A Comparison of the Tests of Adult Basic Education and the Health Occupations Basic Entrance Test in Predicting Academic Success in Practical Nursing Programs

Sally Crenshaw
Western Kentucky University

Follow this and additional works at: http://digitalcommons.wku.edu/theses

Part of the Education Commons

Recommended Citation
http://digitalcommons.wku.edu/theses/939

This Thesis is brought to you for free and open access by TopSCHOLAR®. It has been accepted for inclusion in Masters Theses & Specialist Projects by an authorized administrator of TopSCHOLAR®. For more information, please contact topscholar@wku.edu.
A COMPARISON OF THE TESTS OF ADULT BASIC EDUCATION AND
THE HEALTH OCCUPATIONS BASIC ENTRANCE TEST IN
PREDICTING ACADEMIC SUCCESS IN
PRACTICAL NURSING PROGRAMS

A Thesis
Presented to
the Faculty of the Department of Educational Leadership
Western Kentucky University
Bowling Green, Kentucky

In Partial Fulfillment
of the Requirement for the Degree
Specialist in Education

by
Sally A. Crenshaw
May, 1994
A COMPARISON OF THE TESTS OF ADULT BASIC EDUCATION AND
THE HEALTH OCCUPATIONS BASIC ENTRANCE TEST IN
PREDICTING ACADEMIC SUCCESS IN
PRACTICAL NURSING PROGRAMS

Recommended 4/24/94
(Date)

Director of Thesis

Approved 6/8/94
(Date)

Director of Graduate Studies
A COMPARISON OF THE TESTS OF ADULT BASIC EDUCATION AND
THE HEALTH OCCUPATIONS BASIC ENTRANCE TEST IN
PREDICTING ACADEMIC SUCCESS IN
PRACTICAL NURSING PROGRAMS

A Thesis
Presented to
the Faculty of the Department of Educational Leadership
Western Kentucky University
Bowling Green, Kentucky

In Partial Fulfillment
of the Requirement for the Degree
Specialist in Education

by
Sally A. Crenshaw
May, 1994
ACKNOWLEDGMENTS

The author gratefully acknowledges the contributions of a number of individuals for their part in the completion of this project. Specific acknowledgment of appreciation must be extended to the Principals and Nursing Directors of the Owensboro State Vocational-Technical School and the Madisonville Health Technology Center for permission to conduct this study. Randy Treas, Director, Educational Resources Testing Services, is deserving of special appreciation for providing the HOBET testing materials and scoring services. A special thank you is due the students who willingly participated. Collection of the data could not have been accomplished without the help of Connie Greenwell and Joyce Riggs. An additional thank you is extended to Joyce for her assistance in the arrangement of the data. To my colleagues, at the Madisonville Health Technology Center, I extend sincere appreciation for their patience and understanding. To Diana Gilroy and David Pennaman, who gave much needed advice, I owe
sincere gratitude. I owe a special note of gratitude to Dr. Joyce Logan for giving me confidence as well as being my example of the determination to succeed.

To Dr. Emmett Burkeen I express appreciation for his initial assistance with this project. Members of my specialist project committee, Drs. Dwight Cline, Vernon Sheeley, and Fred Stickle, provided invaluable help. I cannot express enough appreciation for the assistance of Dwight Cline, whose patient direction and encouragement provided me with the necessary confidence to accomplish this task.

To my mother, I owe the beginnings of this effort and I express love and respect for her encouragement. Last, but most important, I express my love and appreciation to my husband, Don, for his understanding, encouragement, and support during this time.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. INTRODUCTION ......................................... 3</td>
<td></td>
</tr>
<tr>
<td>Statement of the Problem ............................. 7</td>
<td></td>
</tr>
<tr>
<td>II. REVIEW OF THE LITERATURE .......................... 10</td>
<td></td>
</tr>
<tr>
<td>Associate and Baccalaureate Nursing Studies ........ 10</td>
<td></td>
</tr>
<tr>
<td>Practical Nursing Studies ............................. 16</td>
<td></td>
</tr>
<tr>
<td>Non-cognitive Studies ................................. 17</td>
<td></td>
</tr>
<tr>
<td>Studies of the Tests of Adult Basic Education (TABE) .. 18</td>
<td></td>
</tr>
<tr>
<td>Studies of the Health Occupations Basic Entrance Test (HOBET) .... 21</td>
<td></td>
</tr>
<tr>
<td>III. METHODOLOGY ......................................... 22</td>
<td></td>
</tr>
<tr>
<td>Subjects ................................................... 22</td>
<td></td>
</tr>
<tr>
<td>Instrument ................................................ 22</td>
<td></td>
</tr>
<tr>
<td>Design ..................................................... 24</td>
<td></td>
</tr>
<tr>
<td>Procedure ............................................... 26</td>
<td></td>
</tr>
<tr>
<td>IV. DATA .................................................. 29</td>
<td></td>
</tr>
<tr>
<td>V. SUMMARY AND CONCLUSIONS ........................... 36</td>
<td></td>
</tr>
<tr>
<td>REFERENCES ............................................... 42</td>
<td></td>
</tr>
<tr>
<td>APPENDIX</td>
<td></td>
</tr>
</tbody>
</table>
LIST OF TABLES

Table | Page
--- | ---
1. Means, Standard Deviation, and Range of AGE/XGPA Completers/Non Completers | 29
2. KVAT Results | 30
A-3. Correlation Coefficients between Predictor Variables and Criterion Variables Summary Table | 52
A-4. Correlation Coefficients between Predictor Variables and Criterion Variables AGE/TABE with KVAT/XGPA | 53
A-5. Correlation Coefficients between Predictor Variables and Criterion Variables HOBET with KVAT/XGPA | 54
The high demand for health care workers, excellent pay/benefits, and job security has created a public interest in health care professions that has educational institutions overwhelmed by applicants seeking entrance to training programs. Many of these applicants have given little thought to what they must possess academically and attitudinally to successfully complete such training. Efforts to identify academic and attitudinal attributes predictive of academic success have long been a goal of educators. Therefore, the purposes of this study were to, first, determine if either the Tests of Adult Basic Education (TABE) or the Health Occupations Basic Entrance Test (HOBET) is a better predictor of academic success in health occupations training programs and, second, what factors as measured by the tests are significant in predicting student success. Criterion variables used were the Kentucky Vocational Achievement Test (KVAT) and exit grade point average (XGPA). While the study did not, with correlational significance, support either of the tests to be overall predictors of academic success, several factors as measured by individual subtests within each showed a significant relationship to the criterion variables. Both tests showed reading subtests to have a relationship to the criterion
variable, but only one subtest showed a relationship to both. This was the HOBET Social Stress Level profile percentage which had a correlational significance with the criterion variables (KVAT) and (XGPA) of -.285 and -.450, respectively at the p<.05 and p<.01 levels of significance.
Chapter I
Introduction

The health care field is one of the most popular career paths in today's society. This popularity is due, in part, to the high demand for health care workers, excellent pay/benefits, and job security. As a result, increased numbers of individuals are choosing to seek entrance into training programs that will provide the necessary skills to enter this popular job market. Because of this increased interest in the health professions, the number of applicants for training programs far outnumber the available openings. Many of the individuals have, in choosing these careers, given little thought to what they must possess academically and attitudinally to successfully complete such training. Consequently, many are ill prepared for the rigorous demands of these training programs. Educators of these prospective students are constantly seeking ways to determine who can be expected to be successful in these programs and ultimately in the occupation itself. Establishing admission requirements that will offer a degree of predictive criteria for success have long been a goal of educational research. However, the results of such studies have done little
to provide identifiable criteria that will, with consistency, predict the probability of success. An exception to this inconsistency in identified criteria is past academic performance and possibly reading skills (McClelland, Yang & Glick, 1992).

