

The

NET

Nurse Entrance Test

**Technical and
Developmental
Report**

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Professional Literature Review of the NET

C. K. Peter, EdD. (1996). Evaluation of a learning assistance program for at-risk students. University of Southern California. Dissertation Abstracts, No. 2000006156.

Purpose of the study: Use of the NET to determine at-risk students from disadvantaged backgrounds.

Findings: Critical thinking scores from the NET were predictive in the identification of at-risk students.

Veronica Abdur-Rahman, PhD; Paul L. Femea, DnSc and Chloe Gaines, MSN. (1994). The nurse entrance test (NET): An early predictor of academic success. The Association of Black Nurses Foundation Journal, (Winter), 10-14.

Purpose of the study: To determine if a relationship exists between beginning nursing students' NET scores and academic success within the first year of professional study.

Findings: The NET significantly correlated with academic outcomes for first year nursing students and accounted for up to 33% of the variance in nursing grades.

P. Femea, C. Gaines, D. Brathwaite, V. Abdur-Rahman. (1995). Sociodemographic and academic characteristics of linguistically diverse nursing students in a baccalaureate degree nursing program. Journal of Multicultural Nursing & Health, 1(3), 24-29.

Purpose of the study: To compare the sociodemographic and academic characteristics of primary English-speaking nursing students and students who spoke English as a second language (ESL).

Findings: ESL students scored significantly lower on the NET in reading, math and test-taking skills than the primary English speaking students. The academic performance of the primary English speaking students was higher in the first semester than ESL students.

Peggy A. Gallagher, MSN, RN; Carole Bomba, MSN, RN; Laura R. Crane, PhD. (2001). Using an admissions exam to predict student success in an ADN program. Nurse Educator, 26(3), 132-135.

Purpose of the study: To determine if the Nurse Entrance Test (NET) is a better predictor of academic success than the Entrance Examination for Schools for Nursing (RNEE). To determine if appropriate interventions based on scores from nonacademic indicators of the NET improves success.

Findings: Statistically significant findings between successful and non-successful groups were found on mathematics scores from the NET.

Lene Symes, PhD, RN, CS; Kathryn Tart, EdD, RN; Lucille Travis, PhD, RN, NA and Margo S. Toombs, MS, CC-SLP. (2002). Developing and retaining expert learners: The student success program. Nurse Educator, 27(5), 227-231.

Purpose of the study: Identify at-risk students and implement a program to assist them in academic success.

Findings: Students who receive less than 55% on the NET reading comprehension score are at risk for non-success in the nursing program with a 50% drop out rate from the program. Students who score less than 55% are required to enter the assistance program.

The Process of Developing the NET

The Examination Committee

The Examination Committee of Educational Resources is responsible for the development of the Nurse Entrance Test (The NET). This standing committee is composed of faculty who are actively involved in both teaching and academic counseling in health occupations programs. The Committee members in their professional preparation and experience represent the four regions of the country - West, South, Midwest and Northeast. The selection of item writers is based upon their educational and professional credentials.

Writing of Test Items

The test items were written by individual health occupation faculty, and then the items were reviewed and evaluated by the Examination Committee described above. The Committee members reviewed the test items, evaluated sample answers, noted whether the desired content or student behavior was properly covered, indicated any need for revision, and recommended that test items be either kept or omitted. The results of this screening were then, carefully, evaluated.

Trial Questions

These questions were then administered to nurses during the first two months of their first college semester. These try-out questions were used to collect information about the test items. Obtaining responses from nurses from all four geographic regions of the U.S. ensured that the arithmetic and reading comprehension skills, the social interaction options (and the stress and learning style items) were tried by students of a truly representative student population. Data from the trial items was reviewed to identify sources of ambiguity by indicating test items for which a large number of candidates selected the same, though unexpected answer. Even though test items were thoroughly reviewed before they were included as trial questions, occasionally a test item was interpreted in a way that was not intended. Such a test item was then corrected or discarded.

Question Clarity

The test items on the NET were not designed to be confusing or tricky. Instead, considerable effort was devoted to make each test item as clear as possible. The main purpose of the try-out items and of the extensive editing of items was to remove possible sources of confusion in wording or structure. Statistical analysis of the trial test items were reviewed by the members of the Examination Committee. If, with a given item, there was conflict between its statistical quality and the academic skill or student behavior the Committee wished to sample, the skill or behavior took precedence. In the end, there were three crucial considerations.

Does the test item distinguish between a student who has adequate skill development for the health occupations in math and reading comprehension and one who does not? Does a test item distinguish between a health occupations' candidate who is experiencing stress and one who is not? Does the test item evaluate, accurately, the perceived learning style of a student? Test items which did not make these distinctions were not used. Every effort was made to ensure that the test items sampled important skill and learning behaviors. There are no trick questions; there are no unanswerable questions.

Currency of Test Content

The Examination Committee, with the assistance of other test specialists of Educational Resources, Inc. continue to evaluate the test items used in the examination.

Development and Technical Data

In the development of the Nurse Entrance Test (NET), a series of standardization procedures were followed to assure that the content of the NET was appropriate for entry level nurses and to provide an effective means of interpreting test performance. The following describes these procedures and provides evidence of the reliability and validity of the NET.

Standardization

The NET was standardized by equating its individual Composite Percentile (and the individual Math and Reading Comprehension Scores) with the Scores of the ACT Composite Scores (and its individual Math and Reading Comprehension Scores). The equating method was carried out by associating the projected scores of the NET with the appropriate score achieved by the same test population on the ACT.

The equating method was selected for several reasons over more traditional methods which rely, primarily, on elaborate sampling. First, while traditional methods rely on the appropriate sampling of certain segments of the population (e.g., race, sex, socioeconomic status), the validity of the equating method is virtually independent of sampling parameters: the only restriction being that the standardization sample represent a wide range of entry-level nurses. This point is especially relevant to the standardization of the NET. Because of the controlled length of each subject in the standardization form, it was possible to administer each subtest to every student in the selected population.

A second important advantage of the equating method over traditional methods of standardization is that the required size of the standardization sample is dramatically reduced. While traditional sampling procedures require relatively large samples so as to accurately reflect the level and range of performance of students from each type of a health occupations' program, the equating method is much more efficient. The only requirement is that the sample size be large enough so that a significant prediction of the appropriate scores of the NET can be made from those of the ACT over the full range of performance.

The ACT is widely used by colleges to determine the skill development of a college applicant for both reading comprehension and math mastery. A correlation study was completed that sought to equate ACT and NET reading and math scores. When two tests are equivalent, they represent parallel forms of each other; that is, they both yield the same information. The validity of the equating method is dependent on this assumption. This assumption was evaluated statistically by examining the correlation of the anchor test (in this case, the NET) with the target test (ACT). Correlations of +.80 or greater are generally considered to represent tests that are parallel. (See the Criterion-Related Validity study discussed below.)

Administrative Procedure

The original standardization of the NET was based on the testing of 1385 beginning nurses from health occupation programs: The original standardization of the NET was based on the testing of 1385 beginning nurses from health occupation programs: These schools came from all four geographical regions of the U.S. for each student, complete data was secured for all subtests of the NET and ACT. Initial testing was conducted from January 1989 through December 1989.

Reliability

The reliability of the NET subtests areas for students who participated in the standardization was examined by the parallel- forms method. The forms were created by treating the odd- numbered questions from the NET as Form A and the even- numbered questions as Form B. The forms were not separated from the original form of the NET except by the computer which read the items in scoring as Form A and Form B. The consistency of the content of the two forms was then evaluated. The coefficients range from +.81 for Math to +.98 for the Reading Comprehension subtest with an overall average of +.92. These coefficients indicate that there is little internal variation in a student's performance from one form of the NET to the next.

Subtest Reliability Coefficient

Reading Comprehension _____	.98
Stress Decisions _____	.97
Social _____	.92
Math _____	.81
Learning Styles _____	.91

Validity

During the development of the NET, the validity of the subtests was examined. The information presented here provides three types of validity evidence: (1) content validity, which concerns the appropriateness of the items on the NET for assessing related academic and learning behaviors; (2) criterion- related validity, which concerns the test's relationship to other variables expected to be related to NET performance; and (3) diagnostic validity, which concerns the test's usefulness in identifying related learning deficits or possible problems.

