THE RELATIONSHIP OF ACADEMIC SUCCESS TO AMERICAN COLLEGE TEST SCORES AND HIGH SCHOOL PERFORMANCE OF STUDENTS ENROLLED IN ELECTRONICS TECHNOLOGY AT THREE OKLAHOMA JUNIOR COLLEGES

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CHAPTER I

INTRODUCTION

Technology has generated thousands of job opportunities for competent technical personnel. Technical education and, more specifically, engineering technology education has been a major component in preparing persons for employment in technical occupations. This presupposes rigorous screening and selection of entering students to assure appropriateness of aptitude and interest.

To the present time, little has been done towards the selection of technical students although numerous tests have been available to measure human behavior such as intelligence, interests and aptitude. The obvious reason has been that there have not been enough student applicants to encourage selection. It has even been necessary, in many instances, to enroll every applicant in order to justify a program; as a result, much time and effort has been devoted by the instructor to the unqualified student who, at some later date, was apt to be dropped from the program. This policy is grossly unfair to the unqualified student as much valuable time may be lost as well as possible damage to his ego and self-confidence. It is also unfair to the qualified student as the progress of the entire class is slowed down and his needs are inadequately met.

Other reasons for inadequate selection procedures relate to the time and effort required to administer a test battery. Should the overburdened school counselor do this or the classroom teacher? Would not the testing have to take place before enrollment? Who would interpret the tests? Will a school whose primary philosophy is steeped in the traditional scholastic attitudes fund such projects? These questions for the most part have been ignored and selection procedures have remained woefully inadequate.

Statement of the Problem

In the fall semester of 1970 Tulsa Junior College first opened its doors offering various curriculums. The attrition rate in engineering technology for the first year was extremely high--approximately 40 percent. The problem was to determine whether or not the existing information that was available for all entering freshmen in Oklahoma, the American College Test (ACT) score, high school GPA, and the level of mathematics completed prior to enrollment in the program could be used as predictors of success in engineering technology. The overall purpose being more realistic counseling of potential enrollees.

Purpose of the Study

The purpose of this study was to evaluate variables, specifically the results of the ACT test battery, high school performance, and knowledge of mathematics courses successfully completed as predictors of success in engineering technology education.

Need for the Study

At the time of the study the engineering technology programs were operating more or less on an open-door policy requiring only that the student take the American College Test (ACT) program test battery. No effort has been made to interpret this information concerning the probability of success in an engineering technology curriculum after having achieved a particular ACT score or level of mathematical training. The need for improvement of the selection procedures was both apparent and urgent. A prime consideration was that the selection procedure be efficient, regarding both time and money, in the gathering and interpreting of the data in order to be usable and acceptable to the schools.

Limitations of the Study

Possible potential intervening variables include the inability to assign an absolute sequence of mathematics courses due to the lack of consistent terminology in the names and variations of course work for classes of the same name in different schools and under different instructors. Other factors include the variability of the instructors backgrounds and grading practices between the three schools involved in the study. Limitations of this nature would be present in any study where more than one teacher was involved regardless of the institution. These differences have been minimized in that instructors of these institutions gained a large portion of their background and were in close association with one another during a National Science Foundation Institute during the summer of 1971.

Another variable, the difference in curriculums, has been minimized by the close coordination of the Oklahoma State Department of Vocational and Technical Education. The fact that the programs were in a state of flux, new curriculums, inexperienced instructors, new equipment, and new ideas would also be another possible intervening variable.

Assumptions

The following assumptions are made:

1. The students involved in this study were representative future enrollees.

2. The engineering technology programs at the three institutions were basically the same.

3. The grading system used by each instructor was fundamentally the same where achievements could be measured by conventional course grade system of A, B, C, D, F in which A was given a numerical value of 4, B the value 3, C the value 2, D the value 1, and F the value of zero.

4. A positive correlation between ACT scores and grade-point average actually would indicate that ACT scores could be used as a predictor of success in the three Junior College engineering technology programs.

5. All the data could be assumed to be interval in nature.

Definitions

Engineering Technician

An engineering technician was taken to be one whose education and experience qualifies him to work in the field of engineering technology.

He differs from a craftsman in his knowledge of scientific and engineering theory and methods and from an engineer by his more specialized background and in his use of technical skills in support of engineering activities.