The increasing number of applicants for health care programs and the lack of consistent predictable measures of success pose a dilemma for educators. Subjectively, veteran educators in such programs may, with some level of accuracy, predict those individuals who will succeed. However, this subjectivity leaves the door open to questions of human error and omits individuals who may be successful and well suited to the occupations. While a great majority of research focuses on identifying predictors of success, more recent research has taken an approach to identifying factors that place students at risk for failure. The underlying premise of this direction in the research is to formulate educational intervention that will prevent such failure (McClellan et al., 1992). Whatever approach is used or preferred, it is increasingly more important and critical that educators find a means of identifying predictive criteria that can be used to admit students who have a high probability of success.
An admission requirement common to all training programs for the health care professions is that of testing. Testing has long been a method through which educators have attempted to determine the success or failure of applicants. As a screening device, testing can eliminate individuals who, academically, cannot perform at the necessary level to succeed. However, often those individuals who successfully meet the requirements of these measurement tools also fail to succeed causing questions to arise regarding the validity of such devices for screening applicants.

There are a variety of tests currently available that attest to validity in predicting the probability of an individual to succeed. Some of these instruments measure achievement and/or aptitudes while others address a combination of attributes that the individual must possess to be successful. Many of these instruments are widely used as screening devices for entry into health care programs. Therefore finding and selecting a test that will effectively aid educators in screening applicants for the health professions becomes a critical and, often, tedious process.

Two instruments of measurement currently available for use as screening devices and as the focus of this
study are the Tests of Adult Basic Education (TABE) and the Health Occupations Basic Entrance Test (HOBET). The TABE offers two forms measuring four overlapping levels of achievement. These norm-referenced tests measure the individual's achievement level in the specific subject areas common to adult basic education curricula such as reading, mathematics, language, and spelling. The TABE provides educators with information for diagnosis, evaluation and placement of individuals in adult education programs. Additionally, the resulting scores can provide correlations for predicting success on the General Education Development (GED) test. The availability of the overlapping levels also provides educators with pre- and post-testing capabilities to measure growth and evaluate instructional content (TABE Technical Report, 1987). The HOBET measures the academic and social skills of applicants seeking entrance to the health professions. The HOBET is primarily a diagnostic instrument designed to aid educators in screening applicants. Its value to the screening process is in its ability to provide 31 diagnostic scores for each examinee and an academic group profile for the following seven subtest areas: essential math skills, social interaction profile,
stress level profile, learning styles, reading comprehension/science texts, reading rate, and composite score. Both tests aid educators in the understanding of an applicant's ability to handle higher level academic/reasoning skills. The HOBET seems to attempt a step further by measuring stress levels/social interaction and learning styles (HOBET Test Manual, 1990).

**Statement of the Problem**

The TABE test is currently used by all vocational education facilities under the governance of the Kentucky Workforce Development Cabinet, Department for Adult and Technical Education as an admission requirement for program entry. Programs under the auspices of the Cabinet cover a wide range of technical competencies from industrial education (i.e., electricity, automotive technology, etc.) to health technology (i.e., practical nursing, radiology, respiratory care, etc.). Students must meet minimum scale score requirements on either the Level D(5/6) or A(5/6) of the TABE in order to be accepted and/or graduate from diploma programs. The minimum scale score required is dependent upon the classification of the occupational choice. Programs considered to be
highly technical (requiring a high degree of academic ability in reading/math skills) are classified as Level I programs and require a scale score of 776 in reading and 790 in math. The majority of the health technology programs fall into the Level I program classification. The question of whether the TABE provides a measurable score predicting success in these programs has been of constant concern to admissions personnel and program instructors. This concern is easily recognized when it is understood that available openings in these programs are limited and open entry - open exit admission is rarely an option. To compound this concern, program instruction covers large amounts of highly technical material in time periods of 22 months or less. Therefore, it is essential that enrollees be adequately prepared in the basic skills of reading/math prior to entrance. In addition, due to the nature of the occupations, educators have sought to find objective criteria that will aid in providing a better method of "tagging" those individuals who are not suited to the occupational stresses. Therefore, educators of these students have long sought the discovery of an instrument that aids in predicting success in health care education. The development of
the HOBET, which purports to test individuals specifically for health occupations, leads educators to the question as to which test may be the better predictor and what attributes of an individual create a predisposition to failure or success. Thus the problems faced in this study are as follows:

1. Is the Health Occupations Basic Entrance Test (HOBET) a better predictor of success in health occupations training programs, specifically practical nursing, than the Tests of Adult Basic Education (TABE)?

2. What factors as measured by the TABE and/or HOBET are significant in predicting student success?
Chapter II

Review of the literature

Over the years, a vast amount of educational research has been conducted in an attempt to provide reliable predictors of academic achievement. Due to the nature of this study, the literature review was narrowed to nursing studies, the majority of which related to two and four-year registered nursing programs. Additional review dealt with practical nursing studies, related studies, that is, admissions tests such as the American College Test (ACT), Scholastic Aptitude Test (SAT) and non-cognitive predictors of success. Studies of the TABE were also reviewed. Since the HOBET was released in 1990, no known research studies are as yet available.

Associate and Baccalaureate Nursing Studies

The major focus of nursing education research relative to prediction of success over the last twenty years has been grouped as (a) graduates - non-graduates of associate and baccalaureate degree programs, (b) academic success in programs, and (c) graduates' performance on licensure examination. Of these groupings, the most consistent predictors of success have been those relating to academics. Non-cognitive
predictors, such as personality traits, have added little to predicting program completion (Feldt & Donahue, 1989). Although academic predictors--that is, high school grade point average, science and nursing course performance, nursing grade point average, etc.--have shown consistency in predicting success, clearly defined admission criteria have not emerged from the years of research (McClelland et al., 1992). A possible exception, as reported by Grant (1986), may be reading comprehension skills. However, according to Feldt (1989), recent emphasis on problem solving ability may negate reading comprehension as a predictor of success unless such measures are supplemented by critical thinking ability. The majority of the nursing studies utilized a variety of independent variables to predict success of selected criterion variables primarily, nursing course GPA/cumulative nursing GPA, and National Council Licensure Examination for Registered Nurses (NCLEX-RN). The independent variables can be categorized in the following combinations (1) previous academic achievement (i.e.: HSGPA/percentile rank, pre-nursing GPA), (2) selected aptitude, achievement, and intelligence tests measuring general academic ability/aptitude and/or nursing
aptitude, (3) achievement in nursing coursework and nursing GPA, (4) selected nursing assessments given at various intervals within the nursing program. Throughout the literature selected variables and categories of variables were used in part or in combination.