Content Validity

Content validity was built into The NET through its design specifications. The selection of test items followed the guidelines developed by the Examination Committee. These guidelines reflected the expressed needs of a survey completed by a representative sample of nursing program directors across the United States. Test items, therefore, were included only if they emphasized appropriate skill focus and learning style behaviors of nurses.

Criterion- Related Validity

The validity of the NET was further examined by determining the relationship of its Composite Score to the Composite Score on the ACT. The following table shows the relationship of the NET performance to the ACT. These values are mean averages for the ACT and the NET. The overall averages range from +.79 to +.83 indicate that there is generally a substantial relationship between performance on the NET and ACT.

Average Correlations of Projected NET Composite Scores with Composite ACT Scores:

The mean NET Comprehensive Percentile_____	50
The mean ACT Composite Score_____	18.856
The Standard Deviation of the NET_____	24.6
The Standard Deviation of ACT_____	5.23
The Correlation Coefficient of Test Data_____	0.81
The Score of the Regression Line_____	0.872
The Y-Intercept of the Regression Line_____	28.103
Confidence Level is above_____	99.7 %

Diagnostic Validity

It was also of interest to assess the diagnostic validity of the NET. The question asked here was whether the NET could identify students who were expected to have deficiencies in the skill areas tapped by the NET subtests.

To test this hypothesis, the NET was administered during the last, academic month of 365 graduating nurses from health occupation programs. It was expected that the presence of academic, skill deficits in reading comprehension and basic mathematics would be less common among graduating students than in a group of entering students.

A t-test comparing the graduating students' performance to the norm was performed for each subtest of NET. The t-values and their levels of significance show that for each subtest the performance of the graduating students was significantly higher than the average of the norms established for entering students.

Conclusion

This data lends support to the validity and reliability of the NET; however, the validity of any instrument must be continually re-evaluated. For this reason, users of the NET are encouraged to submit studies that pertain to the validity and reliability of the NET to predict the level of basic skill mastery in reading and math, and the eventual academic success of entering nurses. The NET correlated well with the ACT, and also gave more diagnostic information for both the Math and Reading Comprehension skill areas than did the ACT. A Composite Score on the ACT may be helpful, but the individual profiles generated by the NET outline specific math deficits and learning style profiles which provide practical insight (supported by specific teaching suggestions) for a health occupation program striving to meet individual differences of students.

A Study Related to LPN Schools in the State of New York

Introduction

The “Nurse Entrance Test” (NET), published by Educational Resources, appears to be a very good indicator of a prospective student’s aptitude to succeed in a Licensed Practical Nursing course. The NET, also, can be a very useful tool to the student, instructor, and administrator.

The administrator can use the Score Summary Sheet to determine if a student will succeed in the LPN program. Besides the general academic scores, the Stress Level and Social Interaction Profile scores can be very helpful. To an instructor, the summary on the Math test can be very useful in determining the average level of the class and identifying individuals who will need additional help. For the student, the NET identifies strengths and weaknesses which can be useful in planning paths to follow.

This resume attempts to summarize each section, offers suggestions for score interpretation, identifies remediation techniques and materials, and suggests a path to determine the NET’s validity to the BOCES LPN program.

SUBTESTS

Essential Math Skills

The “Essential Math Skills” subtest is a well-constructed test. Each section tested (Whole Numbers, Decimal Operations, Fraction Operations, Percent Operations, Number System Conversions, and Simplifying Algebraic Equations) is highlighted allowing the student to develop a mindset for that section. The problems are arranged in order of difficulty with the easiest problems first. This allows the student to adjust his or her time allotment to the problems.

The breakdown of the skills tested on the “Essential Math Skills” is as follows:

<u>Skill Area</u>	<u># of Questions</u>	<u>Percentage</u>
Whole Numbers	12	20
Decimal Operations	8	13.25
Fraction Operations	8	13.25
Percent Operations	8	13.25
Number System Conv.	16	27
<u>Algebraic Equations</u>	<u>8</u>	<u>13.25</u>
Total Amount	60	100

Problems 1-52 test topics covered in the 7th and 8th grade New York State curriculum. Therefore, an individual should be able to score an 80% or better on each of these section. Problems 53-60 are covered in a basic (Regents or non-Regents) freshmen math class (entitled Course I). Therefore, most high school seniors should be able to answer 75% of these problems. Unfortunately, this score may seldom occur. Because the student takes Course I in his or her freshmen year, he or she will forget these basic algebraic operations without the proper reinforcement. Adults will have a more difficult time with these questions.

Therefore, an individual should be able to achieve a composite score of 80% or better. (A raw score of 48 out of 60 questions correct.) An individual who scores 80% or better will most likely have no problem dealing with the math in the LPN course. A student who scores between 70% and 80% (a raw score between 42 and 48) may be considered for enrollment with the strong suggestion that remedial help before and/or during the LPN course be sought. A student who scores below 70% needs intensive remediation before consideration can be given for the LPN course.

The designers of the NET realize that remediation of some kind may be necessary for most students; therefore, the designers have supplied the student, instructor, and administrator with an “Areas of Math Difficulties” sheet. This sheet should be used by all to determine remediation level. This sheet is a very good item analysis of the “Essential Math Skills” subtest.

Reading Comprehension Skills

The “Reading Comprehension Skills” subtest is a fairly reliable indicator of a student’s ability to read and comprehend LPN course material. The administrator and the instructor need to realize that stress and test anxiety which are commonly associated with taking a timed reading test may affect an individual’s score.

The passages on this subtest are graded on a 10th grade level according to the Gunning-Fog Index. The Gunning-Fog Index was developed by Robert Gunning in 1950. The Index takes into account sentence length (average number of words per sentence) and hard words (words of three or more syllables). This Index is commonly used with material written for adults. Therefore, with this grade level in mind, the material should not prove too difficult.

The contents of the passages also does not appear to be too difficult. The articles that are utilized appear to be similar in length, style, and sentence variety to articles found in elementary professional journals and trade publications. Therefore, the students should not experience too much difficulty, especially high school students who have had the first half of LPN I.

The majority of the questions are written on a literal level. (82% or 27 out of 33 questions.) The remaining questions 18% or 6 out of 33 (are inferential. The breakdown of the reading comprehension questions is:

<u>Skill Area</u>	<u># of Questions</u>	<u>Percentage</u>
Main Idea	2	6
Details	16	49
Purpose	2	6
<u>Topic</u>	<u>1</u>	<u>2</u>
<i>LITERAL</i>	27	82 %
Inference	4	12
<u>Theme</u>	<u>2</u>	<u>6</u>
<i>INFERENTIAL</i>	6	18 %

A student's reading level is categorized based on ability to read and comprehend a nursing textbook:

INDEPENDENT	able to read/comprehend without instruction
INSTRUCTIONAL	able to read/comprehend with instruction
FRUSTRATIONAL	unable to read/comprehend with instruction

Students who score a 60% or better (20 out of 33 questions answered correctly) should be considered. A majority of these students will probably score between a 72% and 60% which falls into the Instructional Level since very few (if any) students will score in the Independent Level. Students who score between 42% and 59% (14 to 19 questions answered correctly) can be given consideration if remediation is suggested for before and/or during the LPN course. Students who score below a 42% (13 or less questions answered correctly) should be guided to a remedial reading class for further instruction.

The Reading Rate states the number of words per minute a student reads. The average student should be reading 300 words per minute. If a student is reading less than 225 words per minute, a reading disorder or dysfunction may exist. Therefore, the administrator and the instructor can check a student's school records to determine if special handicapping conditions need to be applied. If a student is reading above 450 words per minute and has a low comprehension score, the student may be reading too fast to comprehend the material properly. The Reading Rate need only affect a student's consideration if his or her scores are borderline.

The Remaining Subtests

The remaining subtest - Testtaking Skills, Stress Level Profile, Social Interaction Profile, and Learning Style - are more useful to an instructor than an administrator who is considering a student for possible enrollment. Note that none of the scores from these subtests are added into

the Composite Score. Therefore, and administrator can make subjective judgments about possible student performance or motivation, but the instructor should use these scores to develop strategies for whole group instruction or for individualized remediation.

