

**THE RELATIONSHIP BETWEEN READING COMPREHENSION SKILL  
ASSESSMENT METHODS AND ACADEMIC SUCCESS FOR FIRST  
SEMESTER STUDENTS IN A SELECTED BACHELOR OF  
SCIENCE IN NURSING PROGRAM IN TEXAS**

A Dissertation

by

JENNIFER D. M. COOK

Submitted to the Office of Graduate Studies of  
Texas A&M University  
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

December 2006

Major Subject: Educational Human Resource Development

**THE RELATIONSHIP BETWEEN READING COMPREHENSION SKILL  
ASSESSMENT METHODS AND ACADEMIC SUCCESS FOR FIRST  
SEMESTER STUDENTS IN A SELECTED BACHELOR OF  
SCIENCE IN NURSING PROGRAM IN TEXAS**

A Dissertation

by

JENNIFER D. M. COOK

Submitted to the Office of Graduate Studies of  
Texas A&M University  
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

Approved by:

Chair of Committee,	Walter F. Stenning
Committee Members,	Stephen L. Stark
	LaVerne Young-Hawkins
	Toby Marshall Egan
Head of Department,	Jim Scheurich

December 2006

Major Subject: Educational Human Resource Development

## ABSTRACT

The Relationship Between Reading Comprehension Skill Assessment Methods and Academic Success for First Semester Students in a Selected Bachelor of Science in Nursing Program in Texas. (December 2006)

Jennifer D. M. Cook, B.S.N., Dominican College;

M.S.N., The University of Texas at Arlington;

M.B.A., University of the Incarnate Word

Chair of Advisory Committee: Dr. Walter F. Stenning

This retrospective descriptive study addressed the relationship between reading comprehension skills as measured by the Nelson-Denny Reading Test and the Nurse Entrance Test and indices of academic success (i.e., grade point average of prerequisite science courses and overall grade point average) prior to admission for students in a Bachelor of Science in Nursing program with student success in the first semester of nursing coursework. Overall, there has been a continual decline in average reading ability of college-aged students. Reading is a basic skill for learning and academic success. To successfully complete an academic program of study in preparation to become professional nurses, students must be able to read and apply material from textbooks and journals. With the well-documented nursing shortage, any attrition from a nursing program contributes to the professional dilemma.

Correlational and descriptive methods were used to determine the relationships among the variables for 179 students in this selected Bachelor of Science in Nursing

(BSN) program. A comparative approach was used to investigate possible cause and effect relationships between measures of academic success of students and reading comprehension abilities. Data were obtained from official academic records and test results for the Nelson-Denny Reading Test and the Nurse Entrance Test. Statistical procedures used to understand and interpret the interactions among and between the variables and included frequency distributions, descriptive statistics, correlational analysis, and a regression model.

Results of the study, limited to the students in this BSN program, indicated that reading comprehension, as measured by the Nelson-Denny Reading Test, was better in identifying student risk for academic failure. There was a positive relationship between the grade point average (GPA) for prerequisite science courses, overall cumulative GPA, and GPA for the first semester nursing courses. Early determination of reading comprehension ability provides needed information to direct intervention activities to improve individual reading comprehension abilities and, thus, promote successful academic performance in the first semester of this nursing program and thereafter.

## **DEDICATION**

I would like to dedicate this work to my life partner and beloved husband,  
Samuel E. Cook, ME, '69. His love and support helped make my dream a reality.

Gig 'em!

## ACKNOWLEDGEMENTS

I wish to express gratitude and appreciation to Dr. Walter F. Stenning, chair of my doctoral committee, for his unwavering support, guidance, and willingness to share his expertise throughout my educational experience. He would say, “not a problem,” even as he continued to guide my research efforts past his official retirement from the university.

I further extend my appreciation and gratitude:

To the other faculty members of my committee, Dr. Stephen L. Stark, for his encouragement and direction for scholarly writing; Dr. LaVerne Young-Hawkins, for her focus on the educational process; and Dr. Toby Marshall Egan, for his grounding in human development.

To all of my nursing colleagues at the University of the Incarnate Word for the many encouraging words and kind moments of listening, Barbara Moreland, for bridging the admission process; Dr. Brenda Jackson and Dr. Jean Deliganis for support to begin the process; Dr. Sandra Strickland and Dr. Maureen Rauschhuber for being inspirations and walking this path with me; Dr. Jane Cardea for her mentoring and scholarly guidance; and Dr. Kathi Light, Dean of the School of Nursing and Health Professions, for support and, especially, for having confidence in me.

To my family, Octavio Martinolich (brother) and wife, Carmen, daughter Dawn and granddaughter Paiten, and Georgios Mihos (brother-in-law), for never wavering in your support and encouragement. To my family members who were there as I began

this process but who have since gone to heaven, Consuelo D. Martinolich (mother), Annie Laurie Mihos (sister), and Scot Martinolich (nephew), may you rest in peace.

To my God, through whom all things are possible.

## TABLE OF CONTENTS

		Page
ABSTRACT .....		iii
DEDICATION .....		v
ACKNOWLEDGEMENTS .....		vi
TABLE OF CONTENTS .....		viii
LIST OF TABLES .....		x
CHAPTER		
I	INTRODUCTION .....	1
	Background of the Study .....	2
	Statement of the Problem .....	6
	Purpose of the Study .....	7
	Research Questions .....	8
	Operational Definitions .....	8
	Assumptions .....	13
	Limitations .....	13
	Methodology .....	14
	Significance Statement .....	16
II	REVIEW OF LITERATURE .....	18
	Introduction .....	18
	Academic Readiness for Secondary Education .....	24
	Cognitive Factors Predictive of Successful Reading and Studying .....	28
	Academic Predictions of Success in Nursing Education .....	35
	Summary .....	47
III	METHODS .....	49
	Study Design .....	49
	Description of Study Population .....	50
	Procedures .....	51
	Instruments .....	54
	Data Analysis .....	59
	Summary of Methodology .....	61



**TABLE OF CONTENTS (continued)**

CHAPTER	Page
IV	RESULTS ..... 62
	Overview ..... 62
	Restatement of the Problem and Research Questions ..... 62
	Results of the Study ..... 63
	Summary of Results ..... 85
V	SUMMARY, DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS ..... 87
	Summary of the Study ..... 87
	Conclusions ..... 89
	Research Questions ..... 90
	Implications and Recommendations ..... 95
	Summary ..... 101
	REFERENCES ..... 102
	APPENDIX A ..... 124
	APPENDIX B ..... 126
	APPENDIX C ..... 128
	APPENDIX D ..... 130
	VITA ..... 132

## LIST OF TABLES

TABLE		Page
1.1	First Semester Nursing Students Grouped by Test Method for Reading Comprehension .....	14
3.1	Point Values for GPA Calculation for Students at the University of the Incarnate Word .....	52
4.1	English Preparation Course Requirements for Students at the University of the Incarnate Word .....	65
4.2	Academic Outcome for First Semester Nursing Student Population at the University of the Incarnate Word .....	66
4.3	First Semester Nursing Students' Reading Comprehension Results .....	67
4.4	N-DRT Measure of Reading Comprehension Ability and Academic Failure for First Semester Nursing Courses .....	68
4.5	Outcome After First Semester Course(s) Failure for N-DRT Measured Group .....	70
4.6	NET Reading Placement for Reading Comprehension Ability and Academic Failure for First Semester Nursing Courses .....	71
4.7	Outcome After First Semester Course(s) Failure for NET Measured Group .....	73
4.8	Student GPA For First Semester Nursing Courses .....	74
4.9	Outcome of Enrollment in First Semester Nursing Courses .....	75
4.10	Student GPA Prerequisite Science Courses .....	76
4.11	Student GPA for Pre-Nursing Courses .....	76
4.12	Final GPA for Students Who Were First Semester Nursing Students .....	77
4.13	Correlations of Reading Comprehension to GPA for First Semester Nursing Courses .....	78

**LIST OF TABLES (continued)**

TABLE		Page
4.14	Mean GPA for Prerequisite Science Courses and Outcome of Enrollment in First Semester Nursing Courses .....	79
4.15	Correlations of Reading Comprehension With the GPA for Prerequisite Science Courses for First Semester Nursing Students .....	81
4.16	Correlations of Reading Comprehension With GPA for Pre-Nursing Courses for First Semester Nursing Students .....	82
4.17	Mean GPA for Pre-Nursing Courses and Outcome of Enrollment in First Semester Nursing Courses .....	83
4.18	Relationships of First Semester Nursing Course Performance to Selected Predictors .....	84
4.19	Regression Model for First Semester Nursing Student Grades (N = 179) .....	86

## CHAPTER I

### INTRODUCTION

Nurse educators continue to be concerned with factors that influence academic success and attrition rates of students entering programs of study for professional nursing. Overall, there has been a continual decline in the average reading ability of college-aged students (Breneman, 1998). Twenty-two years ago, the National Commission on Excellence in Education (1984) delivered a shocking report called *A Nation at Risk*, which awakened millions of Americans to the crisis regarding the poor reading, writing, and mathematic skills of students in primary and secondary education. Early studies of nursing students reported that undergraduate students evidenced poor reading and thinking skills as well as limited vocabulary (Maury-Hess, Crancer, & Brester, 1979). In a more recent study, the reading ability of nursing students is found to be similar to that of other college majors (Dearman & Davis, 1990), and as noted in a 1998 study by Breneman, there has been a continual decline in the average reading ability of all college-aged students.

Various methods and tools have been used to assist in the assessment of overall reading abilities and potential for success for students accepted into academic nursing programs of study. The Nelson-Denny Reading Test (Adebayo, 1993) and the Nurse Entrance Test (Abdur-Rahman, Femea, & Gaines, 1994) are two tools commonly used for this reading skill assessment of students entering colleges and universities. These tools are commonly used to determine baseline reading abilities and the potential need

---

The style for this dissertation follows that of *The Journal of Educational Research*.

for remediation of tested students to increase the chances of accomplishment of academic goals.

### **Background of the Study**

The Sisters of Charity of the Incarnate Word established the University of the Incarnate Word (UIW) in 1881 in San Antonio, Texas. This was more than four decades after the Battle of the Alamo (1836) and three decades after Texas became a state for the first time (1845). In 1905, the sisters admitted the first students to the Santa Rosa Hospital School of Nursing that became one of the pioneer nursing education programs in the South. In 1935, the sisters had the foresight to make the nursing school part of Incarnate Word College, making it one of the first baccalaureate nursing programs west of the Mississippi river. In 1996, the college achieved university status, changing the name to the University of the Incarnate Word (Hendrickson & O'Connor, 1996).

Today, the School of Nursing and Health Professions is the only Catholic baccalaureate-nursing program in Texas. A distinguishing characteristic of this educational program is the emphasis on continuing the work of the founding congregation. The mission to serve the most vulnerable in society is realized through the curricular emphasis on social justice and human dignity (University of the Incarnate Word Bulletin, 2005-2006).

Reading is considered to be a basic skill for learning, and as such, a foundational skill for academic success (Dearman & Davis, 1990; Pugh, Pawan, & Antommarchi, 2000). Throughout the nursing curriculum, the students are confronted with many reading assignments. These assignments are often lengthy, and the level of difficulty is

overwhelming for many students who do not read effectively (Britton, Glynn, & Smith, 1985). In addition, a goal of nursing education is to acculturate students to the practice of reading within the field of nursing (American Association of College of Nursing [AACN], 2005). Therefore, to successfully complete an academic program of study in preparation to becoming professional nurses, nursing students must be able to read and apply material from textbooks and journals (Beeson, 2001).

In the reviewed literature, the academic characteristics of students, both traditional and non-traditional, who choose to enroll in professional nursing programs, can be readily found. For example, on a nationwide basis, the current generation of undergraduate students is reported to be committed to doing well, but often lacks the basic skills necessary for college-level work (Levine & Cureton, 1998). Particularly, they arrive at college with reading deficits, unable to read for details, identify main ideas, or recognize relationships among meaningful ideas (Crane, Poziemski, & Gustafson, 1998). In a U.S. Department of Education (2002) report, approximately one third of high school students considered “at risk” for low academic attainment enroll in a four-year college within two years of high school graduation. For the students who choose to enroll in nursing programs, many are found to be lacking in prerequisite skills leading to a need for additional academic assistance (Symes, Tart, & Travis, 2005). The characteristics of the “Nexter” generation (born after 1980) are confident, achievement-oriented, tenacious, and optimistic but typically in need of structure for learning (Brown, 2001; Zemke, 2001). Therefore, nursing faculty, like all other college faculty, are

challenged to teach the broad range of students with capabilities ranging from “at-risk” to “exceptional.”

Nursing education programs had a reported attrition rate of approximately 44% in 1978 (Roland, 1978), and that statistic has improved only slightly over the next 20 years (Buerhaus, 1998; Jenks, Sellekam, Bross, & Paquet, 1989). The current “good news” is that with increased enrollment numbers, the percentage of dropouts has decreased (AACN, 2005). The “bad news” is that with the well-documented shortage of nurses and the limited enrollment of students in most nursing programs, any attrition presents a challenge to the profession and to society at large (Buerhaus, 2006). A failure to graduate often results in the student and family suffering financial, physiological, and psychological consequences (Byrd, Carter, & Waddoups, 2001; Symes, Tart, & Travis, 2005). The student’s personal loss of self-esteem is known to also create a sense of loss for the student’s peers and faculty (Dowell, 1996). Further, competition for economic resources for nursing education program support for individual students and for institutions as a whole, has increased in keeping with recent reductions of state and federal funds designated for higher education (Dowell, 1996; Heydamn, 1991). Students who leave before completing a designated program of study often use financial resources that diminish the scarce resources allocated to the school and to other nursing students (Heydamn, 1991). With limited program capacity to admit students due to a variety of factors and a need to increase program enrollments, an unsuccessful student also takes the place of a potentially successful student (Heydman, 1991). This displacement of prospective students is a significant cost to program resource utilization.

Implications of findings related to academic suitability and the selection process of students for admission to a nursing program indicate the need to consider unique individual characteristics of the students as well as academic skills (Arathuzik & Aber, 1998; Quill, 1993). The most frequently cited measure for admission to nursing education programs was a GPA of 2.5 or higher (AACN, 2005; Rosenfeld, 1988). Cognitive ability also is recognized as a strong predictor of academic success (Potolosky, Cohen, & Saylor, 2003). A study completed at Morton College in Illinois (Spahr, 1995) focused on the relationship of entering grade point average, posted grades in prerequisite support courses in algebra, biology, and chemistry, and graduation from the nursing program. Results indicated that the best predictor of graduation status was entering GPA, followed by grades in biology, and grades in chemistry. Program success was found to not be significantly different between students with a low-entering GPA and a high GPA. A recommendation was, therefore, made that variables other than GPA need to be identified as screening indices for program success when admitting students to the nursing program. As shown by these reports, making the correct decision in admitting or rejecting a student to a nursing education program is seen as being primarily dependent on implementing screening measures that predict success, while also showing sensitivity to the characteristics of both traditional and non-traditional learners. The particular recommendation offered by Spahr (1995) was to assess reading skill level.

The Nelson-Denny Reading Test and the Nurse Entrance Test (Gallagher, Bomba, & Crane, 2001) have been commonly used for predictability of student success



in collegiate programs. However, the overall conclusion in a review of college reading tests was that no one available test was sufficient for the needs of all programs or all student populations as most tests were found to define and test reading as a set of discrete skills (Gallagher, Bomba, & Crane, 2001). Nursing education programs use a variety of teaching and learning methods to promote the development of nursing professionals prepared to make effective and efficient judgments in dynamic clinical situations (Lindeman & McAthie, 1999; Loving & Wilson, 2000). The use of textbooks is a commonly accepted modality for the transmission of knowledge in nursing education (Albach, 1991; Goodwin, 1996). The learner uses reading for information processing, synthesis of knowledge, and purposeful use of data in both a classroom and clinical environment (Chen & Lin, 2003; Pullen, Reed, & Osler, 2001)

### **Statement of the Problem**

Many students entering nursing programs, like their counterparts in other areas of academic study, have not learned to read effectively (Byrd, Garza, & Nieswiadomy, 1999). The structured use of various study and reading strategies is necessary to facilitate the transition from general education courses to a professional program (Parks & Kirkpatrick, 1996). Students must develop the needed cognitive skill sets for success in nursing education and a career in professional nursing (Thompson & Rebeschi, 1999). In particular, past reading strategies (i.e., memorization) are not always successful when applied to reading requirements of the nursing curriculum (Potolosky, Cohen, & Saylor, 2003).

### **Purpose of the Study**

The primary purpose of this research was to compare the correlate scores for reading comprehension measured by the Nelson-Denny Reading Test and the Nurse Entrance Test with the indices of academic success for first semester students admitted to the nursing program at the University of the Incarnate Word. This research study reviewed unique test results in relation to reading comprehension scores from both standardized tests and grade point averages for prerequisite science courses and cumulative grade point averages prior to admission to the nursing program for students in the study sample. Knowledge learned from this research project will be useful to identify which of the two reading assessment tests is best in identifying students “at risk” for academic failure due to low reading comprehension skills for this collegiate program.

Another expected value of this study is to provide nursing program administrators and faculty better information when choosing between tests to evaluate reading comprehension levels of perspective students. A related value is to provide these same individuals better information to counsel all prospective students with career aspirations in nursing regarding the likelihood of program acceptance and success in this nursing program. Post-testing “at-risk” students can provide needed information that directs early intervention activities to improve individual reading comprehension abilities and, thus, promote successful academic performance in the first semester of this nursing program and thereafter.

### **Research Questions**

1. Is there a relationship between reading comprehension as measured by the Nelson-Denny Reading Test or the Nurse Entrance Test and the academic success for nursing students in the first semester of a Bachelor of Science in Nursing program in Texas?
2. Is there a relationship between reading comprehension as measured by the Nelson-Denny Reading Test or the Nurse Entrance Test with the grade point average (GPA) for prerequisite science courses as a predictor of academic success for nursing students in the first semester of a Bachelor of Science in Nursing program in Texas?
3. Is there a relationship between reading comprehension skills as measured by the Nelson-Denny Reading Test or the Nurse Entrance Test with the cumulative GPA for students prior to acceptance to the nursing program in a Bachelor of Science in Nursing program in Texas?

### **Operational Definitions**

*Bachelor of Science in Nursing Degree (BSN):* The BSN degree is awarded to students who successfully complete general education and nursing program requirements in a four- or five-year educational program at a college or university. The University of the Incarnate Word requires successful completion of 70 hours of general education courses and 63 hours of nursing courses for the awarding of a BSN degree.

*Core:* A term that refers to the university core curriculum, an integrated and sequenced course of study constituting 52 semester hours of the student's degree plan. The content of the core is dictated by the traditional concept of liberal arts. Therefore, the core includes a carefully devised study of rhetoric (intelligent reading and correct writing), philosophy, theology, literature and the arts, mathematics and the natural sciences, history, the behavioral and social sciences, language, and wellness.

*Cumulative Grade Point Average (GPA):* In the School of Nursing and Health Professions at the University of the Incarnate Word, the GPA is calculated from the grades of all college level semester hours attempted, including transferred hours.

*Dropouts:* Students who experienced a failing grade in one or more first semester courses and did not continue to the second semester in the nursing program.

*First Semester Grade Point Average:* The GPA is the point value of each letter grade, added together, and divided by the number of course hours for all first semester courses.

*First Semester Academic Success:* A minimum grade of C (75%) is required in all nursing courses, including a minimum average of 75% for all exams. In general, satisfactory completion of courses in one semester is required prior to enrolling in subsequent semesters.

*National League for Nursing (NLN):* A nationally recognized professional organization dedicated to nursing education and research. The goal of the NLN is the

development and maintenance of quality nursing education programs to prepare professional nurses to meet the needs of diverse populations in a dynamic health care environment (NLN, 2001).

*Nelson-Denny Reading Test (N-DRT)*: The Nelson-Denny Reading Test, Forms E and F, is a reading survey test for high school students, entering college students, preprofessional and pregraduate students. The test is formal, standardized, and norm-referenced. The primary use for the test is for initial screening to identify students who may need special help in reading and to identify superior students who could profit from placement in advanced/accelerated classes. Secondary uses include prediction of success in college courses and diagnosing strengths and weaknesses in areas tested. The test is used effectively to measure the interdependent functions of reading comprehension, vocabulary development, and reading rate, three of the most important skills in the reading process.

*Nurse Entrance Test (NET)*: The Nurse Entrance Test generates an academic and learning profile of potential professional nurses. The NET evaluates seven areas that are essential for academic success including basic math skills, science reading comprehension, and learning styles. Reading comprehension is evaluated at the inferential level for science-related material and set at the 10<sup>th</sup> grade level of difficulty for vocabulary and sentence syntax. This reading ability is considered to be the “normal” adult reading level for nursing applicants to college-level courses.

*Prerequisite Science Courses:* Chemistry I & II, Anatomy & Physiology I & II, Microbiology, and Nutrition courses must be completed within five years of admission to the nursing program.

*Professional Nurse:* An adult who is licensed by the Texas Board of Nurse Examiners “to perform for compensation any act that requires substantial specialized judgment and skill, the proper performance of which is based on knowledge and application of the principles of biological, physical, and social science as acquired by completion of a course in an approved school of professional nursing” (Nursing Practice Act and Nursing Peer Review Act, 2003).

