The Usefulness of the Nurse Entrance Test (NET) for Prediction of Successful Completion in a Nursing Program

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Nurse educators and nursing program administrators continue to be concerned with academic success and attrition rates in nursing education. The usefulness of a tool to assist in predicting academic abilities and success in nursing programs is often identified as a faculty need. The Nurse Entrance Test (NET) is used by many programs of nursing in the United States for a variety of preadmission criteria. Approximately 100,000 NET examinations are administered to potential nursing students each year across the country. Practical nursing, diploma, associate degree and baccalaureate degree programs have found the NET useful to the admission and counseling processes within each school. These schools utilize the NET results for a variety of reasons. Many programs require the NET as an admission criterion with identified scores necessary for admission to the program. Other schools use the NET as a screening and counseling tool, identifying potential "at risk" students as they enter the program. Early identification and intervention with the "at risk" nursing student may have a positive affect on attrition rates and academic success for the student and the nursing program.

An assessment tool that predicts the academic failure or success of the incoming nursing student could provide a framework of counseling interventions for the student and assistance to the faculty and administrators of nursing programs. Effective interventions have been reported to dramatically impact a program's attrition rate (Symes, Tart, Travis &, Toombs, 2002).

Research Question

The research question which guided this study was, "Which results from NET testing may serve as predictors for the academic failure or success of students in nursing programs?"

Review of Literature

Although research examining the predictor variables for successful licensure testing is becoming more evident in the literature, studies using the NET scores as predictors for success within a nursing program are limited in the research literature. Traditionally, nursing focus has been on preparation of the student for the licensure exam. Some attention is refocusing on nursing students performing successfully in the academic setting.

The research information available has addressed a variety issues and used NET data to examine those issues. Quill (1993), Rubino (1998) and Abdur-Rahman, Femea & Gaines (1994) utilized NET scores in their respective associate degree nursing programs for prediction of successful academic outcomes for those students. Quill found no predictive variables for success but admitted that low numbers of students influenced the statistical outcome. Rubino reported that Math skills scores from the NET were correlated with successful completion of the program. Abdur-Rahman et al. found that NET scores did correlate with academic outcomes and accounted for 33% of the variance found in nursing course grades.

Gallagher, Bomba & Crane (2001) compared the NET with the Entrance Examination for Schools for Nursing (RNEE) scores. Statistical difference was found between successful and non-successful group on math scores from the NET. Tucker (1999) found that student critical thinking scores on other measurement tools and clinical judgment correlated with the variables found on the NET. Sayles, Shelton & Powell (2003) determined that the NET variables of composite, math and reading scores were predictive of success in an associate degree program and a successful first attempt for licensure.

Other research using the NET has focused on the “at risk” student. Peter (1996) reported that critical thinking scores from the NET were predictive in the identification of at risk students

from disadvantaged backgrounds. Femea, Gaines, Brathwaite & Abdur-Rahman (1994) and Symes, Tart, Travis & Toombs (2002) utilized the NET with English-as-a-second-language (ESL) students to identify those at risk for non-progress through programs of nursing.

Current research has been limited by the small groups of participants in this study. A large, nationally-based sample of nursing students comparing NET scores to academic success or failure in a program of nursing has not been documented. The available information is also limited to associate and baccalaureate degree programs of nursing. No information is available regarding students in diploma or practical nursing programs.

Method

Sample

The study approach was an exploratory descriptive design. It was decided to use a convenience stratified approach of ERI client schools of nursing. Programs were identified according to type of program (practical nursing, diploma, associate degree or baccalaureate degree) and geographical location in the United States in an attempt to include equal representation. The selection of potential participant programs was then made. These programs were then solicited for willingness to be included in the study. Due to low response rate the sampling procedure was then repeated with other schools. The minimal acceptable sample was set at 270 students per type of program (27 variables of the NET times 10 participants per variable).

Procedure

The programs that agreed to participate were then given rosters including NET scores of the students and selected years of interest (1998, 1999, 2000 and 2001). The NET scores were selected for these years assuming that the students had graduated from programs at the time of

the data collection. These rosters were placed in an Excel® spreadsheet and either emailed or faxed to the participant program. The participants were requested to code each student's status with the appropriate number from the provided key (Table 1.).

Table 1. Student Status Key

Key	Student Status
1	Completed Program
2	Academic Failure 1st Half
3	Academic Failure 2nd Half
4	Withdrew/Reason Unknown
5	Withdrew Because of Family Issues
6	Withdrew for Social Issues
7	Withdrew for Financial Reasons
8	Withdrew for Work Reasons

The student status was left blank if the student never entered the program or if the student is still active in the program.

