

# PREDICTING PERFORMANCE ON THE PROFESSIONAL KNOWLEDGE PORTION OF THE NATIONAL TEACHER EXAMINATIONS

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Teacher education programs are expected to prepare competent individuals. nevertheless, because policy makers have been unable to envision the possibility of classrooms without teachers, they have insisted on a guaranteed supply of teachers, even at the expense of quality (Dolce, 1986). However, since the report titled A National at Risk (National Commission on Excellence in Education, 1983) was published, much **national media and political** attention has been focused on improving the quality of public education at all levels. This attention has caused an upsurge in public demand for quantitative visible educational results, effectiveness, and efficiency. These demands have resulted in growing numbers of legislative mandates at the state and national levels designed to make the education system more accountable. Conceivably, the insistence for increased educational accountability could serve as a catalyst for exerting pressures on the educational community to improve the quality of teachers entering the profession.

External examinations as predictors of competence have been increasingly adopted over the past decade. The National Teacher Examinations have been used to assess the knowledge of teachers and prospective teachers since 1940 when the examinations were first administered by the American Council on Education (Brown, 1974). In 1982 at least 19 states required prospective-teachers to take the National Teacher Examinations for certification purposes in an attempt to improve the quality of teachers entering the profession (Tarver and Carr, 1983).

In a study by the American Association of Colleges of Teacher Education (1986), it was reported that half of the states required testing at some point prior to certification, and two-thirds of the states have mandated increased standards for schools, colleges, and departments of education. Both the American Federation of Teachers and the National Education Association have called for tougher standards for the preparation of teachers. The National Council for the Accreditation of Teacher Education in its redesign of accreditation standards, in effects, raised admission standards into teacher education. They also called for a significant change in the program content, and emphasized an increased reliance on the knowledge base for teacher education (Smith, 1986).

Gideonse (1989) stated that the education of teachers must equip them in many different respects. Teachers must be good models of the educated persons they seek to produce. It is important that teachers be prepared for the development, understanding, and justification of the decisions they make. They must understand the culture and era in which they work. They must be educated to handle value discourse and be able to express themselves with clarity and precision in speaking and in writing. Such an education assures that teachers will possess the generic tools to function as professionals. They should model for their students the goal of an educated citizenry, a goal they seek to help their students achieve in service to the continuously evolving purposes and foundations of a free society.

The 1985 North Carolina General Assembly directed the Board of Governors of the University of North Carolina to establish a Task Force on the Preparation of Teachers by October 1, 1985 and to report the findings and recommendations of its study to the 1987 Session of the General Assembly. As a part of the charge to the Task Force, the legislation directed the Board of Governors to study: (a) standards for improved efficiencies in the administration of teacher education programs and (b) ways to upgrade teacher preparation programs to make the course of study more rigorous and more effective (Board of Governors of The University of North Carolina, 1986).

The typical program of study to prepare for a career in teaching in North Carolina consists of three activities: (a) completion of a general studies program in the lower division of an undergraduate degree program, (b) admission to a formal program of study in professional education in the upper division of a four-year undergraduate program, and (c) satisfactory completion of a supervised student teaching experience prior to entry to full-time employment with a baccalaureate degree as a teacher in the public schools. Admission requirements for entering teacher education programs vary somewhat from one institution to another (Board of Governors of The University of North Carolina, 1986). However, the admission requirements generally included:

1. Satisfactory performance in general studies, often at a level measured by a grade point average of 2.00, "C", or higher.
2. Passing the General Knowledge and Communication Skills portions of the National Teacher Examinations (NTE) at levels set by the State Board of Education.
3. Completing an interview or other assessment and counseling procedures devised by the programs to help ensure that prospective teacher education students have adequate achievement abilities and aptitude for professional study.

The Task Force stated that it felt stronger standards, conscientiously applied, and not longer periods of study, offered the most promising solutions to the problem of making necessary reforms in teacher education programs. Based on this position, major Task Force recommendations called for specific action for strengthening teacher education admission and program approval standards. The action recommended required that:

1. The score requirements on the Communication Skills and General Knowledge portions of the National Teacher Examinations be raised from the current level to at least the 35th percentile, based on validations of the test in North Carolina, (This increase should be phased in over a three year period.)
2. A minimum overall grade point average in general studies courses of 2.50 on a 4.00 point scale, by the end of the fourth full semester of study, be established as a requirement for admission to teacher education programs.
3. All approved programs achieve national accreditation by 1990 under the recently revised and strengthened standards of NCATE.
4. Once established, approved teacher certification programs be expected to maintain a pass rate of 70% on the Professional Knowledge portion of the National Teacher Examinations for graduates seeking initial certification. Programs unable to meet this level of productivity should show cause why they should not be discontinued.

