

ACHIEVEMENT FACTORS IN ELECTRICAL/ELECTRONICS
TECHNOLOGY AT OKLAHOMA STATE TECH

By

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CHAPTER I

INTRODUCTION

There are three optional programs of study in the Electrical-Electronics Department at the Oklahoma State University School of Technical Training (OST) at Okmulgee, Oklahoma. Each of these options; Electrical, Electronics and Instrumentation involve a common core curriculum of four trimesters in the Electronics department and eight required subjects in the General Education department. At the end of the four trimesters students must select one of the specialty program options.

Although the majority of students are successful in completing the requirements of their selected specialized area, they are sometimes less than completely satisfied with their level of achievement as measured by the grades earned. Those that are not successful have the alternative of changing their option.

The rationale underlying the core curriculum concept is to provide a sufficient background from which an individual can branch out into the optional areas of specialization. However, in technology programs that involve a core curriculum, students need to be made aware of the different intensity levels that may be encountered in the various specialty areas. It would be desirable, if possible, to use the level of achievement in the core curriculum areas to predict achievement in the selected optional specialty areas.

Statement of the Problem

Little is known about the relationships between achievement in core curriculum subjects and subsequent achievement in various optional specialty areas. This lack of knowledge makes selection of an optional specialty a matter of chance and, therefore, reduces a students' potential for high achievement. This lack of knowledge constitutes the problem that was addressed in this study.

The problem with which this study was concerned was the relationship of the level of achievement in a core curriculum and required general education subjects to the level of achievement in selected optional areas of specialization.

Need for the Study

If more were known about relationships between the achievement in a core curriculum and the level of achievement in various areas of specialization, a more effective approach to academic and career counseling of students could be undertaken.

Purpose of the Study

The purpose of this study was to examine the relationship between curriculum grade-point average (GPA) and specialty GPA.

Statement of Hypotheses

The hypotheses tested in this study were:

1. There is no statistically significant correlation between individual Technology core curriculum GPA's and individual Electronics option GPA's at OST.

2. There is no statistically significant correlation between individual General Education GPA's and individual Electronics option GPA's at OST.
3. There is no statistically significant multiple correlation between individual GPA's in the Technology core curriculum and the General Education units and individual Electronics option GPA's at OST.
4. There is no statistically significant correlation between individual Technology curriculum GPA's and individual Instrumentation option GPA's at OST.
5. There is no statistically significant correlation between individual General Education GPA's and individual Instrumentation option GPA's at OST.
6. There is no statistically significant multiple correlation between individual GPA's in the Technology curriculum and the General Education units and individual Instrumentation option GPA's at OST.
7. There is no statistically significant correlation between individual Technology curriculum GPA's and individual Electrical option GPA's at OST.
8. There is no statistically significant correlation between individual General Education GPA's and individual Electrical option GPA's at OST.
9. There is no statistically significant multiple correlation between the individual GPA's of the Technology core curriculum and the General Education units and individual Electrical option GPA's at OST.

CHAPTER II

REVIEW OF LITERATURE

Identification of the Need

There have been many studies conducted concerning the relationship of various background variables possessed by students to their level of achievement in a college program of study. Some have been related to overall success in a program, some to success in a single year and others to success in a single course.

Previous research has examined the relationship between achievement and such factors as high school GPA, ACT scores and final grades in a particular subject or course. Other types of variables that suggest some relationship to achievement has been studied and have included sex, family income, previous experience with younger children and others.

Correlation coefficients of relationships between factors such as those mentioned above and academic performance as defined by cumulative college GPA (1) range from 0.55 for a single predictor variable to greater than 0.62 when multiple correlation is used with two or more selected variables. Although coefficients of this magnitude may be significant they normally do not explain, in sufficient amount, the variance of the dependent variable, achievement, when attempting prediction of future scholastic behavior.

In conducting this study, appropriate literature in the areas of Vocational, Technical and General Education as well as in Educational

Psychology was reviewed to identify methodology and extent of success in prediction from known student variables.