A number of studies using previous academic achievement as predictive variables have indicated the value of HSGPA/percentile rank as significant to performance in nursing coursework and subsequent success on licensure examination (Bauwens & Gerhard, 1987; Bolin & Hogle, 1984; Boyle, 1986; Feldt & Donahue, 1989; Knoll, 1990; McClelland et al., 1992; Paech, 1990; Talarczyk, 1989; Tillinghast & Norris, 1968; Whitley & Chadwick, 1986; Wold & Worth, 1990; Yocum & Scherubel, 1985). Achievement in nursing coursework and nursing cumulative GPA were significant to success on licensure exams throughout the literature (Alichnie & Bellucci, 1981; Bauwens & Gerhard, 1987; Brandt, Hastie, & Schumann, 1966; Cloud-Hardaway, 1988; Jenks, Selekmann, Bross, & Paquet, 1989; Krupa, Quick, & Whitley, 1988; Lengacher & Keller, 1990; McKinney, 1989; Whitley & Chadwick, 1986; Woodham & Taube, 1986; Yocum & Scherubel, 1985). Intellective measures using
standardized testing, such as ACT, SAT, and pre-nursing assessments, were predictive of success in nursing coursework and licensure (Alichnie & Bellucie, 1981; Bolin & Hogle, 1984; Boyle, 1986; Dell & Halpin, 1984; Feldt & Donahue, 1989; Foti & DeYoung, 1991; McClelland et al., 1992; Tillinghast & Norris, 1968; Whitley & Chadwick, 1986; Wold & Worth, 1990; Woodham & Taube, 1986). Of the intellective measures, the ACT and SAT in combination with other variables or standing alone were most consistent throughout the literature in predicting achievement (Allichnie & Bellucie, 1981; Bolin & Hogle, 1984; Boyle, 1986; Dell & Halpin, 1984; Feldt & Donahue, 1989; Foti & DeYoung, 1991; Lengacher & Keller, 1990; McClelland & et al., 1992; Tillinghast & Norris, 1968; Wold & Worth, 1990; Woodham & Taube, 1986). Boyle (1986) and McClelland et al. (1992) found the ACT composite score to be the best stand-alone predictor of licensure examinations. Several of the authors found the SATV subscore to be the significant predictor when combined with other variables (Backman & Steindler, 1971; Bolin & Hogle, 1984; Dell & Halpin, 1984; Foti & DeYoung, 1991; Wold & Worth, 1990; Woodham & Taube, 1986). Bauwens & Gerhard (1987) and Feldt (1989) found the Watson-Glaser Critical Thinking
Appraisal (WGCTA) to have potential in the prediction of academic achievement. Feldt (1989) indicated in his findings that as a supplement to reading comprehension scores, the WGCTA would enhance prediction of successful coursework. Assessment of progress in nursing programs is consistently utilized by nursing educators to detect students having difficulty in comprehending nursing theory and process. Measurements most frequently used for this purpose are the Mosby AssessTest and the National League of Nursing Achievement Test (NLN). Several researchers found the Mosby AssessTest to be an accurate predictor of success on the NCLEX-RN (Cloud-Hardaway, 1988; Foti & DeYoung, 1991; Jenks et al., 1989; McKinney, 1989). NLN showed significant ability to predict success and to be effective in intervention strategies for students at risk of failure (Brandt et al., 1966; Mills, Becker, Sampel, & Pohlman, 1992). Throughout the literature review cognitive predictors were clearly the better determinants of success. Some studies examined age, race, sex, and American educated vs foreign educated as having possible patterns to predicting success (Cloud-Hardaway, 1988; Woodham & Taube, 1986; Yocum & Scherubel, 1985). Cloud-Hardaway found age to be a
significant predictor of success on NCLEX. Cloud-Hardaway also found that black graduates' NCLEX scores were most closely associated with prior practical nursing licensure. Mills et al., studying baccalaureate nursing students in an accelerated program, found previous educational experience not to be significantly predictive of performance on the NCLEX-RN. The study results did reveal that men and foreign-educated students were at risk for failure. It should be noted that sex as a factor in determining success on the NCLEX-RN became less significant over time. Foreign educated and those having English as a second language were identified by Mills et al. as being at risk and would be assisted in the transition by providing methods of familiarizing these populations to instructional methods of this country.

Non-cognitive predictors of success in nursing programs have received mixed review throughout the literature (Alichnie & Bellucie, 1981; Moore, 1989; Sharpe, 1988; Tolland, 1990). The literature did suggest that while non-cognitive predictors are not consistent in determining success in programs, they might aid in providing direction for educational
strategies to enhance the student's learning (Sharpe; Tolland).

Practical Nursing Studies

A review of the literature yielded little research into prediction of student success in practical nursing programs. Of the studies reviewed, a variety of conclusions were noted.

Several studies revealed age to be significant to success in practical nursing programs (Meadow, 1964; National League of Nursing, 1954; Seither, 1974; Thompson, 1989; Treich & Boss, 1987). In contrast, a study conducted by the Psychological Corporation (1984) found age to be a poor predictor of success. Meadow (1964) in finding that older and married students did better in school hypothesized life experiences, family responsibilities, and maturity to be the reason.

Educational background as a predictor of success received mixed review. NLN (1954) found that students having less formal education achieved higher scores on measures of success, while Meadow (1964) and Treich and Boss (1987) found the opposite to be true.

A variety of preadmission assessment instruments were evaluated. Thompson (1989) found the SATV subscore and Career Placement Program Reading Test to
be significant predictors of success. Tests specific to the training program and identified as preadmission assessments permeated the literature. The National League of Nursing Pre-Admission and Classification Test (NLN PACE) was found to be highly predictive of success (NLN, 1954; Meadow, 1964). Two studies of the Psychological Corporation's Entrance Examination for Schools of Practical Nursing (PCEE) revealed significant relationships between PCEEV (verbal ability) and PCEEA (academic ability) (Sitzmann, 1970; Sternlicht & Cavallo, 1965). Seither (1974) found the California Reading Test (CRT) consistently predicted academic success. Leitsch (1988b) found the reading ability score of the TABE to be predictive of program success in practical nursing programs.

Non-cognitive Studies

A review of the literature was conducted to determine the effects of non-cognitive predictors on success. Several interesting studies related to personality, study habits, learning styles, and stress were found. Ragle and Ross (1981) studied the relationship of personality types on student retention-attrition in an associate degree Radiography program using the Myers-Briggs Type Indicator (MBTI). The
findings of the study failed to show any significant relationship between personality type and the criterion variables. Moore (1989) found the Embedded Figures Test and the MBTI as helpful to the identification of student retention/withdrawal. Nixon and Frost (1990) found student self-concept to be a strong predictor of academic success. Although research of study habits and learning styles has shown some predictability of success their usefulness may be better in developing strategies to increase the probability of success (Blagg, 1985). Bentley (1982) investigated individual coping mechanisms with stress and found maladaptive coping methods and physiological responses better at predicting success than SAT scores.

**Studies of the Tests of Adult Basic Education (TABE)**

TABE 5 and 6 are norm-referenced tests designed to measure achievement in reading, mathematics, language, and spelling—the subject areas commonly found in adult basic education curricula. Tabe 5 and 6 focus on the basic skills required for a person to function in society. (TABE Technical Report, 1987, p. 1)

The norm-referenced tests assist in diagnosis, evaluation, and placement of adult education students.
Obtained TABE scores are correlated with prediction of General Equivalency Test scores. The TABE offers four overlapping achievement levels and two parallel forms, Form 5 and 6. The four levels—E (Easy), M (Medium), D (Difficult), and A (Advanced)—are based on educational curricula of adult education representing estimated grade ranges from a low of 2.6-4.9 (E) to 8.6-12.9 (A). Different levels of the TABE provide adult education programs with evaluative data to better formulate instructional plans for adult learners. The addition of the advanced level in the revision was to provide better coverage of high school curricula. The norming study of the TABE took place in 1986 using a total sampling of 6300 examinees from the following reference groups: adult basic education programs (including literacy and pre-GED), adult & juvenile offender programs (juvenile age range 16 and older), and vocational technical training programs. Calibration and equating of TABE 5 and 6 was to the California Achievement Tests, Form E (CAT-E) published in 1985. Test comparability was to the TABE-76 (Form 3) which was equated to the California Achievement Tests, Form A (CAT-A) published in 1970.
The literature review found few studies of the TABE and none specific to the TABE-87 utilized in the study. All of the studies reviewed were of previous editions of the TABE. Leitsch (1988), attempting to determine the effectiveness of the TABE in predicting success of selected postsecondary allied health programs, revealed no relationship to exist. However, a parallel study by Leitsch (1988/1989) using only practical nursing students in postsecondary institutions indicated reading scores to be significant predictors of success. Kittner's study (cited in Leitsch, 1988) found the TABE to be positively correlated to successful completion of practical nursing programs, but no correlation with successful completion of business education programs. Pennaman (1983), investigating the predictability of TABE on the grade point averages of students in a Respiratory Therapy program, found the existence of a positive relationship at the p<.01 level of significance. Clemens (1983) found no correlation between the TABE and successful completion of a postsecondary child care program or subsequent job performance, concluding that the TABE should be used for diagnostic purposes only.
Studies of the Health Occupations Basic Entrance Test

The Health Occupations Basic Entrance Test (HOBET) was developed primarily for diagnostic purposes to aid educators in evaluating the academic and social skills of applicants. Norming of the HOBET took place from January 1989 through December 1989 on 1385 beginning college students representing the four geographical regions of the U.S. On the Bell Curve, the average composite percentage score (combined scores of math and reading comprehension) of 60% (50th percentile) represented the mean score of the norming population. The passing composite percentage score (combined scores of math and reading comprehension) was one SD below the mean representing 46% (20th percentile) of the norming population (Educational Resources, 1990). The HOBET was released in 1990, and the literature review found no known formal correlational studies as yet conducted.