Engineering Technology

Engineering technology was defined as that part of the engineering field which requires the application of scientific and engineering knowledge and methods combined with technical skills in support of engineering activities, it lies in the occupational area between the craftsman and the engineer.

Engineer Technology Curriculum

An engineering technology curriculum was defined as an organized program of study and experience designed to meet the requirements for the preparation of a particular kind of technician within a stated period of time.

High school mathematics background was understood to mean the highest level high school mathematics course satisfactorily completed by the student. For the purposes of this study high school mathematics levels were quantified as follows:

Algebra I	level 1
Geometry	level 2
Algebra II	level 3
Trigonometry	level 4
Trigonometry with Matrix Algebra	level 4
Trigonometry with Math Analysis	level 4

Conn

CHAPTER II

REVIEW OF LITERATURE

Technical Education Student Characteristics

The prediction of scholastic achievement has been the object of research studies many times over. Within the past two decades the rapid increase in college enrollment has brought forth an attendant increased interest toward predicting academic success at the college level. However, this impetus has not been inclusive of all areas of college level programs.

In order to predict academic success Schroeder and Sledge did a comprehensive review of studies since 1950 seeking factors relating to collegiate academic success.

The authors said that:

> Intellective factors were found to be more predictive of collegiate achievement than non-intellective factors although the importance of the latter was not disrupted. Intellective factors found in decreasing order of importance were high school achievement (grade point average slightly superior to rank in class), subject matter test scores, and measures of mental ability . . . grades in specific high school courses seemed to correlate more highly with similar college course grades than overall collegiate grades (9).

Greenwood in an effort to predict the success of some New York State engineering technology students concluded:

(1) Intelligence test scores, high school mathematics and English averages, and the number of years of high school mathematics are likely

to be related to academic success in the technical curriculums of community colleges.

(2) It was desirable for students entering electrical or mechanical curriculums to have had at least three years of high school mathematics, although some students are successful with less (5).

Rightland attempting to identify the pattern of psychological characteristics that distinguish successful from unsuccessful technical institute freshmen substantiated the importance of the role of mathematics and study habits for the successful technical institute students (8).

The American College Testing Programs' Research service with students enrolled in two-year occupational terminal curriculums was reviewed by Hoyt. Six groups from six different colleges in six different states were represented and according to Hoyt the following conclusions were made:

(1) The academic potentials of the six groups were remarkably homogeneous. This was more true when potential was measured by high school grades than when it was measured by ACT scores.

(2) These potentials were well below the average established for all colleges but only slightly below the general junior college average. They were weaker in English and social studies than in mathematics and natural science.

(3) College grades for these students averaged slightly higher than comparable grades - for all college and for all junior college students. However, there were marked institutional differences suggesting that grading practices did not follow a uniform standard from college to college or from department to department.

(4) ACT scores and high school grades were about equally predictive of college grades. Combined they possessed useful predictive validity for these "non-academically" oriented students. The level of predictability was, however, reduced over that typically obtained from such data (6).

Shingetomi completed a study related to the academic success of 72 students in a Honolulu Technical School in 1963 and arrived at the following conclusion:

> The high school algebra grade missed being significant at the one percent confidence level. However, there is a possibility that this may prove to be another significant predictor variable (10).

Brown in a study of technical institute students at Oklahoma State University obtained the following results:

> The results of the mathematics (ACT) test proved to be confusing since a negative correlation with respect to grade point average was obtained. Yet the test of significance permitted rejection of the null hypothesis at the one tenth of one percent level, thus showing a significant difference between mathematics test scores of the successful student versus the unsuccessful student (2).

Van Derslice divided technical education student characteristics into three categories: educational, psychological, and sociological. He realized it was more difficult to measure psychological and sociological characteristics than it was to measure educational characteristics (13).

He defined the educational characteristics as a high school graduate, average age 19, who was above the national average in educational ability and achievement. The average technical educational student has a 2.00 or "C" average in high school and has two years in high school mathematics (algebra and geometry) and two years of high school science (general science and biology). This student is below the level of the four-year college student as measured in mathematics and science and does well above average in the ability to handle applied theory.