Each participant program then mailed, emailed or faxed the results back to the research team at ERI. All results were merged into a master Excel® spreadsheet. Cleaning of the data was performed when missing variables were identified. Those students with no status reported were deleted from the data. These results were then imported into SPSS® for Windows for data analysis procedures. Additional cleaning of the data was necessary.

Results

Nursing programs responded with data representing twelve states and all six geographical regions of the United States. The total number of students represented in the data base was 4,339. Table 2 identifies the number of students by type of nursing program. Table 3 is a summary of student status results.

Table 2. Participants by Program Level.

Type of Program	Number
Practical nursing	1890
Diploma	202
Associate degree	1363
Baccalaureate	884
Total	**4339**

Table 3. Summary of Student Status Results

Status	Frequency	Percent
1 Completed Program	3239	74.6 %
2 Academic Failure 1st Half	545	12.6 %
3 Academic Failure 2nd Half	164	3.8 %
4 Withdrew/Reason Unknown	233	5.4 %
5 Withdrew Because of Family Issues	96	2.2 %
6 Withdrew for Social Issues	54	1.2 %
7 Withdrew for Financial Reasons	6	.1 %
8 Withdrew for Work Reasons	2	.0 %

Overall Analysis

Cronbach's alpha coefficient of reliability was set at .89 for the entire data base, indicating a high level of reliability of the data. Correlation was performed between the 27 variables of the NET and student status. Statistically significant correlations are listed in Table 4.

Table 4. Significant Correlations of NET Variables and Student Status

Variable	r
Composite score	.12**
Math Skills score	.07**
Reading comprehension	.14**
Reading rate	.05**
Test-taking skills	.07**
Visual learner	.04**
Social learner	.03*
Solitary learner	.04*
Inferential Reading (Critical Thinking)	.14**
Main Idea (Critical Thinking)	.08**
Predicting (Critical Thinking)	.11**

**. Correlation is significant at the 0.01 level
*. Correlation is significant at the 0.05 level

Regression analysis was then conducted to determine which variables could be predictive of student status. [Note: Composite Score was not used in the same regression procedure with Math and Reading. The Composite Score is an average of these two scores and not an independent variable when placed in an analysis situation with these scores.] Statistical significance was achieved with five variables: Reading Comprehension ($p<0.01$); Math Skills ($p<0.01$); Inferential Reading ($p<0.01$); and Predicting ($p<0.01$) [F-ratio 24.1]. The variables of Composite Score, Social and Solitary learning styles also demonstrated statistical significance ($p<0.01$) [F-ratio 15.4] when regressed on the dependent variable of student status.

Factor analysis was conducted on the variables Composite Score, Reading Comprehension, Math Skills, Inferential Reading and Predicting with the student status of completed the program successfully. The component matrix is in Table A. 68.7 % of variance was explained by the factor of successful completion. Table B contains the component matrix

for those students who failed academically in the first half of the nursing program of enrollment. 64 % of variance is explained by the failure factor.

Table A. Component Matrix for Completed Program

Composite Score	.956
Reading Comprehension	.918
Inferential Reading	.830
Predicting	.712
Math Skills	.697

Table B. Component Matrix for First Half Academic Failure

Composite Score	.922
Reading Comprehension	.907
Inferential Reading	.823
Predicting	.751
Math Skills	.545

The data from three student status groups (completed program, academic failure in first half of program and academic failure in second half of program) were then compared. Statistical significance ($p<0.01$) by t-test was achieved between groups on Composite Score, Reading Comprehension, Math Skills, Inferential Reading and Predicting variables. Table 5 lists means of variable scores by group. The data of the students experiencing academic failure in the first or second half of the program were also combined into another variable for overall failure (AF).

Table 5. Variable Means by Group

Variable	Completed	AF*	AF1**	AF2***
Composite Score	68	60	60	62
Reading Comprehension	64	55	55	56
Math Skills	72	66	67	69
Inferential Reading	66	52	52	54
Predicting	54	46	47	47

* Academic failure overall
** Academic failure first half of program
***Academic failure second half of program

PN Programs

Data was received on a total of 1,890 PN students. Cronbach's alpha was identified at .88, indicating a high level of reliability of the data. Frequency analysis results are reported in Table 6. Correlation analysis was performed with the 27 NET variables and student status. The variables found to be statistically significant (Kachigan, 1991) are in Table 7.