In summary, the review of the literature suggests the use of multiple predictors of success, but support continued belief that cognitive predictors have greater and more consistent predictability. Past academic achievement coupled with objective test data appeared to be of greatest benefit in student success.
Chapter III
Methodology

Subjects

The sample population consisted of 47 females and 6 males for a total of 53 students admitted to a practical nursing program in two state supported vocational education facilities in the western part of Kentucky during the 1991-92 school year. Of the female population, 39 were Caucasian and 8 were African-American individuals. Of the male population, only one participant was African-American. Age of the population ranged from 18 to 52 with the average age being 29.5 years. All students were high school or general equivalency diploma (GED) graduates.

Instrument

The Tests of Adult Basic Education, Form 5 and 6 (TABE, 5 and 6), and the Health Occupations Basic Entrance Test (HOBET) were the instruments used in the study.

The TABE 5 and 6 is a revision of the TABE 1976 edition and is stated to measure achievement as a norm-referenced and a criterion-referenced test. There are four separate levels, Easy (E), Medium (M),
Difficult (D), and Advanced (A), measuring achievement in reading, mathematics, language, and spelling. The TABE Technical Report (1987) identifies the use of the item response theory (IRT) model for establishing content validity of the test. Four reference groups were used to establish normative data: (1) adult education enrollees, (2) incarcerated adult offenders, (3) juvenile offenders housed in juvenile correctional institutions, and (4) students age 16 or older in vocational/technical schools. The California Achievement Test, Form E (CAT-E), was used for the calibration and equating of grade equivalents and scale scores. Measurement of reliability of the TABE 5 and 6 was through the use of the Kuder-Richardson formula 20 (KR 20). The TABE Technical Report (1987) provided reliability results of vocational/technical school enrollees using Kuder-Richardson 20 (KR 20) calculations as ranging from .81 to .92. The estimated reliabilities of the TABE, Form 5 and 6, levels D (difficult) and A (advanced) for all reading and math subtests obtained by applying the Spearman-Brown formula consistently ranged from .92-.95. According to reviews in the Supplement to the Tenth Mental Measurements Yearbook (Kramer & Conoley, 1990), little
external validity is substantiated by any of the published documents. The absence of external validity causes much concern and is considered a source of unreliability. The test was used because of its designation as the approved test for admission to vocational programs throughout the KY TECH system. Scores from both Levels D and A were also a part of the study because both levels are accepted for admission.

The second instrument selected as a predictor variable was the Health Occupations Basic Entrance Test (HOBET). The HOBET was released in 1990 and, at the time this study was initiated, had not had extensive use. Its selection as an instrument for the study was to determine its value as a pre-admission predictor of success in practical nursing.

**Design**

The design of this research was correlational with the intent to determine the effectiveness of the TABE and/or HOBET as pre-admission predictors of success in a diploma level practical nursing program. TABE predictor variables were reading vocabulary scale score (RVSS), reading vocabulary grade equivalent (RVGE), reading vocabulary percentile (RVPC), reading comprehension scale score (RCSS), reading comprehension
grade equivalent (RCGE), reading comprehension percentile (RCPC), mathematics computation scale score (MCSS), mathematics computation grade equivalent (MCGE), mathematics computation percentile (MCPC), mathematics concepts and applications scale score (MASS), mathematics concepts and applications grade equivalent (MAGE), mathematics concepts and applications percentile (MAPC). HOBET predictor variables were as follows: essential math skills percentage (EMS), reading comprehension percentage (RC), reading rate percentage (RR), testtaking skills (TEST), social interaction process-aggressive percentage (SIP), stress level profile percentage for family (FAM), social (SOC), money/time (M/T), academic (ACAD), workplace (WP), auditory learning style percentage (AUD), visual learning style percentage (VIS), social learning style percentage (SLS), solitary learning style percentage (SOLS), oral dependent learning style percentage (ORAL), writing dependent learning style percentage (WRIT), composite percentage (COMP). Criterion variables used were (1) percentage score on the Kentucky Vocational Achievement Test (KVAT) and (2) exit grade point average (XGPA). In order to successfully complete the course of study for
the practical nursing program in Kentucky's vocational schools, students must maintain a 70% average and pass the Kentucky Vocational Achievement Test (KVAT). The KVAT for the practical nursing program is the nationally standardized LPN assessment test.

**Procedure**

In the Spring of 1991, permission to conduct the study was granted by the program directors of two practical nursing programs operated by the Kentucky Cabinet for Work Force Development, Bureau of Adult and Technical Education. Entering students were contacted by letter to request their participation and willingness to take the Health Occupations Basic Entrance Test (HOBET). Students were scheduled for testing and took part in this phase of the study in July 1991, prior to program entrance. Testing was conducted according to the guidelines of the test, and completed tests were scored by the publisher and returned within two weeks of testing. All participants had, as a pre-admission entrance requirement in the practical nursing program, previously taken the Tests of Adult Basic Education (TABE) Form 5 or 6, Level D/A. Student records provided the results for all reading and math subtests and total subtest scores. Only
initial test results were used for statistical purposes. In May 1992, students were given the Kentucky Vocational Achievement Test (KVAT) and the results were recorded. Following graduation, graduates' records were reviewed for final grade point average (XGPA); and students who terminated the program prior to graduation were noted with reasons of academic, personal, wrong career choice, and other.

Following collection of all data, students were assigned numbers to insure anonymity and data were arranged in coded sequence. Statistical analyses were conducted on all records at Western Kentucky University using the SAS computer program.

Several limitations in the study were noted. First, the correlational design of the study reveals only the existence of a relationship between variables; it does not provide a cause and effect basis for the results. The second limitation exists with the instruments used in the study. The Tests of Adult Basic Education (TABE) levels D and A have differing grade ranges. The suggested estimated grade range of the TABE level D is 6.6-8.9, and level A is 8.6-12.9. For example, students who achieve an 11.1 grade equivalent on the TABE level D may not be as
academically prepared as those achieving the same score on the TABE level A. Third, the TABE composite score was not usable as a predictor variable because language and spelling subtests of the TABE are not uniformly given to prospective students. Fourth, the lack of prior study of the HOBET provides little external sources for comparability. A fifth limitation may be that students were in separate programs. Although the curriculum in the programs was the same, the instructional method used in the delivery of this curriculum would likely have been different due to individual differences in instructional staff. Additionally, the chronology of the instruction may also have differed to some degree. Finally, since the study was conducted solely with programs operated in facilities located in the western part of Kentucky, a question of generalizability to programs operated in other facilities of the Commonwealth's geographical regions exists. However, having subjects from separate programs may establish a measure of external validity of the data.
Chapter IV

DATA

Data collected and analyzed for the study included a total of 53 students entering the two programs of practical nursing. The data reflects the inclusion of 8 students who withdrew from the program due to academic or personal problems, illness, and wrong career choice. Table 1 represents the means, standard deviations, and range of data for age, and exit grade point averages (XGPA) of completers and non-completers.