Social Interaction Profile

The manual suggests that an ideal score if Passive - 30% and Aggressive - 70%. If a whole group is highly aggressive, an instructor may consider teaming the students to foster small group interaction. This would teach the students how to work within a group structure striving for success. Students can evaluate group and individual performance. Then, with the guidance of the instructor, discuss the evaluations and produce alternative for handling the situation.

Stress Level Profile

The scores in this subtest represent the percentage of stressors selected. This section may be useful in determining the motivation factors affecting student behavior or anticipated student behavior. Instructors would also have insight into what area(s) may affect student performance. An instructor could identify the area of concern and could work with the student to reduce the stress. This subtest would also help the instructor when developing problem-solving situations. An instructor could purposely choose a high stress area represented by the whole class, incorporate that stress area into a problem-solving situation, illicit student responses, and then discuss alternatives.

Testtaking Skills

This section is a good indicator of the amount of testtaking skills and study skills that should be infused into an individual LPN course. If a group of students scores above a 70%, a review of skills should be touched upon throughout the course. If a group scores between 40% and 70%, then the skills should be reinforced throughout the course. If a group scores below a 40%, then both testtaking skills and study skills need to be taught from the beginning of the LPN course.

Learning Style

This section should prove to be very useful to an instructor on two levels. First, the instructor can adapt his or her style to meet the preferences and strengths of the class. For example, if the majority of a class tends to be visual, then an instructor can infuse the curriculum with visual media. Computer programs, videos, and word games based on vocabulary lists would prove helpful. Having the class read about a topic before it is presented in a lecture format would also be useful.

Second, the instructor can use the information in the Learning Style subtest when forming study or cooperative-learning groups. Cooperative-learning groups are very useful within a class

structure, and study groups (outside of the class structure) should be encouraged by the instructor. For example, an instructor may group a Social Learner, a Solitary Learner, and a Writing Dependent Learner. Such a grouping would be beneficial to all three students. Each student would observe an alternative method of learning from the other two students with the intention that some of the differences can be applied to his or her own study habits.

Remediation

The NET designed to tailor programs and class structure to meet individual needs. The publishers of the NET realize that remediation is a key factor in the success of potential LPN students. The Diagnostic Report of the NET offers remedial and teaching suggestions which may prove useful, but the suggestions are too general to assist an instructor. This section - briefly - attempts to offer some suggestions which may prove useful to the BOCES LPN program.

The above section of SUBTESTS offers suggestions for consideration of potential students. At the same time, scores that are considered too low were offered so that the administrator and the instructor can steer the potential LPN student toward the right remediation. In recent months, the New York State Department of Education has been strongly suggesting the Occupational/Vocational Programs integrate with Basic Literacy Programs. No longer should they be separate.

With this recommendation from the NYS Department of Education in mind, it appears that an easy to handle transition to an integrated program is through the development of Basic Skills modules. In this section, a module will be defined as a set of goals, objectives, instructional strategies, materials, and pre/post test situations for a specific basic skill necessary for successful completion of an Occupational/Vocational program.

Below is a list of modules that could be developed for an LPN course:

MATH

- Fraction Operations
- Decimal Operations
- Ratio/Proportion Operations
- Percentage Operations
- Metric Measurement
- Health Care Systems of Measures (Apothecary and Household)
- Organizing/Reporting Data
- Lifeskills Mathematics (Checkbook, Interest, Loans, Purchasing, Inventory)

READING

- Basic Reading (below grade level of 4.0)
- Intermediate Reading (grade level 4.0-8.0)
- Interpretative Reading (grade level 8.0-12.0)
- Textbook Reading/Annotation

Vocabulary Development
Medical/Nursing Terminology
Reading for Health Care

STUDY SKILLS/TESTTAKING SKILLS

Time Management
Notetaking/Listening Skills
Research Skills
Report/Research Writing
Study Skills for Nursing
Testtaking Skills (General)
Testtaking Skills (Licensing Exam)

SCIENCE

Biology for Nursing
Chemistry for Nursing

(These modules would be more for adult students who have not kept up with their schooling.)

These modules would be designed on two levels. They would be designed so that an LPN instructor could pick and choose modules to infuse into an individual class based on need represented on the NET. The instructor could teach the skill over a long period of time or in a concentrated period of time. These modules would also be designed for the Literacy Instructor. The instructor could design a specific program of remediation for each individual student based on need represented on the NET and based on individual student want. The modules could be used in a concentrated period of time, and the modules could overlap for Integrated instruction.

The modules would also be designed so that students can work on them independently. This would allow the student some freedom in the remediation process. With the workload of an LPN candidate, it is unlikely that all remediation can be done through class time. Therefore, modules that allow for independent work would motivate the LPN candidate to devote time to the remediation process. The Basic Literacy instructor could easily handle this process. He or she can develop an independent, individual program using the modules above and, then, establish deadlines and meeting times for the student. (This method would also be useful for students who receive Public Assistance and are not able to pay for additional day care. The LPN instructor and the Basic Literacy instructor would decide who could enter remediation in this fashion.)

Testing the Above Theories

The best way to see if the NET is the exam of choice for the BOCES LPN program and to see if the above suggestions of remediation and integration are feasible is to test pilot some or all of the above suggestions.

One group of high school students has already taken the NET, has gone through the interview, and has taken the LPN II program. This group received no review or remediation. This group could easily act as a control group.

Another group of high school students are preparing to take the NET. This group will be given some review in preparation for the NET. After testing and before enrollment in the LPN II program, some or all of the above outlined strategies can be implemented. This group can be tracked and followed. The results of their performance would be compared with the control group to see if the review and remediation strategies were successful.

Also by comparing the results on the NET of the two groups, BOCES could begin to develop a series of norms represented of the population they serve. This would be most helpful in determining which students would succeed in the LPN program.

A similar comparison should be done with adult students. This comparison would take a little longer to comply because no adult students have taken the NET nor is it anticipated that they will. Adult students may do better on this test than on the present one given, the PSBT. Adult students are more comfortable with general math and reading tests than with the specific science, spelling and judgment tests currently given.

Conclusion

In conclusion, it is my inclination that the NET should be administered to both high school students entering the LPN II program and to adult students entering the LPN I program. The NET is a fair and accurate test. It also encourages the integration of the Basic Skills and the LPN programs which is highly recommended by the NYS Department of Education.

I, personally, would be more than willing to help test and/or implement any of the above suggestions. I strongly believe in an integrated program and would like to see one incorporated into the LPN program. Once the initial modules are put together, the program can be infused across the board allowing for more universality of the program.

The modules would be developed through a joint effort of the LPN instructor and the Basic Literacy instructor with the majority of the work falling on the Basic Literacy instructor. This method would insure that the materials chosen would enhance the LPN curriculum not add to it. This method, also, would insure that a universal program of remediation would be developed for integration in all BOCES LPN programs.

THE NURSE ENTRANCE TEST

An Early Predictor of Academic Success

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Abstract

The purpose of this study was to determine whether a relationship existed between beginning nursing students' NET scores and academic success within the first year of professional study. The major goal was to identify predictors of academic success so that supportive academic strategies could be implemented for the at-risk student. A statistically significant relationship was found between the NET reading comprehension, math and composite scores and nursing grades during the first semester. Test-taking skills, social stressors and learning styles were also significantly related to course performance. Successful students had significantly higher reading, math, and composite scores and lower family and social stress scores than unsuccessful students. NET scores were also predictive of nursing grades, accounting for 10-33% of the variance when entered into a multiple regression equation.

Introduction

Retention of nursing students is a major concern for nurse educators. Despite the fact that retention has been extensively examined at numerous schools of nursing, the loss of students remains a persistent problem (Allen, Nunley, Scott-Warner, 1988). According to Felts (1986), students who are unsuccessful represent a large-scale wastage of human and economic resources.

Tucker-Allen (1991) described this human wastage as losses which are incurred by the institution, the nursing profession, and the student. Although Tucker-Allen's analysis of loss was directed towards the minority nursing student, it can certainly be generalized to all nursing students. She reported that when the minority nursing student is unsuccessful, the institution suffers a financial loss and the nursing profession suffers a loss in terms of the number of minority nurses available to practice in professional settings. More acutely, the student suffers a tremendous loss in terms of the human capital investment and the psychological trauma of failure.