*Reading Comprehension:* Reading comprehension is an understanding of text that is read or the process of constructing meaning from a text. As comprehension takes place, words are decoded and associated with their meanings in the reader’s memory, and phrases, plus sentences are processed rapidly or fluently enough so that the meanings derived from one word, phrase, or sentence are not lost before the next is processed. Piece-by-piece, in the reader’s memory, without the benefit of live conversation, and relying only on what is derived from the text and the reader’s own prior knowledge or past experiences, the reader perceives a coherent, network of thoughts from what is read. Comprehension is a primary purpose of reading.

*Reading Rate:* A student’s reading rate may be calculated by dividing the number of words read correctly by the total amount of reading time.

*School of Nursing and Health Professions, the University of the Incarnate Word:* The Baccalaureate of Science in Nursing (BSN) program at the university is the third oldest and only Catholic nursing program in Texas. For the past 75 years, the nursing program has prepared graduates to take the licensure examination to become professional nurses. The generic BSN program is planned as a five-semester program with 133 credits of study. The RN to BSN program is offered through the Adult Degree Completion School of the university. This program is designed for registered nurse graduates of diploma or associate degree nursing programs who want to complete educational and clinical experiences necessary for the BSN degree. Both programs are approved by the Board of Nurse Examiners for the State of Texas and have been fully accredited by a nationally recognized accrediting agency since the 1970's. The most recent program accreditation renewal occurred in 2005. Only the generic BSN program is a pre-college degree program and is the focus of this study.

*Selected Additional Demographic Variables:* The cumulative GPA at the completion of the last semester the student attended the university.

*Students:* Individuals who were accepted for admission to the university, and after completion of academic prerequisite courses were accepted to the nursing program. The students in this study were beginning the first semester of the nursing coursework.

### **Assumptions**

1. Reading comprehension at a tenth grade level was integral to academic success in a BSN program of study.
2. Interpretation of the data reviewed accurately reflected the actual data.
3. The proposed and described methodology offered a logical and appropriate design for this research project.

### **Limitations**

1. The study was limited to students in the undergraduate-nursing program at the School of Nursing and health professions of the University of the Incarnate Word.
2. This study was limited to the information acquired from the reviewed literature and implemented testing instruments.
3. Findings were generalized only to first semester nursing students enrolled in the School of Nursing and Health Professions at the University of the Incarnate Word.
4. Reading comprehension was measured only once and within the first two weeks of the first semester of nursing coursework. This is a time when students are known to be more anxious and not as academically engaged as later on in the semester (Symes, Tart, & Travis, 2005).



## Methodology

### *Population*

The survey population consists of 179 nursing students enrolled in the first semester of the BSN nursing program at the School of Nursing & Health Professions at the University of the Incarnate Word during Fall 1996, 1997, 1998, and 2002 and Spring 2003. Forty-three students were tested with the Nelson-Denny Reading Test and 136 students were tested with the Nursing Entrance Test (Table 1.1).

Table 1.1. First Semester Nursing Students Grouped by Test Method for Reading Comprehension

Reading Test	2003 Spring	2002 Fall	1998 Spring	1997 Spring	1997 Fall	1996 Spring	Total
Nelson-Denny Reading Test	20	23					43
Nurse Entrance Test			20	37	39	20	136

### *Instrumentation*

The Nelson-Denny Reading Test, Form E, is a statistically valid and reliable instrument. A two-part test, the Nelson-Denny measures vocabulary development, comprehension, and reading rate. Part I (vocabulary) is a 15-minute timed test; Part II (comprehension and rate) is a 20-minute test. The first minute of the comprehension test is used to determine reading rate.

The Nurse Entrance Test (NET) generates an academic and learning profile of potential professional nurses. The NET evaluates seven areas that are essential for academic success including basic math skills, science reading comprehension, and learning styles. Reading comprehension is evaluated at the inferential level for science-related material. The reading selections are at the 10<sup>th</sup> grade level of difficulty for vocabulary and sentence syntax. This reading ability is considered to be the “normal” adult reading level for applicants to college level course. The researcher developed a data collection form to record the selected student characteristics and results from both reading tests.

#### *Procedures*

The data analyzed came from the reading skill assessment scores for reading comprehension of first semester nursing students enrolled in the School of Nursing and Health Professions at the University of the Incarnate Word. A unique number for each student’s data was assigned to ensure anonymity. The scores from the Nelson-Denny Reading Test were obtained from the Academic Testing Center files. Scores from the Nurse Entrance Test were obtained from department files within the School of Nursing and Health Professions.

The reading tests were administered to the students as a component of the first week orientation to the nursing program curriculum. These assessment tests were used to identify both strengths and areas for improvement of the reading abilities of the students in an effort to tailor the orientation course content on reading and study skills and to better prepare the students to successfully meet course objectives across the curriculum.

### *Data Analysis*

The results of the study are reported using appropriate quantitative statistical techniques according to Gall, Borg, and Gall (1996). The data collected were analyzed with the use of the Statistical Package for Social Studies (SPSS), a statistical analysis software program. Descriptive statistics such as percentages, frequencies, and means were used to organize and guide the interpretation of data. Multiple displays such as tables, charts, and graphs are used to present findings.

The central dependent variable in this research, academic success, is measured by the eligibility of a student to progress to the second semester in the nursing program based on a minimum of 75% earned in each of the three courses of the first semester. The independent variables are divided into categories: reading comprehension and selected additional demographic variables (completion of reading skill development class at UIW, transfer of English course credit from another collegiate institution, and the cumulative GPA at the completion of the last semester the student attended the university). The testing instrument category is represented by only two variables: the Nelson-Denny Reading Test score and the Nurse Entrance Test reading comprehension score.

### **Significance Statement**

Key measures of accountability in higher education include the persistence and graduation rates of students pursuing postsecondary studies (Gebelt, Parilis, Kramer, & Wilson (1996). Colleges and universities required to track program and institutional persistence and graduation rates, strive for methods to improve these percentages. Many

efforts and resources are put forth to assist student learners to complete programs of study, especially nursing programs, where a national shortage of nurses is well known and documented across the country (Heydamn, 1991). The completion of a BSN program of study, while challenging, can lead to a rewarding and varied career. However, failure to complete this program of study or delayed graduation after acceptance to nursing coursework, is costly to many—the student and family, the program and institution, and society. Finding an efficient, valid, and reliable tool for assessing the early likelihood of academic success in any selected nursing program would serve as a model of resource stewardship.

Reading comprehension, one index of academic success that is widely used in admission criteria for general collegiate study, has not been consistently addressed as a criteria for nursing program selection and counseling. Reading comprehension is necessary for active learning (Fopma-Loy & Ulrich, 1999; Thompson & Rebesch, 1999). The successful student must be able to actively understand and analyze what is read to be able to develop an appropriate knowledge base necessary for the clinical practice of nursing and for life-long learning (Beeson, 1996; Chen & Lin, 2003).

## **CHAPTER II**

### **REVIEW OF LITERATURE**

#### **Introduction**

The United States continues to experience a nursing shortage. In a report issued by the American Association of Colleges of Nursing (2005), the increasing demand for nurses continues to outpace the supply. By the year 2014, it is projected that more than 1.2 million new and replacement nurses will be needed (U.S. Department of Labor, Bureau of Labor Statistics, 2005). Factors that contribute to the complexity of the shortage in the country, and especially in Texas, are the economic demands on hospitals and other providers, attractive career options outside the nursing profession for students, demographic forces including the aging nurse workforce, and increased life expectancies of individuals with complex health issues needing more nursing care (Buerhaus, Staiger, & Auerbach, 2003; Reineck, Furino, Lucke, Martinez, & Wood, 2005).

To respond to the increased demand for nurses, the Texas nursing education system is operating close to capacity. Several impediments to producing more graduates include an unprecedented faculty shortage due to aging (the median nursing faculty age is 51), inadequate salaries, and the consequent limitation on number of applicants that can be enrolled in Texas nursing schools (Reineck, Furino, Lucke, Martinez, & Wood, 2005). It is, therefore, essential to admit, retain, and graduate students to become professional nurses. To this end, it is important to identify academic limitations in order that nurse educators can assist students to successfully meet the academic requirements leading to licensure and the practice of professional nursing at the highest level (Beeson

& Kissling, 2001). Increasing the number of successful nursing graduates is imperative to reducing the nursing shortage (Nevidjohn & Erickson, 2001).

In this chapter, the review of literature is divided into three sections: (a) an overview of academic skills for learning in secondary education, (b) cognitive factors necessary for academic success as related to learning, reading, and studying, and (c) academic predictors of success in nursing education. Admission committees for nursing programs endeavor to select students who are most likely to successfully complete the course of study, thus optimizing the success of students fortunate enough to garner an enrollment slot in nursing programs (Beeson & Kissling, 2001; Yin & Burger, 2003). Many students enter the academic setting with a lack of reading habit (Goodwin, 1996) or not adequately prepared to read. This is evidenced by the scores for students in Texas on standardized college and university acceptance tests such as the Scholastic Assessment Test (SAT) or American College Testing (ACT) that are below the national average (National Center for Education Statistics [NCES], 2005; Lewis & Lewis, 2000).

With respect for the increased responsibility of students to be self-directed for learning, cognitive skills are essential for effective and efficient studying. These skills are metacognition, reading comprehension, and background knowledge. Persistence and success of nursing students are enhanced when the variables associated with identification of at-risk students are identified. Retention concerns for college students' settings are presented through review of three theoretical models: (a) Astin's (1977, 1985) theory of involvement, (b) Tinto's (1975, 1993) model of academic and social integration with the formal and informal academic and social systems of a college, and

(c) Bean and Metzner's (1985) model of nontraditional student attrition. Retention of nursing students is presented through a review of programs utilized by baccalaureate nursing programs for early detection of reading and studying abilities.

### *College Students as Learners*

#### **Adult Learning**

Fundamental to human resource development and adult education is an understanding of the adult learning process. Learning is characterized as a lifelong process of accumulating experiences, memorizing information, increasing knowledge, developing skills, and forming beliefs, values, and attitudes for the purpose of reflecting and developing understanding. According to Jarvis, the process of learning is fundamental to life itself (Jarvis, 1995).

Study of adult learning reveals several theoretical concepts proposed about how adults learn: behaviorist, cognitivist, humanist, social learning, and constructivist. Behaviorists view the learning process as having an effect or change in the behavior of the individual. Cognitivists believe that internal mental processes such as memory and information processing drive the learning process. The humanists consider the learning process to be an act designed to fulfill an individual's growth and potential. Those who subscribe to social learning theory consider the interactions between the adult learner and the social context to be invaluable to the learning process. Constructivists find or create meaning for the learning experience. Use of a concept is helpful for both the learner and educator when framing approaches to meeting learning goals (Knowles, 1980).

The literature about adult learning frequently begins with the work of Malcolm Knowles (1970, 1994). Knowles, who is often described as a humanist, believed that adults learn differently than children. Andragogy, the study of teaching adults, is the art and science of helping adults to learn by placing the responsibility for learning on the individual learner. By contrast, the practice of pedagogy, defined as the art and science of helping children learn, places the primary responsibility for learning on the educator. Knowles (1980) went on to write that the two models for teaching should be thought of as opposite ends of the teaching spectrum, and either should be applied according to needs of the teaching situation.

Knowles (1994, 2005) identifies four andragogical assumptions. First, with maturation, the adult learner becomes less dependent and more self-directed based on experiences and the situation presented. Next, the individual attaches more meaning to learning from experiences than from passive exposure to information. Thirdly, learning is facilitated when an individual experiences a need to learn in order to better cope with real-life tasks and problems. Lastly, the individual perceives education as a process of developing increased competence through performance to achieve the full potential of life. Later, Knowles (1990) added the need to know something before committing effort to learning as an additional andragogical assumption.

In general, learning is facilitated through active involvement by the learner in the learning process (Merriam & Caffarella, 1999). Effective educators for adults act as facilitators, guiding students to realize their own knowledge goals rather than just supplying the facts of the subject (Cranton, 1994). Learning is affected by many factors



and behaviors: (a) past learning efforts of the learner, (b) intrinsic motivation and abilities of the learner, (c) positive reinforcement by the instructor, (d) an organized presentation of the material, (e) repetition of concepts, (f) the perceived meaning of tasks and materials, and (g) the physical and emotional learning environment. In drawing on relevant experiences and knowledge of the learner, the educator promotes learning by showing a relationship of the theories and concepts of the new information to the adults' past as well as relevance to future application of the information (Darkenwald & Merriam, 1982).

Study of how adults learn results in an understanding of kinds of knowledge and learning. Philosophers are interested in discoveries that will increase knowledge by means of thinking and interpreting or making sense of stimuli. The German philosopher Habermas developed a framework that consists of three domains of knowledge (Merriam & Caffarella, 1999). Technical knowledge is information about cause and effect relationships in the environment and behavioristic learning theories. Understanding the meaning of information is practical knowledge. It is derived from an understanding of social norms, values, political concepts, and a need to make oneself understood. This is partially reflected in humanistic learning theories (Cranton, 1994). Knowledge gained through critical self-reflection is emancipatory knowledge. A component of constructivist paradigm, it is a component of the transformative learning theory of Mezirow (1996).

The process of learning has been a much-studied subject of philosophers, psychologists, educators, and policymakers since the times of Plato and Aristotle. Understanding how learning occurs has been a common goal of all who have studied and

postulated theories about the learning process. Merriam and Caffarella (1999) write that philosophers were concerned with the nature of knowledge, the human mind, and what it means to know. Plato believed that human intelligence comes from reflection on experiences and objects encountered in the environment of everyday life. Aristotle was an empiricist in that he believed that all knowledge comes through thoughts about impressions realized through the senses (Hergenhahn, 1988). The legacy of this Greek philosopher is the emphasis on the need to look beneath the surface through comprehensive and inquisitive thinking for the deeper meaning of realities (Sahakian & Sahakian, 1966).

Through the years, other philosophies evolved from the positions of the Greek philosophers. In the Middle Ages, Augustine believed that knowledge is gained through an inductive process from what is sensed followed by reflective contemplation (Melcher, 1991). In the thirteenth century, Thomas Aquinas contributed to the philosophy of learning through his pattern of systematically cultivated reasoning. His position was that knowledge results from sifting through the rational arguments stemming from rational thoughts (Melcher, 1991). Descartes, as a philosopher and French geometrician, born in the sixteenth century, proposed that learning results from a methodological approach resulting in separation of mind and body. For Descartes, doubting results in thinking and thinking is linked to existence. For each thought, the systematic discipline of thinking promotes questioning of each thought. John Locke, in the seventeenth century was in agreement with Descartes concerning the distinction between body and mind. He added

that individuals learn through their experiences in the world and the information received through their senses (Solomon & Higgins, 1996).

In the eighteenth century, Kant's philosophy of learning was based on the teaching that through the individual's inherent mental abilities, interpretation of the sensory data of experience results in logical reasoning about what was experienced (Solomon & Higgins, 1996). The rational order of the world as known by science could not be accounted for merely by fortuitous accumulations of the perceptions of the senses. Kant proposed that the objective order of nature and the causal necessity that operates within it are dependent upon the mind (Merriam & Caffarella, 1999). His position provided a synthesis to both the rationalist and the empiricist views of knowledge and of learning (Merriam & Caffarella, 1999).

### **Academic Readiness for Secondary Education**

Multiple factors affect student academic success in colleges and universities. Academic achievement as evidenced by student persistence to degree achievement is influenced by overall academic readiness and student motivation (Hoyt, 1999; Johnson & Kreuzer, 2001; Yaworski, 1998). In response to the increased number of educationally marginally prepared students, higher education institutions have increased the restrictedness of admission policies and the use of academic remedial classes (Levin, 1990). There is documentation that these students are less than adequately prepared in basic skills needed for post-secondary level education such as reading, writing, and mathematics (McCusker, 1999). In a report from the National Center for Education Statistics (2001), remedial courses in reading, writing, and mathematics were available

at all public two-year colleges, 81% of public and 63% of private four-year educational institutions. Enrollment in these developmental classes has shown to have a positive impact for the students to persist and have success with subsequent courses in the degree plan (Boylan, 1999; Peter, 1996).

### *Reading Ability*

Textbooks, an important component of an educational program, are key to teaching and learning. These educational resources are considered to be the most reliable means of transmitting knowledge and providing coherence in a curriculum (Albach, 1991). For academic success, students must be able to read, interpret, and process written material of varying levels of complexity (Applegate, Quinn, & Applegate, 1994; Chase, Gibson, & Carson, 1994). Early research about reading by Thorndike (1917) concluded that reading is a complex process that involves attention to the words and concepts in sentences followed by identification of the interrelatedness of the information to then come to a conclusion and understanding of the message of the author. A major barrier to persistence is experienced by the under-prepared student with marginal reading skills that will result in a compromised ability to adequately respond to the quantity and complexity of reading assignments (Duignan, 1992; Maxwell, 1997).

To read college textbooks, the reader is required to use complex skills, judgment, and relationship of ideas (Poissant, 1994). The approach of the reader is influenced across disciplines by the structure of the text, the extent of required reading, and the magnitude of class discussion based on the readings. The reading in college is intended to lead to analysis and understanding (Byrd, Carter, & Waddoups, 2001). Readers are

challenged to construct knowledge and meaning through interface with expository textbooks on science or mathematical content (Mayer, 1996). Success in college is directly correlated to reading skill (Alexander & Jetton, 2000).

### *Studying*

Study skills are integral to successful academic outcomes. Thomas and Rohwer (1986) describe the task of reading and studying as isolated, individual, and often context-dependent. Study strategy is dependent on the type of information to be learned such as narrative or expository, versus detailed or concise, and the testing method to be used to measure learning. Testing can be objective, short-answer, or essay question formats based on memorization or application of information. Effective reading and studying are outcomes associated with the use of metacognition and background knowledge (Recht & Leslie, 1988).

Background knowledge about a subject or the content to be read has impact on how the student encounters processes and evaluates complex concepts when studying (McWhorter, 1990). Successful processing of new material requires the reader to draw from stored knowledge, making associations with key concepts and facts in the text being read (McWhorter, 1990). The significance of background knowledge was the focus of a significant study by de Groot (1965). In a comparison of chess masters with novice players, the master players were better able to recreate game positions after viewing a model for less than 6 seconds. The more an individual knows about a subject being studied or observed, the greater the number of organized associations that can be made and stored of information related to the subject (Garner, Wagoner, & Smith, 1983;

Schneider & Pressley, 1997). The intricacies of critical reading for comprehension are closely linked to the background knowledge retained in the memory of the reader (Ferstl, & Kintsch, 1998). Students with limited critical reading skills and limited background knowledge about a subject are at risk for failure in the setting of a secondary educational program (McNamara & Kintsch, 1996).

The goals and processes for reading comprehension and studying are complimentary (Peverly, Brobst, & Morris, 2002). To study and commit to memory, the reader must understand the meaning of the information to be remembered (Alexander & Jetton, 2000). Several research studies have defined good reading skill as the ability to identify key points in the text, an essential skill for effective studying (Baker & Brown, 1984; Dole, Duffy, Roehler, & Pearson, 1991; Peverly, Brobst, & Morris, 2002). In these studies, students with sensitivity to major points in the reading were able to correctly answer comprehension questions, thus supporting the premise that this ability is primary to comprehension and summarization in effective studying.

#### *Reading in Nursing Education*

Academic success leading to the practice of professional nursing, is effectively achieved by the nursing student through the use of reading and studying skills. Students enrolled in nursing programs are academically prepared to use the fundamental knowledge gained in primary education to develop problem-solving and decision-making skills in preparation for professional careers (Adams, 1999). The nursing education curriculum builds on this academic preparation of students by teaching facts

and principles necessary to the development of knowledgeable, entry-level professionals able to provide competent nursing care to clients (Byrd, Garza, & Nieswiadomy, 1999).

To gain knowledge, the students must be able to purposefully read the nursing literature, textbooks, and nursing journals. Reading requires a deliberate approach by the student before, during, and after reading to comprehend the material (Caverly, Orlando, & Mullen, 2000). Nursing textbooks are characteristically comprehensive, include a large amount of content-dense information, and use discipline specific terminology (Katz, Carter, Bishop, & Kravits, 2001). For nursing textbooks, the publishers incorporate organizational cues such as a forward, table of contents, chapter titles, indexes, and glossaries along with chapter objectives, visual aids, critical-thinking cases, and study questions (Nist & Diehl, 1998; Nist & Simpson, 2000). The objective of this organizational format is to facilitate strategic reading using the cognitive, metacognitive, and affective processes of the student (Paris, Wasik, & Turner, 1991).

Through diligent efforts, the knowledge learned will be used by the graduated nurse as the foundation for lifelong learning to support critical thinking, clinical reasoning, and creativity, cognitive skills integral to professional nursing practice (Alfaro-LeFevre, 2003; National League for Nursing Accrediting Commission, 2001).

### **Cognitive Factors Predictive of Successful Reading and Studying**

#### *Learning Process*

Researchers have studied the way individuals learn in a variety of contextual situations (Kuhn, 2000; Kuhn & Pearsall, 1998; Nelson, 1999). Through application of metacognitive knowledge, the learner is able to compensate for inherent cognitive

limitations (DiVesta & Moreno, 1993). Metacognitive knowledge encompasses an understanding of tactics matched to tasks, recognition of conditions for which the tactic could be applied, and knowledge of self to evaluate outcomes (Flavell, 1979; Pintrich, Wolters, & Baxter, 2000). As the student reads, monitoring of the understanding of information facilitates the student's ability to select key elements on which to focus attention to make connections among ideas and concepts (Thomas & Rohwer, 1986). Through metacognition, the learner identifies skills and limitations needed to accomplish the task, strategies and techniques required to be applied, and initiates self-monitoring for comprehension and progress toward goal achievement (Kuhn, 2000). The learner also uses recall of relevant knowledge of personal learning skills to successfully accomplish the learning task (Pintrich, 2002).