TABLE 1

Means, Standard Deviation, and Range of Age/XGPA for Completers/Non-Completers

<table>
<thead>
<tr>
<th></th>
<th>MEAN</th>
<th>SD</th>
<th>MIN</th>
<th>MAX</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ALL</td>
<td>29.6</td>
<td>9.22</td>
<td>18</td>
<td>52</td>
</tr>
<tr>
<td>Completers</td>
<td>29.6</td>
<td>9.56</td>
<td>18</td>
<td>52</td>
</tr>
<tr>
<td>Non-completers</td>
<td>29.3</td>
<td>6.96</td>
<td>20</td>
<td>44</td>
</tr>
<tr>
<td>XGPA</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ALL</td>
<td>3.30</td>
<td>.429</td>
<td>2.33</td>
<td>4.0</td>
</tr>
<tr>
<td>Completers</td>
<td>3.32</td>
<td>.363</td>
<td>2.59</td>
<td>4.0</td>
</tr>
<tr>
<td>Non-completers</td>
<td>3.20</td>
<td>.695</td>
<td>2.33</td>
<td>4.0</td>
</tr>
</tbody>
</table>

Forty-five students completed the program and passed the Kentucky Vocational Achievement Test (KVAT) on the
first attempt. Table 2 reflects means, standard
deviation, and score range for the KVAT.

TABLE 2
Mean, Standard Deviation and Range of Scores of KVAT

<table>
<thead>
<tr>
<th>Mean</th>
<th>SD</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>68.88</td>
<td>4.124</td>
<td>62</td>
</tr>
<tr>
<td></td>
<td></td>
<td>78</td>
</tr>
</tbody>
</table>

Minimum required passing score: 61

Correlation coefficients were calculated using the
Pearson r for each predictor and criterion variable to
establish if a relationship existed. The predictor
variables were as follows:

*AGE - Age at time of program entry
*RVSS - TABE reading vocabulary scale score
*RVGE - TABE reading vocabulary grade equivalent
*RVPC - TABE reading vocabulary percentile
*RCSS - TABE reading comprehension scale score
*RCGE - TABE reading comprehension grade equivalent
*RCPC - TABE reading comprehension percentile
*MCSS - TABE math computation scale score
*MCGE - TABE math computation grade equivalent
*MCPC - TABE math computation percentile
*MASS - TABE math concepts/applications scale score
*MAGE - TABE math concepts/appl. grade equivalent
*MAPC - TABE math concepts/appl. percentile
*EMS - HOBET essential math skills
*RC  - HOBET reading comprehension percentage
*RR  - HOBET reading rate percentage
*TEST - HOBET testtaking percentage
*SIP  - HOBET social interactive process-aggressive percentage
*FAM - HOBET family stress level percentage
*SOC - HOBET social stress level percentage
*M/T - HOBET money/time stress level percentage
*ACAD - HOBET academic stress level percentage
*WP  - HOBET workplace stress level percentage
*AUD - HOBET auditory learning style percentage
*VIS - HOBET visual learning style percentage
*SLS - HOBET social learning style percentage
*SOLS - HOBET solitary learning style percentage
*ORAL - HOBET oral dependency percentage
*WRIT - HOBET writing dependency percentage
*COMP - HOBET composite percentage

The criterion variables were the Kentucky Vocational Achievement Test (KVAT) and exit grade point average (XGPA).
The findings did not support the over-all predictability of the TABE or the HOBET. (see Appendix A for summary and break-out tables A-3, A-4, and A-5) Therefore, the problem statement--Is the Health Occupations Basic Entrance Test (HOBET) a better predictor of success in health occupations training programs, specifically practical nursing, than the Tests of Adult Basic Education (TABE)?--was not supported by the data. However, the analysis of the data did identify factors measured by the tests to have significance in predicting success of the criterion variables. The TABE reading vocabulary scale score (RVSS), reading comprehension scale score (RCSS), reading comprehension grade equivalent (RCGE), and reading comprehension percentile score (RCPC) all correlated with exit GPA (XGPA) at the .01 level of significance. The HOBET reading comprehension (RC) and reading rate (RR) both showed strong correlations, but the HOBET reading comprehension (RC) showed the strongest correlation, .520 at the .001 level of significance, of all predictor variables. The HOBET composite score (COMP) showed a weak correlation with exit grade point average. The only predictor variable showing correlation with both the KVAT and XGPA was the
HOBET social stress level profile percentage (SOC). Both relationships showed a negative correlation at the P<.05 level of significance for KVAT and the p<.001 level of significance for XGPA.

Age as a predictor was not supported by the data, but did have some relationship to predictor variables within the TABE. While a positive relationship existed at the p<.05 level of significance with reading vocabulary scale score (RVSS), a negative relationship existed at the p<.01 level of significance with math concepts and applications scale score and grade equivalent (MASS and MAGE). Both the TABE and HOBET showed intra-correlations; however, TABE showed the greatest number of such relationships. Inter-correlations among the TABE and HOBET strongly supported the overall correlational findings that reading skills are important in predicting outcomes. Data analyses also revealed a strong relationship (p<.001 level of significance) to exist between the criterion variables KVAT and XGPA. Several negative relationships were shown to exist between the subtests of the TABE and HOBET as well as within the subtests of the HOBET itself. HOBET stress level percentage scores of social (SOC), money/time (M/T), and academic (ACAD),
correlated negatively, at the p<.05 level of significance with TABE reading comprehension scale score (RCSS), grade equivalent (RCGE), and percentile score (RCPC). HOBET academic stress level profiles (ACAD) correlated negatively with TABE math concepts and applications scale score (MASS). HOBET auditory learning style percentage (AUD) and TABE reading comprehension percentile (RCPC) had negative correlations. Within the HOBET itself, negative correlations were found to exist between social interactive process (aggressive percentage) and family (FAM), social (SOC), and academic (ACAD) stress level profile percentage. Of these correlations, the strongest relationship existed between SIP and FAM. Additional negative correlations were found to exist between auditory (AUD) and visual (VIS) learning styles, social (SLS) and solitary (SOLS) learning styles. The strongest negative correlations between learning styles occurred with AUD and VIS at the p<.001 level of significance. A negative correlation between social learning style (SLS) and workplace (WP) stress level profile occurred at the p<.05 level of significance. Oral (ORAL) and written (WRIT)
dependency styles of learning showed strong negative correlations at the p<.001 level of significance. Oral dependency style (ORAL) also correlated negatively with TABE reading comprehension grade equivalent (RCGE) and percentile scores (RCPC) at the p<.05 level of significance. Although the data analyses rejected the first problem of this study, it did point to several factors as measured by the TABE and HOBET that appear to have correlational significance with the criterion variables identified.
Chapter V
Summary and Conclusions

The purposes of this study were, first, to determine if either or both the Tests of Adult Basic Education (TABE) and/or Health Occupations Basic Entrance Test (HOBET) could predict success in health occupations programs, specifically practical nursing; and, second, what factors as measured by these tests have impact on determining success in such programs. The criterion variables used were exit grade point average (XGPA) and Kentucky Vocational Achievement Test scores (KVAT).

The data analyses failed to provide a correlational significance between the tests (TABE and HOBET) and the criterion variables that would support the emergence of either test as a better predictor of academic success. The fact that a composite score for the TABE was not available for data analysis causes true reliability of determining a relationship with criterion variables to be suspect. The composite score of the TABE is provided only when all subtests (reading, math, language and spelling) are given. Since applicants seeking entrance to health occupations programs in Kentucky's vocational schools are required
to meet only minimum scores on reading and math subtests, language and spelling subtests are not regularly given; therefore, the availability of composite scores are not uniformly accessible. However, the HOBET composite score, which was available for study, did correlate with XGPA at .324 but failed in correlational significance with KVAT. Therefore, while there is a slight indication that the HOBET might provide some measure of academic success, basing admissions on the HOBET composite score alone would be highly suspect due to the weakness (at the p<.05 level of significance) of the relationship. Previous studies, as referenced, in the literature review support entrance tests as predictors of academic success and past studies of the students of the KY TECH system have led to the development of minimum required scores for program entrance. Therefore, the students in this study sample, having met the required entrance score, tended to do well in the program. Had the sample included students below the minimum required scores, the greater the likelihood that stronger correlations would have been found.

