any loss of benefits to which you are otherwise entitled. Also, please be aware that the use of the compiled data will

be limited to this research, as authorized by Indiana University of Pennsylvania, although the survey results may at some point be presented in other formats, such as journal articles or conference presentations but your identity will be kept strictly confidential. Only aggregate data will be shared. There are no known risks and/or discomforts associated with this study.

Thank you for your advanced consideration for participation in this study.

Viki Hedderick, MSN, RN

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**This project has been approved by the Indiana University of
Pennsylvania Review Board for the protection of Human Subjects (Phone:
734/357-7730).**

Appendix E

Introductory Information to Electronic Survey

To:

From: Viki Hedderick, MSN, RN, Doctoral Candidate IUP

Re: Participation in NCLEX Predictor Assessment Utilization

Dear Nursing Education Program Leader,

Approximately 7-10 days ago you received a letter via the US Postal service informing you of my dissertation research study. I am hopeful you will participate in this research study. It will only take 5 -10 minutes to respond to the 14 brief questions on the electronic survey.

As stated in the letter, the purpose of this study is to investigate how many programs in Pennsylvania are using NCLEX predictor assessment products and how they are using them in their programs. Your participation in this study is voluntary. Please be aware that the use of the compiled data will be limited to this research, as authorized by Indiana University of Pennsylvania. Although the survey results may at some point be presented in other formats, such as journal articles or conference presentations but your identity will be kept strictly confidential. Only aggregate data will be shared.

If as the leader, you identify a designee that has detailed knowledge of your program's utilization and implementation of NCLEX predictor assessments, please forward this email to that individual for completion.

To access the electronic survey, simply highlight the following link, right click and select "open hyperlink" to begin:

NCLEX Predictor Assessment Survey

Thank you for your consideration for participation in this study.

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Appendix F

Evaluation Criteria for Senge's Concepts

	Maximum Level of Function	Moderate Level of Function	Minimum Level of Function
Shared Vision (Purpose of NCLEX)	All faculty concur on purpose for initiating NCLEX predictor assessment	Majority of faculty concur with purpose for initiating NCLEX predictor assessment	Less than majority faculty concur on purpose for initiating NCLEX predictor assessment
Shared Vision (Decision to implement a NCLEX predictor assessment)	Formal Group Decision	Informal Group Decision	Individual Decision
Shared Vision (Identification of specific predictor product/vendor selection)	Formal Group Decision	Informal Group Decision	Individual Decision
Shared Vision (Faculty reaction to implementation)	Lack of resistance or limited to select few. If resistance, response is proactive and data driven.	Lack of resistance or limited select few. If resistance, response is limited or reactionary/casual.	Global resistance to implementation. Lack of response to resistance.
Mental Models (Use of resources in product selection)	Employs multiple resources beyond own region as well as incorporates purpose and outcome objectives.	Employs resources with narrow focus including within own program and region.	Employs limited resources such as product representative demonstration/ materials
Team Learning	Initial education by product representative and consistent/timely ongoing education includes a mix of product information as well as driven by program outcomes & student performance data.	Initial education by product representative and consistent/timely ongoing education focused on product updates.	Initial education by product representative and ongoing education limited in focus and/or frequency

Evaluation Criteria for Senge's Concepts (continued)

	Maximum Level of Function	Moderate Level of Function	Minimum Level of Function
Systems Thinking (Means to monitor effectiveness)	NCLEX success rates and identify assessment performance to appropriate aspects of curriculum via student performance data and identify policies/responses for correction via continuous improvement processes	NCLEX success rates and identify assessment performance to appropriate aspects of curriculum via student performance data	NCLEX success rates with or without casual observation to other outcomes
Systems Thinking (Employ changes in program)	Make multiple changes in curriculum and or policies based on student performance data and demonstrate ongoing plan for future evaluation/monitoring/changes	Initiate minimal changes in curriculum and or policies based on student performance data.	No changes or changes limited to response to casual observations