Using the School College Aptitude Test (SCAT) Van Derslice found that technical students scored about the 45th percentile on verbal comprehension, near the 47th percentile on quantitative or abstract reasoning, and at the 40th percentile on a reading comprehension test. He concluded that technical students must possess abilities in verbal comprehension, numerical reasoning and numerical ability (13).

Psychological characteristics displayed by technical education students were an active and early interest in the field they enter. Successful students work better independently and psychological tests seem to indicate they are "thing" oriented rather than "people" oriented. They seem to have a need for laboratory centered programs and a dominant interest in practical work and application.

Gillie takes the position that incoming students with one year of algebra and an interest in an area of technology stand a good chance of graduating from a technical program (4). He identifies the "middle level" student as best suited for technical education and describes him as the youngster who is in the 25th to 75th percentile of his secondary school class.

Tinnell took the first step toward establishing a basis from which promising students for the emerging technologies could be identified (12). He studies 22 students of the Oklahoma State University Electromechanical Pilot Training Program and concluded that high school background in mathematics offers the most promise for identifying potentially successful students - for electromechanical technology.

Summary

Curriculum design should be based on both input and output telations. The implication of this is that the characteristics of the student should be expected to have a bearing on the design or choice of courses.

Added to this consideration is the fact that academic achievement is influenced by a great number of variables, so that predictability of such achievement is highly individual, and is not readily transferred between different groups. Even where course content requirements may be the same, the suitability of teaching methods may differ significantly for student groups having different characteristics. The studies reported in the literature thus emphasize, among other things, the differences among various groups of students, and consequently the particular curriculum must be judged individually by a combination of several measures.

(1) Relation between the choice of mathematics course and success in the rest of the curriculum.

(2) Success of the intended students in the mathematics courses being considered.

Further summary was reflected in a statement of the Commission of Science Education. The education of techniques is based on science and mathematics. Technical education has unique requirements and characteristics quite different in numerous ways from the education of scientists and engineers and has an identity of its own.

Statement of Hypotheses

Based on the review of the literature and with the scope of this study and assumptions set forth, the following hypotheses are stated.

(1) There is no significant correlation between the American College Testing (ACT) mathematics score and the first year grade point average (GPA) earned at Tulsa Junior College (T.J.C.), Northern Oklahoma College (N.O.C.) and Northeastern Oklahoma A & M College (N.E.O.).

(2) There is no significant correlation between the ACT natural science score and the first year GPA earned at T.J.C., N.O.C., and N.E.O.

(3) There is no significant correlation between the ACT English score and the first year GPA earned at T.J.C., N.O.C., and N.E.O.

(4) There is no significant correlation between the ACT social science score and the first year GPA earned at T.J.C., N.O.C., and N.E.O.

(5) There is no significant correlation between the ACT composite score and the first year GPA earned at T.J.C., N.O.C., and N.E.O.

(6) There is no significant correlation between the high school GPA and the first year GPA earned at T.J.C., N.O.C., and N.E.O.

(7) There is no significant correlation between the level of mathematics taken prior to admission and the first year GPA earned at T.J.C., N.O.C., and N.E.O.

CHAPTER III

METHOD AND PROCEDURE

Methods of Investigation

In this chapter, the writer specifies the methodology used in investigating the problem of this study. The selection of the sample, the procedure followed, and the treatment of the data are also discussed.

Data Selection

All grades used in determining achievement were obtained from students' official files. Only those students who started the Electronics program in September 1972 were selected as subjects. Electronics majors who did not take any Electronics courses were not used in this study.

Table I presents the data relative to ACT scores, highest mathematics taken before the electronics program, college GPA and high school GPA for each student presented and included.

TABLE I

COLLECTED DATA FROM T.J.C., N.O.C., AND N.E.O.