Results of Previous Research

A study by Goldman and Slaughter (2) attempted to demonstrate effectiveness in predicting a single class grade compared to the prediction of overall GPA of college students. This investigation dealt with the regression of GPA on Scholastic Aptitude Test scores (SAT) and high school grade-point averages.

Using classes in psychology, biology, chemistry, physics, and sociology, the researchers found multiple correlations between class GPA, SAT and high school GPA that were quite good. Multiple correlations of these same components with overall GPA were found to be lower. These results would seem to support the major goal of the investigation to demonstrate that grades in lesser number of classes can be predicted with better accuracy than the overall GPA.

Since overall GPA is a composite formed from the grades in many classes, it is normally assumed to be more reliable and predictable than grades for a single class.

Conclusions reached by Goldman and Slaughter were that the overall GPA of college students was a composite of nonequivalent components and that substantial differences exist in grading standards. If, in fact, grading standards are not highly correlated within a given institution, then no predictor will have more than moderate validity in predicting GPA.

Other researchers have studied the ability of the Scholastic Aptitude Test - Verbal (SAT-V) and Scholastic Aptitude Test -

Quantitative (SAT-M) scores to predict achievement over a substantial period of college attendance (3). The cumulative GPA of a student at the time of leaving college was used as the criterion of academic performance. Termination of a student's academic career was a function of graduation, academic dismissal or personal choice.

In a sample of 318 students who earned a mean of 71.6 credits before terminating their college careers, the correlations of cumulative grade point averages and SAT-V and SAT-M were 0.52 and 0.43, respectively. Correlations of 0.26 and 0.22 were found for these same variables to the cumulative GPA for those students who persisted to graduation.

Of particular interest is the fact that the correlations of 0.52 and 0.43 were almost identical when compared to the correlation between SAT-V and freshman GPA of 0.50 and SAT-M and freshman GPA of 0.46.

Findings of this research led the investigators to the conclusion that:

These studies illustrate the importance of choosing a proper criterion of achievement to test the hypothesis at hand. Limiting the sample to be studied to those students who persist until graduation does not produce an adequate picture of the SAT's long-term predictive validity for students in general. The terminal GPA, although it has the weakness of being based on different numbers of credits for different students, should be the preferred criterion for gauging the ability of an admissions test to predict students performance over their academic careers (3, p. 848).

In a study to determine the relative importance of some of the factors which contribute to college success, McCausland and Stewart (4) found that high school GPA and the composite score of the American College Test (ACT), in combination, was most effective for selection or prediction purposes.

Utilizing analysis of variance and multiple linear regression, it

was determined that these two variables accounted for 62 percent of the GPA variance for the college freshman in this study. The addition of other variables, such as study skills and academic attitude, did not produce a significant increase in the reliability of GPA prediction.

The researchers concluded that "even though the high school average was found to be the best single predictor of college success, it does not indicate specific strengths and weaknesses" (4, p. 357).

A similar study was undertaken by the Counseling Bureau at the University of South Carolina (5). The purpose of this study was to improve the selection of freshman members entering the Honors Program in the University's College of Arts and Sciences.

Using a correlational approach to the criterion variable grade point ratio (GPR), 42 variables ranging from SAT scores to memory span were evaluated as to which would have the highest predictive value, either individually or in combination.

Of the 11 variables found useful in predicting GPA, High School Rank accounted for the most variance. This finding was consistent with most previous research in the prediction of college achievement.

It should be noted that the prediction equation developed as a result of this study utilized only two variables, SAT-Q and High School Rank. Five additional variables were found to be significantly predictive, but their added increment of prediction was not considered sufficient to warrant their use.

A more focused study conducted by Roberts (6) evaluated the effectiveness of ACT composite scores and the ACT mathematics scores, as independent variables, in attempting to identify potentially successful students in a technology program.

Of the five hypotheses tested, only two were found to have statistically significant correlations. In both cases the correlations were so small as to offer little promise of actually predicting student success.

Roberts concluded that:

Perhaps the greatest significance of this study lies in the fact that it demonstrates that the factors which are useful in identifying promising potential students for the technological areas may not be the same as those used in other areas of education (6, p. 28).