Motivation and metacognitive ability influence the approach by the student to learn and achieve academically (Pintrich, 1989; Pintrich & Garcia, 1992). Learning is defined as an enduring change in behavior over time that affects the variations of manner of the response of individual to stimuli based on previous experiences with that stimuli (Domjan & Burkhard, 1993). Two theories of learning are that of entity and increment (Woolfolk, 1998). Entity theory consists of an assumption that the ability of an individual student is a stable and controlled trait. Each individual has a fixed level of ability with some having more or less ability than others. These students are performance-oriented, accepting of minimally acceptable grades and tending to expend token amounts of effort, excusing grades as a factor of the amount of time spent on the objectives rather than on student ability (Woolfolk, 1998). Incremental theory is based



on a belief learning is a dynamic process of change in knowledge requiring continuous alteration in skills used to acquire and process information (Kintsch, 1998; Woolfolk, 1998). Students subscribing to incremental theory strive to obtain success in learning by increased effort, study, and practice (Woolfolk, 1998). These students are motivated to be goal-directed for learning and to include application opportunities and experiences to increase knowledge and experience (Woolfolk, 1998).

Effective learning requires the student to be actively involved in self-monitoring of efforts and application of cognitive abilities (Nist & Holschuh, 2000). The motivated student is one who assumes responsibility for academic achievement or improvement, develops a positive attitude toward self and the learning environment, and establishes learning goals (Hodge, Palmer, & Scott, 1992). College students who experience difficulties with learning have often been found to have experienced academic problems in high school. This negative experience creates a problem with self-concept for learning new information that leads to a misplacement of the cause for the difficulty from lack of ability to self-monitor and use appropriate study strategies to that of the difficulty being from an external social cause beyond the student's control (Tuckman, 1996). These successive negative experiences with studying and learning lead to a decline in motivation that is characteristic of attribution theory. In the presence of a sense of a non-changing personal approach, the frequent academic failure results in the progressive expectancy of inability to succeed and lowered self-esteem. These students see success as the results of external factors beyond their control (Archer & Schevak, 1998; den Heyer, 1981). When success with learning does occur, the students attribute it to the

simplicity of the task and do not see it as a cause and effect event related to the amount of effort expended to learn (den Heyer, 1981).

Motivation to learn and use effective study and learning strategies should occur during the formative student development years and is potentiated by parents, peers, and educators who value academic achievement. Purcell-Gates (1995) writes that students enter secondary education with inadequate orientation toward inquiry and use an approach to gaining knowledge as something that involves memorizing facts and formulas (as in high school). To learn and achieve academically, students are stimulated by classes and assignments with clear, obtainable, and meaningful outcomes (Jaasma & Koper, 1999). Assessment of reading abilities is necessary to identify learning strengths of the college student and to determine potential causes for learning deficiencies before remediation or assistance can be provided (Meyer, Cliff, & Dunne, 1994).

Adaptive cognition and motivational skills for learning orientation are lacking in some college students (Pintrich, 2002; Pintrich, Wolters, & Baxter, 2000). Effective learning results from reading for performance. Reading continues until understanding of the material is interrupted. To problem-solve, the reader uses metacognitive techniques to re-read and analyze phrases and sentences for exact meaning (Woolfolk, 1998). The level of motivation toward self-regulation of cognitive strategies is a key factor in academic success (Tuckman, 1996).

### *Reading Ability*

Metacognitive processes are problem-solving skills applied to a cognitive task such as reading (Brown, 1978; Brown, Campione, & Day, 1981; Brown, & Smiley, 1978). The complexity of the cognitive activity needed for reading was described in the early twentieth century by Thorndike (1917) as a deliberate process of reasoning that involves selecting, repressing, emphasizing, rejecting, correlating, and organizing information to achieve understanding. Flavell (1979) later defined metacognition as the knowledge the individual has about his own thought processes and involves both learning tactic and learning strategy. The mechanics of learning are influenced by the learner's awareness of personal characteristics related to information processing, background knowledge, and motivational orientation to complete the task (Hodge, Palmer, & Scott, 1992). Contribution to awareness is through background knowledge, familiarity with the task or information to be learned, and driving motivation for learning.

The link of metacognition to reading includes self-knowledge by the student of personal reading and learning abilities as well as strategies to accomplish the reading task and monitor comprehension of the content read (Hodge, Palmer, & Scott, 1992). Effective readers have used metacognitive strategies to maximize learning through reading and studying (Volet, 1991). With appropriately developed metacognitive skills, the student can identify the skills needed for effective comprehension of reading assignments and determine alterations in strategy use for difficult to comprehend material. Hodge, Palmer, and Scott (1992) describe the effective reader as one who

actively controls cognitive activities while engaged in reading. Learners are constantly using metacognitive strategies to match their own concepts and goals for reading to the details of the text, monitoring, and revising reading and study skills as needed to accomplish the desired outcome (Applegate, Quinn, & Applegate, 1994). Purposeful reading involves the use of strategies or processes such as previewing, changing the reading pace, and the use of questioning as the material is read. In this dynamic way the reader, especially with difficult to absorb text, is monitoring the level of understanding and making adjustments as needed (Volet, 1991).

#### *Study Skills*

Effective studying requires metacognitive skills to prevent learning deficits that can result in academic failure (Thomas & Rohwer, 1986). Knowledge-acquisition refers to the cognitive act of extracting meaning from data, such as understanding language within the context or comprehending a test question. In studying, the student uses metacognitive skills to gain understanding of material read, identify important concepts, and make memory connections of the content to facilitate future retrieval and use of the knowledge (Kuhn & Pearsall, 1998). In student behavior terms, students would use metacognition as self-talk to ask themselves what they are being asked to do and what they need to know about the subject (Worrell, 1990).

Students with metacognitive awareness related to reading comprehension abilities can implement specific learning strategies to monitor and adjust reading behaviors to maximize comprehension, a necessary skill for academic success. In a summary of the research literature, Brown (1982) emphasized that the cognitive training

of unskilled learners should include an explanation that metacognitive skill development is correlated to successful reading and learning. Proficient readers use automatic word-recognition skills that result in higher order integration of material into a design for understanding (Rumelhart, 1985). Students demonstrate use of metacognitive strategies to assist them to be insightful, reflective, and analytical (Spear-Swerling & Sternberg, 1994). Vadhan and Stander (1993) conducted a study with 109 college students to assess the correlation of metacognitive ability with actual test grades. The findings were that the students with high metacognitive ability also scored high exam grades and academic success while the opposite was found to be true with lower metacognitive ability.

#### *Metacognitive Strategies*

Academic success for college students requires reading skill strategies based on metacognitive skills and strategies (Vadhan & Stander, 1993). Independent learners actively control their learning through self-regulation and autonomous use of metacognitive strategies (Maxwell, 1997). Through use of these strategies, the learner is able to adapt to the academic literacy challenge requiring in-depth critical thinking by employing specific tactics (Schraw, Horn, Thorndike-Christ, & Bruning, 1995). The student involvement in the reading requires planning and predicting to keep track of what is completely or incompletely understood. This leads to a search for information to support or improve desired knowledge (Sinkavich, 1995).

Through the natural cognitive developmental process, metacognitive ability matures (Ambruster, 1983; Peverly, Brobst, & Morris, 2002). Most college students possess some level of metacognitive knowledge about their learning. Research directs

educators to avoid concluding that college students have the necessary metacognitive skills for academic success (Cheung & Kwok, 1998). The development of these skills may be delayed by culture, peer interaction, the characteristics of academic experiences, or the degree of desire of the individual to acquire the skills (Schraw, Horn, Thorndike-Christ, & Bruning, 1995; Schraw & Moshman, 1995).

### **Academic Predictions of Success in Nursing Education**

With the increased need to graduate students to become professional nurses, it is important to identify cognitive factors and in the academic ability of entering students. The literature on metacognition offers guidance for assisting students to perform at a more optimal academic level (Worrell, 1990). Success with nursing curriculum requires reading comprehension, study strategies, and problem-solving skills. Students are challenged to read and demonstrate comprehension of textbook material and journal articles in preparation for client care. Evaluation of metacognitive skills at program entry can allow nursing faculty to incorporate instruction for skill development as a preventative educational practice to minimize learning deficits and course failures (Worrell, 1990).

### *Recognition of Risks for Attrition in Secondary Education*

Much research has been published about student retention in secondary education, particularly for students in the first year of academic study. There is national concern about the excessive number of students who leave programs of secondary education prior to degree completion (Milem & Berger, 1997; Smith, 1990; Tinto & Russo, 1994). The direction of studies of the problem is to identify root-causes with the

intent to develop retention programs to promote freshman year academic engagement and persistence to degree achievement (Milem & Burger, 1997).

For student populations at both community colleges and universities, the academic experience is enhanced by the faculty interaction and feelings of connectedness with other students in the pursuit of learning (Churchill, Reno, & Batchelor, 1998). Childs, Jones, Nugent, and Cook (2004) studied students in community colleges and commuter students in universities. Both populations of non-campus resident students were found to be at risk for poor social adjustment to the education environment. Retention rates are increased when the academic atmosphere for student provides academic support through faculty mentorship, financial support, self-development, and professional/leadership development (Villarruel, Canales, & Torres, (2001).

Astin's (1977) study of college students was not just to classify students during their educational experience, but also to design a model to identify contributing factors to student attrition. The initial predictors for attrition in the four-year longitudinal, multi-institutional study of students leaving college included 110 variables regarding general environmental factors of residence, work, and college. The data were obtained from the responses of the students on a freshman questionnaire. Information was obtained about high school standing, socioeconomic status, educational goals, and the personal perception of expected academic achievement. The results were used to develop a worksheet for administrators, educators, and individual students to predict chances of persistence or attrition from college (Braxton & Hirschy, 2005).

Tinto's (1993) model focused on the factors that keep students enrolled in community colleges and predictors of student attrition from secondary education in general. Institutional goals and the academic and social environment are principal determinants affecting persistence. For these students, social and academic integration into the institution's systems prevents isolation that can lead to withdrawal from secondary education (Tinto & Russo, 1994). The academic experience and, thus integration, is enhanced by interactions with faculty, satisfactory academic achievement, and peer-group interaction. Lacking these factors to support engagement, students tend to leave the academic setting (Tinto & Russo, 1994). Several factors found to be key to retaining students involve the institutional climate and the faculty that is focused on student education and social as well as intellectual development through educational goals reflective of the institutional mission (Tinto & Russo, 1994).

The purpose of Tinto's original research at North Carolina State University and model development was to identify factors related to retention of students during the freshman year. Data were collected, using the Freshman Experience Survey, about factors related to persistence of freshman students to the sophomore year: student goal commitment, perceived student academic and intellectual development, student peer-group relations, student finances, faculty interactions with students, faculty concerns, and institutional commitment to engagement of students. The most important factor for persistence was found to be the student's perception of successful academic and intellectual development ( $p < .05$ ). Institutional commitment was found to also be



important and was reflected in the grade point average of the freshmen (Braxton & Hirschy, 2005).

Research with Tinto's model was been carried out to test and expand the utilization of the original model for student retention and persistence. Williamson and Creamer (1988) used the model in a study conducted in both the community college and university setting. Additional variables in the study included background, integration, commitment, and persistence. The variable of locus of control, a background variable, had the strongest correlation (.085) to persistence for the community college students. Persistence for university students was correlated to academic and social integration. The recommendation from the study was that in addition to the factors from Tinto's model, data from background characteristics should be considered in studies of persistence in secondary education (Braxton & Hirschy, 2005).

In a midwestern community college, Mutter (1992) used Tinto's model to study persisting and non-persisting students. An important finding was that social integration was not significantly related to whether or not a student remained enrolled in college. Persistence was positively associated with academic integration ( $p < .05$ ), including interaction with college personnel, student predicted GPA, academic goal commitment ( $p < .05$ ) as reflected in the amount of time dedicated to studying, and institutional commitment ( $p < .05$ ) through student encouragement. The study results supported three factors of Tinto's model associated with student persistence.

Bean and Metzner (1985) developed a model from the study of attrition of nontraditional students. In this study, the decision of these students to leave the academic

setting centered around four sets of variables: (a) academic performance, (b) psychological outcomes, (c) background and defining variable, and (d) environmental variables. The best predictor of attrition was the academic GPA. Background variables had the least impact on the decision to persist in or leave the academic setting.

McCaffrey (1991) used Bean and Metzner's model to investigate the relationship of the variables to the persistence of nontraditional students in an external degree program. The variables with the most significant relationship to student retention were environmental factors: finances, intent, number of college credits earned, and stress related to family obligations.

The retention models of Astin, Tinto, and Bean and Metzner are only three of the plethora of models that have been developed to predict attrition of students from secondary education programs by identification of risk factors common to student populations. A common risk factor identified by most models is difficulty with the meeting academic requirements and the significance of early identification of the problem, followed by the availability of academic and faculty support programs to minimize the risk by developing the academic skills of the student (Tinto, 2006). This is similar to the educational goals for the students in this study. "Project Assist," a program to support student studying, test-taking, and time-management skills, was in place at this university at the time of enrollment for these students. Through funding from a Title V grant, "The First Year Engagement Program" has expanded the resources and support services dedicated to the promotion of success for first students at the university. The expected outcome is student engagement as they learn to become self-directed and

accountable for identification and utilization of resources to support their educational experience (University of the Incarnate Word Bulletin, 2005-2006).

*Recognition of Risks for Attrition in Nursing Education*

For schools of nursing, the definition of success in education is both persistence to graduation and passage of the NCLEX-RN and is integral to the reputation of the program and to the requirements for accreditation (Beeson & Kissling, 2001). Links have been found to preadmission academic criteria including high school ranking (Yang, Glick, & McClelland, 1987; Seldomridge & DiBartolo, 2004) and scores on the national standardized tests such as the American College Testing (ACT) or Scholastic Assessment Test (SAT) (Fowles, 1992). For admission to upper division nursing programs, the grade point average (GPA) for prerequisite courses in the sciences (microbiology, anatomy and physiology, and chemistry) as well as the GPA reflecting all other general academic courses completed are also linked to NCLEX-RN passage (Arathuzik & Aber, 1998; Byrd, Garza, & Nieswiadomy, 1999). Studies of non-academic factors that impact persistence to graduation and ultimately success with the NCLEX-RN are English as a second language and social conditions such as family obligations, personal relationship changes, support system conflicts, and financial problems (Arathuzik & Aber, 1998; Cunningham, Stacciarinni, & Towle, 2004; Sherrod et al., 1992). Students identify positive academic experiences as academic support services and faculty guidance and support. Poor academic achievement is reported to be related to curriculum, particularly science classes, class sizes, study habit deficits, and reluctance to seek learning assistance (Sherrod et al., 1992; Tomlinson-Clarke, 1994).

### *Admission Criteria for Nursing Programs*

The primary objective of the nursing program is to prepare undergraduate students for entry-level professional nursing practice. Nursing programs are accredited by either the National League for Nursing or the American Association of Colleges of Nursing. As such, curriculums and outcome objectives for nursing programs are similar as are expectations that students need to have academic skill abilities such as reading comprehension. Nursing programs are challenged to utilize the most reliable admission and progression criteria out of conscientious concern for stewardship of limited clinical slots, qualified faculty, and monetary resources available to finance the education program (Worrell, 1990).

Many studies have been done to identify predictors of academic success in baccalaureate nursing (BSN) programs and performance on the licensing examination (National Council for Licensing Examination-Registered Nurse or NCLEX-RN) (Mills, Sampel, Pohlman, & Becker, 1992). Perez (1977) found that the GPA at the end of the freshman year was predictive of NCLEX-RN outcome. In 1980, Seither reported that high school percentile rank was consistently the best predictor of GPA for college courses and the GPA for biological and behavioral sciences had the highest correlation with the cumulative collegiate GPA. Similarly, Melcolm, Venn, and Barker-Bausell (1981) found that GPA on admission to the nursing program was a significant predictor of success within the program and on the licensing exam. Likewise, Yocum and Scherubel (1985) noted a significant relationship existed between preadmission GPAs and nursing program success.

Higgs (1984) reported verbal fluency and thought organization related significantly to academic success and personal characteristics of age and marital status were unrelated to program success. Glick, McClelland, and Yang (1986) reported prenursing GPA and biology GPA were strong correlates of subsequent academic achievement in the program. They found no significant correlation between chemistry GPA and the nursing GPA.

Whitley and Chadwick (1985) conducted an analysis of 23 variables for predictability of success on NCLEX-RN. For the sample of 186 graduates, 28 were unsuccessful on the licensing examination. Significant predictor variables were ACT scores and entry and exit GPAs. Age and marital status were also statistically related.

Spahr (1987) looked at the relationship between student grades in beginning nursing courses and student scores on the Nelson-Denny Reading Tests. With the small sample of 47 first semester nursing students, success related positively to the ability to read and write. The author's conclusion was that the study showed a need for comprehensive pre-admission assessments for incoming nursing students. A study by Fearing (1995) found a relationship between reading abilities as measured by the Nelson-Denny Reading Test and persistence by minority nursing students to successful completion of a baccalaureate nursing program. Gallagher, Bomba, and Crane (2001) studied the relationship of admission scores from the Entrance Examination for Schools of Nursing (RNEE) to the grade point average for completion of the first semester of nursing courses in a community college. Through regression analysis, the reading comprehension subtest was significantly correlated with the first semester success,  $r$

=.23 and  $p < .05$ . This first semester success was also found to be a predictor of overall successful completion of the program and success with the NCLEX-RN. In a study (n=190), reading skill assessment scores on admission to the nursing program were found to be significantly higher for nursing students who passed the licensing examination and those who did not pass (Yellen & Geoffrion, 2001).

### *Nursing Curriculum*

Nursing education is designed to prepare students to process information to make decisions in clinical practice. The competent practice of professional nursing in a dynamic health care system requires the nurse to be prepared to synthesize theoretical and empirical knowledge gained from the humanities, the natural, behavioral, and social sciences, and the nursing curriculum (Keating, 2005). Alfaro-LeFevre (2003) writes that nurses are expected to use the nursing process, a problem-solving process, to provide outcome goal-oriented effective and efficient client care. There are five sequential steps to the nursing process. Assessment, the first step, requires the collection of data or information about the situation and client to determine current findings through observation. Subjective information is obtained from the client or significant other about health history; objective data is derived from direct assessment of the client and review health reports. Analysis of the data collected is done to determine actual or potential problems related to the well being of the client. This data is then compared to specific criteria to determine the appropriate nursing diagnosis or diagnoses. Outcome goals are formulated that will be used to determine interventions appropriate to the diagnosis and used as the basis for evaluation of the interventions. Interventions are defined and

carried out based on the identified nursing care needs of the client. The evaluation phase of the nursing process is a continual circle of assessment to determine if the actions are appropriate, producing the desired responses, or if modifications are needed (Alfaro-Lefevre, 2003).

Use of the nursing process is dependent on reading, writing, and critical-thinking skills. Professional nurses must demonstrate the ability to follow a train of thought to the logical conclusion for application of knowledge in providing client care (May, Edell, Butell, Doughty, & Langford, 1999). This ability further is facilitated through reflective learning as described by Baker (1984). The professional nurse is responsive to a situation by cognitively reviewing and assessing information to achieve understanding and create meaning. The skill of analysis requires identification of similarities and differences between recognition of the need for intervention or continued observation. Approaches or modalities of treatment necessitate the use of inference skills to examine research findings to identify implications for nursing practice and to scrutinize assessment of the data to establish appropriate nursing diagnoses. Deductive reasoning skills are then needed to recognize and predict client behaviors and responses to the plan of nursing care (Thompson & Rebesch, 1999).

Throughout the nurse-client relationship, the nurse must critically think, draw from the acquired nursing knowledge base, and continuously assess and evaluate the appropriateness of decisions made regarding client care (Alfaro-Lefevre, 2003). Accrediting bodies considers use of the nursing process to be an integral component of preparation for professional nursing practice (AACN, 2005; NLN, 2005). Essential core

program outcome competencies include the ability to perform inquiry, critical analysis, and synthesis of applicable information. Curriculums must prepare graduates who can (a) apply research-based knowledge for nursing and the sciences as the basis for practice, (b) use clinical judgment and decision-making skills, (c) engage in self-reflection and collegial dialogue about professional practice, (d) evaluate nursing care outcomes through the acquisition of data and the vigilance for inconsistencies, (e) implement appropriate revisions of interventions and goals, and (f) demonstrate creativity in continuous problem solving (AACN, 2005). Graduates of nursing education programs are thus prepared to evaluate and incorporate new research findings to meet client needs in clinical situations (Keating, 2005).

#### *Learning in the Nursing Curriculum*

Nursing textbooks contain complex information and concepts in a concentrated format that is challenging to even students well skilled in reading. An analysis of the reading demands for nursing curriculums found the reading level to be at the 13<sup>th</sup> grade level (Halaska, 1992; Katz, Carter, Bishop, & Kravits, 2001). A statistically significant relationship between reading comprehension and first semester nursing grades was found by Abdur-Rahman, Femea, and Gaines (1994). This was supported by Gallagher, Bomba, and Crane (2001) in a study that demonstrated a relationship of reading comprehension as measured on admission to a nursing program and the success of the students in the first nursing courses.