Table 6. Summary of PN Student Status Results

Status	Frequency	Percent
1 Completed Program	1406	74.4 %
2 Academic Failure 1st Half	221	11.7 %
3 Academic Failure 2nd Half	76	4 %
4 Withdrew/Reason Unknown	123	6.5 %
5 Withdrew Because of Family Issues	41	2.2 %
6 Withdrew for Social Issues	18	1.0 %
7 Withdrew for Financial Reasons	4	.2 %
8 Withdrew for Work Reasons	1	.1 %

Table 7. Significant Correlations of NET Variables and Student Status

Variable	r
Composite score	.10**
Math Skills	.06*
Reading comprehension	.12**
Reading rate	.05*
Test-taking skills	.07**
Social learner	.07**
Inferential Reading (Critical Thinking)	.11**
Main Idea (Critical Thinking)	.10**
Predicting (Critical Thinking)	.10**

**. Correlation is significant at the 0.01 level
*. Correlation is significant at the 0.05 level

Regression analysis was then performed on the data. Significant findings include: Composite Score ($p<0.01$); Reading comprehension ($p<0.01$); Social learner ($p<0.01$); Inferential Reading ($p<0.05$); and Predicting ($p<0.05$). The PN means by group of these significant variables are listed by student status in Table 8.

Table 8. PN Variable Means by Group

Variable	Completed	AF*	AF1**	AF2***
Composite Score	63	57	56	61
Reading Comprehension	67	52	52	54
Math Composite	60	62	60	62
Inferential Reading	56	47	47	49
Predicting	51	44	44	46

* Academic failure overall
** Academic failure first half of program
***Academic failure second half of program

Diploma Programs

Data was received regarding 202 students from diploma programs across the country. Cronbach's alpha was set at .86 for the data, indicating an acceptable level of reliability.

Frequency analysis results are in Table 9. Correlation analysis was conducted between NET variables and student status. The significant findings are reported in Table 10.

Table 9. Summary of Diploma Student Status Results

Status	Frequency	Percent
1 Completed Program	129	63.9 %
2 Academic Failure 1st Half	49	24.3 %
3 Academic Failure 2nd Half	4	2 %
4 Withdrew/Reason Unknown	6	3 %
5 Withdrew Because of Family Issues	5	2.5 %
6 Withdrew for Social Issues	9	4.5 %
7 Withdrew for Financial Reasons	0	0 %
8 Withdrew for Work Reasons	0	0 %

Table 10. Significant Correlations of NET Variables and Student Status

Variable	r
Composite score	.09**
Whole Numbers	.08**
Reading Comprehension	.10**
Inferential Reading (Critical Thinking)	.11**
Predicting (Critical Thinking)	.08**

**. Correlation is significant at the 0.01 level
*. Correlation is significant at the 0.05 level

Regression analysis was utilized to find significance in prediction within the variables listed in Table 10. The Math Skills score was substituted for the Whole Numbers variable. The predicting variables were: Composite Score ($p<0.01$) and Reading Comprehension ($p<0.01$).

Table 11. Diploma Variable Means by Group

Variable	Completed	AF*	AF1**	AF2***
Composite Score	67	53	53	61
Reading Comprehension	65	51	51	59
Math Composite	69	56	55	65
Inferential Reasoning	66	50	49	65
Predicting	57	45	45	45

* Academic failure overall
** Academic failure first half of program
***Academic failure second half of program

Associate Degree Programs

The data base for associate degree program included 1,363 students. Cronbach's alpha was set at .85, indicating an acceptable level of reliability. Student status results are presented in Table 12. Correlation analysis identified statistically significant relationships differentiating from previous findings. These results are listed in Table 13.

Table12. Summary of Associate Degree Student Status Results

Status	Frequency	Percent
1 Completed Program	942	69.1 %
2 Academic Failure 1st Half	219	16.1 %
3 Academic Failure 2nd Half	74	5.4 %
4 Withdrew/Reason Unknown	87	6.4 %
5 Withdrew Because of Family Issues	33	2.4 %
6 Withdrew for Social Issues	5	.4 %
7 Withdrew for Financial Reasons	2	.1 %
8 Withdrew for Work Reasons	1	.1 %

Table 13. Significant Correlations of NET Variables and Student Status

Variable	r
Composite score	.09**
Whole Numbers	.08**
Reading Comprehension	.10**
Inferential Reading (Critical Thinking)	.11**
Predicting (Critical Thinking)	.08**

**. Correlation is significant at the 0.01 level
*. Correlation is significant at the 0.05 level

Regression analysis was then performed. The Math Skills score was substituted for the Whole Number variable. The results are as follows: Composite Score ($p<0.01$); Reading Comprehension ($p<0.001$); Inferential Reading ($p<0.01$); and Predicting ($p<0.01$). The Math Skills score was not statistically significant in this model for this group of students. Table 14 presents the variable means by student status in this group.