There is little doubt that certain selected variables, individually or together, are providing a useful means of reducing some of the guesswork in predicting success or level of achievement for college students. Other research studies have provided sufficient evidence that there are many student variables that can contribute to the increased accuracy of prediction (7) (8) (9). It should be understood that these variables need to be examined systematically in order to add further to the understanding of which variables efficiently predict different types of learning.

It seems evident that as the factors of learning performance and achievement in college students continue to be examined, an increasing number of these factors will be uncovered. It also seems evident that it will be extremely difficult, if not impossible, to identify a single factor, or even several factors, which would successfully predict college success or level of achievement for all students, in all programs of study, at all institutions.

Supporting this premise, an investigation by Bradshaw (10) was concerned with three groups of freshmen, male students who entered different educational institutions administered by the College of Engineering

of Oklahoma State University. The study sought to identify characteristic differences between the three groups in regards to ACT composite scores, mechanical aptitude, algebra skills, reading skills, vocational interests and personality variables. The groups tested were main-campus engineering freshmen, main-campus technical institute freshmen, and metropolitan-campus technical institute freshmen. The criterion used was overall grade-point average received at the end of the first fall semester in school.

A coefficient of correlation was used to determine relationships between first semester grade-point averages and each of the measured characteristics. A multiple regression analysis was performed to identify relative weights for the variables most highly correlated with the criterion.

In analyzing the differences between the three groups, Bradshaw (10) found that the engineering students scored higher than either group of technician students in scholastic aptitude, algebra skills, reading skills, and mechanical comprehension. The main-campus technician students were found to score higher than metropolitan-campus technician students in scholastic aptitude and mechanical comprehension. The main-campus students also tended to score higher on the algebra and reading tests.

Although several statistically significant differences were found to exist among the three groups in vocational interests, it was suggested that the magnitude and direction of these differences were such that they appeared to be of limited usefulness.

In examining the relationships between the measured characteristics and academic achievement of the three groups, the investigator found

that:

The composite ACT score consistently tended to be a good predictor in each group. In general, the tests were most efficient in predicting the performance of the engineering students and least efficient in predicting the achievement of the engineering technology students (10, p. 106).

Since differences among engineering technology students were identified, Bradshaw concluded that:

The usefulness of test data for predicting academic performance should be established at each individual institution despite apparent similarities in curricula level, objectives, and structure. The results suggest that college level technician education programs at different institutions serve students with different characteristics. Research directed at investigating the relationship between institutional environment and student characteristics would appear pertinent (10, p. 107).

It was also concluded that since significant relationships were found to exist between grade-point average and scholastic aptitude, mechanical comprehension, algebra skills, and reading skills that evaluation of these scores "would appear to magnify the probability of a student's chances of achieving satisfactorily" (10, p. 108). Caution was expressed, however, that since the results obtained were based upon groups, generalizations to individuals could give misleading results.

The prediction of academic performance presents many problems to researchers. The primary difficulty is the isolation of variables which accurately and consistently predict the criterion used. Too often a student's potential performance in college is based upon a prediction equation in which the only predictor variables are high school grades and entrance test scores. Taken together these two types of predictors do a reasonably good job with modest success at predicting student achievement. To improve the accuracy of prediction, it seems that variables which are similar both in history and composition should predict

one another better than variables further removed in time and different in structure.

Lending support to this assumption Owen and Feldhusen (11) studied the effectiveness of three models of multivariate prediction for academic success in identifying the criterion variance of achievement in nursing education.

Using a battery of predictor variables, both cognitive and noncognitive, an optimum of predictors was determined for the criterion, first semester GPA. A multiple regression procedure was employed for the first model. The optimum set was then used to predict the grade point averages for subsequent semesters. Results of the effectiveness of this model showed significant but steadily declining correlations for subsequent semester predictions.

In the second model, the researchers determined an optimum set of predictors for each individual semester from the same battery of predictor variables. Results indicated that, while the average multiple correlations tended to decline over subsequent semesters, the decrease was not as severe as with the first model.