Student Grade Book No.	ACT Scores Math.	Nat. Sc.	Eng-lish	Soc. Sc.	Comp.	Highest Math before Electronic program*	College GPA 72-73**	High School GPA
1	25	17	19	20	20	1	1.63	1.15
2	18	16	16	13	16	1	2.00	1.95
3	16	17	18	10	15	2	0.96	N/A
4	20	26	24	25	13	4	3.45	0.98
5	20	14	21	23	20	1	3.38	2.52
6	19	06	23	27	19	3	0.00	1.17
7	17	11	10	14	13	2	1.25	2.92
8	16	18	11	23	17	2	1.28	N/A
9	14	22	27	29	23	2	0.00	1.28
10	18	25	10	18	18	2	1.00	1.53
11	18	16	16	18	17	2	0.72	2.62
12	13	10	04	07	09	1	0.00	N/A
13	11	15	20	20	17	2	3.42	N/A
14	10	18	17	16	15	1	2.71	N/A
15	08	14	08	14	11	1	0.85	0.38
16	05	12	04	05	07	1	1.00	1.61
17	21	18	11	22	18	2	0.85	2.30
18	21	22	26	28	24	3	3.11	2.59
19	14	19	26	23	21	1	3.53	2.12
20	18	24	23	26	23	3	3.54	0.44
21	26	28	21	24	25	4	2.03	2.92
22	15	15	11	6	12	1	2.42	0.4

Table I (Continued)

Student Grade Book No.	ACT Scores Math	Nat. Sc.	Eng- lish	Soc. Sc.	Comp.	Highest Math before Elec- tronic program*	College GPA 72-73**	High School GPA
23	15	21	10	14	15	2	3.31	3.0
24	19	14	13	14	15	3	3.2	3.23
25	10	17	8	12	2	3	1.17	1.79
26	22	31	16	25	24	2	3.92	3.5
27	22	18	19	22	20	2	1.90	2.16
28	21	21	18	17	19	3	1.76	2.00
29	16	15	13	12	14	1	3.32	2.57
30	25	17	18	12	18	4	2.92	2.05
31	19	17	11	15	16	3	0.52	1.42
32	17	16	8	6	12	1	1.05	1.5
33	16	15	7	6	11	1	1.56	2.4
34	22	19	16	22	20	2	3.34	2.66
35	19	20	12	5	14	3	1.15	1.82

*See attached ranking
**Based on 4.0 system

Population

The admission data to be considered was gathered from the group of students who entered in the first year of the electronics program at Tulsa Junior College, Northern Oklahoma College and Northeastern Oklahoma A & M College in September of 1972. Approximately 104 students were enrolled during this period. Of this total number, more than forty percent were excluded from the samples. In practically all of these cases, the criterion or grade point average for the first year was missing and they were not included in this population. A total of 35 people made up the population of the study.

Data Collection

The American College Test scores, the highest high school level of mathematics and high school grade point averages were obtained from the students' official file.

In a previous study it was found that students earning a passing grade (2.0 or better) at the end of the first year generally do equally as well or better in the second year (11). Thus the grade point average for the first year was selected as the criterion of success for this study. Letter grades earned by students were converted to a numerical scale ranging from 0 for 'F' to 4.0 for 'A'. Grade point averages were computed by multiplying the numerical grade by the number of credit hours and taking the mean of the sum of these products.

The predictor variables employed in this experiment were the ACT scores, level of high mathematics and high school grade point average. By comparing these test scores against the first year grade point average, the testing of the hypotheses can be accomplished.

Statistical Method

For this study, the Pearson product moment coefficient of correlation, designated r, was the measure which was used to yield information regarding the relationship of the criterion and the predictor variables. This measure of correlation may be thought of essentially as the ratio which expresses the extent to which changes in one variable are accompanied by or are dependent upon changes in a second variable. In addition to telling the degree of relationship, the Pearson r, in conjunction with the two means and standard deviations, permit the writing of a linear equation for predicting probable grade point averages from the predictor variables.

To test the hypothesis regarding the relationship between ACT scores and GPA the statistical hypothesis known as the null hypothesis was employed. This hypothesis which states that there is a null amount of correlation will be rejected when the observed data reaches some prescribed level of significance but will not be rejected otherwise.

The t-ratio test of r will be used to test the null hypothesis. The t-ratio designated t, is defined as the ratio of the obtained r to the standard error or r. The procedure to be used in this study was to reject the null hypothesis when t was as large as 2.727 (1% level) or larger, not reject it when t was 1.65 (5% level), and reserving judgment when it was between the two values of t.

The first task was that of constructing a correlation table. The steps in constructing the correlation table and in computing r may be outlined as follows:

Step 1

Group the ACT Math scores into class intervals and enter them on the Y axis. Then group the grade point averages into class intervals and enter them on the X axis. See Table II.