At North Carolina State University students must successfully pass both the Communication Skills and General Knowledge portions of the National Teacher Examinations prior to being admitted to their professional methods course. In practice, this requires the students to successfully pass the two portions of the NTE by the end of their sophomore year. The Professional Knowledge Test is usually completed during or immediately after the students' last semester of their baccalaureate program.

Based on these requirements, the administration within the College of Education and Psychology at North Carolina State University has made a decision to raise the admission standards for students entering the College. The admission decision for entering freshmen students at North Carolina State University is based on a freshmen academic admission index. A minimum 2.0 freshmen academic admission index score has been established by university officials for incoming freshmen students for all programs offered on the campus. The maximum index obtainable is 3.61 for male applicants and 3.71 for female applicants. However, the university officials have given the administrators within the various colleges and departments local autonomy to establish their own minimum admission index scores if they wish for them to be higher than the university minimum. The higher admission standards established for the College of Education and Psychology, (a minimum 2.3 freshmen academic admission index score), was established to help assure that students admitted into the various teacher preparatory programs within the college will be academically capable of passing the various portions of the NTE.

Since the effectiveness of teacher preparatory programs in North Carolina will be determined by the percentage of graduates who pass the various portions of the National Teacher Examinations, a need existed to identify readily available variables that could be used to predict student performance on the examinations. The results of such research could be used in arriving at better informed decisions about the performance of prospective teachers on the National Teacher Examinations and for advising, counseling, and/or making admission decisions concerning students seeking entrance into teacher education programs and the teaching profession.

## Purpose and Objectives

The purpose was to determine how well selected academic variables predict student performance on the Professional Knowledge portion of the National Teacher Examinations. More specifically, the objectives, stated as research questions, were as follows:

1. To what extent can the freshmen academic admission index utilized at North Carolina State University be used as a predictor of student performance on the Professional Knowledge portion of the National Teacher Examinations?
2. To what extent can achievement on the various portions of the Scholastic Aptitude Tests (SAT) be used as a predictor of performance on the Professional Knowledge portion of the National Teacher Examinations?
3. To what extent can achievement in selected academic and professional courses be used as predictors of student performance on the Professional Knowledge portion of the National Teacher Examinations?
4. To what extent can achievement on the Communication Skills and General Knowledge portions of the National Teacher Examinations be used as predictors of student performance on the Professional Knowledge portion of the National Teacher Examinations?
5. To what extent can a student's undergraduate accumulated grade point average be used as a predictor of student performance on the Professional Knowledge portion of the National Teacher Examinations?

## Methods and Procedures

The population for the study consisted of students ( $N = 106$ ) who were admitted to North Carolina State University as freshmen students and who graduated from the Agricultural Education Program between July 1, 1981 and May 9, 1987. Transfer students who entered the Agricultural Education program other than through the regular freshmen academic admission process were not included in the population because data were not available for the research variables for those students. The time period was selected to assure that all the program graduates would have been required to complete the current version of the National Teacher Examinations for certification to teach agricultural education subjects in North Carolina. The Annual North Carolina State University Commencement Bulletins for the academic years from 1981-81 through 1986-87 were used to identify the study **population and** served as the frame for the study. The research sample was randomly selected based on a formula established by Krejcie and Morgan (1970) and consisted of 84 program graduates.

Based on research by Brown (1974) and Tarver and Carr (1983), a decision was made to include the following academic variables as the independent variables for the study: (a) GPA in required freshmen English courses; (b) GPA in required freshman math courses; (c) GPA in required educational psychology course; (d) Scholastic Aptitude Test-Verbal (SATV) scores; (e) Scholastic Aptitude Test-Math (SATM) scores; (f) freshmen academic admission index scores; (g) NTE-General Knowledge scores; (h) NTE-Communication Skills scores; and (i) undergraduate accumulated grade-point average. NTE-Professional Knowledge scores served as the dependent variable for the study. Data for 1986 and 1987 graduates were obtained from a computerized data filing system in the College of Education and Psychology. Data for the remaining students were obtained from the students' permanent records from the Registrar's Office at North Carolina State University.