Using the same optimum set of predictors obtained for the second model, all previous semesters averages were incorporated as new and additional predictors in a third model. New predictions were then made for the subsequent semesters. Since this model was built directly on the second model, a statistical comparison was made. Results of the comparison showed that the increments made beyond those of the second model were highly significant. As an example, the second semester correlation using model two was 0.66 while the third model produced a correlation of 0.78. This is a difference that is significant beyond the

0.001 level.

Since the college surroundings are a somewhat different educational environment than students have been accustomed to in high school, it appears reasonable that prediction of college success from performance within college should be more accurate than predictions from earlier high school performance or from tests taken before college entry. The findings of Owen and Feldhusen (11) appear to strongly support this argument.

Summary

This review of literature has clearly revealed the necessity for continued investigation into the identification of independent variables and relationships to dependent variables in attempting to predict level of achievement at the college level.

Although considerable research has been conducted in this area, the literature has also revealed that institutional, student and program of study characteristics and differences are factors affecting the results of a study.

In general, this review of literature has documented that a problem does exist. In addition, it is believed that sufficient evidence has been presented to warrant this study at Oklahoma State Tech. Moreover, this review has provided information and guidelines for conducting this research.

CHAPTER III

METHODOLOGY

The purpose of this study was to examine the relationship between core curriculum grade-point averages (GPA) and specialty GPA. With this objective established, a review of selected literature was undertaken to ascertain what had been concluded from previous studies and also to examine the statistical methods applied. Next, data from a sufficient number of graduates of each specialty area had to be gathered. Statistical procedures appropriate for the purpose of this study were then selected to test the hypotheses.

Definitions

For the purpose of this study, the following definitions may be useful:

Technical specialty or option - Those courses that are required to graduate from a given program of study after completion of the core curriculum.

Program of study - A training program in the area of Electrical, Electronics or Instrumentation Technology. Students may complete multiple options.

Trimester - A sub-division of the academic year at Oklahoma State Tech. Fifteen weeks in length.

Assumptions

The following assumptions were made for the purpose of this study. These assumptions must be satisfied for the statistical methods to be used in the analysis of the data to be valid:

1. The data are assumed to be at least ordinal in nature.
2. The student data studied in this research were representative of students who graduate from the various specialty areas in the Electrical-Electronics Department at Oklahoma State Tech.

Collection of the Data

Records of all graduates from the Technology program of the Electrical-Electronics Department at Oklahoma State Tech, between May, 1978, and September, 1979, were examined. Altogether, data from 127 graduate records were collected to be used in this study.

Of this total number, data on 74 students were rejected and 53 accepted for analysis. The most common reasons for rejection were transfer credit from another institution or successful completion of advanced standing tests administered by Oklahoma State Tech. Only those students completing all of the program requirements at Oklahoma State Tech were included in this study.

Analysis of the Data

A multivariate analysis method, multiple regression, was chosen as the statistical treatment to be used in this study. Multiple regression allows the analysis of the collective and separate contributions of two or more independent variables to the variation of a dependent variable. Technology core curriculum GPA and general education GPA were considered

to be independent variables and the specialty GPA was the dependent variable.

Calculations necessary for multiple regression analysis utilizing raw scores are sums, means and sums of squares. Additional statistics needed are deviation sums of squares, deviation cross products and standard deviations.

The coefficients of determination, designated R^2 , and the coefficient of multiple correlation, designated R , were used to provide information concerning the relationship among the variables. The F test was used to test hypotheses three, six and nine, at the 0.01 level.

If the null hypotheses were rejected, additional calculations were done to examine the relative contributions of each independent variable to the variance of the dependent variable.

Finally, regression coefficients and intercept constants were calculated for use in regression equations for attempted prediction of level of achievement.

Limitations

Extreme care should be exercised when using a regression equation developed in one study for application with other groups. The results of this study are limited to graduates of the Technology program in the Electrical-Electronics Department of Oklahoma State Tech. Any attempted use of the results with others should, of course, be done only after modification and verification of constants and variables.