The importance of early identification of students who may be at risk for failure or may experience difficulty in completing the nursing program is stressed in the nursing literature (Fowles, 1992; Younger & Grap, 1992; Jenks, Selekman, Bross & Paquet, 1989; Payne & Duffy, 1986). With early identification, educational and supportive strategies can be implemented to increase student retention and reduce the financial and human losses. Efforts must therefore be directed toward identifying valid and reliable predictors of program success.

This retrospective study was conducted to identify predictors of academic success, using student data routinely collected on admission to the upper division at the College of Nursing at Prairie View A&M University, a 2+2 baccalaureate degree program. The College of Nursing has a long legacy of successfully graduating predominantly minority nurses, it also has a history of high attrition rates (Waugh, 1992).

Review of the Literature

The literature review will focus on variables identified in the nursing literature as predictors of academic success and the optimal time for prediction of student outcomes. Numerous articles have been written describing prediction of success on the NCLEX-RN examination, and to a lesser extent, predictors for success within nursing programs. Fowles (1992) reported that successful completion of the nursing curriculum has been identified as a major predictor of success on NCLEX-RN in many studies. It is therefore necessary when discussing academic predictors in nursing programs, to include literature dealing with predictors as they relate to success on the NCLEX-RN.

Variables used to predict success on NCLEX-RN may be grouped into three(3) categories, corresponding to distinct points of time in the student's matriculation. The categories are pre-admission, pre-clinical, and clinical. Pre-admission predictors include variables such as high school grade point averages (GPA) Scholastic Aptitude Test (SAT) and American College Test Assessment (ACT). According to Fowles (1992), none of these variables have been consistently identified with successful outcomes. Pre-clinical variables include lower division GPA, such as GPA in prerequisite biological, social sciences, and the humanities. Younger and Grap (1992) reported that GPA in schools of nursing were a valid predictor of NCLEX-RN in the white and Hispanic subgroups, but only a modest predictor for those in the Black and Asian subgroups. In addition, Wold and Worth (1990) reported that the lack of course grade comparability between institutions where many students are college transfers poses questions of uncontrolled variability.

Clinical variables cited in the literature as predictor variables have included grades in nursing didactic, theory, and practicum courses; cumulative nursing GPA; Comprehensive Nursing Achievement Tests published by NLN; and the Mosby ASSESSTEST. The results of several investigations (Jenks, et al. 1989; McKinney, Small, O'Sell & Coonrod, 1988; Payne & Duffy, 1986), revealed that the Mosby ASSESSTEST and the NLN Comprehensive Nursing Achievement Test were strong predictors of success on the NCLEX-RN. However these evaluations are administered at the end of the senior year, when there is not sufficient time to help the student at risk.

Few investigators have examined non-cognitive variables as predictors of success. Studies done by Jenks, et al. (1989) and McKinney, et al. (1988) indicated that age at the time of graduation had no significant effect on NCLEX-RN performance. McKinney et al (1988) recommended that nonacademic predictors such as the student's learning style, attitude and/or motivation, should be investigated, since these investigations would provide a holistic approach to the needs of students and improve understanding of a wider range of predictors.

While the strongest and most reliable predictors of success are cognitive variables, Jenks, et al. (1989) warned that using pre-admission GPA, SAT or ACT must be carefully considered for individuals returning to college at a later age, or those choosing nursing as a second profession. The authors observed that using these GPA may place too much time between high school and college performance.

There is agreement among nurse researchers that the optimal time to identify high risk students is early in the nursing program. Quick, Krupa, and Whitley (1988) determined that, on admission to the nursing major, 83.4% of the students who could have difficulty on the licensing examination could be identified. According to Payne and Duffy (1986) the use of pre-admission variables was not warranted as criteria for admission into an early intervention program. The results of their study suggested that the optimal time to begin predictions is following the first semester of professional study, when the truly high-risk students can be identified quite accurately. According to the authors, the most important prediction points appear to be the mid-junior year, end of junior year, and mid-senior year.

In light of the findings that predictor variables are not consistently stable and vary from institution to institution, it has been recommended by Fowles (1992) that each nursing program examine its own predictors of success. The Nurse Entrance Test (NET) was identified by the faculty of the College of Nursing as a tool which could allow for early identification of students at risk for failure. This study differs from those reported in the literature in two important aspects. First, there are no reported studies of the use of the NET as a predictor of academic success. Secondly, students admitted into the nursing program, were evaluated at the same time, upon admission to the program. Thus students at-risk for academic failure could be identified prior to their enrollment in nursing courses.

Purpose

The purpose of this study was to determine whether a relationship existed between beginning nursing students' NET scores and academic success within the first year of professional study. The research questions generated were:

1. Is there a relationship between the NET cognitive scores and academic performance in the first year of professional study?
2. Is there a relationship between The NET non-cognitive scores and academic performance in the first year of professional study?

The Nurse Entrance Test (The NET)

The Nurse Entrance Test published by Educational Resources (1991) is a diagnostic instrument that evaluates seven academic, social, and learning profiles of beginning nursing students. The test provides thirty-one diagnostic scores for each student. These scores are sub-scores of the following seven profiles: essential math skills, reading comprehension for science textbooks, stress level profile, social interaction profile, learning styles inventory, composite percentage scores, and composite percentile scores. The NET has been significantly equated with the ACT (Educational Resource, 1991) and provides a much broader range of information about the in-coming nursing student than ACT or lower division GPA alone.

Study Variables

The NET cognitive variables used in this study were: the reading comprehension scores, math scores, and composite percentile scores. Non-cognitive NET variables were learning styles scores, test-taking skills scores, and stress profile scores. The outcome variable was successful academic performance in courses during the first year of professional study. Success in a course at the College of Nursing was defined as a final course grade of 75 or better. The first year of professional study consists of two semesters. During the first semester, students are enrolled in four courses: Introduction to Professional Nursing, Basic Concepts of Nursing - Theory and Practicum, and Health Assessment. During the second semester, students are also enrolled in four courses: Pathophysiology, Pharmacology, Adult Health I - Theory and Practicum.

Methodology

The sample for the study consisted of 128 students' NET scores and final semester course grades obtained from three classes admitted between Fall 1991 and Fall 1992. The data was obtained in a manner that assured the students' anonymity and confidentiality.

Fifty-three percent (53%) of the students were generic students, matriculating from the main campus pre-nursing program. The majority were black, single and female. Thirty-eight percent (38%) had dependent children and 43% reported having part-time or full time employment. The mean age of the sample was 26, with a range of 20-43. The demographics of the sample are further described in Table 1.

Data Analysis

Using the SPSS Statistical Package, both descriptive and inferential statistics were used to analyze the data. Descriptive statistics included frequency distributions, means, and standard deviations. The Pearson r Correlation Coefficient was used to determine relationships among the NET's scores and nursing grades. Regression analysis used to determine amount of variance that could be explained by NET scores.

Descriptive Statistics

The descriptive statistics for the NET variables are described in Table 2. The essential math component of the NET evaluates the students' ability to perform basic operations in mathematics and algebra. The mean of 73.64 reflected basic math competency for the sample. The NET evaluates reading comprehension at the inferential level, and reading selections at the tenth grade level of difficulty for vocabulary and sentence syntax is used. The sample's mean of 50.91 with standard deviation of 27.05 reflected the wide variability in reading comprehension ability of the group.

The NET measures the student's ability to use testtaking strategies when taking objective, essay and standardized examinations. The sample mean of 38.04 was indicative of the poor testtaking skills of the group. The stress level profile provides information on five important areas in personal coping. Money and time were identified as major stressors. Family, social, and academic stressors were equivalent stressors.

The learning styles profile showed that students were varied in their learning modes. More students preferred or had distinct preference for the visual mode of learning rather than the auditory mode. The majority of the students learned equally well whether in a social setting, such as in a group, or independently (solitary). The majority of students also preferred the oral and writing dependent modes of learning.

Correlational Analyses

To determine whether significant relationships existed among the identified Net scores and academic performance during the first year of professional study, Pearson r correlations were done. Table 3 displays the significant correlations that were found among the NET and nursing course grades. Introduction to Professional Nursing and Basic Concepts of Nursing courses correlated significantly with most of the NET variables.