The data analyses did provide some areas of correlational significance between subtests of both
tests and the criterion variables. The TABE reading vocabulary scale score (RVSS), reading comprehension scale score (RCSS), grade equivalent (RCGE), and reading comprehension percentile score (RCPC) all correlated with exit grade point average (XGPA) at the \( p < .05 \) level of significance. Although that relationship is weak, it is evident that comprehension skills are important to learning. Prior research indicates this as being a factor in success and the results of this study support these findings. Further support is demonstrated by the fact that a strong relationship exists between HOBEET reading comprehension (RC) and exit grade point average (XGPA) \( (p < .001 \) level of significance). The HOBEET reading rate shows a weak relationship but continues to support the fact that strong reading skills are important to success.

Although review of the literature did not reveal strong relationships between affective attributes and success in practical nursing, the results of this study did reveal one variable to have a negative correlation with both criterion variables (KVAT and XGPA). This factor was social stress level profile percentage (SOC). A weak relationship existed with KVAT at the \( p < .05 \) level of significance, but when correlated with exit grade
point average (XGPA) a relationship of .450 existed at the p<.001 level of significance. Therefore, the high level of significance of the latter would appear to strengthen research findings that individuals having difficulty relating to others have difficulty in achieving success. No other variable within the range of stress level profiles showed any correlation with academic success. Therefore, the findings of this study do not support a commonly held belief that the stress of limited time/financial resources, family matters, job demands, or academic concerns of students have an effect on achieving program success. Learning styles as measured by the HOBET did not show a relationship to academic success. One possible reason for this might be the instructional methods, lectures, demonstrations, hands-on experiences, etc., utilized in the programs are of such variety that each student's learning style will be addressed at some point within the educational process. Another factor explaining the lack of a relationship might be that a small student-teacher ratio allows for individualized instruction.

The failure of the study to support either or both instruments in determining the outcomes of the criterion variables does not devalue the importance of
their use in the assessment of individuals seeking entrance to health occupations programs. Admissions counseling has traditionally emphasized the need for applicants to have strong academic ability, as well as, financial means, family support and job schedules appropriate to program demands prior to program entrance. The results of this study support this emphasis but also provide implications for going a step further. An additional focus of counseling may need to be in the area of attitudes and interpersonal communication. Research has long supported the importance of interpersonal communication to success on the job and, in today's society, its relevance to the individual's ability to succeed in family and social life is also being emphasized. Therefore, program admissions may need to include assessment of attitudes and interpersonal communication skills in order to more effectively counsel prospective students. The inclusion of classes on communication skills may also be suggested by this study. Assisting the student in the development of good interpersonal communication would be conducive to the learning environment and provide an avenue for the building of individual self-esteem.
In conclusion, in conducting this study the author attempted to determine whether the tests studied predict academic success in practical nursing programs or produce measurable factors that can be used as predictors of success. While the study did not, with correlational significance, support the former, it can be concluded that each has specific subtests that justify the need for additional study to further evaluate the ability of these factors to predict academic success. Studies of pre-admission assessment and counseling procedures of practical nursing programs might serve to identify areas of the process that may be able to increase the expectation of success of entering students. Larger sample sizes should be utilized in future research for generalizability.
References


### Table A-3

<table>
<thead>
<tr>
<th>VAR</th>
<th>AGE</th>
<th>RVGE</th>
<th>RCSS</th>
<th>MASS</th>
<th>ACAD</th>
<th>WRIT</th>
<th>COMP</th>
<th>KYAT</th>
<th>GPA</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGE</td>
<td>1.000</td>
<td>-0.283</td>
<td>-1.375</td>
<td>-1.035</td>
<td>0.035</td>
<td>-0.086</td>
<td>0.059</td>
<td>0.024</td>
<td>0.325</td>
</tr>
<tr>
<td>RVGE</td>
<td>* 2.821</td>
<td>1.000</td>
<td>0.963</td>
<td>-2.849</td>
<td>-0.370</td>
<td>-0.954</td>
<td>0.540</td>
<td>0.291</td>
<td>0.071</td>
</tr>
<tr>
<td>RCSS</td>
<td>0.226**</td>
<td>-0.642</td>
<td>1.000</td>
<td>0.838</td>
<td>* 0.343</td>
<td>0.473</td>
<td>* -0.577</td>
<td>* -0.356</td>
<td>* -0.185</td>
</tr>
<tr>
<td>MASS</td>
<td>0.677**</td>
<td>-0.800</td>
<td>0.890</td>
<td>1.000</td>
<td>0.635</td>
<td>0.777</td>
<td>0.000</td>
<td>0.148</td>
<td>0.368</td>
</tr>
<tr>
<td>ACAD</td>
<td>-0.175</td>
<td>0.004</td>
<td>0.483</td>
<td>-0.413</td>
<td>0.633</td>
<td>1.000</td>
<td>0.767</td>
<td>0.057</td>
<td>0.000</td>
</tr>
<tr>
<td>WRIT</td>
<td>0.000**</td>
<td>0.199</td>
<td>0.000</td>
<td>0.268</td>
<td>0.406</td>
<td>0.000</td>
<td>1.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>COMP</td>
<td>0.096</td>
<td>0.599</td>
<td>0.000</td>
<td>0.767</td>
<td>0.877</td>
<td>0.000</td>
<td>0.000</td>
<td>1.000</td>
<td>0.000</td>
</tr>
<tr>
<td>KYAT</td>
<td>0.000**</td>
<td>0.093</td>
<td>0.000</td>
<td>0.115</td>
<td>0.154</td>
<td>0.000</td>
<td>0.000</td>
<td>0.115</td>
<td>1.000</td>
</tr>
<tr>
<td>GPA</td>
<td>0.000**</td>
<td>0.093</td>
<td>0.000</td>
<td>0.115</td>
<td>0.154</td>
<td>0.000</td>
<td>0.000</td>
<td>0.115</td>
<td>1.000</td>
</tr>
</tbody>
</table>