CHAPTER IV

RESULTS

Identification of Data

Data for all graduates from each of five trimesters, beginning in May, 1978, and extending through September, 1979, were gathered. Data for 127 students were examined with 53 accepted for analysis and 74 rejected.

It is possible for a graduate of the Electrical-Electronics Technology program of study at Oklahoma State Tech to complete multiple options. Evidence of this is shown (see Appendix) by the number of subjects used for analysis in each of the specialty areas.

Since course requirements, following the core curriculum, are different for each option, those students completing multiple options were treated individually within each specialty area analysis. This resulted in data for 37 students being contained in the Electronics option, 40 in the Electrical option and 49 in the Instrumentation option.

Results of Analysis

Tables I, II and III contain the results of the hypotheses testing for each specialty area using the coefficients of determination.

Data in Table I summarize the results of the Electronics option. The specific hypotheses tested were:

1. There is no statistically significant correlation between

TABLE I
COEFFICIENTS OF DETERMINATION, COEFFICIENTS OF CORRELATION
AND F-TEST RESULTS FOR ELECTRONICS OPTION

Name of Test	R^2	R	F-Test	Hypothesis Disposition
Core Curriculum GPA/ Electronics Option GPA	0.38	0.62	21.52	Rejected
General Education GPA/ Electronics Option GPA	0.40	0.63	23.2	Rejected
Core Curriculum GPA and General Education GPA/ Electronics Option GPA	0.48	0.69	15.69	Rejected

In each case the rejection level was 0.01.

TABLE II
COEFFICIENTS OF DETERMINATION, COEFFICIENTS OF CORRELATION
AND F-TEST RESULTS FOR INSTRUMENTATION OPTION

Name of Test	R^2	R	F-Test	Hypothesis Disposition
Core Curriculum GPA/ Instrumentation Option GPA	0.38	0.62	29.38	Rejected
General Education GPA/ Instrumentation Option GPA	0.44	0.66	37.09	Rejected
Core Curriculum GPA and General Education GPA/ Instrumentation Option GPA	0.51	0.71	23.68	Rejected

In each case the rejection level was 0.01.

TABLE III
COEFFICIENTS OF DETERMINATION, COEFFICIENTS OF CORRELATION
AND F-TEST RESULTS FOR ELECTRICAL OPTION

Name of Test	R^2	R	F-Test	Hypothesis Disposition
Core Curriculum GPA/ Electrical Option GPA	0.45	0.67	30.72	Rejected
General Education GPA/ Electrical Option GPA	0.65	0.81	70.54	Rejected
Core Curriculum GPA and General Education GPA/ Electrical Option GPA	0.67	0.82	38.12	Rejected

In each case the rejection level was 0.01.

individual Technology core curriculum GPA's and individual Electronics option GPA's at OST.

2. There is no statistically significant correlation between individual General Education GPA's and the Electronics option GPA's at OST.
3. There is no statistically significant multiple correlation between individual GPA's in the Technology core curriculum and the General Education units and individual Electronics option GPA's at OST.

Examination of Table I shows that 38 percent of the variance of the Electronics option GPA is shared or accounted for by the variance of the core curriculum GPA. This resulted in the rejection of the hypothesis of no statistically significant correlation.

Figures for General Education GPA's and the Electronics option GPA's illustrate that 40 percent of the variance of the Electronics GPA is shared by the General Education GPA. This resulted in the rejection of the hypothesis of no statistically significant correlation.

Taken together in a multiple correlation the Technology core curriculum and General Education GPA's shared 48 percent of the variance with the Electronics option GPA's. This resulted in the rejection of the hypothesis of no statistically significant multiple correlation.

As a result of the rejection of each hypothesis, it was possible to generate regression models for each case. These are given here where Y' is the projected specialty grade, X_1 is the GPA earned in the Technology core curriculum and X_2 is the GPA earned in the General Education units.

$$Y' = 0.1948 + (0.7510)X_1, \text{ using } X_1 \text{ alone.}$$

$Y' = (-0.6109) + (0.8635)X_2$, using X_2 alone.