Peters (2000) is supportive of the cognitive-constructivist model of learning. Teachers are viewed as facilitators of active learning by students. Through this approach,



students are better prepared to reflect, act, evaluate and use critical thinking in complex nurse-client situations. If reading comprehension abilities of students are evaluated early in the nursing education program, students can be empowered to see connections between nursing knowledge and nursing concepts. Skilled readers can then be active and self-directed in learning throughout the nursing program and be professionals with lifelong learning practices (Gallagher, Bomba, & Crane, 2001).

Nursing students bring background knowledge from personal experiences that are applicable to learning in nursing. To support learning of nursing concepts, faculty can encourage students to reflect on familiar knowledge about illness or health promotion as the textbook material is read (Wittrock, 1998). Faculty will promote the use of metacognition skills through journaling, group dialogue, and collaborative tasks to support meaningful learning by stimulating the skilled reader to incorporate the cognitive processes of selecting and organizing (Mayer, 1996).

The purpose of nursing textbooks, like other professional study textbooks, has changed from methods to discover meaning to facilitation methods for learning and constructing meaning. This change in purpose has created a need for the reader to have active reading skills (Vaca & Vaca, 2005). Recommendations are provided to the students about how to use the textbook and class discussions and assignments to promote learning for application. Nurse educators use classroom discussion of reading assignments to assist students to move beyond recall to a higher level of understanding (Beeson, 2001). Study-reading strategies can include use of memorization and highlighting to assist the learning process as long as the student is mindful to identify

main ideas and review the marked material. Self-monitoring of learning requires the use of questions, before, during, and after reading that ask for analysis, prediction, comparison, or evaluation to determine the level of comprehension beyond the factual material reviewed (Paris, Wasik, & Turner, 1991). The successful nursing student must have a repertoire of strategies to facilitate comprehension of nursing material.

### **Summary**

The desire is to admit the most highly qualified candidates into the nursing program and support them through to successful completion of the academic requirements. Admission screening for and early detection of risk factors for attrition are identified in the literature as essential to reduce program-specific student attrition rates (Campbell & Dickson, 1996). Although the reviewed studies had variations in findings, a variety of cognitive processes were found to have resulted in the strongest correlation with successful program completion. The selection process for program admission and achievement of professional licensure can be an essential component in minimizing attrition. It has been well documented that program admission of students who are unsuccessful results in a waste of financial resources with concomitant losses of self-esteem for the student and family. Nursing faculty are challenged by the lack of successful program completion for students. The accreditation and the reputation of the nursing program are jeopardized when student attrition and failure to achieve licensure occurs. The complexity of the processes and interactions of the students, faculty, and intuitions supports the recommendation by Tinto (2006) for study of student attrition at

the level of the individual institution to promote academic success and outcome achievement.

## **CHAPTER III**

### **METHODS**

The purpose of this chapter was to present the design, methodology, and procedures that were followed in conducting this study. Specifically, procedures included study design, sample description and selection, instrumentation, data collection, and data analysis.

#### **Study Design**

This retrospective study design used correlational and descriptive methods to determine the relationships among the variables (Burns & Grove, 2003). Due to the nature of the study, descriptive and ex post facto techniques were used for analysis of data.

The study was based on analysis of reading comprehension levels and academic performance of students enrolled in a nationally accredited Bachelor of Science in Nursing program. A comparative approach was used to investigate possible cause and effect relationships between measures of academic success of students and their reading comprehension abilities. Data were obtained from official academic records including student transcripts and test results from the Nelson-Denny Reading Test and the Nurse Entrance Test. The primary independent variable was the reading comprehension scores. The dependent variable, academic success, was measured by the first semester nursing course grade point average (GPA). The GPAs for prerequisite science courses and the overall GPAs for courses prior to admission to the nursing program were also examined.

### **Description of Study Population**

The study setting was a liberal arts university in a major city in Texas. The university is accredited by the Southern Association of Colleges and Universities. The National League accredited all nursing programs at the university for Nursing in 1996 through 2001 and by the Commission on Collegiate Nursing Education since April 2001. In addition, the baccalaureate program is fully approved by the Texas Board of Nurse Examiners. The students in the study were enrolled in a plan of study to be awarded a Bachelor of Science in Nursing (BSN). Prior to application and acceptance to the nursing program, the students completed at least 42 hours of required academic courses.

The reading comprehension ability of new students enrolled in the first semester of this generic nursing program was tested for six different semesters from 1996 through 2003. The total number of students tested was 187; however, 8 students were excluded from this study because complete transcript information was not available. Participation in the testing was required of all students during the orientation week of the first semester of the nursing program. An alphanumeric code was assigned to each of the students in the study sample to provide anonymity. The designed code identified each student by the semester (i.e., fall or spring) and year of enrollment. The code provided the means to align the reading comprehension test scores with the selected indices of academic success including the grade point average for the first semester nursing courses, all prerequisite science courses, and all college courses prior to admission to the nursing program.

Entrance requirements for admission to this nursing program were established prior to 1996. These requirements were based on the literature review of studies about predictors of success in baccalaureate nursing programs plus the previous experience of the faculty and administration with identified student characteristics for those students who successfully completed the nursing program. The overall entrance academic GPA was required to be a minimum of 2.5, based on a 4.0-point system. To promote improved graduation rates, a 2.5 GPA for prerequisite science courses was also required. In a further attempt to minimize program attrition or delayed graduation, the reading assessment tests were initially administered to identify student reading comprehension levels. Although intervention services and strategies to promote improved reading abilities were made available to those students with low-test scores, only a few students actually volunteered to participate in the skill enrichment program.

### **Procedures**

Permission for this study was requested and granted from the Institutional Review Board (IRB) at Texas A&M University (Appendix A) and from the University of the Incarnate Word (Appendix B). The transcripts of all 179 students were obtained from the Office of the Registrar following receipt of institutional IRB approval, letters of endorsement of the study by the Academic Vice-President for Student Affairs (Appendix C) and the Dean of the School of Nursing and Health Professions (Appendix D) at the University of the Incarnate Word. Permission was provided by the school dean to review the minutes of the Nursing Student Admission Committee to gather application data about each student in the study. Students were not considered to be at risk for injury

because of the retrospective nature of the study and the coding strategies used to protect the privacy of the students. Therefore, it was not necessary to obtain consent from the students for use of the data reviewed and analyzed.

Information on reading assessment scores was used from the actual test result reports for the 43 students tested by Nelson-Denny Reading Test and the 136 students tested by the Nurse Entrance Test. All grade point average calculations utilized in the study were calculated from the actual academic transcripts of the students. The GPA for prerequisite science courses and the overall pre-nursing admission value were determined from data on the actual academic transcript for the majority of students. In a few cases, when the values were not available on the reviewed transcripts, the information was taken from the records of the Nursing Student Admission Committee. The point values for letter grades designated by the university are provided in Table 3.1.

Table 3.1. Point Values for GPA Calculation for Students at the University of the Incarnate Word

Letter Grade	Value
A	4.0
A-	3.7
B+	3.3
B	3.0
B-	2.7
C+	2.3
C	2.0
D+	1.3
D	1.0
D-	0.7

*Note:* The university does not use the letter grade “C-.” Therefore, there is not a letter or point value provided in this table.

These point values were used to determine the GPA for the 16 hours of prerequisite science courses, the cumulative GPA prior to admission to the nursing program, the GPA for the 9 hours of first semester nursing courses, and the end cumulative GPA at the university.

All freshman students admitted to the university have evaluation of academic readiness levels prior to enrollment in English courses. If the Scholastic Aptitude Test (SAT) scores for reading and writing are acceptable, the student can enroll in English courses. If the SAT score is not satisfactory, the student is tested with the Nelson-Denny Reading Test. The Examiner's Manual for Forms E and F for The Nelson-Denny Reading Test (1981) was used to convert the raw score into a grade based percentile rank using the reference group table for a four-year university. For total scores for vocabulary and comprehension less than 39%, the students must complete an academic reading and/or writing preparation course prior to enrollment in college English courses. Students who transfer in English course hours are exempt from evaluation by the Nelson-Denny Reading Test. For this study, data were collected to determine the number of students in the study who, prior to nursing program admission, transferred in English hours and those who had academic preparation course requirements of reading, writing, or both courses.

Data regarding program completion, transfer, or withdrawal from the nursing program also were extracted from the academic transcripts of all students in the study as of January 2006. Study data were collected for the number of students (a) who had earned a BSN within six semesters of program admission or after more than six



semesters, (b) for those who had earned a degree other than the BSN, and (c) for those students who left the university without a degree.

### **Instruments**

The Nelson-Denny Reading Test (N-DRT) and the Nursing Entrance Test (NET) were used in this study to measure reading comprehension abilities of the first semester nursing students. For two semesters (Fall 2002 & Spring 2003), the N-DRT, Form E, was used to evaluate reading comprehension abilities for a total of 43 students. The director of the Learning Assistance Center at the university administered the tests and followed the testing directions in the Examiner's Manual. The test is designed to predict success in college courses by diagnosing strengths and weaknesses in vocabulary development, reading comprehension, and reading rate. These interdependent and related factors are considered by the authors of the N-DRT to be important skills in the reading process (Brown, Bennett, & Hanna, 1981). By way of description, the Nelson-Denny Reading Test is a two-part test with the first part consisting of a 15-minute timed test to measure vocabulary followed by a 20-minute test to measure reading comprehension and reading rate. The N-DRT is a formal, standardized, and norm-referenced product (Brown, Bennett, & Hanna, 1981). The nursing faculty chose the N-DRT for two primary reasons. First, the test was recommended by the academic testing faculty to be a proper and simple instrument to identify students who may need special help in reading. Second, research reported by the publisher indicated that test results could be used to both predict success in college courses and to diagnose strengths and weaknesses in areas tested (Brown, Bennett, & Hanna, 1981).

The first reading passage of the N-DRT is considered to be the longest and the easiest of the test. To determine reading rate, the students read for a minute, marking the point reached when time is called. The number of words read is counted to determine the number of words per minute the student can read. Comprehension is measured with all eight of the passages included in the N-DRT. Each passage is followed by a series of related multiple-choice questions. Two of the passages are written at the high school grades 9 to 10 level, three passages are at the grade 13 level, and two passages are written at the 17<sup>th</sup> grade level. All test materials are taken from *Scholastic* magazine or textbooks covering the humanities, social science, and science (Flippo & Caverly, 2000). The variety of reading passages is purposefully chosen to minimize the risk of a score being high or low based on a student having knowledge or lacking in knowledge in a particular subject. Questions to measure comprehension of the readings are equally divided between literal understanding and interpretation of the readings (Brown, Fisco, & Hanna, 1993b).

The internal consistency reliability of the total test scores for a four-year university for Form E is .91 (Brown, Bennett, & Hanna, 1981). The measure used by the publisher was context dependence. For the test, a sample of 225 college sophomores from two, four-year institutions varying in region and size were used. The Context Dependence Index (CDI) is expected to be positive and statistically significant. It is a measure of the degree to which correct item responses are influenced by the context of the material read. The reported score for Form E was .29 (Brown, Bennett, & Hanna, 1981). The Context Independence Index (CII), an undesired characteristic, measures the

degree to which examinees can correctly answer the items through previous knowledge or application of logic. This score should be zero or negative. For the validation sample for Form E, the CII was .09 (Brown, Bennett, & Hanna, 1981).

To calculate reading rate, the number of words that were read in the first test passage after one minute of time was recorded. To determine reading comprehension, the number of correct responses to all multiple-choice questions answered was determined. The raw scores were plotted on the reference table for Grade 15, Form E, for a Four-Year College/University. Scores for the students in Fall 2002 were plotted on the end-of-year table, while scores for the students in Spring 2003 were plotted on the beginning-of-year table. The interpreted scores were then used to support the focus of the first semester orientation content on successful reading and studying skills.

A strength of the N-DRT stems from the fact that it was normed on college students from four-year institutions varying by region and size. A reported limitation of the test is that the difficulty level of most of the reading passages is problematic for under-prepared students (Flippo & Caverly, 2000). For the purpose of this study to identify those students with weak reading skills, this limitation is a strength that supports the use of this test.

The Nurse Entrance Test was developed by the Examination Committee of Educations Resources. Members of the committee are faculty representing the four regions of the United States who actively teach and counsel in nursing education programs. Committee members are responsible for reviewing, evaluating, and selecting test items written by nursing and health occupations faculty. Questions are beta-tested by

students at the beginning of the first semester within nursing programs who volunteer for testing participation. The goal of the committee is to determine if a specific item distinguishes math and reading comprehension abilities for students with adequate to low levels skill development (Frost, 1991).

The NET evaluates six essential areas for academic success. These include basic math skills, reading comprehension, learning styles, test-taking skills, stress level, and social interaction abilities (Frost, 1991). Reading comprehension is evaluated at the inferential level that is considered to be the normal adult reading level for applicants to college-level courses for science-related material. Reading selections taken from science related texts are at the 10<sup>th</sup> grade level of difficulty for vocabulary and sentence syntax. For the student who scores well, it is predicted that there should not be difficulty reading college-level science content. In contrast, for the student who scores poorly, it is predicted that there is less likelihood of success when reading assigned science text. Though this is not part of the NET, the words per minute that the applicant can read when placed in a test or study situation are estimated and reported (Frost, 2003).

Educational Resources reports that over 600,000 students have taken the NET in the last four years (Frost, 2003). National norming is evaluated each year to provide the most current statistics by degree program, for both the entire group and individual results. Approximately one fourth of professional nursing programs utilize the NET for either pre-admission testing or as a counseling tool (Frost, 2003).

The original standardization of the NET was done in 1989 by testing health occupation students with both the NET and American College Test (ACT). The

standardization method was chosen because of the relative independence of sampling limits and efficiency through the use of entry-level nursing students. The validation of the presumed equivalency between the two tests used the assumption of the equating method of standardization. The reported overall mean averages for the NET and the ACT reading and math scores ranged from .79 to .83 (Frost, 1991). In addition, correlations of .80 or greater indicated a positive and significant relationship between performances on the two tests.

As a measure of reliability, the parallel forms method was used to examine the inter-test reliability of the NET subtest areas. Specifically, the odd-numbered questions of the NET were considered to be Form A and the even-numbered questions were considered to be Form B. The resulting reliability coefficients represented little internal variation in a student's performance for forms of the NET (Frost, 1991). The reported reliability coefficient for reading comprehension was .98, well above the .80 level considered to be the lowest acceptable coefficient for a well-developed, reliable instrument (Burns & Grove, 2003).

Content validity was built into the NET as a result of the design specifications (Frost, 1991). Criterion-related validity was determined by examination of the correlation coefficient for the composite score of the NET to the composite score of the ACT. The reported test data was .81 and the subsequent score of the regression line was .872. The associated confidence level was computed as above 99.9%. Finally, to evaluate the diagnostic validity of the test, a *t*-test was used to compare the results of graduating student responses to the norm results for each subtest obtained for entering

students. Graduating students achieved a significantly higher average score than the average of the norms established for entering students (Frost, 1991).

### **Data Analysis**

For this study, data analysis was facilitated through the use of the computer program, Statistical Package for the Social Sciences (SPSS 11.5 for Windows, 6 September 2002). To assist in understanding and interpreting the interactions among and between the variables, several statistical procedures were used. Initially, frequency distributions and descriptive statistics for the variables of study focus (i.e., reading comprehension and academic success) were used. Next, correlational analyses of interval data with the Pearson product moment procedure were performed with a predetermined .05 alpha level or less to be indicative of statistical significance. Finally, a regression model was used to assess the predictive nature of significant variables identified during correlation analyses. Again, a .05 alpha or less was assumed to be indicative of statistical significance.

Descriptive statistics and frequency distributions were used to provide an overview of the data. Descriptive data included the numbers of students tested by N-DRT or the NET, the core academic preparation course requirements, the academic degree outcomes of students, the reading comprehension scores as measured by the N-DRT or the NET, and the GPA's for the prerequisite science courses, the cumulative pre-nursing courses, and the first semester nursing courses.

The Pearson product moment correlation was used to answer the three posed research questions. The first question asked if there is a relationship between reading

comprehension as measured by the Nelson-Denny Reading Test or the Nurse Entrance Test and the academic success for nursing students in the first semester of a Bachelor of Science in Nursing program in Texas. The variable of GPA for the first semester nursing courses was correlated with the reading comprehension scores as measured by either the N-DRT or the NET. The second question asked if there is a relationship between the grade point average (GPA) for prerequisite science courses as a predictor of academic success for nursing students in the first semester of a Bachelor of Science in Nursing program in Texas. The third question asked if there is a relationship between the cumulative GPA of students prior to acceptance to the nursing program in a Bachelor of Science in Nursing program in Texas.

Each of the three research questions was further tested using the two-sample test. The sample was divided into the two groups of students who took either the NDRT or the NET and those who successfully completed the first semester of the nursing program and those who did not. The first semester GPA for the two groups of students was used as the dependent variable while the reading comprehension scores as determined by either the N-DRT or the NET remained as the independent variable. Finally, to determine the strength of existence of relationships among those variables with a significant level of association found during the correlation analysis procedures, a regression model was used.

### **Summary of Methodology**

It was the intent of this study to assess the relationship of the degree of academic success in the first semester of the nursing program in a south Texas university as a factor of the reading comprehension ability of the students. Study design, sample selection, confidentiality procedures, and protection of students as study participants were described. Study procedures and descriptions of the study instruments were presented. The plan for statistical analysis was detailed.



## **CHAPTER IV**

### **RESULTS**

#### **Overview**

This study addresses the relationship between the reading comprehension skills as measured by the Nelson-Denny Reading Test and the Nurse Entrance Test and indices of academic success for BSN students prior to admission to the nursing program (i.e., grade point average for prerequisite science courses and overall grade point average with student success in the first semester of nursing coursework) at the University of the Incarnate Word. In this chapter, there is (a) a restatement of the problem and research questions, (b) the results of the statistical analysis, and (c) a brief summary.

#### **Restatement of the Problem and Research Questions**

The problem driving the investigation in this study was the need to examine the relationship between reading comprehension and factors of academic success for students newly admitted to the nursing program at the University of the Incarnate Word to facilitate delineation of procedure to be used to evaluate baseline student reading comprehension skills. Test results for reading comprehension tests administered to nursing students upon admission to the nursing program were reviewed in relation to grade point averages for prerequisite science courses, cumulative grade point average for academic courses prior to admission to the nursing program, and grade point average for the first semester nursing courses.

The three research questions for this study are:

1. Is there a relationship between reading comprehension as measured by the Nelson-Denny Reading Test or the Nurse Entrance Test and the academic success for nursing students in the first semester of a Bachelor of Science in Nursing program in Texas?
2. Is there a relationship between reading comprehension as measured by the Nelson-Denny Reading Test or the Nurse Entrance Test with the grade point average (GPA) for prerequisite science courses as a predictor of academic success for nursing students in the first semester of a Bachelor of Science in Nursing program in Texas?
3. Is there a relationship between reading comprehension skills as measured by the Nelson-Denny Reading Test or the Nurse Entrance Test with the cumulative GPA for students prior to acceptance to the nursing program in a Bachelor of Science in Nursing program in Texas?

### **Results of the Study**

Three types of statistical analysis were used: (a) frequency distributions, (b) descriptive analysis, and (c) correlation analysis. The statistical tests performed assumed a predetermined .05 alpha level of significance for purposes of data interpretation, indicating that lesser values are indicative of statistical significance. The computer software, Statistical Package for the Social Sciences (SPSS 11.5 for Windows), was used for data analysis.

### *Descriptive Findings*

Basic descriptive statistics were used to describe study variables such as the total number, mean, and standard deviation for reading comprehension scores, and grade point average for prerequisite science course, pre-nursing courses, and grade point average for the first semester nursing courses. The findings are reported for the entire sample and by type of reading comprehension test (N-DRT or NET) used for the student groups.

### *The Population*

The sample consisted of 179 students enrolled in the first semester of the BSN nursing program at the School of Nursing & Health Professions of the University of the Incarnate Word during Fall 1996, 1997, 1998, 2002 and Spring 2003. (Note: Testing was not done between Spring 1999 and Fall 2002 because of staffing constraints.) There were 43 students tested by the Nelson-Denny Reading Test (Group 1) and 136 students tested by the Nursing Entrance Test (Group 2). All students were tested during the first week of the first semester of enrollment in the nursing program for the semesters listed. This is detailed in Table 1.1 in Chapter I. For this study, all students enrolled in each of the first semester nursing courses were tested for the designated times. All students tested with the Nelson-Denny were included; however, a total of eight students tested with the NET were excluded from the study because the GPA for prerequisite science courses or the cumulative GPA could not be determined from transcripts.

For students new to the university, reading and writing skills are tested on admission with the Nelson-Denny Reading Test with one exception. If the student

transferred in English course hours from another institution or had an acceptable score from the Scholastic Aptitude Test (SAT), the students were exempt from further testing. Academic preparation courses in reading and writing are required if the Nelson-Denny Reading Test results for vocabulary and reading comprehension are 0-39%. As illustrated in Table 4.1, 125 or almost 70% of the students in the study were not tested because they had English course hours accepted by transfer by the registrar for the university.

Table 4.1. English Preparation Course Requirements for Students at the University of the Incarnate Word

Requirement	N	%
Transferred in English courses	125	69.8
None required by testing	26	14.5
Core-Prep reading course required	3	1.7
Core-Prep writing course required	8	4.5
Core-Prep reading and writing courses required	17	9.5
Total	179	100.0

*Note:* “Core” refers to the university core curriculum, an integrated and sequenced course of study constituting 52 semester hours of the student’s degree plan. The content of the Core is dictated by the traditional concept of liberal arts. The core includes a carefully devised study of rhetoric (intelligent reading and correct writing), philosophy, theology, literature and the arts, mathematics and the natural sciences, history, the behavioral and social sciences, language, and wellness.