Regression Analysis

Predictor variables which were significantly correlated with each course grade were then entered into a step-wise multiple regression equation to determine the amount of variance in course grades that could be explained by the variable (see Table 4). For Health Assessment, 10% of the variance in the course grade could be explained by the NET composite score. The NET math score explained 26% of the variance in the Basic Concepts Practicum grade, with an additional 7% explained by the social stress score. A total of 33% of the variance in Basic Concepts practicum course was explained by the NET. Similarly, the NET composite score explained 25% of the variance in the Basic Concepts theory course, an additional 3% came from social learning score and 4% from workplace stress score. Therefore, 32% of the variance for that course was explained by the NET. Twenty-eight(28) percent of the variance in Introduction to Professional Nursing was explained by the NET.

Discussion

The NET significantly correlated with academic outcomes for first year nursing students, and accounted for up to 33% of the variance in nursing grades. The findings that inadequate educational preparation, poor testtaking skills, and multiple social stressors correlated with academic performance are consistent with findings reported in the literature (Wolaken & Wieczorek, 1991; Allen, Nunley, Scott-Warner, 1988).

The College of Nursing has used the NET results to implement retention strategies to enhance student's academic success. Students identified with mathematics and reading comprehension deficiencies are provided with academic support services. Students with math deficiencies are required to take a remedial math course during the first clinical semester. Reading comprehension computer programs and workbooks are used with students experiencing reading deficiencies.

Students with identified academic and social stressors are counseled to take a reduced course load. A reduced course of study is less stressful to the student, the student is able to work on strengthening identified weakness, and at the same time, take two nursing courses. Several educators have recommended that reduced course load or part-time curriculum patterns are a must for at risk nursing students (Hussey & Wolahan, 1990).

Study skills classes, test-taking workshops, and peer-tutoring are additional retention strategies used for students during their first year of study. In addition, students are strongly encouraged to form study groups to increase their likelihood of success. Computer assisted programs to strengthen testtaking skills and critical thinking are also available for student's use.

Academic advising and counseling are a critical part of any retention program. Students are assigned a faculty advisor at the time of admission to the nursing program, and remain with the same advisor until graduation from the program. Many of our students are employed and have significant family and social responsibilities. Counseling is therefore a vital component of the faculty's responsibility.

The above strategies have been used by numerous nursing programs to improve student retention. However, several investigators have recommended that research is needed to determine the most effective intervention for enhancing success of the at-risk student (Fowles, 1992; Younger & Grap, 1992). The data generated from the NET have facilitated the early identification of the at risk student, and retention strategies have been implemented. However, strategy or combination of strategies that are most effective in improving academic outcomes for at risk students, still need to be determined.

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TABLE 1

Characteristics of the sample (N = 128)

<u>Variable</u>	<u>N</u>	<u>% Sample</u>
Sex		
Female	103	80.5
Male	25	19.5
Race		
Black	107	83.5
White	8	6.0
Asians	12	9.0
Marital Status		
Single	90	72.6
Married	30	24.2
Divorced	4	3.2
Dependent Children	49	38.0
Employed	59	46.0
Status at entry		
Generic	70	54.6
Transfer	58	45.3
Age	mean 26 years range 20 to 43 years	

TABLE 2

Descriptive Statistics of NET

<u>Variable</u>	<u>Mean</u>	<u>Std Dv</u>	<u>Min.</u>	<u>Max.</u>
Reading	50.91	27.05	1.00	99.00
Math	73.64	13.63	39.00	95.00
Composite	63.52	27.37	2.00	99.00
Test-taking Skills	38.04	8.52	0.00	60.00
Stress Profile				
Family Stressors	30.25	20.23	0.00	90.00
Social Stressors	32.26	17.10	0.00	80.00
Money/Time	63.18	18.36	10.00	99.00
Academic Stressors	32.57	21.26	0.00	80.00
Workplace Stressors	22.65	15.89	0.00	90.00
Learning Style				
Auditory Learning	43.73	24.63	0.00	99.00
Visual Learning	66.96	20.63	12.00	100.00
Social	69.41	22.24	14.00	100.00
Oral	64.41	19.32	25.00	100.00
Writing	60.69	23.44	7.00	100.00
Solitary	68.84	31.82	0.00	100.00

TABLE 3

Significant correlations of NET with course grades:

	INTRO	BASIC THEORY	BASIC PRACT	HEALTH ASSESS	ADULT PRACTNET
READ	.4264**	.4795**	.3597*	.2960**	—
NETMATH	.4664**	.3940**	.5174*	.3358**	.4288**
NETCOMP	.5211**	.5077**	.4922*	.3423**	.3244*
TTS	.2444*	.2435*	—	—	—
STRESSFA	-.4738**	-.4262**	-.2984*	—	—
STRESSSC	-.3407*	-.4178**	-.4141**	—	-.2756
*STRESSWP	-.3082**	-.3523**	-.3209*	—	—
AUDLEARN	-.3443*	—	—	—	—
SOCLEARN	-.2752*	-.3624***	—	—	—

p < 0.05**

p < 0.01

Course Topics:

INTRO - INTRODUCTION TO PROFESSIONAL NURSING
 BASIC THEORY - BASIC CONCEPTS OF NURSING THEORY
 BASIC PRACT - BASIC CONCEPTS OF NURSING PRACTICUM
 HEALTH ASSESS - HEALTH ASSESSMENT
 ADULT PRACT - ADULT HEALTH PRACTICUMNET

NET Topics:

TTS - TESTTAKING SKILLS
 STRESSFA - FAMILY STRESS
 STRESSSC - SOCIAL STRESS
 STRESSWP - WORKPLACE STRESS
 AUDLEARN - AUDITORY LEARNER
 SOCLEARN - SOCIAL LEARNER

TABLE 4

Step-wise multiple regression variance explained by predictor variables

	Intro	Basic concepts theory	Basic concepts practicum	Health Assessment
NETcomp	0.25241	0.25046	—	0.10081
Auditory	0.28439	—	—	—
Social Learning	—	0.28583	—	—
Workplace	—	0.32070	—	—
NETmath	—	—	0.25905	—
Social Stress	—	—	0.33257	—

Cultural Bias Study

DIFFERENTIAL ITEM FUNCTIONING -- The Mantel-Haenszel Procedure

by Mitchell Jarvis, BSCS, BSM

The purpose of differential item functioning is to study the comparison of two groups of examinees which react differently to the same test question. These differences are worth investigating to open up what problems a test question may have in relation to cultural bias and what measures are needed to correct this problem.

Differential item functioning (dif) can be approached in numerous fashions. The most popular approach before the mid-80's was the chi-square test. The chi-square test is based upon the hypothesis that test question contains no dif and accurate parametric measures needed to investigate the questions are not produced, especially for small samples of examinees. The digression from this style of procedure has recently been made towards the seminal process of the Mantel-Haenszel approach.

Educational Resources uses the simplest form of the Mantel-Haenszel procedure to examine test items for cultural bias. This procedure uses two groups of examinees, the reference group and the focus group. The reference group being the standard against which a comparison is made on the performance of the focus group. The focus group is usually the minority being investigated for cultural bias. Each item of the test is compared between the two groups on the basis of correct and incorrect responses. The responses are then used to produce a common odds-ratio of the test item. This common odds-ratio (θ) is an estimate used in the Mantel-Haenszel procedure. It is then referenced on a scale of $0.3 < \theta < 3$, with a value of $\theta = 1$ indicating no bias. Test items containing values outside of this range are investigated for dif.

Current overall studies of the Nurse Entrance Test have concluded that the examination contains no cultural bias. These studies were done on five classifications of cultural groups; Caucasian, African-American, Native-American, Hispanic and Asian. The Nurse Entrance Test contains six subtests. Two subtests scores (Essential Math Skills and Reading Comprehension) are used to produce the overall composite percentage scores of the test. The remaining four subtests (Social Decisions, Stressful Situations, Learning Styles and Testtaking Skills) can be used for counseling purposes and individual profiles of the examinee.

The overall results for the six subtests and cultural groups are listed below. The reference group in this study was Caucasian; hence, no scores are provided for this group.