$Y' = (-0.8000) + (0.4458)X_1 + (0.5527)X_2$, using X_1 and X_2
in combination.

Table II contains the results of the statistical treatment in determining the relationships of the Instrumentation specialty to the General Education and core curriculum GPA's. The hypotheses tested were:

4. There is no statistically significant correlation between individual Technology core curriculum GPA's and individual Instrumentation option GPA's at OST.
5. There is no statistically significant correlation between individual General Education GPA's and individual Instrumentation option GPA's at OST.
6. There is no statistically significant multiple correlation between individual GPA's in the Technology core curriculum and the General Education units and the Instrumentation option GPA's at OST.

Values in Table II are interpretable in the same manner as those found for the Electronics option.

It can be seen that the regression of the Instrumentation option GPA's on the Technology core curriculum alone accounts for 38 percent of the variance. Forty-five percent of the variance is accounted for by the variance of the General Education GPA's. In combination, the Technology core curriculum and General Education GPA's share 51 percent of the variance of the specialty GPA. The F values calculated resulted in each of the hypotheses being rejected at the 0.01 level.

Regression models calculated for each condition tested are given

below where Y' , X_1 and X_2 have the same meaning as in the previous results utilizing data from the Instrumentation table (see Appendix).

$$Y' = 0.6740 + (0.6765)X_1, \text{ using } X_1 \text{ alone.}$$

$$Y' = 0.0514 + (0.7434)X_2, \text{ using } X_2 \text{ alone.}$$

$$Y' = (-0.1428) + (0.3593)X_1 + (0.5064)X_2, \text{ using } X_1 \text{ and } X_2 \\ \text{in combination.}$$

In Table III are the results of the analysis done for the Electrical specialty area. Hypotheses assumed and tested for this area were:

7. There is no statistically significant correlation between individual Technology core curriculum GPA's and individual Electrical option GPA's at OST.
8. There is no statistically significant correlation between individual General Education GPA's and individual Electrical option GPA's at OST.
9. There is no statistically significant multiple correlation between individual GPA's of the Technology core curriculum and the General Education units and individual Electrical option GPA's at OST.

Evaluation of the relationship between Technology core curriculum GPA's and Electrical option GPA's determined that 45 percent of the variance was shared between these variables. When considering regression of the Electrical option on General Education alone, 65 percent of the Electrical option variance was accounted for. Taken in combination the Technology core curriculum and General Education shared 67 percent of the variance with the Electrical specialty. When subjected to the F test all hypotheses were rejected.

Regression equations for each are presented below. Y' is the projected Electrical option GPA, X_1 is the core curriculum GPA and X_2 is the General Education GPA.

$$Y' = 0.6652 + (0.8806)X_1, \text{ using } X_1 \text{ alone.}$$

$$Y' = 0.788 + (0.9126)X_2, \text{ using } X_2 \text{ alone.}$$

$$Y' = (-0.1372) + (0.2852)X_1 + (0.7432)X_2, \text{ using } X_1 \text{ and } X_2 \\ \text{in combination.}$$

CHAPTER V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

The problem with which this study was concerned was the lack of knowledge about the relationship between level of achievement in a Technology core curriculum and required General Electric subjects and the level of achievement in an area of specialization. The areas of specialization were those of Electronics, Instrumentation and Electrical that exist in the Electrical-Electronic Department at Oklahoma State Tech.

Summary

The purpose of this study was to examine the relationship between core curriculum grade point average (GPA) and specialty GPA. Multiple regression analysis was the statistical treatment selected for analysis of the data obtained. Both simple and multiple correlations were calculated and tested for significance. The F test, utilizing the coefficient of determination, was used to test the null hypotheses.

Specifically the study sought to:

1. Determine whether there was a significant correlation between the individual Technology core curriculum GPA's and individual Electronic option GPA's at OST.
2. Determine whether there was a significant correlation between individual General Education GPA's and individual Electronic

option GPA's at OST.