An additional 26 students tested at a satisfactory level on the N-DRT and were thus not required to take English core preparation courses. Of the remaining students, 3 were required to take the English core preparation reading course, 8 students were

required to take the English core preparation writing course, and 17 were required to take both writing and reading English core preparation courses.

Academic outcomes were evaluated for this study by review of student transcripts to determine if a degree was awarded at the completion of the nursing program of study, within six semesters of acceptance to the program. Information was confirmed from evaluation of transcripts as of January 2006, as shown in Table 4.2.

Table 4.2. Academic Outcome for First Semester Nursing Student Population at the University of the Incarnate Word

Degree	N	%
BSN awarded within 6 semesters of admission to nursing program	106	59.2
BSN awarded after more than 6 semesters	21	11.7
Other degree awarded by January 2006	8	4.5
No degree awarded by January 2006	44	24.6
Total	179	100.0

One hundred six, or approximately 60%, of the 179 students had been awarded a BSN degree within the designated time of six semesters. Another 21 students had been awarded a BSN by January 2006 after more than six semesters from acceptance to the nursing program. Thus, approximately 70% of the admitted students tested in this study graduated with a BSN. Eight students representing only 4.5% of the students in the sample were awarded a bachelor's degree from the university in an area of study other

than nursing. Forty-four, or approximately 25% of the study sample students, had not been awarded a degree from the university by January 2006. These students either withdrew from the nursing program or were still enrolled at the university but had not yet completed their academic degree plan of study.

### *Reading Comprehension*

Reading comprehension and reading placement levels of students in the first semester nursing courses were measured and reported by the Nelson-Denny Reading Test for 43 students and by the Nurse Entrance Test for 143 students. The mean score for students for reading comprehension on the Nelson-Denny Reading Test (N-DRT) was 46.42. The reported norm mean from the standardization sample for sophomore level students at a four-year university is 52.44 (Brown, Fisco, & Hanna, 1993a). Therefore, the obtained sample score is lower than the reported normed mean for this test. This is detailed in Table 4.3.

Table 4.3. First Semester Nursing Students' Reading Comprehension Results

GROUP	N	Minimum	Range Maximum	Mean	SD
N-DRT	43	22	66	46.42	11.28
NET	136	24	93	62.99	14.09
TOTAL	179				

*Note:* N-DRT = Nelson-Denny Reading Test; NET = Nurse Entrance Test.

With the N-DRT, the scores ranged from 22 to 66 with a mean of 46.42 and standard deviation of 11.28. Passages from a variety of subjects were used to measure comprehension in the Nelson-Denny Reading Test. Students who have a reading comprehension score of 57-72 are ranked in the top 25% of students at a four-year university; scores of 40-56 are ranked in the middle 50%; and scores of 2-39 are ranked in the bottom 25% (Brown, Bennet, & Hanna, 1981). For each of the two semesters that the N-DRT was used, approximately 70%, or almost three fourths of the students, achieved scores at or above the middle percentage level. This is detailed in Table 4.4.

Table 4.4. N-DRT Measure of Reading Comprehension Ability and Academic Failure for First Semester Nursing Courses

Semester	N	Top 25 % (57-72)	Fail/ Dropout	Middle 50% (40-56)	Fail/ Dropout	Bottom 25% (2-39)	Fail/ Dropout
Spring 2003	20	1	0/0	14	4/3	5	1/1
Fall 2002	23	4	1/1	13	0/0	6	2/2
Total	43	5	1/1	27	4/3	11	3/3

*Note 1:* N-DRT = Nelson-Denny Reading Test.

*Note 2.* Fail = students who experienced a failing grade in one or more first semester courses. Dropout = students who experienced a failing grade in one or more first semester courses and did not continue to the second semester in the nursing program.

As shown in Table 4.4, in the Spring 2003 semester, of the five students who failed the first semester nursing courses, four were in the middle percent range for normed scores, and one student was in the bottom percent for the normed score range. In the Fall 2002 semester, three students failed the first semester nursing courses. One of the students had a reading comprehension score in the top fourth of the range, but due to

personal reasons, was unable to meet course objectives for first semester nursing courses. The other two students were evaluated to be in the bottom range of reading comprehension scores.

A summary of outcomes for individual students is found in Table 4.5. Six of the eight students tested by the N-DRT who failed at least one course in the first semester did not repeat the failed first semester course(s) and withdrew from the university. One of the six students who did not repeat the failed nursing course(s) changed to another major and was awarded a degree from the university. One of the eight students repeated the failed course(s) but, due to a second failure, was not able to progress to the second semester courses and decided to withdraw from the university. Only one of the eight students successfully repeated the failed first semester course and progressed to the second semester. This student subsequently failed in another semester of nursing courses resulting in an enforced change of major. The student had not completed degree requirements by January 2006. In summary, six of the eight students left the university without earning a degree, one earned a bachelor's degree in a non-nursing area, and one is still working toward a degree in another area of study.



Table 4.5. Outcome After First Semester Course(s) Failure for N-DRT Measured Group

Student	Reading Comp Level	Progress to 2 <sup>nd</sup> Semester	Academic Outcome
1A802	Top 25%	N*	Withdrew
1G103	Mid 50%	Y*	In Progress
1R103	Mid 50%	N*	Withdrew
1U103	Mid 50%	N**	Withdrew
1V103	Mid 50%	N*	Withdrew
1D103	Bot 25%	N*	Withdrew
1F802	Bot 25%	N*	Withdrew
1M802	Bot 25%	N*	Withdrew

*Note 1:* N-DRT = Nelson-Denny Reading Test.

*Note 2:* First number of student code represents group, last three numbers represent the semester of enrollment.

*Note 3:* Reading Comp Level is Reading Comprehension Level for the NDRT.

*Note 4:* N\* = did not progress to 2<sup>nd</sup> semester & did not repeat failed course(s); N\*\* = did not progress to 2<sup>nd</sup> semester but did fail repeated 1<sup>st</sup> semester course(s); Y\* = progress to 2<sup>nd</sup> semester after passing repeated 1<sup>st</sup> semester course(s). Mid = middle; Bot = bottom.

The mean score for reading comprehension as measured by the Nurse Entrance Test (NET) was 62.99, which is above the reported average score of 56.00 (Frost, 1991). The interpretation of this is that out of 100 nursing students tested, 62.99 read at a reading comprehension level that is lower than the norm group. The obtained score of 62.99 is at the “instructional” reading comprehension level according to the Diagnostic Report booklet (Frost, 1991). Students tested by the NET had scores ranging from a minimum of 24, which is identified to be at the “frustration” reading comprehension level to the maximum value of 93, which is identified to be at the “independent” reading comprehension level. This is detailed in Table 4.6.

Table 4.6. NET Reading Placement for Reading Comprehension Ability and Academic Failure for First Semester Nursing Courses

Semester	N	Independent Level (76-100)	Fail/ Dropout	Instructional Level (35-75)	Fail/ Dropout	Frustration Level (0-34)	Fail/ Dropout
Spring 1998	20	7	2/2	13	4/3	0	0/0
Fall 1997	39	6	1/1	32	8/5	1	0/0
Fall 1996	40	8	0/0	31	5/2	1	1/0
Total	136	25	3/3	108	19/11	3	1/0
Percent	18.4		79.4		2.2		

*Note 1:* NET = Nurse Entrance Test.

*Note 2:* Fail = students who experienced a failing grade in one or more first semester courses. Dropout = students who experienced a failing grade in one or more first semester courses and did not continue to the second semester in the nursing program.

With reference to Table 4.6, of the 136 students tested with the NET, 25 (18.4%) had reading comprehension scores identified at the independent level, 108 (79.4%) had reading comprehension scores identified at the instructional level, and 3 (2.2%) had reading comprehension scores identified at the frustration level. There were students in each reading comprehension group who failed to successfully complete nursing courses in the first semester. There were 3 students in the independent level group, 19 in the instructional level group, and 1 in the frustration level group.

The outcomes for students who failed the initial enrollment in first semester nursing courses are summarized in Table 4.7. Of the 3 students from the 25 students in the independent level, 2 withdrew from the nursing program after the first semester and did not complete any degree requirements for the university; one successfully repeated the first semester course but withdrew from the university without completing

requirements for a degree from the university. Nineteen of the 108 students in the instructional level failed the initial attempt with the first semester nursing courses. Eleven of these students chose to not remediate the failure. Nine of these students withdrew from the university and 3 of the 9 students initiated a change of academic major and were awarded BA, BBA, and a BS, respectfully. Of the 8 students who chose to remediate the failed courses, 1 student failed a second time and withdrew from the university. The remaining 7 students successfully matriculated to second semester. However, 7 were unsuccessful in another semester; 3 of these students ultimately withdrew from the university, while 4 students changed academic majors and were awarded degrees from the university (2 BBA's, BS, & 2 BA's, respectfully). One student with a score identified in the frustration level group did successfully repeat the failed first semester course but had a course failure in another semester. This student changed academic major and was awarded later a BA degree.

Table 4.7. Outcome After First Semester Course(s) Failure for NET Measured Group

Student	Reading Comp Level	Progress to 2 <sup>nd</sup> Semester	Academic Outcome
2M198	Independent	N*	Withdrew
2R198	Independent	N*	Withdrew
2S897	Independent	Y	Withdrew
2F198	Instructional	Y	Withdrew
2G198	Instructional	N*	Withdrew
2K198	Instructional	N*	Withdrew
2W198	Instructional	N*	Withdrew
2N897	Instructional	N*	Withdrew
2R897	Instructional	Y	Withdrew
2U897	Instructional	N*	Withdrew
2X897	Instructional	N*	BBA
2FF897	Instructional	N*	BS
2HH897	Instructional	N*	Withdrew
2KK897	Instructional	Y	BA
2QQ897	Instructional	N*	Withdrew
2AA197	Instructional	N**	Withdrew
2BB197	Instructional	Y	BA
2D896	Instructional	Y	Withdrew
2F896	Instructional	Y	BSN
2G896	Instructional	Y	BBA
2S896	Instructional	N*	Withdrew
2V896	Instructional	N*	BS
2RR896	Instructional	Y	BA
2DD896	Frustration	Y	BA

Note 1: NET is Nurse Entrance Test.

Note 2: First number of student code represents group, last three numbers represent the semester of enrollment.

Note 3: Reading Comp Level is Reading Comprehension Level for the NET.

Note 4: N\* = did not progress to 2<sup>nd</sup> semester & did not repeat failed course(s); N\*\* = did not progress to 2<sup>nd</sup> semester but did fail repeated 1<sup>st</sup> semester course(s); Y\* = progress to 2<sup>nd</sup> semester after passing repeated 1<sup>st</sup> semester course(s).

*Grade Point Averages*

**First Semester GPA**

For the entire sample, the first semester GPA scores ranged from 0.00 to 4.00; the mean was 3.00 and the standard deviation was .89. This is detailed in Table 4.8.

Table 4.8. Student GPA For First Semester Nursing Courses

Group	N	Mean	SD	Dropouts
N-DRT	43	2.70	.99	3
NET	136	3.09	.84	6
TOTAL	179	3.00	.89	9

*Note 1:* N-DRT is Nelson-Denny Reading Test; NET is Nurse Entrance Test.

*Note 2:* Dropouts were students who earned "0" GPA for all three first semester nursing courses.

One hundred and forty-eight (82.7%) of the 179 students successfully completed the first semester requirements and progressed to the second semester. Students are required to achieve a minimum of a "C" or 2.0 in each of the three first semester nursing courses in order to progress in the nursing program. A total of 31 of the 179 students failed to earn a 2.0 GPA in each of the three first semester courses. For the N-DRT students, the range of GPA scores for the first semester nursing courses was .00 to 3.90 with a mean of 2.70. Eight of these 43 students earned a GPA of less than 2.0, failing to make a "C" in all three first semester nursing courses. The first semester GPA score range for NET students was .00 to 4.00 with a mean of 3.09. Of this group of students, 23 failed to earn a 2.0 in all three of the first semester courses. This resulted in 18.6% of

N-DRT and 16.9% of NET tested students, or 17.3% of the entire sample failing to successfully complete the first semester nursing courses. This is detailed in Table 4.9.

Table 4.9. Outcome of Enrollment in First Semester Nursing Courses

Semester	Students	Passed All Courses	Percent	Failed at Least One Course	Percent
<b>N-DRT</b>					
SP 03	20	15	75	5	25.0
FA 02-	23	20	87	3	13.0
Total	43	35	81.4	8	18.6
<b>NET</b>					
SP98	20	14	70	6	30.0
FA 97	39	30	77	9	23.0
SP 97	37	35	95	2	5.0
FA 96	40	34	85	6	15.0
Total	136	113	83.1	23	16.9
Total	179	148	82.7	31	17.3

*Note 1:* N-DRT = Nelson-Denny Reading Test; NET = Nurse Entrance Test.

*Note 2:* "Failure" means that the student earned less than a "C" in one or more of the three nursing courses in the first semester, which are Introduction to Professional Nursing, Pharmacology, and Basic Health Assessment.

### Prerequisite Science GPA

The requirement for unconditional admission to the nursing program is a GPA of 2.5 for the 16 hours of prerequisite science courses. The prerequisite science course GPA score for students tested by the N-DRT ranged from 2.00 to 4.00 with a mean of 2.96. For the students tested by the NET, the prerequisite science course GPA score ranged from 2.20 to 4.00 with a mean of 3.13. For the entire sample, the mean GPA score for prerequisite science courses was 3.09. This is detailed in Table 4.10.

Table 4.10. Student GPA Prerequisite Science Courses

Group	N	Minimum	Maximum	Mean	SD
N-DRT	43	2.00	4.00	2.96	.52
NET	136	2.20	4.00	3.13	.47
Total	179	2.00	4.00	3.09	.49

*Note 1:* N-DRT = Nelson-Denny Reading Test; NET = Nurse Entrance Test.

*Note 2:* The prerequisite science courses are chemistry, anatomy and physiology I and II, and microbiology. GPA calculated from all science courses taken at the university or accepted as transfer credit prior to admission to the nursing program.

### Pre-Nursing GPA

For the entire group, the pre-nursing GPA range was 1.90 to 4.00, the mean was 3.29, and the standard deviation was .45. This is detailed in Table 4.11.

Table 4.11. Student GPA for Pre-Nursing Courses

Group	N	Minimum	Maximum	Mean	SD
N-DRT	43	2.36	4.00	3.10	.38
NET	136	1.90	4.00	3.35	.44
Total	179	1.90	4.00	3.29	.45

*Note 1:* N-DRT = Nelson-Denny Reading Test; NET = Nurse Entrance Test.

*Note 2:* This GPA was calculated from all of the courses taken at the university or accepted as transferred hours prior to admission to the nursing program.

The requirement for admission to the nursing program is an overall GPA score of 2.50 for prerequisite courses. Based on individual circumstances, a student can be

conditionally admitted with a GPA score less than 2.50. The overall prerequisite courses GPA score for students in N-DRT ranged from 2.36 to 4.00 with a mean of 3.10. For the students in NET, the overall GPA score range was 1.90 to 4.00 with a mean of 3.35.

### **Final GPA**

For the 43 students tested with the N-DRT, the GPA score range was 2.24 to 3.96 with a mean of 3.03. For the 136 students tested by the NET, the GPA score range was 1.77 to 3.91 with a slightly higher mean of 3.16. For the 179 students in the sample with a mean of 3.13, the final GPA recorded on the university transcripts ranged from 1.77 to 3.96. This is detailed in Table 4.12.

Table 4.12. Final GPA for Students Who Were First Semester Nursing Students

Group	N	Minimum	Maximum	Mean	SD
N-DRT	43	2.24	3.96	3.03	.36
NET	136	1.77	3.91	3.16	.35
Total	179	1.77	3.96	3.13	.36

*Note:* This Final GPA was obtained from the transcripts of the students in the study as of January 2006.

### *Correlation Analysis*

The Pearson product moment correlation coefficients was used to produce the correlations between reading comprehension as measured by the Nelson Denny Reading Test and the Nurse Entrance Test with the final GPA score for first semester nursing courses, the GPA for prerequisite science courses, and the overall GPA for pre-nursing courses.



*Research Question 1*

Is there a relationship between reading comprehension as measured by the Nelson-Denny Reading Test or the Nurse Entrance Test and the academic success for nursing students in the first semester of a Bachelor of Science in Nursing program in Texas?

The Pearson correlation of reading comprehension scores for the entire sample with the GPA scores for first semester nursing course was significant at the .29 as shown in Table 4.13.

Table 4.13. Correlations of Reading Comprehension to GPA for First Semester Nursing Courses

Test Group	N	Correlation	<i>t</i> -test	<i>p</i> *	<i>eta</i> <sup>2</sup>
N-DRT	43	.33	17.99	.001	.109
NET	136	.21	43.06	.001	.044
Total	179	.29	45.17	.001	.084

*Note 1:* N-DRT = Nelson-Denny Reading Test; NET = Nurse Entrance Test.

*Note 2:* *p*\* is significant at .001 level.

The Pearson correlation of reading comprehension scores as measured by the Nelson-Denny Reading Test was significant at the .33 level indicating a weak, positive correlation with the reading comprehension level of the students and the GPA of first semester nursing courses. Likewise, the NET scores of reading comprehension were significant at the .21 level, which also indicates a weak, positive correlation with the first semester nursing GPA.

Additional findings centered on the mean GPA for the first semester nursing courses for those students tested by the N-DRT, by the NET, and for the whole sample as further divided by those students who passed the first semester courses and those students who did not pass these courses. This is detailed in Table 4.14.

Table 4.14. Mean GPA for Prerequisite Science Courses and Outcome of Enrollment in First Semester Nursing Courses

Group	Students	Passed All Courses	Percent	Science GPA	1 <sup>st</sup> Sem. GPA	Failed at Least One Course	Science GPA	1 <sup>st</sup> Sem. GPA	Percent
N-DRT	43	35	81.4	3.23	3.09	8	2.66	1.00	18.6
NET	136	113	83.1	3.19	3.37	23	2.88	1.74	16.9
Total	179	148	82.7	3.15	3.37	31	2.79	1.53	17.3

*Note 1:* N-DRT = Nelson-Denny Reading Test; NET = Nurse Entrance Test.

*Note 2:* "Failure" means that the student earned less than a "C" in one or more of the three nursing courses in the first semester, which are Introduction to Professional Nursing, Pharmacology, and Basic Health Assessment.

*Note 3:* Science GPA is prerequisite Science courses GPA.

For the 35 students who passed the first semester nursing courses and who were tested by the N-DRT, the mean GPA for the first semester nursing courses was 3.09, which was lower than the 3.30 mean GPA for the 148 students who passed the first semester nursing courses. For the 8 students tested with the N-DRT who failed the first semester nursing courses, the mean GPA was 1.00, which was lower than the 1.53 mean GPA for all 31 students who did not pass the first semester nursing courses.

For the 113 students who passed the first semester nursing courses and who were tested by the NET, the mean first nursing semester courses GPA was 3.37, a score higher than the 3.30 mean GPA for the first semester nursing courses for all 148 students who

passed these courses. For the 23 students who failed the first semester nursing courses, the mean first semester nursing course GPA was 1.74, a score higher than the 1.53 mean GPA for the first semester nursing courses for all 31 students who did not pass these courses.

### *Research Question 2*

Is there a relationship between reading comprehension as measured by the Nelson-Denny Reading Test or the Nurse Entrance Test with the grade point average (GPA) for prerequisite science courses as a predictor of academic success for nursing students in the first semester of a Bachelor of Science in Nursing program in Texas?

The Pearson correlation of reading comprehension scores for the entire group with the GPA scores of prerequisite science courses with the first semester nursing course GPA scores was significant at the .22 level as shown in Table 4.15.

The Pearson correlation of reading comprehension as measured by the Nelson-Denny Reading Test and the GPA for prerequisite science courses was .24, indicating a weak, positive correlation with the entered scores. The Pearson correlation of reading comprehension as measured by the NET with the GPA for prerequisite science courses was .16, indicating a slightly stronger correlation between the entered scores.

Table 4.15. Correlations of Reading Comprehension With the GPA for Prerequisite Science Courses for First Semester Nursing Students

Test Group	N	Correlation	<i>t</i> -test	<i>p</i> *	<i>eta</i> <sup>2</sup>
N-DRT	43	.24	37.61	.001	.058
NET	136	.16	77.64	.001	.023
Total	179	.22	85.10	.001	.048

Note 1: N-DRT = Nelson-Denny Reading Test; NET = Nurse Entrance Test.

Additional findings centered on the mean GPA for prerequisite science courses for those students tested by the N-DRT, by the NET, and for the whole sample, further divided by those students who passed the first semester courses and those students who did not pass these courses (see Table 16). For the 35 students who passed the first semester courses and who were tested by the N-DRT, the mean GPA for prerequisite science courses was 3.03, which was lower than the 3.15 mean GPA for prerequisite science courses for all 148 students who passed the first semester courses. For the 8 students who failed the first semester courses, the mean GPA for prerequisite science courses was 2.66, which was lower than the 2.79 mean GPA for prerequisite science courses for all 31 students who did not pass the first semester courses.

For the 113 students who passed the first semester courses and who were tested by the NET, the mean GPA for prerequisite science courses was 3.19, which was higher than the 3.15 mean GPA for prerequisite science courses for all 148 students who passed the first semester courses. For the 23 three students who failed the first semester courses, the mean GPA for prerequisite science courses was 2.88, which was higher than the 2.79

mean GPA for prerequisite science courses for all 31 students who did not pass the first semester courses.