TABLE II

CORRELATION TABLE FOR ACT MATH SCORES AND COLLEGE GPA

X: Grade Point Average

Y: ACT Math Scores

	0.0	0.3	0.6	0.9	1.2	1.5	1.8	2.1	2.4	2.7	3.0	3.3	3.6	3.9	fy	y'	fy'	fy'^2	x'y'
30–32																			
27–29																			
24–26						1	1			1					3	4	12	48	8
21–23			1			1	1				1	1		1	6	3	18	54	33
18–20	1	1	1	2			1				1	2			9	2	18	36	–14
15–17				2	2	1			1			2			8	1	8	8	1
12–14	2											2			4	0	0	0	0
9–11				1						1		1			3	–1	–3	3	–5
6–8			1												1	–2	–2	4	8
3–5				1											1	–3	–3	9	9
0–2																			
fx	3	1	3	6	2	3	3	0	1	2	2	8	0	1	35		48	162	40
x'	–6	–5	–4	–3	–2	–1	0	1	2	3	4	5	6	7					
fx'	–18	–5	–12	–18	–4	–3	0	0	2	6	8	40	0	7	3				
fx'^2	108	25	48	54	8	3	0	0	4	18	32	200	0	49	549				
x'y'	–12	–10	–12	–6	–4	–8	0	0	2	9	20	40	0	21	40				

Step 2

Place one tally mark for each pair of scores in the appropriate cell of the table. After each of the scores have been plotted, place an Arabic numeral in each cell to denote the number of tallies the cell contains.

Step 3

Add the frequencies in each row and enter the results in the column marked fy. Next add the frequencies in each column and enter the results in the row marked fx. The sums of row fx and column fy should be equal no N, in this case 35.

Step 4

Assume an arbitrary origin near the center of the distribution for each variable and record the deviation values x' and y' in their respective row and column.

Step 5

Multiply the values for fy and y' in the same rows and enter the products in the fy' column. Next multiply the values for fx and x' in the same column and enter the product in the fx' row. (All calculations in step 5 should be with due regard to sign.)

Step 6

Multiphy the values for y' and fy' in the same rows and enter the products in the fy'^2 column. Likewise, multiply the values for x' and fx' in the same columns and enter the products in the fx'^2 row.

Step 7

Total the fy' and fy'^2 column to obtain Σ fy' and $\Sigma fy'^2$. Also, total the fx' and fx'^2 rows to obtain Σ fx' and $\Sigma fx'^2$.

Step 8

Multiply each tally by both its corresponding x' and y' values and enter the product in the x'y' column. Total the x'y' column to obtain Σ x'y'.

Step 9

Calculate the corrections and standard deviations for both X and Y from the formulas given below.

$$C'_x = \frac{\Sigma fx'}{N} = \frac{3}{35} = 0.0856$$

$$C'_y = \frac{\Sigma fy'}{N} = \frac{48}{35} = 1.37$$

$$\sigma_x = \frac{\Sigma fx'^2}{N} - (C'X^2) = \frac{549}{35} - 0.0072 = 4.22$$

$$\sigma_y = \frac{\Sigma fx'^2}{N} - (C'Y^2) = \frac{162}{35} - 1.88 = 1.66$$

Step 10

Substitute the values for Σ x'y', N,c'_x, σ_x, and σ_y in the equation below and solve for r.

$$r = \frac{\frac{\Sigma x'y'}{N} - (c'xC'y)}{\sigma_x \sigma_y} = \frac{1.028}{7} = 0.146$$

The same procedure was followed in computing the coefficient of correlation between each test score and the grade point average and between ghe high school algebra grade and the criterion. Upon the completion of this procedure the results were then analyzed and the hypotheses rejected or not rejected.

Since the working hypothesis stated that there was a null amount of correlation, it becomes necessary to test the obtained coefficients of correlation to see if the relationships are real or merely chance relationships. The test of significance was initiated by employing Fisher's t formula.

To test a correlation of 0.146 with N = 35, proceed as follows:

$$t = r\sqrt{\frac{N-2}{1-r^2}} \qquad \text{(Fisher's formula for t)}$$

$$t = 0.146\sqrt{\frac{35-2}{1-(146)^2}} = 0.146 \text{ X } 5.81 = 0.848$$

Referring to Fisher's t table with degrees of freedom N-2 or 35-2= 33, it was found that t must be equal to or greater than 2.727 to be significant at the one percent level. Since the calculated t was less than 0.848, the conclusion was that the correlation of 0.848 shows no significant relationship. There was less than one chance in 100 that the relationship could not be due to chance, hence, the null hypothesis was not rejected.