3. Determine whether there was a significant multiple correlation between individual GPA's in the Technology core curriculum and the General Education units and individual Electronics option GPA's at OST.
4. Determine whether there was a significant correlation between individual Technology core curriculum GPA's and individual Instrumentation option GPA's at OST.
5. Determine whether there was a significant correlation between individual General Education GPA's and individual Instrumentation option GPA's at OST.
6. Determine whether there was a significant multiple correlation between individual GPA's in the Technology core curriculum and General Education units and individual Instrumentation option GPA's at OST.
7. Determine whether there was a significant correlation between individual Technology core curriculum GPA's and individual Electrical option GPA's at OST.
8. Determine whether there was a significant correlation between individual General Education GPA's and individual Electrical option GPA's at OST.
9. Determine whether there was a significant multiple correlation between individual GPA's of the Technology core curriculum and the General Education units and individual Electrical option GPA's at OST.

Findings of Study

The findings of the study as supported by the data gathered include:

1. The individual Technology core curriculum GPA's showed a statistically significant correlation with individual Electronics option GPA's.
2. The individual General Education GPA's showed a statistically significant correlation with individual Electronics option GPA's.
3. The individual GPA's in the Technology core curriculum and the General Education units showed a statistically significant multiple correlation to individual Electronics option GPA's.
4. The individual Technology core curriculum GPA's showed a statistically significant correlation with individual Instrumentation option GPA's.
5. The individual General Education GPA's showed a statistically significant correlation with individual Instrumentation option GPA's.
6. The individual GPA's in the Technology core curriculum and the General Education units showed a statistically significant multiple correlation with individual Instrumentation option GPA's.
7. The Technology core curriculum GPA's showed a statistically significant correlation with individual Electrical option GPA's.
8. The individual General Education GPA's showed a statistically significant correlation with individual Electrical option GPA's.
9. The individual GPA's in the Technology core curriculum and the

General Education units showed a statistically significant multiple correlation with the individual Electrical option GPA's.

Conclusions

1. Core curriculum and General Education are highly correlated with each specialty area, individually and collectively. Correlations from 0.62 to 0.81 were found when the variables were analyzed separately and from 0.69 to 0.82 when they were taken in combination.
2. Unaccounted variances are equal to 52 percent in the Electronics specialty, 49 percent in the Instrumentation specialty and 33 percent in the Electrical specialty.
3. Accuracy of attempted prediction should be most reliably undertaken in the Electrical specialty and least reliably in the Electronics specialty.
4. General Education GPA's are a better predictor than Technology core curriculum GPA's in each specialty area.
5. Evaluation standards and procedures in the specialty area courses are not highly compatible with Technology core curriculum and General Education standards and procedures. This is most evident in the Electronics and Instrumentation options.

Recommendations

Results of this study show that attempted prediction of the level of achievement in the Electronics and Instrumentation specialty areas at Oklahoma State Tech should not be undertaken with the variables used.

With unaccounted variance of 52 and 49 percent, respectively, prediction would be no better than that offered by chance.

It is recommended that the regression models calculated for the Electrical option be utilized. The one exception to this being the model that uses the Technology core curriculum GPA's separately.

It is further suggested that when Oklahoma State Tech officials counsel students, regarding the selection of a specialty area, increased emphasis be placed upon the apparent differences of student evaluation supported by this study.

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APPENDIXES

TABLE IV
COLLECTED DATA FOR ELECTRONICS SPECIALTY

Subject Number	Y	X ₁	X ₂
1	2.25	2.40	2.63
2	2.15	2.13	3.10
3	2.30	3.08	2.91
4	2.90	3.28	3.48
5	2.25	2.40	3.85
6	1.00	1.95	2.54
7	2.90	2.85	3.00
8	2.75	2.73	3.56
9	1.75	2.90	2.95
10	2.80	2.65	3.55
11	1.50	2.08	2.90
12	1.65	2.28	3.21
13	2.40	2.73	3.31
14	1.75	2.80	3.05
15	3.30	3.13	3.99
16	2.55	2.40	2.91
17	2.15	2.70	3.34
18	2.15	2.15	3.16
19	1.75	2.53	3.28
20	1.90	2.03	3.56
21	1.90	2.33	2.69
22	3.00	3.28	3.73