*Research Question 3*

Is there a relationship between reading comprehension skills as measured by the Nelson-Denny Reading Test or the Nurse Entrance Test with the cumulative GPA for students prior to acceptance to the nursing program in a Bachelor of Science in Nursing program in Texas?

The Pearson correlation of reading comprehension for the entire sample with the GPA for pre-nursing courses was at the .24 level, indicating a strong and positive correlation between variables. This is presented in 4.16.

Table 4.16. Correlations of Reading Comprehension With GPA for Pre-Nursing Courses for First Semester Nursing Students

Test Group	N	Correlation	<i>t</i> -test	<i>p</i> *	<i>eta</i> <sup>2</sup>
N-DRT	43	.13	53.59	.001	.017
NET	136	.16	88.04	.001	.026
Total	179	.22	99.84	.001	.058

*Note:* N-DRT = Nelson-Denny Reading Test; NET = Nurse Entrance Test.

The Pearson correlation of reading comprehension as measured by the Nelson-Denny Reading Test was at the .13 level, indicating a weak, positive correlation with the reading comprehension level of the students and the GPA of pre-nursing courses. With

the NET, the Pearson correlation of reading comprehension was at the .16 level, also indicating a weak, positive correlation with the GPA for pre-nursing courses.

Additional findings centered on the mean GPA for pre-nursing courses for those students tested by the N-DRT, by the NET, and for the whole sample, further divided by those students who passed the first semester courses and those students who did not pass these courses. This is shown in Table 4.17.

Table 4.17. Mean GPA for Pre-Nursing Courses and Outcome of Enrollment in First Semester Nursing Courses

Group	Students	Passed All Courses	Percent	P-N GPA	1 <sup>st</sup> Sem. GPA	Failed at Least One Course	P-N GPA	1 <sup>st</sup> Sem. GPA	Percent
N-DRT	43	35	81.4	3.17	3.09	8	2.80	1.00	18.6
NET	136	113	83.1	3.42	3.37	23	3.02	1.74	16.9
Total	179	148	82.7	3.36	3.30	31	2.94	1.53	17.3

*Note 1:* N-DRT = Nelson-Denny Reading Test; NET = Nurse Entrance Test.

*Note 2:* "Failure" means that the student earned less than a "C" in one or more of the three nursing courses in the first semester, which are Introduction to Professional Nursing, Pharmacology, and Basic Health Assessment.

For the 35 students who passed the first semester courses and who were tested by the N-DRT, the mean GPA for pre-nursing courses was 3.17, which was lower than the 3.36 mean GPA for pre-nursing courses for all 148 students who passed the first semester courses. For the 8 students who failed the first semester courses, the mean GPA for pre-nursing courses was 2.80, which was lower than the 2.94 mean GPA for pre-nursing courses for all 31 students who did not pass the first semester courses.

For the 113 students who passed the first semester courses and who were tested by the NET, the mean GPA for pre-nursing courses was 3.42, which was higher than the 3.36 mean GPA for pre-nursing courses for all 148 students who passed the first nursing semester courses. For the 23 students who failed the first semester courses, the mean GPA for pre-nursing courses was 3.02, which also was higher than the 2.94 mean GPA for pre-nursing courses for all 31 students who did not pass the first semester courses.

As a secondary emphasis or focus, a regression model was used to further analyze the data. This analysis is an important factor in determining which reading comprehension test to use in a planned intervention to promote retention of future students entering the nursing program. As shown in Table 4.18, 28% of the variance is accounted for in this predictive validity model.

Table 4.18. Relationships of First Semester Nursing Course Performance to Selected Predictors

Selected Variable	N	Correlation	<i>t</i> -test	<i>p</i> *	<i>eta</i> <sup>2</sup>
Reading Comprehension					
N-DRT	43	.326*	26.99	.033	.106
NET	136	.212*	52.15	.013	.045
Science GPA Group	179	.357**	85.10	.001	.127
Pre-Nursing GPA Group	179	.468**	99.84	.001	.219

Note 1: N-DRT = Nelson-Denny Reading Test; NET = Nurse Entrance Test.

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

\*\* Correlation is significant at the 0.01 level (2-tailed).

### Summary of Results

The results of statistical analyses of the data are presented using two primary statistical methods of analysis: descriptive and correlational analysis. In addition, a regression model of statistical analysis was employed. The study sample consisted of 179 students who, at the beginning week of the first semester of the nursing program, completed a reading comprehension assessment test using either the Nelson-Denny Reading Test or the Nurse Entrance Test. The group was homogenous, in that all students had met the entrance requirements of the nursing program, having completed the prerequisite science courses and the pre-nursing courses with a minimum GPA of “C+” or 2.5. Because the correlational analysis results were positive between the reading comprehension levels as measured by both reading tests and the student grade point averages for the first semester nursing courses, the prerequisite science courses, and the overall courses prior to admission to the nursing program, a regression analysis was completed.

The purpose of this study was to examine the academic outcomes of students whose reading comprehension was measured at the beginning of the first semester of the nursing program. The analysis steps were taken from an *ex post facto* study where the outcome was already known. The assessment of reading comprehension as measured by either the Nelson-Denny Reading Test or the Nurse Entrance Test was correlated to the grade point average for the beginning semester of nursing courses. Although the obtained correlations were weak, they were positive. There was a slightly higher correlation score for academic success for students whose reading comprehension was



measured by the Nelson-Denny Reading Test, than for those students whose reading comprehension was measured by the NET; however, the level of significance was retained  $\leq 0.05$ .

Table 4.19. Regression Model for First Semester Nursing Student Grades (N = 179)

Predictors	Criterion is 1 <sup>st</sup> Semester GPA				F	p
	N-DRT	r	N-DRT	r <sup>2</sup>		
Reading Comprehension	.326	.292	.033	.086	6.25	.013
Pre-Nursing GPA	.512	.468	.001	.219	24.70	.001
Science GPA	.368	.357	.015	.127	6.00	.015
Total (R)	.574	.527	.330	.278	36.95	.001

Note 1: N-DRT = Nelson-Denny Reading Test.

Note 2: Regression model with 1<sup>st</sup> semester nursing course GPA as criteria = .167 (reading comprehension) + .356 (Pre-Nursing GPA) + .174 (science GPA) + -.920.

Twenty-two percent of the variance is covered by the pre-nursing GPA. The prerequisite science GPA accounts for 6% of the variance.

## **CHAPTER V**

### **SUMMARY, DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS**

#### **Summary of the Study**

The purpose of this descriptive study was to investigate and analyze the results of the relationship between reading comprehension levels and measures of academic success for students in the first semester of a nursing program. Reading comprehension was measured by the Nelson-Denny Reading Test and the Nurse Entrance Test. These findings were correlated with the measure of academic success for the first semester nursing courses (i.e., the grade point average), the prerequisite science course grade point average, and the overall grade point average prior to acceptance to the nursing program.

The study was initiated to guide faculty in decisions regarding program admission as one strategy to decrease the attrition of students admitted to the nursing program. All students entering the nursing program meet the minimum academic criteria for admission with respect to the required grade point average for prerequisite science courses and the overall grade point average for all college courses attempted. However, some students admitted do not successfully complete a course of study in nursing. The goal of nursing faculty and administrators is to select the most capable students and to provide the needed academic support of those students who demonstrate difficulty meeting the defined program educational objectives. To accommodate this first goal, admission criteria must, in part, be based on valid measures of the academic strengths.

Similarly, academic support services must define appropriate interventions on valid measures of academic deficits.

Chapter I introduces the study by discussing the importance, background, and the specific purpose of the study. The problem statement provides further clarification of the purpose, followed by definitions of terms used in the study. The limitations and assumptions are included in this chapter.

Chapter II is a review of the literature focused on information about two nationally recognized instruments commonly used to assess reading abilities of college students, predictors of success in nursing programs, and the relationship of reading comprehension to academic success in higher education. The adopted study instruments are the Nelson-Denny Reading Test and the Nurse Entrance Test. For the Nelson-Denny Reading Test, the information reviewed focused on the use of the test with college students reported in the literature and provided by the test publishers. There were no studies found that report the use of this test to measure reading abilities with nursing students. For the Nurse Entrance Test, the literature and publisher's review included a limited number of studies reporting use of the test as a screening tool for admission decisions to nursing programs. This literature reviewed focused on the use of NET scores to set admission criteria for the nursing programs. The designated scores were for academic skills, particularly reading abilities that were related to predictors of successful completion of the nursing programs and, ultimately, success with the licensing exam.

In Chapter III, the problem is restated followed by discussion of research design, methodology, and study procedures. A retrospective study design that used descriptive

*ex-post facto* techniques provided the basis for statistical analysis of variables. Data for reading comprehension test results were used from the files of students who had been enrolled in the first semester nursing courses during six semesters from 1996 to 2003. A section on instrumentation provided descriptions of reading test validity and reliability and the history of the development and standardization of both the Nelson-Denny Reading Test and the Nurse Entrance Test. Selected statistical procedures were then presented, emphasizing the appropriateness of their use in the study.

Chapter IV included a restatement of the problem and the population. The findings and results of the statistical procedures were presented, relating them to the research questions. In addition, a regression analysis was performed when significant results were obtained from the critical correlations. Tables were used to graphically represent the study findings in a clear and concise manner. Interpretations were drawn, and recommendations for future studies were provided. Finally, the limitations and study implications of these limitations are discussed relative to the generalizability of study findings to the general population of newly accepted students into nursing programs. .

### **Conclusions**

The convenience sample in this study included 179 students enrolled in the first semester nursing courses from 1996 to 2003. Forty-three students had an assessment of reading comprehension using the Nelson-Denny Reading Test and 136 students were tested for this same variable using the Nurse Entrance Test. Descriptive data were obtained from the university transcripts of the students. This included the grades and calculated grade point average for prerequisite nursing courses, especially science course

GPA and the overall grade point average prior to acceptance to the nursing program. Reading comprehension levels were correlated with these measures to evaluate the significance between reading comprehension and academic success.

The overall findings of this study indicated that there was a weak, positive correlation between of reading comprehension measured by the two tests and successful completion of the first semester nursing students. The correlation results were slightly higher for those tested with the Nelson-Denny Reading Test over those tested by the Nurse Entrance Test. This supported the relationship of reading comprehension, prerequisite science GPA, and cumulative pre-nursing GPA to academic successful completion of the first semester of the nursing program at the University of the Incarnate Word to be at a level above chance. Further analysis of the data using a regression model showed that the results of the N-DRT were a higher correlation than the results of the NET. This analysis is an important factor in determining which reading comprehension test to use in a planned intervention to promote retention of future students entering the nursing program. This predictive validity model accounts for 28% of the variance in the respective outcome measures of the population studied.

### **Research Questions**

#### *Research Question 1*

The question asked: Is there a relationship between reading comprehension as measured by the Nelson-Denny Reading Test or the Nurse Entrance Test and the academic success for nursing students in the first semester of a Bachelor of Science in Nursing program in Texas? The initial analysis revealed that the Nelson-Denny

assessment of reading comprehension is slightly superior to the Nurse Entrance Test in describing the academic predicting success of students in the first semester nursing courses. However, the magnitude of the  $r^2$  is low with the reading comprehension testing using both the N-DRT and the NET. Measurement of reading comprehension on admission to the nursing program of study is not the strongest predictor of initial academic success. However, the value of choosing to test reading comprehension is that there was a weak, positive relationship between reading comprehension and the first semester GPA. This finding is consistent with the conclusions of Abdur-Rahman, Femea, and Gaines (1994) and Byrd, Garza, and Nieswiadomy (1999) regarding the relationship of reading comprehension to success in nursing courses. Early identification of risk factors for academic jeopardy followed by access to an appropriate remediation program would enhance the opportunity for successful completion of the nursing program of study (Jenks, Sellekam, Bross & Paquet, 1989; Symes, Tart, & Travis, 2005). Academic assistance programs as reported in the literature, include reinforcement of course content, learning lab and computer access, development of study skills, and assistance with reading for comprehension (Gallagher, 2003; Symes, Tart, & Travis, 2005). For students in the study, the only intervention to remediate or improve reading comprehension was a two-hour class during orientation on recommended reading and studying skills.

To evaluate reading comprehension, a decision must be made by the faculty and administration of the nursing program regarding the choice of test to adopt. A decision of which test would be used to measure reading comprehension during orientation to the

nursing program would need to consider not only the predictability of the test but also the difference in cost for administration of the two tests. The N-DRT is site-licensed to the university and can be administered and scored by the university Learning Assistance and Testing Center at no additional fee to the students. To use the NET, a fee must be paid for each student to be tested and to obtain the results. The value of choosing the N-DRT would be that the relationship to prediction of successful completion of the first semester was slightly better and the cost to implement is less than that of the NET.

### *Research Question 2*

The question asked: Is there a relationship between reading comprehension as measured by the Nelson-Denny Reading Test or the Nurse Entrance Test with the grade point average (GPA) for prerequisite science courses as a predictor of academic success for nursing students in the first semester of a Bachelor of Science in Nursing program in Texas? The Pearson correlation of reading comprehension scores for the entire group with the GPA scores of prerequisite science courses with the first semester nursing course GPA scores was significant at the .22 level. The students who had higher reading comprehension scores were academically successful with both the prerequisite science courses and with the first semester nursing courses. For students tested for reading comprehension by the NET, there was a slightly higher correlation of reading comprehension to prerequisite science GPA than those tested by the N-DRT. The number of students in the NET tested groups was three times larger than that for the N-DRT. Also, the mean GPA for the students tested by the NET was 3.40, whereas the mean GPA for the students tested by the N-DRT was 3.17. This is consistent with the

literature reports of the relationship of reading comprehension abilities and successful prediction of academic success with nursing courses (Fowles, 1992).

For students tested for reading comprehension by the N-DRT, 8 students failed the first semester. Reading comprehension scores of 3 students were in the bottom 25% level, 4 were in the lower middle 50% level, and 1 scored in the top reading comprehension level. For this student, academic failure was the result of personal rather than academic circumstance. The mean prerequisite science GPA for these students was lower than the mean prerequisite science GPA for all 41 students who failed the first semester.

For students tested for reading comprehension by the NET, 23 students or 16.9% of the students, failed the first semester. Reading comprehension scores of three students were at the independent reading level, 19 students were at the instructional reading level, and only 1 student was at the frustration level. The mean science GPA for these 23 students was higher than the mean for all 41 students who failed. The reading component of the NET evaluates reading at the inferential level for science-related materials and reports the reading aptitude to be at the frustration, instructional, or independent levels. Students who scored at the independent and instructional levels were able to read the assigned texts and understand the material once presented the information in class lectures and practiced under supervision in the practicum of the nursing courses. This is consistent with the research reports of the significance of use of the NET to evaluate potential for academic success in a nursing education program (Frost, 1991; Symes, Tart, & Travis, 2005). The expected academic outcome for the graduates of the nursing



curriculum is that they would be able to recognize and assess case scenarios, identify and prioritize needs, establish goals, implement appropriate actions, and evaluate the intervention outcomes.

A review of academic admission criteria for nursing programs found that a common requirement is a minimum grade of “C” in prerequisite science courses. A review of the literature found research reports that students who earned “C” in science and in nursing courses were not successful ultimately at program completion on the NCLEX-RN (Beeson, 2001; Forsythe, 1997; Smith, 1990). No studies of program attrition could be found related to early program semesters and “C” grades in science course. However, the cognitive variables required for academic success with the science courses have been found to be the most reliable predictors of academic success in the nursing curriculum (Alexander & Brophy, 1997; Barkley, Rhodes & Dufour, 1998; Gallagher, 2003).

### *Research Question 3*

The question asked: Is there a relationship between reading comprehension skills as measured by the Nelson-Denny Reading Test or the Nurse Entrance Test with the cumulative GPA for students prior to acceptance to the nursing program in a Bachelor of Science in Nursing program in Texas? The Pearson correlation of reading comprehension for the entire sample with the GPA for pre-nursing courses was at the .24 level, indicating a strong and positive correlation between variables. The Pearson correlation of reading comprehension as measured by the Nelson-Denny Reading Test was at the .13 level, indicating a weak, positive correlation with the reading

comprehension level of the students and the GPA of pre-nursing courses. With the NET, the Pearson correlation of reading comprehension was at the .16 level, also indicating a weak, positive correlation with the GPA for pre-nursing courses.

From the analysis of the correlations, the cumulative GPA, representing completion of science and general education courses, is the strongest predictor of academic success in the first semester of the nursing program at the university. This finding is consistent with findings from the literature on predictors of success in nursing programs (Sayles, Shelton, & Powell, 2003). The overall GPA for pre-nursing courses has been shown to be one of the strongest predictors of success for baccalaureate nursing students (Alexander & Brophy, 1997; Barkley, Rhodes & Dufour, 1998; Gallagher, 2003). Common to these studies is the finding that future success in academics is best determined by past success in comparable areas.

### **Implications and Recommendations**

The findings of this study show that there is a relationship between reading comprehension abilities and the grade point averages for prerequisite science courses, the cumulative pre-nursing courses and the first semester nursing courses. The curriculum for this nursing program includes courses in technical skills and the specific knowledge integral to nursing practice. The admission criteria for a minimum cumulative GPA of 2.5 on a 4.0 scale is based on research showing the predictive relationship to successful completion of the nursing program and the NCLEX-RN (Lewis & Lewis, 2000; Potolsky, Cohen, & Saylor 2003; Yin & Burger, 2003). All students admitted to this nursing program have met these admission requirements, but

not all students progress to successful completion of the nursing program. Other variables identified that may be predictive at admission of potential for academic success include high school GPA, student characteristics such as freshman admission, college transfer and previous degree, and non-academic factors such as English as a second language, social and family factors, stress, and anxiety (Arathuzik & Aber, 1998; Yin & Burger, 2003).

Data for reading comprehension ability were studied and found to have a relationship to the first semester GPA and ultimately persistence to graduation for the student population at this university. Measurement of this skill should be included in the admission process to identify students in need of referral to an academic support program as they enter this nursing program. Symes, Tart, and Travis (2005) reported that for a particular baccalaureate nursing program, students who are identified to have low reading comprehension scores at admission are referred to the Nursing Success Program to remediate the identified deficits that are predicted to interfere with academic success. This has resulted in student persistence and graduation at rates similar to students with higher comprehension levels. The Nursing Entrance Test (NET), the Mosby Assess Test, and the Entrance Examination for Schools for Nursing (RNEE) are commonly used standardized tests with predictive validity. All three tests include assessment of reading comprehension ability. The California Board of Registered Nursing (2000) reported that reading abilities at the 12<sup>th</sup> grade level as measured by the Nelson-Denny Reading Test were required for admission to two nursing programs.

The implications for the nursing program administration and faculty are for decisions regarding the application of this finding to the policies for selection of and academic support for students admitted to the nursing program at this university.

Decision possibilities include:

1. The *status quo* can be maintained by continuing to use the criteria as it is currently. This would result in a continued admission of students without regard or consideration for reading comprehension ability as they enter the nursing program at this university.
2. A reading comprehension assessment could be included in the admission criteria for all students to identify students at risk for academic difficulties. This assessment could be prior to admission using a standardized test such as the N-DRT or a standardized test for assessment of nursing students such as the NET, Mosby Assess Test, the Entrance Examination for Schools of Nursing (RNEE), or the Health Education Systems Admission Exam (HESI). Admission criteria would include values for reading comprehension scores that must be achieved to be eligible for admission.
3. Reading comprehension could be assessed using the above-mentioned test post-acceptance to the nursing program. The assessment could be used to identify potentially at-risk students and facilitate early intervention.
4. Assessment of reading comprehension could be done for students when they become academically challenged. This would facilitate rescue remediation, rather than prevention, of academic failure for students who met the

admission criteria. This is the current practice and often does not always result in a positive outcome for the students or the nursing program.

5. A student success program to meet the needs unique to nursing students could be developed to complement the university academic assistance program for students. This could be modeled after programs currently used in nursing education programs that have experienced high attrition rates. This program, based on academic difficulties that stem from reading deficiencies, could include the use of computer assisted reading comprehension programs, study skill classes, test-taking workshops, and faculty and peer-tutoring sessions. Such a program would enhance the persistence of high-risk students.
6. Enhancement of the current program for pre-nursing majors could include specific reading comprehension skills. Admission practices for some nursing programs include assessments, while students are completing prerequisites for enrollment in the nursing programs. Often cited as being significant has been a higher grade point average throughout the course of studies. Fewer grades of C or lower have been predictive of successful persistence in the nursing program and ultimately success with the NCLEX-RN (Yin & Burger, 2003). Again, early identification and remediation of risk factors for academic challenges can result in an applicant pool with improved potential for successful completion of the nursing program and entry into professional practice.

Recommendations for future research include:

1. This study should be replicated with additional students at this university or a similar university to get a larger and more equal sample of students tested for just reading comprehension or with the assessment tests that evaluate reading comprehension in conjunction with other factors identified to be predictors of success in nursing programs. The increased sample size would be needed to generalize the correlation results to a larger population.
2. The homogeneity of the students and the narrow range of GPAs in first semester nursing courses, prerequisite science and pre-nursing courses in this study are secondary to the small number in the study population. Therefore, repeat of the study with a larger sample would broaden the range of these variables.
3. With future replication of the study using the N-DRT, compression of the time for testing reading comprehension could be compressed from 20 minutes to 15 minutes to increase the variability of the comprehension test scores. This can possibly provide a more sensitive measure of reading skill that would further discriminate not only between “good” and “poor” comprehenders but possibly between low and high overall verbal ability (Kintsch, 1998). This decrease in time allotment would result in extra pressure on those processed underlying skill in comprehension, such as decoding, working memory, and coordination of knowledge.