CHAPTER IV

RESULTS OF INVESTIGATION

Correlation tables showing ACT mathematics scores, ACT natural science scores, ACT English scores, ACT social science scores, ACT composite scores, high school GPA scores and high school mathematics versus college GPA scores are shown in Tables III through VIII, respectively. Each table presents data for groups from three junior colleges.

These correlations were tested by the t tests at the one percent confidence level. The results are shown in Table IX. By examining Table IX, it was found that the relationship between the ACT natural science scores versus college GPA was the only test that was significant at the one percent confidence level. Thus the null hypothesis was rejected. The ACT mathematics test, ACT English test, ACT social science test, ACT composite test, high school GPA test, and high school mathematics test, respectively, were not significant at this confidence level. Thus the null hypothesis was not rejectecd. Instead the ACT English test, ACT composite test and the high school GPA test were found to be significant at the five percent confidence level. The high school mathematics test was not significant at either the one percent or the five percent confidence level. This test showed the least relationship.

TABLE III

CORRELATION TABLE FOR ACT NATURAL SCIENCE SCORES AND COLLEGE GPA

X: Grade Point Average

Y: ACT Math Scores	0.0	0.3	0.6	0.9	1.2	1.5	1.8	2.1	2.4	2.7	3.0	3.3	3.6	3.9	fy	y'	fy'	fy'^2	x'y'
30–32														1	1	4	4	16	28
27–29							1								1	3	3	9	0
24–26				1								2			3	2	6	12	14
21–23	1					1					1	1			4	1	4	4	8
18–20			1	1	1		1			1		2			7	0	0	0	0
15–17		1	1	3		2	1		1	1		2			12	−1	−12	12	5
12–14			1	1							1	1			4	−2	−8	16	−4
9–11	1				1										2	−3	−6	18	24
6–8	1														1	−4	−4	16	24
3–5																			
0–2																			
fx	3	1	3	6	2	3	3	0	1	2	2	8	0	1	35		−13	103	99
x'	−6	−5	−4	−3	−2	−1	0	1	2	3	4	5	6	7		$c'_x = 0.0856$			
fx'	−18	−5	−12	−18	−4	−3	0	0	2	6	8	40	0	7	3	$c'_y = -0.372$			
fx'^2	108	25	48	54	8	3	0	0	4	18	32	200	0	49	549	$\sigma_x = 4.22$			
x'y'	36	5	12	15	6	1	0	0	−2	−3	−4	5	0	29	99	$\sigma_y = 1.25$			
																$r = 0.537$			

TABLE IV

CORRELATION TABLE FOR ACT ENGLISH SCORES AND COLLEGE GPA

X: Grade Point Average

Y: ACT Math Scores	0.0	0.3	0.6	0.9	1.2	1.5	1.8	2.1	2.4	2.7	3.0	3.3	3.6	3.9	fy	y'	fy'	fy'^{2}	x'y'
30-32																			
27-29	1														1	4	4	16	-24
24-26											1	2			3	3	9	27	42
21-23	1						1					2			4	2	8	16	8
18-20				1		2	1			1		1			6	1	6	6	3
15-17			1							1		1		1	5	0	0	0	0
12-14				1							1	1			3	-1	-3	3	-6
9-11		1	1	1	2				1			1			7	-2	-14	28	18
6-8			1	2		1									4	-3	-12	36	33
3-5	1			1											2	-4	-8	32	36
0-2																			
fx	3	1	3	6	2	3	3	0	1	2	2	8	0	1	35		-10	164	110
x'	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7					
fx'	-18	-5	-12	-18	-4	-3	0	0	2	6	8	40	0	7	3				
fx'^{2}	108	25	48	54	8	3	0	0	4	18	32	200	0	49	549				
x'y'	-12	10	20	36	8	1	0	0	-4	3	8	40	0	0	110				