Using the Statview 512+ (Abacus Concepts, Inc., 1986) computer software program, stepwise regression analyses were employed to determine the strength of the relationship between each predictor variable and combination of predictor variables and National Teacher Examinations-Professional Knowledge Test scores. Descriptive statistics were used to describe the sample.

## Findings

The mean score for the sample for the Professional Knowledge portion of the National Teacher Examinations was 659.32. The mean scores reported in Table 1 represented the 50th percentile for

the Communication Skills portion and the 52nd percentile for the General Knowledge portion of the National Teacher Examinations based on 1987 NTE data. The grades earned in the required English courses by agricultural education graduates from 1981 to 1987 were just above a "C" average. However, the grades earned by the research sample in the required freshman math courses tended to be considerably higher. The mean grade point average for the required educational psychology course indicated that the students earned higher grades in this course than in their required freshmen English and math courses. The SAT scores earned by the agricultural education majors were sufficient to meet the standards currently being required for admission into North Carolina State University. The current admission criteria requires a minimum score of 400 on both the SATV or SATM and a minimum combined SATV and SATM score of approximately 900. The freshmen academic admission index is computer-calculated and includes the following variables: (a) total high school GPA, (b) rank in high school graduation class, (c) highest SATV score, (d) highest SATM score, and (e) a weighted factor representing sex of the applicant. The mean undergraduate grade point average for the sample was 3.0 on a 4.0 scale. This score indicated that the students making up the research sample were above average, academically.

Table 1  
Means and Correlation Coefficients for Selected Academic Variables Examined as Predictors of NTE-Professional Knowledge Test Scores

Variable	<u>M</u>	SD	<u>f</u>
NTE test scores			
Communication skills	658.06	10.83	.745*
General knowledge	661.12	10.40	.728*
Mean GPA in required courses			
Freshman English	2.33	.68	.230*
Freshman Math	2.70	.94	.106
Educational psychology	3.16	.72	.081
SAT scores			
Verbal	425.95	83.64	.041
Math	487.74	87.47	.043
Freshman academic admission index	2.15	.42	.073
Undergraduate accumulated grade point	3.00	.39	.137

Note. Maximum NTE-communication skills score = 800; Maximum NTE-general knowledge score = 800; Maximum GPA in required courses = 4.0; Maximum freshman academic admission index score = 3.61 for males and 3.71 for females; Maximum SATV scores = 800; Maximum SATM scores = 800; and Maximum undergraduate accumulated grade point = 4.0.

\* $p < .05$ .

Using the Davis Conventions (Davis, 1971), the multiple correlation coefficients (R) reported in Table 2 indicated that a very strong association existed between the independent variables identified as predictor variables and the dependent variable, NTE-Professional Knowledge Test scores. A scatter plot of the data showed that the relationship between the dependent and independent variables was linear.

Data in Table 2 indicated that the NTE-Communication Skills Test had the strongest correlation with and was the best predictor of the variables tested for predicting student performance on the Professional Knowledge portion of the National Teacher Examinations, (NTE-PK).

In this instance, student performance on the NTE-General Knowledge Tests was the second best predictor, and performance in the required educational psychology course was the third best predictor of student performance on the NTE-Professional Knowledge Test. The three predictor variables, NTE-Communication Skills Test, NTE-General Knowledge Test, and required educational psychology course, together yielded a multiple correlation coefficient of .823 and represented the best prediction one could make for student performance on the NTE-Professional Knowledge Test based on the predictors studied. Based on the adjusted  $R^2$  values in Table 2, the researcher can predict approximately 67% of the variance in student performance on the NTE-Professional Knowledge Test.

Table 2  
Stepwise Multiple Regression of NTE-Professional Knowledge Test Scores on the Significant Independent Variables

Variables	<u>R</u>	<u>R</u> <sup>2</sup>	Adj. <u>R</u> <sup>2</sup>	<u>F</u>
NTE-communication skills scores	.745	.555	.549	102.183*
NTE-general knowledge scores	.798	.637	.328	70.946*
Required educational psychology course	.823	.677	.665	55.972*

\*p < .05.

According to Borg and Gall (1983), the second predictor is not chosen on the basis of its product-moment correlation with the criterion when using stepwise regression analysis. Rather, the second predictor is chosen on the basis of how well it improves upon the prediction achieved by the first variable. The same principle is used for selecting additional predictors, that is the third predictor is chosen on the basis of how well it improves the prediction achieved by the first two predictors, and so forth. This helps to explain why academic performance in required English courses was not included in the predictor model and academic performance in the Educational Psychology course was, even though the GPA of the English courses were significantly correlated with performance on the Professional Knowledge test and the GPA of the Psychology course was not.