	<u>Math</u>	<u>Social</u>	<u>Stress</u>	<u>Learn</u>	<u>Read</u>	<u>Test</u>
African-American	0.98	0.91	0.68	1.05	0.99	1.02
Native-American	1.49	1.01	0.86	0.96	1.10	1.09
Hispanic	0.57	0.90	0.99	1.02	0.62	0.91
Asian	1.17	0.85	0.59	0.89	1.49	1.15

This research study was performed on 1060 examinees over a six month period with twenty-seven (27) schools from selected geographical regions in the United States. The dispersion of degree programs of the 27 selected were 9 Associate Degree, 10 Diploma and 8 Baccalaureate schools. The table below shows the total number of examinees observed and representing regions for each of the five cultural groups.

<u><i>Group</i></u>	<u><i>Total</i></u>	<u><i>Geographic Region</i></u>
Caucasian	353	North Carolina, Kansas, Arkansas, New York
African-American	152	Ohio, Maryland, Alabama
Native-American	167	Arizona, Oklahoma
Hispanic	215	Florida, Texas, California
Asian	173	California

Critical Thinking Appraisal

The NET's Reading Comprehension Subtest

The identification and validation of applicant selection criteria, which predict success for graduates, holds significant interest for nurse educators. Students who fail to acquire professional entry skills, or who are excluded from employment by poor competency examination scores, represent a substantial loss for the individual, the educational institution, and society.

Indicators of success that become available after admission to a nursing program and during progression through that program serve a different, but equally important, function. Such predictors are useful in monitoring student progress, reducing unnecessary attrition, and serving as the basis for advisement relative to remedial experiences, individualized study emphasis, or course or program withdrawal. Such selection criteria may be categorized as representative of the cognitive domain.

The ability to think critically and analytically underlies much of competent nursing practice; critical thinking ability may be related to success in nursing in one of two possible ways: 1) essential patterns of critical thinking ability established prior to nursing education might predict ultimate success on the NCLEX examination; or 2) nursing educational experiences (such as exposure to the scientific approach and the nursing process) might produce gains in critical thinking ability and a corresponding positive relation to NCLEX performance.

The Critical Thinking Appraisal of the NET has been reported to predict success in certain types of professions or instructional programs in which critical thinking is known to play an important role. A description of the Critical Thinking Appraisal as the ability to:

1. *define a problem;*
2. *select pertinent information for problem solution;*
3. *recognize stated and unstated assumptions;*
4. *formulate or select relevant and promising hypotheses;*
5. *draw valid conclusions and judge validity of inferences.*

The NET measures critical thinking as a composite which includes 1) attitudes of inquiry that involve an ability to recognize the existence of problems, and an acceptance of the general need for evidence in support of what is asserted to be true; 2) knowledge of the nature of valid inferences, abstractions, and generalizations in which the weight or accuracy of different kinds of evidence are logically determined; and 3) skills in employing and applying the above attributes. The NET accomplishes an assessment of critical thinking ability by evaluating success with inferential reading, comprehending the main idea of a passage and ability to predict outcomes while reading science material.

Nurses must have good critical thinking ability in order to process data and make clinical decisions. Much of the research related to critical thinking ability has been done with nursing students, rather than with practicing nurses for comparison. Critical thinking ability and decision-making skills are believed to be closely related cognitive skills. In the nursing process, which is a problem-solving process, the nurse collects data utilizing both inductive and deductive reasoning, makes hypothesis (or inferential nursing diagnoses), and plans, implements, and evaluates patient care. Many of the mental processes needed to successfully implement the nursing process are analogous to the mental processes defined as critical thinking ability. Nurses need to learn theoretical and statistical relationships, such as variables which influence high-risk health states. The NET assesses the applicant's abilities for this through its Critical Thinking Appraisal.

Sociodemographic and Academic Characteristics of Linguistically Diverse Nursing Students in a Baccalaureate Degree Nursing Program

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The purpose of this study was to compare the sociodemographic and academic characteristics of primary English-speaking nursing students and nursing students who spoke English as a second language (ESL). The sample consisted of 137 students' Nurse Entrance Test (NET) scores and semester course grades obtained from four classes admitted to the college between Fall 1991 and Spring 1993. The ESL nursing students were older and more likely to be male and married than the American born student. There were no significant differences between the two groups on the basis of student, work, or parental status. ESL students also had significantly lower scores in reading, math, (and their composite), and in test-taking skills; but higher scores in family, social, and workplace-stress. In terms of learning style, the ESL students had significantly higher social- and writing-dependent scores than the primary English-speaking students.

In general, the academic performance of primary English speaking students was high during the first semester of professional study, but lower than the ESL students during the second trimester. Strategies to assist the ESL students to become academically successful are discussed.

Key Words: Baccalaureate Degree; English Speaking; Culture; Culture diversity; Second language; Teaching strategies; Values.

Introduction

Traditionally, students from culturally diverse backgrounds have comprised a small percentage of nursing school enrollments. However, with the increasing decline of the enrollment of traditional middle-class, white students, schools of nursing have begun to increase their enrollments of culturally diverse students. The current demographic trends demand that, for nursing to keep pace with the changing face of America, there must be an increase in the number of culturally diverse students prepared to care for its citizens.

By the year 2000, approximately one in every three Americans will be an ethnic minority (Ferrell, 1988). The 1980 census indicated that more than 20% of the United States population was composed of minority racial and ethnic groups: 11.5% African Americans; 6.4% Hispanics; and the remaining 2.4% Asians and native Americans. However, over the previous decade, the number of Americans of Asian or Pacific-Island origin has increased 120%; while Hispanics grew by 60.5%, African-Americans by 17.4%, and whites by 6.4%. Despite the prodigious growth of the ethnic minorities, they remain under-represented in the health professions.

Nursing has a challenge and an opportunity to enrich itself as a profession and to meet the needs of an increasingly pluralistic society by admitting culturally diverse students into its ranks.

Background

Prairie View A&M University College of Nursing, a historically black, land-grant university, has been in the forefront of educating African American nurses for over 75 years. Initially a diploma nursing program, today the College of Nursing is an accredited baccalaureate program and continues to educate predominantly African Americans. The current student population is reflective of a diverse culture. In addition, the College of Nursing also attracts a substantial number of male students (see Table 1). Furthermore, the current enrollment patterns reveal an increasing number of Hispanic, White and Asian students.

Student attrition is an important concern at the College of Nursing. High attrition rates at the College of Nursing for ethnic minority nursing students are reflective of the trend observed nationwide (Jones, 1992). Students who experience the greatest difficulty academically have been those for whom English is a second language. The linguistically diverse students are particularly at risk for academic failure during the first two semesters of academic study.

Purpose

The purpose of this retrospective study was to determine the differences in sociodemographic and academic characteristics of students for whom English is a primary language and students for whom English is a second language. In this study, the culturally and linguistically diverse student is defined as a student who was born outside of the United States and for whom English is a second language (ESL).

Literature Review

Although much has been written about identifying and responding to the special needs of students at-risk for academic failure, a review of the nursing literature revealed few articles that discussed assessment characteristics and instructional strategies for culturally diverse students. Memmer and Worth (1991) found that attrition rates for culturally diverse students have been very high, especially during the first year of the nursing program when they encountered theory nursing courses. Johnston (1989) examined the specific influence of oral and written language competence on ability to pass the NCLEX-RN examination. The study findings revealed that language was the major variable predictive of success on the NCLEX-RN.

Using students' demographic data, a learning style inventory, and a learning and study strategies inventory, Keane (1993) examined the relationship between learning styles and selected learning-study strategies of culturally diverse nursing students. The results suggested that students who expressed themselves effectively, both orally and in writing, as well as reading with understanding, were able to master concepts and apply conceptual thinking to problem-solving. Keane's study findings also suggested that nursing students whose primary language was English

understood difficult content more easily and took better lecture notes than the linguistically diverse students, who spoke their primary language at home.

To assist the culturally diverse student to become successful academically, Holtz and Wilson (1992) developed a model for empowerment. These authors theorized that success for the culturally diverse student was directly related to the presence of academic support (i.e. counseling, study groups, tutorials) and faculty facilitation (i.e. needs assessment and support services). Empowerment occurs when the student uses the resources offered, graduates and scores well on the NCLEX-RN examination.

Johnston (1989) recommended that nursing educators implement specific teaching and evaluation strategies throughout the curriculum in order to promote the students success in the program on the NCLEX-RN examination. Further, Johnston advocated that persons responsible for developing the NCLEX-RN ensure that the tests are as free as possible from cultural and linguistic bias. The same recommendation can be made for other standardized tests, such as National League for Nursing (NLN) and teacher-made examinations.