4. Design of a future study of reading comprehension and academic success with initial nursing courses could include assessment of the influence of cultural factors, peer interaction, and self-motivation. These factors have been studied in relationship to overall success with nursing program completion and with success on the NCLEX-RN.
5. For this university, students are screened for reading ability on admission and prior to enrollment in English courses. For students who have declared a nursing major and who have completed the English course requirements, a repeat evaluation of reading ability while the students are completing prerequisite science courses could identify needs for remediation in reading for understanding and application, note-taking, and test-taking skills. This could result in a pool of more capable applicants to the nursing program. The student skill enhancement program to prepare students for the nursing curriculum could be offered as a content intense course during summer session or as a semester intersession course for nursing majors at this university or in collaboration with other nursing programs in the community.
6. A similar study could be designed to include both quantitative and qualitative assessments of the students. Repeat of the methodology would be used for the quantitative data. Students who tested at different levels of reading comprehension and who are identified as being at risk for academic difficulties could be interviewed about their learning practices, about factors

that they consider to be contributory or hindering to their academic success, and about their performance efforts during the test of reading comprehension.

### **Summary**

In the current era of the nursing shortage that is predicted to continue on at least for the next 20 years, it is imperative to not only recruit but also to select students who have the potential to successfully complete the nursing education program prepared for success with the licensing examination and a productive professional career. The early identification of students at risk academically allows for involvement in programs designed to strengthen the academic deficits that will lead to improved quality of foundational knowledge development as the student progresses through the required course of study. The relationship of reading comprehension to admission criteria of the GPA for prerequisite science courses and the cumulative GPA prior to admission to the nursing program with the successful completion of the first semester nursing courses is important to this university. The mission of the university and the School of Nursing and Health Professions is to provide excellent, student-centered health professions education to promote leadership development in graduates prepared for entry-level professional practice with a philosophy that values the dignity of the individual and serves as a guide for making ethical-moral decisions. Celebrating 75 years of educating nurses, it is important to select students with the potential to succeed. The accuracy of the admission criteria is important to promote proper selection of students and to avoid denial of entry to qualified applicants or to admit potentially unqualified students.



## REFERENCES

- Abdur-Rahman, V., Femea, P., & Gaines, C. (1994). The nurse entrance test (NET): An early predictor of academic success. *Association of Black Nursing Faculty, 5*(1), 10-14.
- Adams, B. (1999). Nursing education for critical thinking: An integrative review. *Journal of Nursing Education, 38*(3), 111-119.
- Adebayo, A. (1993). Predicting the academic success of re-entry college students from placement test scores: A multiple regression analysis. *College Quarterly, 1*(2), 369-379.
- Albach, P. (1991). The unchanging variable: Textbooks in comparative perspective. In P. Albach, G. Kelly, H. Petrie, & L. Weis (Eds.), *Textbooks in American society* (pp. 237-254) Albany, NY: SUNY Press.
- Alexander, J., & Brophy, G. (1997). A five-year study of graduates' performance on NCLEX-RN. *Journal of Nursing Education, 36*, 443-445.
- Alexander, P., & Jetton, T. (2000). Learning from text: A multidimensional and developmental perspective. In M. Kamil, P. Mosenthal, P. Pearson, & R. Barr (Eds.), *Handbook of reading research* (Vol. 3, pp. 285-310). Mahwah, NJ: Erlbaum.
- Alfaro-LeFevre, R. (2003). *Critical thinking and clinical judgment: A practical approach*. Philadelphia: Saunders.

- Ambruster, B. (1983). The role of metacognition in reading to learn: A developmental perspective. *Reading Education Report No. 40*. Urbana, IL: Center for the Study of Reading.
- American Association of Colleges of Nursing [AACN]. (2005). *Commission on collegiate nursing education*. Retrieved September 26, 2005, from <http://www.aacn.nche.edu>
- Applegate, M., Quinn, K., & Applegate, A. (1994). Using metacognitive strategies to enhance achievement of at-risk liberal arts college students. *Journal of Reading*, 38(1), 32-39.
- Arathuzik, D., & Aber, C. (1998). Factors associated with National Council Licensure Examination-registered nurse success. *Journal of Professional Nursing*, 14, 119-126.
- Archer, J., & Schevak, J. (1998). Enhancing students' motivation to learn: Achievement goals in university. *Educational Psychology*, 18(2), 205-223.
- Astin, A. (1977). *Four critical years*. San Francisco: Jossey-Bass.
- Astin, A. (1985). *Achieving academic excellence*. San Francisco: Jossey-Bass.
- Baker, L. (1982). An evaluation of the role of metacognition deficits in learning disabilities. *Topics in Learning and Learning Disabilities*, 12, 27-33.
- Baker, L., & Brown, A. (1984). Metacognitive skills and reading. In P. Pearson, (Ed.), *Handbook of reading research* (pp. 353-394). New York: Longman.
- Barkley, T., Rhodes, R., & Dufour, C. (1998). Predictors of success on the NCLEX-RN. *Nursing & Health Perspectives*, 19(3), 132-137.

- Bean, J., & Metzner, B. (1985). A conceptual model of nontraditional student attrition. *Review of Educational Research, 55*, 485-540.
- Beeson, S. (1996). The effect of writing after reading on college nursing students' factual knowledge and synthesis of knowledge. *Journal of Nursing Education, 35*(6), 258-263.
- Beeson, S. (2001). Assign it and they will read! Or will they? Reading activities of nursing students. *Nurse Educator, 25*(6), 273-281.
- Beeson, S., & Kissling, G. (2001). Predicting success for baccalaureate graduates on the NCLEX-RN. *Journal of Professional Nursing, 17*(3), 121-127.
- Boylan, H. (1999). Demographics, outcomes, and activities. *Journal of Developmental Education, 23*(2), 2-6.
- Braxton, J., & Hirschy, A. (2005). Theoretical developments in the study of college student departure. In A. Seidman (Ed.), *College student retention: Formula for student success* (237-246). Westport, CT: Praeger Press.
- Breneman, D. (1998). Remediation in higher education: Its extent and cost. In D. Ravitch (Ed.), *Brookings paper on education policy 1998* (pp. 359-383). Washington, DC: Brookings Institution Press.
- Britton, B.K., Glynn, S.M., & Smith, J.W. (1985). Cognitive demands of processing expository text: A cognitive workbench model. In B.K. Britton & J.B. Black (Eds.), *Understanding expository text* (pp. 227-247). Hillsdale, NJ: Erlbaum.

- Brown, A. (1978). Knowing when, where, and how to remember: A problem of metacognition. In R. Glaser (Ed.), *Advances in instructional psychology* (Vol. 1, pp. 77-165). Hillsdale, NJ: Erlbaum.
- Brown, A. (1982). Learning how to learn from reading. In J. Langer & M. Smith-Burks (Eds.), *Reader meets author: Bridging the gap* (pp. 26-54). Newark, NJ: International Reading Association.
- Brown, A., Campione, J., & Day, J. (1981). Learning to learn: On training students to learn from texts. *Educational Researcher*, 10, 14-21.
- Brown A., & Smiley, S. (1978). The development of strategies for studying texts. *Child Development*, 48, 1-8.
- Brown, B. (2001). *The multigenerational workforce: Mixing it up at the coffee station*. Glen Allen, VA: Virginia Hospital and Healthcare Association.
- Brown, J., Bennett, J., & Hanna, G. (1981). *The Nelson-Denny reading test examiner's manual, Forms E and F*. Chicago: Riverside.
- Brown, J., Fisco, V., & Hanna, G. (1993a). *Nelson-Denny reading test: Manual for scoring and interpretation*. Chicago: Riverside.
- Brown, J., Fisco, V., & Hanna, G. (1993b). *Nelson-Denny reading test: Technical report*. Chicago: Riverside.
- Buerhaus, P. (1998). Is another RN shortage looming? *Nursing Outlook*, 46(3), 103-107.
- Buerhaus, P. (2006, September 14). *The nursing shortage: Where do we stand now?* Speech delivered to the 6<sup>th</sup> TNA Annual Leadership Forum, Austin, TX.

- Buerhaus, P., Staiger, D., & Auerbach, D. (2003). Is the current shortage of hospital nurses ending? *Health Affairs*, 22(6), 191-198.
- Burns, N., & Grove, S. (2003). *Understanding nursing research*. Philadelphia: Saunders.
- Byrd, E., Carter, E., & Waddoups, S. (2001). *Taking control of your college reading and learning*. Fort Worth, TX: Harcourt.
- Byrd, G., Garza, P., & Nieswiadomy, R. (1999). Predictors of successful completion of a baccalaureate nursing program. *Nurse Educator*, 24(6), 33-37.
- California Board of Registered Nursing. (2000). *NCLEX-RN task force report: The problem and the plan*. Retrieved June 6, 2006, from [http://www.rn.ca.gov/forms/pdf task force 00.pdf](http://www.rn.ca.gov/forms/pdf%20task%20force%2000.pdf)
- Campbell, A., & Dickson, C. (1996). Predicting student success: A 10-year review using integrative review and meta-analysis. *Journal of Professional Nursing*, 12(1), 47-59.
- Caverly, D., Orlando, V., & Mullen, J. (2000). Textbook study reading. In R. Flippo & D. Caverly (Eds.), *Handbook of college reading and study strategy research* (pp. 105-148). Mahwah, NJ: Erlbaum.
- Chase, N., Gibson, U., & Carson, J. (1994). An examination of demands across four college courses. *Journal of Developmental Education*, 18(4), 10-16.
- Chen, F., & Lin, M. (2003). Effects of a nursing literature reading course on promoting critical thinking in two-year nursing program students. *Journal of Nursing Research*, 11(2), 137-146.

- Cheung, C., & Kwok, S. (1998). Activities and academic achievement among college students. *Journal of Genetic Psychology, 159*, 147-162.
- Childs, G., Jones, R., Nugent, K., & Cook, P. (2004). Retention of African-American students in baccalaureate nursing programs: Are we doing enough? *Journal of Professional Nursing, 20*(2), 129-133.
- Churchill, J., Reno, B., & Batchelor, N. (1998). The learning communities concept: Increasing student involvement. *Nurse Educator, 23*(6), 7-8.
- Crane, L., Poziemski, C., & Gustafson, J. (1998). *Assessing motivational aspects of reading in developmental reading courses*. Paper presented at the annual meeting of the Illinois Association for Institutional Research, Findlay. (ERIC Documentation Reproduction Service No. ED424890)
- Cranton, C. (1994). *Understanding and promoting transformative learning*. San Francisco: Jossey-Bass.
- Cunningham, H., Stacciarinni, J., & Towle, S. (2004). Strategies to promote success on the NCLEX-RN for students with English as second language. *Nurse Educator, 29*(1), 15-19.
- Darkenwald, G., & Merriam, S. (1982). *Adult education: Foundations of practice*. New York: Harper & Row.
- Dearman, C., & Davis, D. (1990). Reading abilities of master's students versus readability of textbooks, *Journal of Nursing Education, 29*(9), 406-411.
- de Groot, A. (1965). *Thought and choice in chess*. The Hague: Mouton.

- den Heyer, K. (1981). Reading and motivation. In J. Edwards (Ed.), *The social psychology of reading: An interdisciplinary monograph series for language professionals* (Vol. 1, pp. 51-60). Silver Springs, MD: Institute of Modern Languages.
- DiVesta, F., & Moreno, V. (1993). Cognitive control functions of study activities: A compensation model. *Contemporary Educational Psychology, 18*, 47-65.
- Dole, J., Duffy, G., Roehler, L., & Pearson, P. (1991). Moving from the old to the new: Research on reading comprehension instruction. *Review of Educational Research, 61*(2), 239-264.
- Domjan, M., & Burkhard, J. (1993). *The principles of learning and behavior*. Monterey, CA: Brooks & Cole.
- Dowell, M. (1996). Issues in recruitment and retention of minority nursing students. *Journal of Nursing Education, 35*, 293-297.
- Duignan, W. (1992). Student reading level and college success. *Reading and Teaching in Developmental Education, 8*(2), 95-103.
- Fearing, A. (1995). Predictors of academic performance for minority baccalaureate nursing students. (Doctoral dissertation, Illinois State University, 1995). *Dissertation Abstracts International, 56-10, Section B*.
- Ferstl, E., & Kintsch, W. (1998). Learning from text: Structural knowledge assessment in the study of discourse comprehension. In S. Goldman & H. Van Oostendorp (Eds.), *The construction of mental representations during reading* (pp. 247-277). Mahwah, NJ: Erlbaum.

- Flavell, J.H. (1979). Metacognition and cognitive monitoring. A new area of cognitive-development inquiry. *American Educational Research Journal*, 22, 199-216.
- Flippo, R., & Caverly, D. (Ed.). (2000). *Handbook of college reading and study strategy research*. Mahwah, NJ: Erlbaum.
- Fopma-Loy, J., & Ulrich, D. (1999). Seventeen ways to transform reading assignments into critical thinking experiences. *Nurse Educator*, 24(5), 11-13.
- Forsythe, S. (1997). *Identification of predictors of success for the NCLEX-RN and development of an early assistance intervention for at-risk transfer students*. (Doctoral dissertation, Nova Southeastern University, 1997). *Dissertation Abstracts International*, 58, 1799.
- Fowles, E. (1992). Predictors of success on NCLEX-RN and within the nursing curriculum: Implications for early intervention. *Journal of Nursing Education*, 31(2), 53-57.
- Frost, M. (Ed.). (1991). *The NET: Form A, diagnostic report*. Shawnee Mission, KS: Educational Resources.
- Frost, M. (Ed.). (2003). *The NET: Technical & developmental report*. Shawnee Mission, KS: Educational Resources.
- Gall, M.D., Borg, W.R., & Gall, J.P. (1996). *Educational research: An introduction* (2<sup>nd</sup> ed.). White Plains, NY: Longman.
- Gallagher, P. (2003). *Using a study-reading intervention to improve success in a community college nursing program*. Unpublished doctoral dissertation, Northern Illinois University, DeKalb.



- Gallagher, P., Bomba, C., & Crane, L. (2001). Using an admissions exam to predict student success in an ADN program. *Nurse Educator*, 27(3), 132-135.
- Garner, R., Wagoner, S., & Smith, T. (1983). Externalizing question-answering strategies of good and poor comprehenders. *Reading Research Quarterly*, 18(4), 439-447.
- Gebelt, J., Parilis, G., Kramer, D., & Wilson, P. (1996). Retention at a large university: Combining skills with course content. *Journal of Developmental Education*, 20(1), 2-10.
- Glick, O., McClelland, E., & Yang, J. (1986). NCLEX-RN: Predicting the performance of graduates of an integrated baccalaureate nursing program. *Journal of Professional Nursing*, 2(2), 98-103.
- Goodwin, L. (1996). *Aliteracy among college students: Why don't they read?* Paper presented at the annual meeting of the College Reading Association, Charleston, SC. (ERIC Documentation Reproduction Service No. ED410527)
- Halaska, M. (1992). *An analysis of prepractice and practice reading demands on associate degreed registered nurses*. Unpublished doctoral dissertation, University of Wisconsin, Milwaukee.
- Hendrickson, L., & O'Connor, B. (Eds.). (1996). *Celebrating the word: The college becomes the University of the Incarnate Word*. San Antonio, TX: The University of the Incarnate Word Press.
- Hergenhahn, B. (1988). *An introduction to theories of learning* (3<sup>rd</sup> ed.) Englewood Cliffs, NJ: Prentice Hall.

- Heydamn, A. (1991). Retention/attrition of nursing students: Emphasis on disadvantaged and minority students. In P. Baj, & G. Clayton (Eds.), *Review of research in nursing education* (Vol. 4, pp. 74-85). New York: National League for Nursing.
- Higgs, Z. (1984). Predicting success in nursing: From prototype to pragmatics. *Journal of Nursing Research*, 6, 77-93.
- Hodge, E., Palmer, B., & Scott, D. (1992). Metacognitive training in cooperative groups on reading comprehension and vocabulary of at-risk college students. *College Student Journal*, 26(4), 440-448.
- Hoyt, J. (1999). Remedial education and student attrition. *Community College Review*, 27(2), 51-72.
- Jaasma, M., & Koper, R. (1999). The relationship of student-faculty out-of-class communication to instructor immediacy and trust and to student motivation. *Communication Education*, 48(1), 41-47.
- Jarvis, P. (1995). *Adult learning in the social context*. New York: Routledge.
- Jenks, J., Sellekam, J., Bross, T., & Paquet, M. (1989). Success in NCLEX-RN: Identifying predictors and optimal timing for intervention. *Journal of Nursing Education*, 28(3), 112-117.
- Johnson, A., & Kreuzer, P. (2001). *Improving retention through a comprehensive student development model*. Seattle, WA: American Educational Research Association. (ERIC Document Reproduction Service No. ED452783)
- Katz, J., Carter, C., Bishop, J., & Kravits, S. (2001). *Keys to nursing success*. Upper Saddle River, NJ: Prentice Hall.

- Keating, S. (2005). *Curriculum development & evaluation in nursing*. Philadelphia: Lippincott, Williams, & Wilkens.
- Kintsch, W. (1998). *Comprehension: A paradigm for cognition*. Cambridge: Cambridge University Press.
- Knowles, M. (1970). *The modern practice of adult education: Andragogy versus pedagogy*. New York: Association Press.
- Knowles, M. (1980). *The modern practice of adult education: From pedagogy to andragogy*. New York: Association Press.
- Knowles, M. (1990). *The adult-learner: A neglected species* (4<sup>th</sup> ed.). Houston, TX: Gulf.
- Knowles, M. (1994). *A history of the adult education movement in the United States: Includes adult education institutions through 1976*. Malabar, FL: Krieger.
- Knowles, M. (2005). *The adult learner: The definitive classic in adult education and human resource development*. Boston: Elsevier.
- Kuhn, D. (2000). Metacognitive development. *Current Directions in Psychological Science*, 9(5), 178-181.
- Kuhn, D., & Pearsall, S. (1998). Relations between metastrategic knowledge and strategic performance. *Cognitive Development*, 13, 227-247.
- Levin, H. (1990). At-risk students in a yuppie age. *Educational Policy*, 4, 283-295.
- Levine, A., & Cureton, J. (1998). *When hope and fears collide: A portrait of today's college student*. San Francisco: Jossey-Bass.

- Lewis, C., & Lewis, J. (2000). Predicting academic success of transfer nursing students. *Journal of Nursing Education, 39*, 234-236.
- Lindeman, C., & McAthie, M. (1999). *Fundamentals of contemporary nursing practice*. Philadelphia: Saunders.
- Loving, G., & Wilson, J. (2000). Infusing critical thinking into the nursing curriculum through faculty development. *Nursing Educator, 25*(2), 70-75.
- Maury-Hess, S., Crancer, J., & Brester, M. (1979). Textbook selection for associate degree nursing programs (an evaluative study). *Journal of Nursing Education, 18*, 11-16.
- Maxwell, M. (1997). *Improving student learning skills*. Clearwater, FL: H & H.
- May, B., Edell, V., Butell, S., Doughty, J., & Langford, C. (1999). Critical thinking and clinical competence: A study of their relationship in BSN seniors. *Journal of Nursing Education, 38*, 100-110.
- Mayer, R. (1996). Learning strategies for making sense out of expository text: The SOI model for guiding three cognitive processes in knowledge construction. *Educational Psychology Review, 8*(4), 357-371.
- McCaffrey, C. (1991). Factors influencing adult student persistence in an external degree program. *Dissertations Abstracts International, 52*, 1986. (UMI No. AAC 9134760, 279)
- McCusker, M. (1999). Effective elements of developmental reading and writing programs. *Community College Review, 27*(2), 93-106.

- McNamara, D., & Kintsch, W. (1996). Learning from texts: Effects of prior knowledge and text coherence. *Discourse Processes*, 22, 247-288.
- McWhorter, K. (1990). *Academic reading*. Glenview, IL: Scott, Foresman, and Company.
- Melcher, P. (1991). *The great conversion: A historical introduction to philosophy*. Mountain View, CA: Mayfield.
- Melcom, N., Venn, R., & Barker-Bausell, R. (1981). The prediction of state board test pool examination scores within an integrated curriculum. *Journal of Nursing Education*, 20(5), 24-28.
- Merriam, S., & Caffarella, R. (1999). *Learning in adulthood: A comprehensive guide* (2<sup>nd</sup> ed.). San Francisco: Jossey-Bass.
- Merriam, S., & Cunningham, P. (Eds.). (1989). *Handbook of adult and continuing education*. San Francisco: Jossey-Bass.
- Meyer, J., Cliff, A., & Dunne, T. (1994). Impressions of disadvantage: Monitoring and assisting the student-at-risk. *Higher Education*, 27, 95-117.
- Mezirow, J. (1996). Toward a leaning theory of adult literacy. *Adult Basic Education*, 6(3), 115-127.
- Milem, J., & Berger, J. (1997). A modified model of college student persistence: Exploring the relationship between Astin's theory of involvement and Tinto's theory of student departure. *Journal of College Student Development*, 38, 387-397.