*Appendix A

Correlation Coefficients Between Predictor Variables And Criterion Variables

Summary Table of All Variables

Note: *p<.05, **p<.01, ***p<.001 Level of Significance

N=253
Appendix A

Table A-4

<table>
<thead>
<tr>
<th>VAR</th>
<th>AGE</th>
<th>RVSS</th>
<th>RVGE</th>
<th>RVPC</th>
<th>RCSS</th>
<th>RCGE</th>
<th>RCPC</th>
<th>MCSS</th>
<th>MCGE</th>
<th>MCPC</th>
<th>MASS</th>
<th>MAGE</th>
<th>MAPC</th>
<th>KVAT</th>
<th>GPA</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGE</td>
<td>1.000</td>
<td>*0.282</td>
<td>0.225</td>
<td>0.267</td>
<td>0.293</td>
<td>0.006</td>
<td>0.099</td>
<td>-0.006</td>
<td>0.024</td>
<td>0.045</td>
<td>**0.386</td>
<td>**0.382</td>
<td>0.175</td>
<td>0.140</td>
<td>0.055</td>
</tr>
<tr>
<td>RVSS</td>
<td>*0.282</td>
<td>1.000</td>
<td>*0.642</td>
<td>*0.800</td>
<td>*0.603</td>
<td>*0.489</td>
<td>*0.594</td>
<td>0.200</td>
<td>0.123</td>
<td>0.171</td>
<td>*0.291</td>
<td>0.189</td>
<td>*0.327</td>
<td>0.152</td>
<td>**0.354</td>
</tr>
<tr>
<td>RVGE</td>
<td>0.226</td>
<td>***0.642</td>
<td>1.000</td>
<td>***0.839</td>
<td>*0.343</td>
<td>***0.473</td>
<td>***0.575</td>
<td>0.108</td>
<td>0.005</td>
<td>0.168</td>
<td>*0.284</td>
<td>*0.277</td>
<td>**0.430</td>
<td>0.076</td>
<td>0.097</td>
</tr>
<tr>
<td>RVPC</td>
<td>0.267</td>
<td>***0.800</td>
<td>***0.639</td>
<td>1.000</td>
<td>*0.402</td>
<td>**0.421</td>
<td>***0.667</td>
<td>0.154</td>
<td>0.175</td>
<td>*0.309</td>
<td>0.242</td>
<td>0.232</td>
<td>**0.507</td>
<td>0.067</td>
<td>0.164</td>
</tr>
<tr>
<td>RCSS</td>
<td>0.203</td>
<td>***0.603</td>
<td>*0.343</td>
<td>1.000</td>
<td>***0.633</td>
<td>***0.777</td>
<td>0.081</td>
<td>-0.018</td>
<td>0.046</td>
<td>0.224</td>
<td>0.058</td>
<td>0.179</td>
<td>0.222</td>
<td>**0.420</td>
<td></td>
</tr>
<tr>
<td>RCGE</td>
<td>-0.006</td>
<td>***0.489</td>
<td>***0.473</td>
<td>***0.633</td>
<td>1.000</td>
<td>***0.767</td>
<td>0.095</td>
<td>0.074</td>
<td>0.065</td>
<td>0.234</td>
<td>0.132</td>
<td>0.177</td>
<td>0.068</td>
<td>**0.401</td>
<td></td>
</tr>
<tr>
<td>RCPC</td>
<td>0.099</td>
<td>***0.594</td>
<td>***0.575</td>
<td>***0.657</td>
<td>***0.777</td>
<td>***0.767</td>
<td>1.000</td>
<td>0.178</td>
<td>0.154</td>
<td>*0.287</td>
<td>0.261</td>
<td>0.114</td>
<td>*0.352</td>
<td>0.144</td>
<td>**0.385</td>
</tr>
<tr>
<td>MCSS</td>
<td>-0.006</td>
<td>0.200</td>
<td>0.108</td>
<td>0.154</td>
<td>0.081</td>
<td>0.095</td>
<td>0.178</td>
<td>1.000</td>
<td>***0.844</td>
<td>***0.872</td>
<td>***0.519</td>
<td>**0.439</td>
<td>**0.429</td>
<td>0.186</td>
<td>0.158</td>
</tr>
<tr>
<td>MCGE</td>
<td>0.024</td>
<td>0.123</td>
<td>0.095</td>
<td>0.175</td>
<td>-0.018</td>
<td>0.074</td>
<td>0.154</td>
<td>***0.844</td>
<td>1.000</td>
<td>***0.873</td>
<td>***0.397</td>
<td>**0.407</td>
<td>**0.374</td>
<td>0.220</td>
<td>0.132</td>
</tr>
<tr>
<td>MCPC</td>
<td>0.045</td>
<td>0.171</td>
<td>0.168</td>
<td>*0.329</td>
<td>0.046</td>
<td>0.035</td>
<td>*0.287</td>
<td>***0.872</td>
<td>***0.873</td>
<td>1.000</td>
<td>***0.399</td>
<td>**0.390</td>
<td>***0.497</td>
<td>0.097</td>
<td>-0.024</td>
</tr>
<tr>
<td>MASS</td>
<td>**0.386</td>
<td>*0.291</td>
<td>*0.284</td>
<td>0.242</td>
<td>0.224</td>
<td>0.234</td>
<td>0.261</td>
<td>***0.519</td>
<td>**0.397</td>
<td>**0.399</td>
<td>1.000</td>
<td>***0.862</td>
<td>**0.828</td>
<td>0.156</td>
<td>0.151</td>
</tr>
<tr>
<td>MAGE</td>
<td>**0.386</td>
<td>0.189</td>
<td>*0.277</td>
<td>0.232</td>
<td>0.058</td>
<td>0.132</td>
<td>0.114</td>
<td>**0.439</td>
<td>**0.407</td>
<td>**0.390</td>
<td>***0.862</td>
<td>1.000</td>
<td>***0.833</td>
<td>0.082</td>
<td>0.058</td>
</tr>
<tr>
<td>MAPC</td>
<td>-0.175</td>
<td>*0.327</td>
<td>**0.430</td>
<td>**0.507</td>
<td>0.179</td>
<td>0.177</td>
<td>*0.352</td>
<td>**0.429</td>
<td>**0.374</td>
<td>**0.497</td>
<td>***0.828</td>
<td>***0.813</td>
<td>1.000</td>
<td>0.068</td>
<td>0.027</td>
</tr>
<tr>
<td>KVAT</td>
<td>0.140</td>
<td>0.152</td>
<td>0.076</td>
<td>0.087</td>
<td>0.222</td>
<td>0.068</td>
<td>0.144</td>
<td>0.186</td>
<td>0.220</td>
<td>0.097</td>
<td>0.156</td>
<td>0.082</td>
<td>0.068</td>
<td>1.000</td>
<td>***0.689</td>
</tr>
<tr>
<td>GPA</td>
<td>0.055</td>
<td>**0.354</td>
<td>0.097</td>
<td>0.164</td>
<td>**0.420</td>
<td>**0.401</td>
<td>**0.385</td>
<td>0.158</td>
<td>0.132</td>
<td>-0.024</td>
<td>0.151</td>
<td>0.058</td>
<td>0.027</td>
<td>***0.689</td>
<td>1.000</td>
</tr>
</tbody>
</table>