Phillips and Hartley (1990) and Kruz (1993) described retention strategies in critical areas of reading, listening, speaking and writing. They advocated the use of computer-assisted instruction, recording of lectures, visual displays of major concepts, study groups, and writing laboratories to facilitate the learning needs of culturally and linguistically diverse students. The authors also reported that these students preferred kinesthetic and tactile learning styles.

Nonacademic strategies such as peer support groups, financial resources, culturally diverse faculty, mentor programs, and academic advising were also reported to facilitate academic success for the ethnic student (Memmer and Worth, 1991 and Crawford and Olinger, 1988). The findings from the literature support Holtz and Wilson's (1992) empowerment model of academic support and faculty facilitation. In order to decrease the attrition, nursing educators must begin to examine variables among the culturally diverse student population which can influence academic achievement. To retain culturally diverse students, it is essential to assess the population and implement strategies that will facilitate academic success.

Methodology

The study sample consisted of 173 students' Nurse Entrance Test (NET) scores and semester course grades obtained from four classes admitted to the College of Nursing between Fall 1991 and Spring 1993. Table 1 describes the characteristic of the sample. Fifty-three percent (53.1) of the sample were generic and the majority were African American, single and female. Seventeen percent (17.3) had dependent children and 34.1% reported having part-time or full-time employment. The mean age of the sample was 27, with a range of 20-44.

Twenty-five percent of the student population was foreign born, with the majority from Africa. Most of the African students were from Nigeria, with one (1) student from Liberia, two (2) from

Ethiopia, and one (1) from Sierra Leone. Asian students comprised seven (7) students from the Philippines, two (2) students from China and two (2) students from the IndoPakistan region. Students from the Caribbean were primarily from Jamaica, with one (1) student from Trinidad. Almost eight percent of the sample spoke English as their primary language.

Chi square analyses were used to determine differences in the demographic variables between the primary English speaking and ESL students (Table 2). The results showed that a greater proportion of ESL students were male; and were more likely to be married. Although there were no significant differences between the two groups based on student, work, or parental status, the ESL group were more likely transfer students, more likely employed and had more children than the American students. The ESL students were also significantly older than the American born students

Instrument

The NET is a diagnostic examination that is required of all students admitted to the professional program at the College of Nursing. This examination is used to evaluate students' cognitive and non-cognitive abilities, such as basic mathematical skills, reading comprehension for science textbook, stress level, social interaction, learning styles, and test-taking skills. The NET's reliability was established and average coefficient was +.93 with coefficients ranging from +.89 for math to +.97 for the reading comprehension subtest. The criterion-related validity was determined by correlating the NET's composite score with the ACT's composite score. The averages were +.79 to +.83 (Educational Resources, 1990). The NET's ability to predict academic outcomes among minority nursing students has previously been reported (Abdur-Rahman, Femea, Gaines, 1994).

Data Analysis

Descriptive and inferential statistics were analyzed using the SPSS Statistical Package. The descriptive statistics included frequency distributions, means, and standard deviations. T-tests were used to determine differences between English speaking and ESL students for the NET variables and academic performance. A comparison of the differences in NET scores between primary English speaking and ESL students is presented in Table 3. The ESL students had significantly lower reading, math, composite and test-taking skills scores. In addition, the ESL students had significantly higher family, social, and workplace stressor scores. Academic stressor scores revealed an interesting finding. The ESL students had lower academic stress than the primary English speaking students, which suggests that at no time of entry for the nursing program, the ESL student did not perceive the nursing program as academically stressful. The types of learning styles for the two groups were very similar, but the ESL students scored significantly higher on social and writing dependent learning styles.

Finally, a comparison of academic performance for the two groups is presented in Table 4. ESL students had significantly lower grades in all courses during the first semester except for Health Assessment. The fist semester GPA was also significantly lower than the primary

English-speaking students. By the second semester, however, the average grades for the ESL students were higher for almost all courses, NLN tests and GPA. ESL students had significantly higher scores for the Adult Health Nursing I - Theory course.

Discussion

The study's findings confirmed that our culturally diverse students are at risk for academic failure and dismissal from the College of Nursing during the first clinical semester. To successfully retain this population, the process must be a joint, collaborative venture between faculty, students, and administration. Efforts to facilitate adjustment to the new academic environment during the first semester are crucial. The development of an appreciation, sensitivity to the understanding of the cultural background and values of the culturally diverse student is an important first step. Practical examples of such efforts may include support for culturally diverse student forums and planning and implementing international programs on campus.

Faculty who share the culture or have an understanding of the students' culture can facilitate the process of helping with the adjustment during the first semester. For example, a Nigerian faculty member was encouraged to attend a national conference on working with international students. Based on the conference report and the philosophy that students have unique legitimate issues, an international nursing students' organization was formed. The organization provides a place for the culturally diverse students to meet with peers and faculty and discuss concerns. An issue that was shared with the group was the belief in many African cultures that nursing was not a "proper" or masculine profession for African males. Indeed, several of the male students were enrolled in nursing without their family's knowledge. Faculty must be willing to encourage discussion of feelings, to assist students to resolve ego threatening beliefs and become comfortable with their decision to enter the nursing profession.

The results indicated that our culturally diverse students had significantly more self-perceived family, social and workplace stressors than American-born students. This finding is understandable considering the role of African males as heads of extended families. For example, many of our African students discuss the strong ties to extended families. They are expected to assist financially in supporting family members, especially the elderly members. Often, when there is an illness in the family, students will immediately interrupt their education to return to their country.

Since many of our culturally diverse students must handle work, family and school responsibilities simultaneously, administrators can seek creative opportunities to help students with financial assistance, such as encouraging the student to apply for "green cards," awarding financial aid to those who are eligible for nonrestrictive monies, and seeking scholarships. Administrators can also serve as advocates to negotiate payment plans for meeting financial obligations of tuition at the university level (Allen, Nunley, Scott-Warner, 1988).

Our study results also indicated that the culturally diverse students had difficulty with reading comprehension, mathematics and test-taking skills. They were significantly more writing dependent when compared to American born students, and preferred the social mode for learning. This suggests that the culturally diverse students have a strong preference for writing notes and studying in groups.

A variety of teaching strategies to facilitate students' success is important. Students must be taught effective test-taking strategies. The College of Nursing uses predominantly multiple choice testing, while most foreign students are accustomed to essay tests and assignments. Workshops on test-taking strategies benefit culturally diverse students as well as African American students (Phillips & Hartley, 1990). Computer software and the use of popular print, i.e. newspaper and journal articles to reinforce basic principles and concepts, can be effective strategies to enhance comprehension. The uses of gaming teaching strategies and cooperative learning techniques are also beneficial. It is also important that the culturally diverse students understand the necessity of seeking and using appropriate faculty support.

Faculty and staff must be educated to recognize that culturally diverse students' speech patterns, habits, customs and beliefs may cause the student to be hesitant to speak up in class or actively participate in class discussions. It is interesting that the culturally diverse students did academically better than the American born students during the second clinical semester. This finding supports Keane's (1993) observation that ESL nursing students are not necessarily "remedial" students but need to be perceived and taught as foreign-born language students who have not quite mastered English.

To promote cultural diversity in nursing programs, an important strategy is to create a climate or environment in which there is an expectation of successful outcomes for all students. If faculty and administration believe that culturally diverse students will not be academically successful, they will continue to find that these students will contribute significantly to high attrition rates. Recognizing cultural biases and having an open mind and willingness to work with the culturally diverse students can bring about positive results for students and the university.