Table 14. Associate Degree Variable Means by Group

Variable	Completed	AF*	AF1**	AF2***
Composite Score	69	64	64	64
Reading Comprehension	64	57	57	58
Math Skills	75	71	72	71
Inferential Reading	66	56	57	58
Predicting	54	48	48	49

* Academic failure overall
** Academic failure first half of program
***Academic failure second half of program

Baccalaureate Programs

The baccalaureate data base contained 884 students. Cronbach's alpha was determined to be .88, an acceptable level of reliability for the data. The breakdown of student status is located

in Table 15. Correlation of NET variables with student status was conducted. The statistically significant correlations are in Table 16.

Table15. Summary of Baccalaureate Student Status Results

Status	Frequency	Percent
1 Completed Program	762	86.2 %
2 Academic Failure 1st Half	56	6.3 %
3 Academic Failure 2nd Half	10	1.1 %
4 Withdrew/Reason Unknown	17	1.9 %
5 Withdrew Because of Family Issues	17	1.9 %
6 Withdrew for Social Issues	22	2.5 %
7 Withdrew for Financial Reasons	2	.1 %
8 Withdrew for Work Reasons	1	.1 %

Table 16. Significant Correlations of NET Variables and Student Status

Variable	r
Composite score	.14**
Math Skills	.07*
Reading Comprehension	.16**
Family stressors	.08*
Social stressors	.11**
Inferential Reading (Critical Thinking)	.19**
Predicting (Critical Thinking)	.09**

**. Correlation is significant at the 0.01 level
*. Correlation is significant at the 0.05 level

Regression analysis was performed with Composite, Math Skills, Reading Comprehension, Family stressors, Social stressors, Inferential Reading and Predicting scores as independent variables and student status as the dependent variable. Composite score, Reading Comprehension, Inferential Reasoning scores and Social stressors were significant predictors of student status ($p<0.01$) within this group of students. The means of variables by student status group are listed in Table 17.

Table 17. Baccalaureate Variable Means by Group

Variable	Completed	AF*	AF1**	AF2***
Composite Score	75	64	64	63
Reading Comprehension	70	56	57	55
Math Skills	80	72	72	73
Inferential Reading	73	55	55	53
Predicting	61	49	50	49

* Academic failure overall
** Academic failure first half of program
***Academic failure second half of program

Discussion

Reliability coefficients of the entire data base and of the data in each of the subgroups were established at very satisfactory levels for the study. Composite scores and Reading Comprehension scores were consistently leading predictors for academic success across all of the programs when results are combined and analyzed separately based on type of program. Factor analysis also supports Composite scores and Reading comprehension scores as having the most influence on the student status of success or failure in this data set. Inferential Reading scores emerged as also having influence on student status, which was an expected finding. It does logically follow that if the student can critically think, the chances of academic success may be enhanced. Critical thinking skills from the NET have been found to correlate with critical thinking and clinical judgment (Tucker, 1999).

Group means for the variables of Composite score, Reading, Math, Inferential Reading and Predicting for the successful students and the students who experienced academic failure in the first half of the program demonstrate statistical significance ($p<0.01$). The means for the successful group are markedly higher than the means for the academic failure group.

Diploma nursing programs yielded the highest rate of academic failure (24%). This may be related to the small sample size (n=202). Associate degree programs were next with 16%, followed by practical nursing at 12% and then baccalaureate with 6%.

The data from practical nursing programs indicate that learning styles may have an influence on success. The social learning variable emerged as a possible predictor. The NET assists the student to identify self-indicated learning styles. The two options then become social learner versus solitary learner. Data analysis of the entire data base provides support for the identification of learning styles also as a potential predictor for student academic success.

The data from baccalaureate programs indicated that Social Stressors play some role in the success or failure of students. This finding was not demonstrated in the Sayles, Shelton & Powell (2003) study. The origins of this result may lead to speculation as to causes of this finding. This data would not be surprising in an associate degree program, where students tend to be older, working and have families however the variable did not emerge in the associate degree data. Today's baccalaureate student, traditionally a younger student, may not differ drastically from the demographics of the associate degree student.

Often a nursing program may consider setting entrance criteria for the program. The information regarding the successful student from this study may assist in the admissions procedures as students are screened.

Limitations

Limitations for this study are identified. The sample was not randomly selected. Participants were purposively approached for participation based on geographical location and type of program. The number for diploma program student participants is low (n=202).

Generalizations from that data should be approached with caution. Bias may be present in the data if schools with low attrition rates were the primary responders to the request for data.

Implications for Future Research

The study should continue with additional data collection. A variable not assessed by this study was that of the ESL student. New data collections should also factor in this variable. Even though the numbers of diploma nursing programs have decreased over the last two decades there are still viable programs in existence. Continued data collection from diploma programs to increase the sample size may result in different results.

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