N=53
* .05, ** .01, *** .001 Levels of Significance
### Appendix A

#### TABLE A-5

**Correlation Coefficients Between Criterion Variables And Predictor Variables**  
(HOBET Subtests With KVAT And XGPA)

<table>
<thead>
<tr>
<th>VAR</th>
<th>EMS</th>
<th>RC</th>
<th>RR</th>
<th>TEST</th>
<th>SIP</th>
<th>FAM</th>
<th>SOC</th>
<th>MT</th>
<th>ACAD</th>
<th>WP</th>
<th>AUD</th>
<th>VIS</th>
<th>SLS</th>
<th>SOLS</th>
<th>ORAL</th>
<th>WRIT</th>
<th>COMP</th>
<th>KVAT</th>
<th>GPA</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMS</td>
<td>1.00</td>
<td>.218</td>
<td>-.044</td>
<td>-.023</td>
<td>-.066</td>
<td>-.090</td>
<td>.063</td>
<td>-.047</td>
<td>-.057</td>
<td>.104</td>
<td>.039</td>
<td>.077</td>
<td>.001</td>
<td>.103</td>
<td>-.155</td>
<td>-.055</td>
<td>**.707</td>
<td>.117</td>
<td>-.024</td>
</tr>
<tr>
<td>RC</td>
<td>.218</td>
<td>1.000</td>
<td>.197</td>
<td>*.302</td>
<td>-.013</td>
<td>-.072</td>
<td>*-.349</td>
<td>*.277</td>
<td>-.339</td>
<td>-.076</td>
<td>-.241</td>
<td>.271</td>
<td>-.001</td>
<td>-.056</td>
<td>-.213</td>
<td>.025</td>
<td>**.755</td>
<td>.104</td>
<td>**.520</td>
</tr>
<tr>
<td>RR</td>
<td>-.044</td>
<td>.197</td>
<td>1.000</td>
<td>.227</td>
<td>-.003</td>
<td>.069</td>
<td>-.187</td>
<td>.053</td>
<td>-.127</td>
<td>-.064</td>
<td>-.142</td>
<td>.027</td>
<td>-.153</td>
<td>-.010</td>
<td>.079</td>
<td>.063</td>
<td>.150</td>
<td>-.134</td>
<td>**.397</td>
</tr>
<tr>
<td>TEST</td>
<td>-.023</td>
<td>*.302</td>
<td>.227</td>
<td>1.000</td>
<td>-.014</td>
<td>-.053</td>
<td>-.019</td>
<td>-.200</td>
<td>-.099</td>
<td>.015</td>
<td>-.023</td>
<td>.081</td>
<td>-.101</td>
<td>.139</td>
<td>-.130</td>
<td>.031</td>
<td>.202</td>
<td>.097</td>
<td>.175</td>
</tr>
<tr>
<td>SIP</td>
<td>-.066</td>
<td>-.013</td>
<td>-.003</td>
<td>-.014</td>
<td>1.000</td>
<td>**-.395</td>
<td>**-.415</td>
<td>.132</td>
<td>*.302</td>
<td>.046</td>
<td>.014</td>
<td>-.025</td>
<td>.046</td>
<td>.018</td>
<td>*.291</td>
<td>-.177</td>
<td>.013</td>
<td>.161</td>
<td>-.058</td>
</tr>
<tr>
<td>FAM</td>
<td>-.090</td>
<td>-.072</td>
<td>.069</td>
<td>-.053</td>
<td>**-.395</td>
<td>1.000</td>
<td>*.351</td>
<td>*-.274</td>
<td>.115</td>
<td>-.098</td>
<td>-.131</td>
<td>.121</td>
<td>-.128</td>
<td>.138</td>
<td>-.209</td>
<td>*-.274</td>
<td>.068</td>
<td>-.059</td>
<td>.060</td>
</tr>
<tr>
<td>SOC</td>
<td>.063</td>
<td>*-.349</td>
<td>-.187</td>
<td>-.019</td>
<td>**-.415</td>
<td>*.351</td>
<td>1.000</td>
<td>.168</td>
<td>.217</td>
<td>.220</td>
<td>.017</td>
<td>.034</td>
<td>-.141</td>
<td>-.019</td>
<td>*.329</td>
<td>.231</td>
<td>.223</td>
<td>*.285</td>
<td>**.450</td>
</tr>
<tr>
<td>MT</td>
<td>-.047</td>
<td>*.277</td>
<td>.053</td>
<td>-.200</td>
<td>.132</td>
<td>*.274</td>
<td>.168</td>
<td>1.000</td>
<td>.149</td>
<td>.260</td>
<td>.087</td>
<td>-.099</td>
<td>-.142</td>
<td>-.002</td>
<td>.253</td>
<td>.002</td>
<td>-.207</td>
<td>-.220</td>
<td>-.130</td>
</tr>
<tr>
<td>ACAD</td>
<td>-.057</td>
<td>*.339</td>
<td>-.127</td>
<td>-.099</td>
<td>*.302</td>
<td>.115</td>
<td>.217</td>
<td>.149</td>
<td>1.000</td>
<td>.047</td>
<td>.161</td>
<td>-.143</td>
<td>-.013</td>
<td>-.045</td>
<td>-.097</td>
<td>.045</td>
<td>*.299</td>
<td>-.015</td>
<td>-.175</td>
</tr>
<tr>
<td>WP</td>
<td>.104</td>
<td>-.076</td>
<td>-.064</td>
<td>-.015</td>
<td>.046</td>
<td>-.098</td>
<td>.220</td>
<td>.260</td>
<td>.047</td>
<td>1.000</td>
<td>-.031</td>
<td>.163</td>
<td>*.280</td>
<td>.038</td>
<td>.035</td>
<td>.040</td>
<td>-.139</td>
<td>.008</td>
<td>-.036</td>
</tr>
<tr>
<td>AUD</td>
<td>.039</td>
<td>-.241</td>
<td>-.142</td>
<td>-.023</td>
<td>.014</td>
<td>-.131</td>
<td>.017</td>
<td>.087</td>
<td>.161</td>
<td>-.031</td>
<td>1.000</td>
<td>**.472</td>
<td>*.291</td>
<td>-.106</td>
<td>.203</td>
<td>-.054</td>
<td>-.092</td>
<td>-.056</td>
<td>-.094</td>
</tr>
<tr>
<td>VIS</td>
<td>.077</td>
<td>.271</td>
<td>.027</td>
<td>.081</td>
<td>-.025</td>
<td>.121</td>
<td>.034</td>
<td>-.099</td>
<td>-.143</td>
<td>.163</td>
<td>**.472</td>
<td>1.000</td>
<td>-.203</td>
<td>.127</td>
<td>*.317</td>
<td>.228</td>
<td>.187</td>
<td>-.083</td>
<td>.028</td>
</tr>
<tr>
<td>SLS</td>
<td>.001</td>
<td>-.001</td>
<td>-.018</td>
<td>-.101</td>
<td>.046</td>
<td>-.128</td>
<td>-.141</td>
<td>-.142</td>
<td>-.013</td>
<td>*.280</td>
<td>*.291</td>
<td>-.203</td>
<td>1.000</td>
<td>**.422</td>
<td>*-.319</td>
<td>.241</td>
<td>.095</td>
<td>-.152</td>
<td>-.108</td>
</tr>
<tr>
<td>SOLS</td>
<td>.103</td>
<td>-.056</td>
<td>-.010</td>
<td>.139</td>
<td>.018</td>
<td>.138</td>
<td>-.019</td>
<td>.002</td>
<td>-.045</td>
<td>.038</td>
<td>-.106</td>
<td>.127</td>
<td>**.422</td>
<td>1.000</td>
<td>-.186</td>
<td>*.319</td>
<td>.072</td>
<td>.210</td>
<td>.126</td>
</tr>
<tr>
<td>ORAL</td>
<td>-.155</td>
<td>-.213</td>
<td>.079</td>
<td>-.130</td>
<td>*.231</td>
<td>-.209</td>
<td>*.329</td>
<td>.253</td>
<td>-.097</td>
<td>.035</td>
<td>.203</td>
<td>*-.347</td>
<td>*.319</td>
<td>-.018</td>
<td>1.000</td>
<td>**.522</td>
<td>-.147</td>
<td>.034</td>
<td>-.146</td>
</tr>
<tr>
<td>WRIT</td>
<td>-.055</td>
<td>.025</td>
<td>-.063</td>
<td>.031</td>
<td>-.177</td>
<td>*.274</td>
<td>.231</td>
<td>-.207</td>
<td>*.299</td>
<td>.040</td>
<td>-.054</td>
<td>.228</td>
<td>-.241</td>
<td>*.319</td>
<td>**.522</td>
<td>1.000</td>
<td>-.026</td>
<td>-.093</td>
<td>.145</td>
</tr>
<tr>
<td>COMP</td>
<td>-.221</td>
<td>-.194</td>
<td>-.234</td>
<td>-.136</td>
<td>-.134</td>
<td>.159</td>
<td>.163</td>
<td>-.110</td>
<td>.132</td>
<td>-.139</td>
<td>-.092</td>
<td>.187</td>
<td>.095</td>
<td>.072</td>
<td>-.147</td>
<td>-.026</td>
<td>1.000</td>
<td>.171</td>
<td>*.324</td>
</tr>
<tr>
<td>KVAT</td>
<td>.117</td>
<td>.104</td>
<td>-.134</td>
<td>.097</td>
<td>.161</td>
<td>-.059</td>
<td>*.285</td>
<td>-.220</td>
<td>-.015</td>
<td>.008</td>
<td>-.056</td>
<td>-.083</td>
<td>-.152</td>
<td>.210</td>
<td>.034</td>
<td>-.093</td>
<td>.171</td>
<td>.100</td>
<td>**.689</td>
</tr>
<tr>
<td>GPA</td>
<td>.024</td>
<td>**.520</td>
<td>**-.397</td>
<td>.175</td>
<td>-.068</td>
<td>.080</td>
<td>**.450</td>
<td>-.130</td>
<td>-.175</td>
<td>-.036</td>
<td>-.094</td>
<td>.028</td>
<td>-.108</td>
<td>.126</td>
<td>-.146</td>
<td>.145</td>
<td>*.324</td>
<td>**.689</td>
<td>1.000</td>
</tr>
</tbody>
</table>

N=53  
*.05, **.01, ***.001 Levels of Significance