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TABLE 1
Characteristic of the Sample (N=173)

<u>Characteristic</u>	<u>N</u>	<u>% Sample</u>
<i>Status at entry</i>		
Generic	92	53.1
Transfer	81	46.8
<i>Gender</i>		
Female	146	84.4
Male	27	15.6
<i>Nationality</i>		
Black American	117	67.6
African	24	14.0
Asian	11	6.3
White	10	6.0
Caribbean	8	4.5
Hispanic	2	1.0
American Indian	1	.5
<i>Language</i>		
Primary English	138	79.7
English as a second Language (ESL)	35	20.2
<i>Marital Status</i>		
Single	124	73.4
Married	38	22.5
Divorced	7	4.0
Dependent children	30	17.3
Employed	59	34.1
<i>Age</i>		
	Mean 27 years	
	Range 20 to 44 years	

TABLE 2
Comparison of Demographic Variables

<u>Variable</u>	<u>PES*</u>	<u>ESL**</u>	<u>p value</u>
<i>Gender</i>			
Male	12.6	30	0.0000
Female	87.4	70	
<i>Marital Status</i>			
Single	78.4	50.0	0.0003
Married	16.5	50.0	
Divorced	5.0	--	
<i>Student Status</i>			
Generic	54.0	46.4	0.5996
Transfer	46.0	53.6	
<i>Work Status</i>			
Employed	31.5	46.7	0.1662
Unemployed	68.5	53.3	
<i>Parental Status</i>			
Have children	15.4	26.7	0.2230
No children	84.6	73.3	
Age	25.22	32.68	0.0000

*PES - Primary English Speaking

**ESL - English as a second language

TABLE 3

Comparison of primary English speaking and English as a second language students' performance on NET variables

<u>NET Variables</u>	<u>PES</u>	<u>ESL</u>	<u>p value</u>
Reading	56.2340	29.2333	0.0000
Math	74.8811	65.7667	0.0011
Composite	67.4825	39.0667	0.0000
Test-taking skills	38.6761	33.7000	0.0024
Stressors			
Family	27.7832	37.3000	0.2113
Social	30.0000	41.6667	0.0005
Money/time	61.3916	62.9667	0.6780
Academic	35.6643	22.3333	0.0014
Workplace	20.6294	35.6667	0.0000
Learning Style			
Auditory	45.8741	52.6333	0.1897
Visual	63.5524	69.7667	0.1647
Social	68.5944	78.7000	0.0239
Oral	66.1049	64.3667	0.6657
Writing Dependent	56.7203	72.4333	0.0011
Solitary	68.1888	69.2333	0.8706

TABLE 4

Comparison of performance in course work between primary English speaking and English as a second language nursing students

<u>Semester</u>	<u>PES</u>	<u>ESL</u>	<u>p value</u>
Semester One			
Intro to Prof. Nursng	81.0113	75.3310	0.0000
Basic concepts (T)*	78.2533	74.3308	0.0032
Basic concepts (P)*	82.3478	78.9769	0.0027
Health Assessment	80.4664	77.6000	0.0802
NLN Test Score	31.3652	19.6957	0.0394
Semester one GPA	2.4767	1.8787	0.0000
Semester Two			
Pathophysiology	80.4621	84.0625	0.3085
Pharmacology	77.8624	81.5250	0.1441
Adult Health 1 (T)*	79.0573	82.7636	0.0363
Adult Health 1 (P)*	92.7991	86.0636	0.7730
NLN Test 1 Score	17.0500	26.3333	0.2577
NLN Test 2 Score	19.8983	20.8333	0.9259
Semester two GPA	2.4375	2.6795	0.3778
First year GPA	2.5571	2.6603	0.6247

*T -Theory course

*P - Practicum course

The Relationship of Nurse Entrance Test (NET) Scores to Completion of a Baccalaureate Nursing Program

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Introduction

Nursing educators and nursing programs across the country are concerned with academic success and attrition rates in nursing education. The usefulness of a tool to predict academic abilities and success is often a topic of discussion in these higher education settings. Educational Resources, Inc. (ERI) has offered the Nurse Entrance Test (NET) as a diagnostic instrument for approximately ten years. ERI has continued to build a national data base containing information provided by client schools reporting students' successful completion of the nursing program. This data base allows examination of those relationships that may exist between the NET scores obtained by each student and a successful or unsuccessful nursing program outcome.

Review of Literature

The literature reveals that the NET has been utilized in at least five studies. Peter (1996) examined the evaluation of a learning assistance program for at-risk students, using the NET to predict at-risk students. Findings support the use of critical thinking scores from the NET to be predictive of the identification of at-risk students. Abdur-Rahman, Femea and Gaines (1994) found that NET scores correlated with academic outcomes in the first year of a nursing program and accounted for 33% of the variance in nursing grades. Femea, Gaines, Brathwaite and Abdur-Rahman utilized the NET in a population of English-as-a-second- language (ESL) students to predict academic performance. ESL students scored significantly lower on the NET in reading, math and test-taking skills and demonstrated a lower degree of academic performance in the first semester of course work.

Gallagher, Bomba, and Crane (2001) compared the NET to the Entrance Examination for Schools of Nursing (RNEE) as predictors for academic success. Mathematics scores from the NET were statistically significant predictors for the population under study. Symes, Tart, Travis and Toombs (2002) used NET scores in identification of at-risk students that may require additional support for academic success.

Method Design

The design of this study was an exploratory descriptive approach. Client BSN schools of nursing were asked to assist in this project from a targeted approach. Those schools willing to participate were faxed a roster of their students from ERI's NET data bank, (1998, 1999, 2000 academic years) listing each student and applicable NET scores. Each school was asked to indicate which students on the roster had not successfully completed its nursing program.

Population

The population for this study was defined as BSN students from the academic years of 1998, 1999 and 2000. These students, if following a normal track, should have graduated from the program before the time of data selection for this study.

Sample

The data received included schools of nursing in Georgia, Texas, Alabama, South Carolina, Michigan, West Virginia and Illinois. The minimum sample was set at 1000 participants (5 participants per item from the exam) and the highly acceptable level was set at 2000 students (10 participants per item).

Procedures

The rosters of participants were culled from the ERI data bank. The results of the NET scores were placed in an EXCEL® spreadsheet. Each student was coded for completion or non-completion of the program. The data base was then converted to SPSS® for Windows for analysis.

Results

Schools of nursing representing seven states returned data to ERI. The initial data pool totaled 2,239 students. Cleaning of the data resulted in a total of 1,860 students with NET and completion data. The data included 1,385 students who had successfully completed the program with 475 students who had not.

Analysis

Cronbach's alpha (coefficient of reliability) was established at 0.88, indicating a good level of data reliability. Descriptive statistics were computed on the NET data in the entire data set. Composite score mean was 66 (sd 14.0); Math score mean was 73 (sd 17); and Reading score mean set at 61 (sd 17). Although the correlations are not high, statistical significance was demonstrated. Table 1 represents correlations of Composite score, Math score and Reading scores.

Table 1.

<u>Variables</u>	<u>Pearson Correlation</u>
Composite – Completed	.06*
Math – Completed	.09**
Reading – Completed	.11*

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

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

Regression analysis was performed with Math scores and Reading scores as predictors of successful or unsuccessful completion of the program. ANOVA revealed a statistically significant model ($p < .005$). The Reading score was the primary predictor in this model, followed by Math. F-ratio was 11.74 indicating a good model.

R square was .013, establishing a 13% variation between Math and Reading scores (Field, 2000).

The data base was then divided into two groups, those students who had completed the nursing programs and those who had not been completed. Next, a t-test was conducted to examine differences in these two groups. Statistical significance (2-tailed) was obtained for Composite, Reading and Math scores ($p < .005$ for all) between the two groups.

Frequency analysis was then run on the two groupings of students (completed/not completed). Approximately 48% of the students who completed programs scored at or below the mean on Composite score; 56% scored at or below the mean on Math; and 48% scored at or below the mean on Reading.

60% of the “not completed” group scored below the mean on Composite scores.

Approximately 57% of unsuccessful students scored below the mean on Math scores, 60% below the mean on Reading scores.

Discussion/Conclusions

This study has attempted to examine national data on NET scores and successful/unsuccessful completion of a BSN nursing program. This data is somewhat limited by lack of total geographical representation. The number of students in the data base is acceptable. It is not known if all of the students in the data base were unsuccessful due strictly to academic failure or for other reasons.

The data indicates that the NET is a predictor for successful completion of a BSN program. The leading predictor was identified as the Reading score; however, Math and Composite scores also present as indicators of completion of a program in this study. Statistical significance was demonstrated between the two groups of students for Composite, Math and Reading scores from the NET. Future research is indicated to examine which point of failure in the academic programs is most common, along with the reasons for the academic failure. The framework is also provided for prediction of potential failure in a BSN program.

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