$c'_x = 0.0856$

$c'_y = -0.286$

$r = 0.348$

$\sigma_x = 4.22$

$\sigma_y = 2.15$

TABLE V

CORRELATION TABLE FOR ACT SOCIAL SCIENCE SCORES AND COLLEGE GPA

X: Grade Point Average

Y: ACT Math Scores

	0.0	0.3	0.6	0.9	1.2	1.5	1.8	2.1	2.4	2.7	3.0	3.3	3.6	3.9	fy	y'	fy'	fy'^{2}	x'y'
30-32																			
27-29											1				3	4	12	48	-32
24-26							1					2		1	4	3	12	36	51
21-23			1		1		1					3			6	2	12	24	18
18-20			1	1		1						1			4	1	4	4	-3
15-17		1				1				1					3	0	0	0	0
12-14			1	1	1	1				1	1	2			8	-1	-8	8	-8
9-11				1											1	-2	-2	4	6
6-8	1			1		1			1						4	-3	-12	36	24
3-5				2											2	-4	-8	32	24
0-2																			
fx	3	1	3	6	2	3	3	0	1	2	2	8	0	1	35		10	192	80
x'	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7		$c'_x = 0.0856$			
fx'	-18	-5	-12	-18	-4	-3	0	0	2	2	8	40	0	7	3	$c'_y = 0.286$			
fx'^{2}	108	25	48	54	8	3	0	0	4	18	32	200	0	49	549	$r = 0.210$			
x'y'	-30	0	-8	39	-2	2	0	0	06	-3	12	55	0	21	80	$\sigma_x = 4.22$			
																$\sigma_y = 2.325$			

TABLE VI

CORRELATION TABLE FOR ACT COMPOSITE SCORES AND COLLEGE GPA

X: Grade Point Average

Y: ACT Math Scores

	0.0	0.3	0.6	0.9	1.2	1.5	1.8	2.1	2.4	2.7	3.0	3.3	3.6	3.9	fy	y'	fy'	fy'^{2}	x'y'
30–32																			
27–29																			
24–26							1				1	1		1	4	4	16	64	64
21–23	1											2			3	3	9	27	12
18–20	1		1	1		2	1			1		2			9	2	18	36	-4
15–17		1	1	1	1		1			1	1	2			9	1	9	9	3
12–14				2	1				1			1			5	0	0	0	0
9–11	1		1			1									3	-1	-3	3	11
6–8				1											1	-2	-2	4	6
3–5															0	-3	0	0	0
0–2				1											1	-4	-4	16	12
fx	3	1	3	6	2	3	3	0	1	2	2	8	0	1	35		43	159	104
x'	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7					
fx'	-18	-5	-12	-18	-4	-3	0	0	2	6	8	40	0	7	3				
fx'^{2}	108	25	48	54	8	3	0	0	4	18	32	200	0	49	549				
x'y'	-24	-5	-8	9	-2	-3	0	0	0	9	20	80	0	28	104				

$c'_x = 0.0856$

$c'_y = 1.23$

$\sigma_x = 4.22$

$\sigma_y = 1.74$

$r = 0.39$

TABLE VII

CORRELATION TABLE FOR HIGH SCHOOL GPA AND COLLEGE GPA

X: Grade Point Average

Y: High School GPA

	0.0	0.3	0.6	0.9	1.2	1.5	1.8	2.1	2.4	2.7	3.0	3.3	3.6	3.9	fy	y'	fy'	fy'^2	x'y'
3.9																			
3.6																			
3.3														1	1	5	5	25	35
3.0											1	1			2	4	8	32	36
2.7					1		1								2	3	6	18	-6
2.4			1			1					1	3			6	2	12	24	28
2.1			1				1					1			3	1	3	3	1
1.8				1		1	1			1					4	0	0	0	0
1.5			1	3											4	-1	-4	4	13
1.2	1	1													2	-2	-4	8	22
0.9	1					1						1			3	-3	-9	27	6
0.6															0	-4	0	0	0
0.3			1						1			1			3	-5	-15	75	-15
fx	2	1	4	4	1	3	3	0	1	1	2	7	0	1	30		2	216	120
x'	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7					
fx'	-12	-5	-16	-12	-2	-3	0	0	2	3	8	35	0	7	5				
fx'^2	72	25	64	36	4	3	0	0	4	9	32	75	0	49	473				
x'y'	30	10	12	9	-6	1	0	0	-10	0	24	15	0	35	120				