- Mills, A., Sampel, M., Pohlman, V., & Becker, A. (1992). The odds for success on NCLEX-RN by nurse candidates from a four-year baccalaureate nursing program. *Journal of Nursing Education, 31*(9), 403-408.
- Mutter, P. (1992). Tinto's theory of departure and community college student persistence. *Journal of College Student Development, 33*(4), 310-317.
- National Center for Education Statistics [NCES]. (2001). *The condition of education 2000*. Retrieved August 1, 2006, from <http://nces.ed.gov>
- National Center for Education Statistics [NCES]. (2005). *Digest of Education Statistics Tables & Figures 2005*. Retrieved May 18, 2006, from [http://nces.ed.gov/programs/digest/d05/tables0dt05\\_129.asp](http://nces.ed.gov/programs/digest/d05/tables0dt05_129.asp)
- National Commission on Excellence in Education. (1984). *A nation at risk: The imperative for educational reform*. Washington, DC: U.S. Department of Education.
- National League for Nursing [NLN]. (2005). Retrieved September 5, 2005, from <http://www.nln.org/>
- National League for Nursing Accrediting Commission. (2001). *Accreditation manual and interpretive guidelines by program type for postsecondary and higher degree programs in nursing*. New York: Author.
- Nelson, T. (1999). Cognition versus metacognition. In R. Sternberg (Ed.), *The nature of cognition* (pp. 625-641). Cambridge, MA: MIT Press.

- Nevidjohn, B., & Erickson, J. (2001). The nursing shortage: Solutions for the short and long term. *Online Journal of Issues in Nursing*, 6(1). Retrieved July 28, 2006, from [http://www.nursingworld.org/ojin/tpc14\\_4.htm](http://www.nursingworld.org/ojin/tpc14_4.htm)
- Nist, S., & Diehl, W. (1998). *Developing textbook thinking* (4<sup>th</sup> ed.). Boston: Houghton Mifflin.
- Nist, S., & Holschuh, J. (2000). Comprehension strategies at the college level. In R. Flippo & D. Caverly (Eds.), *Handbook of college reading and study strategy research* (pp. 403-474). Mahwah, NJ: Erlbaum.
- Nist, S., & Simpson, M. (2000). College studying. In M. Kamil, P. Mosenthal, P. Pearson, & R. Barr (Eds.), *Handbook of reading research* (Vol. 3, pp. 645-666). Mahwah, NJ: Erlbaum.
- Nursing Practice Act and Nursing Peer Review Act, § 301.002 (2) (2003). Retrieved January 23, 2006, from <http://www.bne.state.tx.us>
- Paris, S., Wasik, B., & Turner, J. (1991). The development of strategic readers. In R. Barr, M. Kamil, P. Mosenthal, & P. Pearson (Eds.), *Handbook of reading research* (Vol. 2, pp. 609-640). White Plains, NY: Longman.
- Parks, B., & Kirkpatrick, S. (1996). Academic support program for high-risk students. *Journal of Nursing Education*, 35, 331-333.
- Perez, T. (1977). Investigation of academic moderator variables to predict success on state board examinations in a baccalaureate nursing program. *Journal of Nursing Education*, 16(8), 16-23.

- Peter, C. (1996). *Evaluation of a learning assistance program for at-risk students in nursing education*. Unpublished doctoral dissertation, University of Southern California, Los Angeles.
- Peters, M. (2000). Does constructivist epistemology have a place in nursing education? *Journal of Nursing Education, 39*(4), 166-171.
- Peverly, S., Brobst, K., & Morris, K. (2002). The contribution of reading comprehension ability and meta-cognitive control to the development of studying in adolescence. *Journal of Research in Reading, 25*(2), 203-216.
- Pintrich, P. (1989). The dynamic interplay of student motivation and cognition in the college classroom. In M. Maehr & C. Ames (Eds.), *Advances in motivation and achievement: Motivation enhancing environments* (pp. 117-160). Greenwich: JAI Press.
- Pintrich, P. (2002). The role of metacognitive knowledge in learning, teaching, and assessing. *Theory Into Practice, 41*(4), 219-225.
- Pintrich, P., & Garcia, T. (1992). *An integrated model of motivation and self-regulated learning*. Paper presented at the annual meeting of the American Educational Research Association, San Francisco.
- Pintrich, P., Wolters, C., & Baxter, G. (2000). Assessing metacognition and self-regulated learning. In G. Schraw & J. Imapra (Eds.), *Issues in the measurement of metacognition* (pp. 43-97). Lincoln, NE: Buros Institute of Mental Measurements.



- Poissant, H. (1994). *Assessing and understanding the cognitive and metacognitive perspectives of adults who are poor readers*. Urbana, IL: Center for the Study of Reading.
- Potolsky, A., Cohen, J., & Saylor, C. (2003). Academic performance of nursing students: Do prerequisite grades and tutoring make a difference? *Nursing Education Perspectives, 24*(5), 246-250.
- Pugh, S., Pawan, F., & Antommarchi, C. (2000). Academic literacy and the new college learner. In R. Flippo & D. Caverly (Eds.), *Handbook of collegiate reading and study strategy research* (pp. 25-42). Mahwah, NJ: Erlbaum.
- Pullen, R., Reed, K., & Osler, K. (2001). Promoting clinical scholarship through scholarly writing. *Nurse Educator, 26*(2), 81-83.
- Purcell-Gates, V. (1995). *Other people's words: The cycle of low literacy*. Cambridge, MA: Harvard University Press.
- Quill, E. (1993). *The relationship between the nurse entrance test and success in an associate degree nursing program*. Unpublished doctoral dissertation, Northern Arizona University, Flagstaff.
- Recht, D., & Leslie, L. (1988). Effect of prior knowledge on good and poor reader's memory of text. *Journal of Educational Psychology, 80*(1), 16-20.
- Reineck, C., Furino, A., Lucke, J., Martinez, J., & Wood, R. (2005). Health and nurses in Texas. In their own words: 2004 survey of Texas registered nurses. *The Nurse Workforce Data System, 2*(3), 1-88.
- Roland, H. (1978). *The nurses' almanac*. New York: Aspen Systems.

- Rosenfeld, P. (1988). Measuring student retention: A national analysis. *Nursing & Health Care*, 9(11), 198-202.
- Rumelhart, D. (1985). Toward an interactive model of reading. In H. Singer & R. Ruddell (Eds.), *Theoretical models and processes of reading* (3<sup>rd</sup> ed., pp. 722-750). Newark, NJ: International Reading Association.
- Sahakian, W., & Sahakian, M. (1996). *Ideas of great philosophers*. New York: Harper & Row.
- Sayles, S., Shelton, D., & Powell, H. (2003). Predictors of success in nursing education. *The ABNF Journal*, 23(6), 116-120.
- Schneider, W., & Pressley, M. (1997). *Memory and development from 2 to 20* (2<sup>nd</sup> ed.). Mahwah, NJ: Erlbaum.
- Schraw, G., Horn, C., Thorndike-Christ, T., & Bruning, R. (1995). Academic goal orientations and student classroom achievement. *Contemporary Educational Psychology*, 20, 359-368.
- Schraw, G., & Moshman, D. (1995). Metacognitive theories. *Educational Psychology Review*, 7(4), 351-371.
- Seither, F. (1980). Prediction of achievement in baccalaureate nursing education. *Journal of Nursing Education*, 19(3), 28-36.
- Seldomridge, L., & DiBartolo, M. (2004). Can success and failure be predicted for baccalaureate graduates on the computerized NCLEX-RN? *Journal of Professional Nursing*, 20(6), 361-368.

- Sherrod, R., Harrison, L., Lowery, B., Wood, F., Edwards, R., Gaskins, S. et al. (1992). Freshman baccalaureate nursing students' perceptions of their academic and nonacademic experiences: Implications for retention. *Journal of Professional Nursing*, 8(4), 203-208.
- Sinkavich, F. (1995). Performance and metamemory: Do students know what they don't know? *Journal of Instructional Psychology*, 22(1), 77-87.
- Smith, V. (1990). Nursing student attrition and implications for pre-admission advisement. *Journal of Nursing Education*, 29, 215-218.
- Solomon, R., & Higgins, K. (1996). *A short history of philosophy*. New York: Oxford University Press.
- Spahr, A. (1987). *The relationship between grades earned in introductory nursing courses and several predictor variables: An exploratory study*. Cicero, IL: Morton College.
- Spahr, A. (1995). *Predicting graduation status of nursing students using entering GPA and grades in algebra, biology, and chemistry*. (ERIC Documentation Reproduction Service No. ED386224)
- Spear-Swerling, L., & Sternberg, R. (1994). The road not taken: An integrative theoretical model of reading disability. *Journal of Learning Disabilities*, 27(2), 91-103.
- Symes, L., Tart, K., & Travis, L. (2005). An evaluation of the nursing success program. *Nurse Educator*, 30(5), 217-220.

- Thomas, J., & Rohwer, W. (1986). Academic studying: The role of learning strategies. *Educational Psychologist, 21*, 19-41.
- Thompson, C., & Rebesch, L. (1999). Critical thinking of baccalaureate nursing students at program entry and exit. *Nursing and Health Care Perspectives, 20*, 248-252.
- Thorndike, E. (1917). Reading as reasoning: A study of mistakes in paragraph reading. *Journal of Educational Psychology, 8*(6), 3-23.
- Tinto, V. (1975). Dropouts from higher education: A theoretical synthesis of recent research. *Review of Educational Research, 45*, 89-125.
- Tinto, V. (1993). *Leaving college: Rethinking the causes and cures of student attrition*. Chicago: The University of Chicago Press.
- Tinto, V., & Russo, P. (1994). Coordinated studies programs: Their effect on student involvement at a community college. *Community College Review, 22*(2), 16-25.
- Tinto, V. (2006). Research practices of student retention: What next? *Journal of College Student Retention & Research Theory & Practice, 8*(1), 1-19.
- Tomlinson-Clarke, S. (1994). A longitudinal study of the relationship between academic comfort, occupational orientation and persistence among African American, Hispanic, and White college students. *Journal of College Student Development, 35*(1), 25-27.
- Tuckman, B. (1996). The relative effectiveness of incentive motivation and prescribed learning strategy in improving college students' course performance. *Journal of Experimental Education, 64*(3), 197-210.

- University of the Incarnate Word Bulletin*. (2005-2006). San Antonio, TX: The University of the Incarnate Word Print Shop.
- U.S. Department of Education, National Center for Education Statistics. (2002). *The condition of education: 2002*. Washington, DC: U.S. Government Printing Office.
- U.S. Department of Labor, Bureau of Labor Statistics. (2005). *Monthly labor review, November*. Retrieved December 30, 2005, from <http://www.bls.gov/search/search.asp>
- Vacca, R., & Vacca, J. (2005). *Content area reading: Literacy and learning across the curriculum*. Boston: Pearson, Allyn & Bacon.
- Vadhan, V., & Stander, P. (1993). Metacognitive ability and test performance among college students. *The Journal of Psychology, 128*(3), 307-309.
- Villarruel, A., Canales, M., & Torres, S. (2001). Bridges and barriers for educational mobility of Hispanic nurses. *Journal of Nursing Education, 40*, 245-251.
- Volet, S. (1991). Modeling and coaching of relevant metacognitive strategies for enhancing university students' learning. *Learning and Instruction, 1*, 319-336.
- Whitley, M., & Chadwick, P. (1985). Baccalaureate education and NCLEX: The causes of success. *Journal of Nursing Education, 25*(3), 94-101.
- Williamson, D., & Creamer, D. (1988). Student attrition in 2 and 4 year colleges: Application of a theoretical model. *Journal of College Student Development, 29*(3), 210-217.

- Wittrock, M. (1998). Cognition and subject matter learning. In N. Lambert & B. McCombs (Eds.), *How students learn* (pp. 143-152). Washington, DC: American Psychological Association.
- Woolfolk, A. (1998). *Educational psychology*. Boston: Allyn-Bacon.
- Worrell, P.J. (1990). Metacognition: Implications for instruction in nursing education. *Journal of Nursing Education*, 29(4), 170-175.
- Yang, J., Glick, O., & McClelland, E. (1987). Academic correlates of baccalaureate graduate performance on NCLEX-RN. *Journal of Professional Nursing*, 3, 298-306.
- Yaworski, J. (1998). Why do students succeed or fail? A case study comparison. *Journal of College Reading and Learning*, 29, 57-72.
- Yin, T., & Burger, C. (2003). Predictors of NCLEX-RN success of associate degree nursing graduates. *Nurse Educator*, 28(5), 232-236.
- Yellen, E., & Geoffrion, A. (2001). Associate degree nurse success in NCLEX-RN, predictors and implications. *Nurse Educator*, 26(5), 208-211.
- Yocum, C., & Scherubel, J. (1985). Selected pre-admission and academic correlates of success on state board examinations. *Journal of Nursing Education*, 24(6), 244-249.
- Zemke, R. (2001). Here come the millennials. *Training*, 38(7), 44-49.

**APPENDIX A**  
**IRB PROTOCOL REVIEW FROM TEXAS A&M**



Office of the Vice President for Research  
Texas A&M University

Office of Research Compliance

Administrative  
Institutional Review Boards  
Human Subjects  
Research

Department of Health Services  
Human Subjects

Department of Health Services

Department of Health Services  
Human Subjects

Department of Health Services  
Human Subjects

Department of Health Services  
Human Subjects

Department of Health Services  
Human Subjects

Department of Health Services  
Human Subjects

Department of Health Services  
Human Subjects

Department of Health Services  
Human Subjects

Department of Health Services  
Human Subjects

Department of Health Services  
Human Subjects

Department of Health Services  
Human Subjects

Department of Health Services  
Human Subjects

Department of Health Services  
Human Subjects

Department of Health Services  
Human Subjects

Department of Health Services  
Human Subjects

Department of Health Services  
Human Subjects

Department of Health Services  
Human Subjects

Department of Health Services  
Human Subjects

Department of Health Services  
Human Subjects

Department of Health Services  
Human Subjects

Department of Health Services  
Human Subjects

Department of Health Services  
Human Subjects

Department of Health Services  
Human Subjects

Department of Health Services  
Human Subjects

Department of Health Services  
Human Subjects

Department of Health Services  
Human Subjects

Department of Health Services  
Human Subjects

Department of Health Services  
Human Subjects

Department of Health Services  
Human Subjects

Department of Health Services  
Human Subjects

Department of Health Services  
Human Subjects

November 16, 2005

**MEMORANDUM**

**TO:** Jennifer DM Cook  
EAHR  
MS 4226

**FROM:** Dr. J. Steven Moore, Chair  
Institutional Review Board  
MS 1186

**SUBJECT:** IRB Protocol Review

**Title:** Reading Skill Assessment Method Choice and the Relationship to First Semester Academic Success for Students in a Selected BSN Program in Texas

**Protocol Number:** 2005-0576  
**Review Category:** Expedited Review  
**Approval Date:** November 16, 2005 to November 15, 2006

**The approval determination was based on the following Code of Federal Regulations:**  
45 CFR 46.110(b)(1) - Some or all of the research appearing on the list and found by the reviewer(s) to involve no more than minimal risk.

**Remarks:** Expedited Review Category 5

The Institutional Review Board - Human Subjects in Research, Texas A&M University has reviewed and approved the above referenced protocol. Your study has been approved for one year. As the principal investigator of this study, you assume the following responsibilities:

**Renewal:** Your protocol must be re-approved each year in order to continue the research. You must also complete the proper renewal forms in order to continue the study after the initial approval period.

**Adverse Events:** Any adverse events or reactions must be reported to the IRB immediately.

**Amendments:** Any changes to the protocol, such as procedures, consent/assent forms, addition of subjects, or study design must be reported to and approved by the IRB.

**Informed Consent/Assent:** All subjects should be given a copy of the consent document approved by the IRB for use in your study.

**Completion:** When the study is complete, you must notify the IRB office and complete the required forms.



**APPENDIX B**  
**IRB PROTOCOL REVIEW FROM UNIVERSITY**  
**OF THE INCARNATE WORD**

APPLICATION FOR INSTITUTIONAL REVIEW BOARD APPROVAL FORM  
University of the Incarnate Word

(PLEASE TYPE INFORMATION)

1. Principal Investigator (type name): Jennifer D.M. Cook, MSN, MBA

2. Co-Investigator: None

3. Division/Discipline: School of Nursing and Health Professions

4. Research Category: a.  Exempt b.  Expedited Review c.  Full Board Review

5. Purpose of Study

The purpose of this research is to compare the predictive abilities of the Nelson-Denny Reading Test and the Nurse Entrance Test to the academic success of nursing students of varying ages and ethnicity admitted to the nursing program at the University of the Incarnate Word. The expected value is to identify at-risk students who can be directed to early intervention to improve reading abilities and probability of successful academic performance in the first semester of the nursing program.

6. Number of Subjects: 250 Controls: 0

7. Does this research involve any of the following:

	YES	NO		YES	NO
Inmates of penal institutions	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Fetus in utero	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Institutionalized mentally retarded	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Viable fetus	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Institutionalized mentally disabled	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Nonviable fetus	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Committed patients	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Dead fetus	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Mentally retarded outpatient	<input type="checkbox"/>	<input checked="" type="checkbox"/>	In vitro fertilization	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Mentally disabled outpatient	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Minors (under 18)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Pregnant women	<input type="checkbox"/>	<input checked="" type="checkbox"/> *			

\* The pregnancy status of a female is not a condition of admission to the nursing program.  
For each "Yes", state what precautions you will use to obtain informed consent.

8. Duration of study: November 1, 2005 – May 10, 2006

9. How is information obtained? (Include instruments used) Quantitative analysis of the reading skill test results to the science GPA and GPA for the first semester nursing courses will be done. The student records will be accessed from the archive files of the School of Nursing. An identification number will be assigned to each student to protect confidentiality of information as it relates to the individual student.

10. Confidentiality – (Are identifiers used for subjects?:  Yes  No)

11. Benefit of research: Results will be used to give nursing program administrators improved information when choosing between tests to evaluate reading skill levels of accepted students.

12. Possible risk to subjects: None

\*\*\*IF CHANGE IN RESEARCH OCCURS THE BOARD MUST BE NOTIFIED BEFORE RESEARCH IS CONTINUED\*\*\*

Principal Investigator signature Jennifer D.M. Cook

Date 2 December 2005

IRB Approval signature [Signature]

Date Dec 7, 2005

Application # 05-12-004

**APPENDIX C**  
**PERMISSION LETTER FROM THE VICE PRESIDENT**  
**FOR ACADEMIC AND STUDENT AFFAIRS, UIW**



UNIVERSITY OF THE  
INCARNATE WORD

January 9, 2006

Dr. Bobbye G. Fry  
Registrar  
University of the Incarnate Word  
4301 Broadway  
San Antonio, Texas 78209

Dear Dr. Fry,

Jennifer Cook, nursing faculty at the University of the Incarnate Word and doctoral student at Texas A&M University, has permission to have access to science prerequisite grades and first semester nursing grades for students enrolled in Fall 1996, 1997, and 2002 and Spring 1997, 1998 and 2003. This data will be used to determine if there is a correlation between reading skills and academic success in prerequisite science classes and the nursing program.

The research results will be used by the university and the School of Nursing for the evaluation and modification of the nursing student retention plan. As such, Jennifer Cook will be acting as an agent of the university in the conduct of the research.

Sincerely,

A handwritten signature in black ink that reads "Denise J. Doyle". The signature is written in a cursive style with a large, stylized initial "D".

Dr. Denise J. Doyle  
Vice President for Academic and Student Affairs

**APPENDIX D**  
**PERMISSION LETTER FROM THE DEAN OF THE SCHOOL OF**  
**NURSING AND HEALTH PROFESSIONS, UIW**



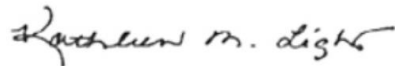
September 29, 2005

Institutional Review Board  
Texas A & M University  
1500 Research Parkway, Suite B-150 (Center Bldg.)  
College Station, TX 77843-1186

To Whom It May Concern:

Jennifer Cook, nursing faculty at the University of the Incarnate Word and doctoral student at Texas A and M University, has permission to use the reading assessment data of first semester nursing students who completed the Nelson-Denny test and the Nurse Entrance Test during fall 1997-1998, fall 2002 and spring 2003. The results will be important to the School of Nursing decision about whether a reading test will be used in the admission to the program process and which test is a better predictor of student successful completion of the nursing program.

Sincerely,

A handwritten signature in cursive script that reads "Kathleen M. Light".

Kathleen M. Light, EdD, MSN, RN  
Professor and Dean  
School of Nursing and Health Professions

## VITA

JENNIFER D. M. COOK  
 University of the Incarnate Word  
 School of Nursing and Health Professions  
 4301 Broadway  
 San Antonio, Texas 78209

### EDUCATION

- 2006      Doctor of Philosophy  
 Educational Human Resource Development  
 Texas A&M University  
 College Station, Texas
- 1991      Master of Business Administration  
 University of the Incarnate Word  
 San Antonio, Texas
- 1979      Master of Science in Nursing  
 The University of Texas at Arlington  
 Arlington, Texas
- 1970      Bachelor of Science in Nursing  
 Dominican College  
 Houston, Texas

### PROFESSIONAL EXPERIENCE

- 1/89 – Present      Instructor of Nursing, School of Nursing and Health Professions  
 University of the Incarnate Word, San Antonio, Texas
- 10/84 – 10/88      Director of Clinical Nursing, Santa Rosa Medical Center  
 & Santa Rosa Children's Hospital, San Antonio, Texas
- 6/71 – 6/84      Assistant Director of Nursing, Saint Joseph Hospital  
 Fort Worth, Texas
- 6/70 – 10/70      Staff Nurse – Intensive Care Unit, Saint Joseph Hospital  
 Houston, Texas

This dissertation was typed and edited by Marilyn M. Oliva at Action Ink, Inc.