Analysis of variance tests were performed to determine whether the R<sup>2</sup> value obtained after adding each new predictor to the multiple regression analysis was significantly different than the R<sup>2</sup> value for the analysis without the predictor. As reported in Table 2, the addition of each new predictor to the multiple regression analysis model resulted in a statistically significant difference in the R<sup>2</sup> values than before the predictor was added. All the predictor variables utilized in the model for predicting NTE-Professional Knowledge Test scores yielded F values which were statistically significant (p < .05). The variance explained in predicting the NTE-Professional Knowledge scores was not statistically significant (p > .05) for the following independent variables and, thus, were not included in the model for predicting performance on the NTE-Professional Knowledge Test: (a) GPA in required freshmen English courses; (b) GPA in required freshman math courses; (c) Scholastic Aptitude Test-Verbal (SATV) scores; (d) Scholastic Aptitude Test-Math (SATM) scores; (e) freshmen academic admission index scores; and (f) undergraduate accumulated grade point average.

Barrick, McCracken, Miller, Van Tilburg, and Warmbrod (1986) caution that in general, R<sup>2</sup>, the proportions of variance in the dependent variables explained or accounted for by the variance in the independent variables, calculated on a sample trends to overestimate the population R<sup>2</sup>. However, an adjusted R<sup>2</sup> attempts to correct the optimistic bias of the sample R<sup>2</sup>. The degree of overestimation or R<sup>2</sup> is influenced, among other things, by the ratio of the number of independent variables to the size of the sample. Based on the fact that the adjusted R<sup>2</sup> values reported in Table 2 for the prediction model established was only .012 different than the R<sup>2</sup> values calculated for the data, an assumption can safely be made that the ratio of the sample size used in this study was adequate for the number of independent variables investigated.

### Conclusions

Student performance on the Communication Skills and General Knowledge portions of the National Teacher Examinations (NTE), along with an evaluation of their performance in their required educational psychology course can be used as very good predictors for determining student success on the Professional Knowledge portion of the National Teacher Examinations.

Student performance on the verbal and math portions of the Scholastic Aptitude Test (SAT), their performance in required freshmen math and English courses, their freshmen academic admission index scores, and their undergraduate accumulated grade point averages does not associate highly with student performance on the Professional Knowledge portion of the National Teacher Examinations and, thus, should not be used as predictors for performance on the NT&Professional Knowledge Test.

The Board of Governors decision to raise the minimum passing score for the Communication Skills and General Knowledge portions of the NTE will not significantly affect agricultural education majors at North Carolina State University since the mean scores for the research sample for the two portions of the National Teacher Examination were well in excess of the new 35th percentile requirement.

Since the average freshmen academic admission index score for Agricultural Education students who graduated between July 1, 1981 and May 9, 1987 was 2.149 and the admission index did not correlate significantly with performance on the NTE-Professional Knowledge Tests, the 2.30 admission index score established by the administrators within the College of Education and Psychology to insure a higher NTE passing rate is not statistically supported and will result in a reduction of the number of students admitted to the College.

### **Recommendations**

Individuals responsible for advising transfer students who are considering entering the agricultural education program at North Carolina State University should review the students' performance on the Communication Skills and General Knowledge portions of the National Teacher Examinations and their performance in the required educational psychology course if available, and counsel the students relating to their potential for successfully completing the NTE-Professional Knowledge Test, which is required for initial certification in North Carolina.

Administrators within the College of Education and Psychology at North Carolina State University should reconsider their decision to raise the freshmen academic admission index score and lower it to the 2.0 index which has been established by university officials as being acceptable for the rest of the university. This recommendation is based on the following: (a) the freshmen academic admission index score does not correlate statistically with student performance on the Professional Knowledge portion of the National Teacher Examinations, (b) the performance on the various portions of the National Teacher Examinations of agricultural education graduates between July 1, 1981 and May 9, 1987, who were admitted on 1.8 to 2.0 freshmen academic admission index scores, was higher than that being recommended by University Board of Governors, and (c) the higher (2.3) freshman academic admission index score will reduce the number of students who will be admitted to the agricultural education program and the College if potential students in the future obtain scores typical of those which were earned by the agricultural education majors who graduated between July 1, 1981 and May 9, 1987.

Additional research should be conducted to identify other variables which account for additional variance for predicting student performance on the Professional Knowledge portion of the NTE.

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