$c'_x = 0.167$

$c'_y = 0.0667$

$\sigma_x = 4.15$

$\sigma_y = 2.68$

$r = 0.36$

TABLE VIII

CORRELATION TABLE FOR HIGH SCHOOL MATH AND COLLEGE GPA

X: Grade Point Average

	0.0	0.3	0.6	0.9	1.2	1.5	1.8	2.1	2.4	2.7	3.0	3.3	3.6	3.9	fy	y'	fy'	fy'^{2}	x'y'
4							1			1		1			3	2	6	12	16
3	1	1		2	1	1					2	1			9	1	9	9	-7
2	1		2	2	1		1					5		1	13	0	0	0	0
1	1		1	2		2	2		1	1		1			10	-1	-10	-10	8
fx	3	1	3	6	2	3	3	0	1	2	2	8	0	1	35		5	31	17
x'	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7					
fx'	-18	-5	-12	-18	-4	-3	0	0	2	6	8	40	0	7	3				
fx'^{2}	108	25	48	54	8	3	0	0	4	18	32	200	0	49	549				
x'y'	0	-5	4	0	-2	1	0	0	-2	3	8	10	0	0	17				

$c'_x = 0.0856$

$c'_y = 0.143$

$\sigma_x = 4.22$

$\sigma_y = 0.93$

$r = 0.001205$

TABLE IX

COEFFICIENT OF CORRELATION AND T-TEST RESULTS

Name of Test	r	t-test	Hypothesis Disposition
ACT Math	0.146	0.848	Fail to Reject
ACT Natural Science	0.537	3.66	Reject
ACT English	0.348	2.14	Fail to Reject
ACT Social Science	0.210	1.23	Fail to Reject
ACT Composite	0.39	2.44	Fail to Reject
High School GPA	0.36	2.04	Fail to Reject
High School Math	0.0012	0.0069	Fail to Reject

In each case the rejection level was 0.01

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

The purpose of this study was to gather data that might assist in evaluating selected variables to validate admission practices for electronic students. Specifically, the study sought to:

1. Determine whether there was a significant relationship between the American College Testing scores and the first year college grade point average.

2. Determine whether there was any significant relationship between high school GPA, level of high school mathematics and the first year college grade point average.

Investigation of the above problems were accomplished by first solving for the Pearson product moment coefficient of correlation, designated r. After computing the coefficients of correlation, Fisher's t test was used to determine whether the null hypothesis would be rejected or not rejected. The correlation between the ACT composite score and the criterion proved to be significant at the five percent level of significance, but not at the one percent level.

The population consisted of only 35 students who completed the first year of the Electronics program at Tulsa Junior College, Northern Oklahoma College, and Northeastern Oklahoma A & M College, during the period of September, 1972. More than sixty percent of the total number of students enrolled during this period were excluded because of incomplete data.

Findings

The findings of the study as supported by the data gathered in thesis are summarized below:

1. The mathematics ACT scores showed an insignificant correlation with the criterion.

2. The natural science ACT scores showed a significant correlation with the criterion.

3. The English ACT scores showed an insignificant correlation with the criterion. However, this was significant at the five percent level.

4. The social science ACT scores showed an insignificant correlation with the criterion.

5. The composite ACT scores showed an insignificant correlation with the criterion. However, this was significant at the five percent level.

6. The high school GPA scores showed an insignificant correlation with the criterion. However, this was significant at the five percent level.

7. The high school mathematics scores showed an insignificant correlation with the criterion. This showed the least relationship.

Conclusion

Results of the study indicated that only the Natural Science test had significant relationship with the grade point average. The ACT tests in mathematics, English, social science, composite, high school GPA and high school mathematics showed an insignificant correlation with the criterion.

The ACT composite test missed being significant at the one percent level. However, there is a possibility that this may prove to be another significant predictor variable. Perhaps with more data and a much more accurate means of interpreting the grades from the high school record, the coefficient of correlation between the composite test and GPA might increase. Presently, the secondary schools vary widely in standards, students and curriculum. The private high schools, rural high schools and urban high schools all have their own methods of listing the level of courses and each employs a different grading system.

Recommendation

Due to the limited number of students involved in this project and the newness of Electronics program at Tulsa Junior College, additional studies using more students and different institutions are needed to support or redefine the findings of this thesis.

Additional research is needed to show the intercorrelation among the independent variables.

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