TABLE IV (Continued)

Subject Number	Y	X ₁	X ₂
23	1.90	2.63	2.96
24	2.00	2.40	3.20
25	2.40	2.73	3.24
26	3.25	3.45	3.91
27	2.75	3.20	3.79
28	1.90	2.78	3.40
29	2.75	3.86	3.78
30	2.15	2.58	3.38
31	1.90	2.85	3.30
32	2.00	3.15	3.15
33	1.40	3.15	3.73
34	1.25	1.90	2.36
35	2.25	3.08	3.44
36	2.65	2.98	3.60
37	2.75	2.90	3.75
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Σ :	82.35	100.45	121.69
Mean:	2.23	2.71	3.29
Σ^2 :	194.11	280.02	406.02

Y = Specialty GPA

X₁ = Core Curriculum GPA

X₂ = General Education GPA

TABLE V
COLLECTED DATA FOR INSTRUMENTATION SPECIALTY

Subject Number	Y	X ₁	X ₂
1	3.05	3.28	3.83
2	2.50	2.40	2.63
3	2.65	2.78	3.90
4	2.50	2.13	3.10
5	2.80	3.08	2.91
6	2.90	3.28	3.48
7	2.65	2.40	3.85
8	1.00	1.95	2.54
9	2.40	1.85	3.35
10	3.05	2.85	3.00
11	3.00	2.73	3.56
12	2.90	3.08	3.79
13	2.50	2.90	2.95
14	3.05	2.65	3.55
15	2.00	2.23	2.43
16	2.15	2.08	2.90
17	2.15	2.28	3.21
18	2.55	2.73	3.31
19	1.50	2.08	3.08
20	2.50	2.80	3.05
21	3.40	3.13	3.99
22	2.15	2.40	2.91

TABLE V (Continued)

Subject Number	Y	X ₁	X ₂
23	1.90	2.70	3.34
24	2.15	2.15	3.16
25	2.40	2.53	3.28
26	2.55	2.58	3.19
27	2.30	2.03	3.56
28	2.15	2.33	2.69
29	3.15	3.28	3.73
30	1.50	2.60	2.38
31	2.30	2.63	2.96
32	2.25	2.40	3.20
33	2.90	2.73	3.24
34	3.50	3.45	3.91
35	3.00	3.20	3.79
36	2.30	2.78	3.40
37	3.00	3.86	3.78
38	2.65	2.58	3.38
39	1.80	2.85	3.30
40	2.50	3.15	3.75
41	2.40	3.15	3.73
42	2.40	2.56	2.41
43	1.25	1.90	2.36
44	2.65	3.08	3.44
45	2.65	2.98	3.60

TABLE V (Continued)

Subject Number	Y	X ₁	X ₂
46	1.75	2.30	2.86
47	2.15	1.90	2.31
48	2.80	1.53	2.74
49	3.00	2.90	3.75
Σ :	120.70	129.22	158.56
Mean:	2.46	2.64	3.24
Σ^2 :	310.60	351.93	523.69

Y = Specialty GPA

X₁ = Core Curriculum GPA

X₂ = General Education GPA

TABLE VI
COLLECTED DATA FOR ELECTRICAL SPECIALTY

Subject Number	Y	X ₁	X ₂
1	3.80	3.28	3.83
2	2.65	2.40	2.63
3	3.65	2.78	3.90
4	3.00	2.13	3.10
5	3.55	2.40	3.85
6	1.40	1.95	2.54
7	3.00	2.73	3.56
8	1.50	2.08	2.56
9	2.65	3.08	3.79
10	2.75	2.90	2.95
11	3.55	2.65	3.55
12	2.40	2.23	2.43
13	3.30	2.08	2.90
14	2.50	2.51	2.51
15	2.50	2.40	2.91
16	2.50	2.28	1.99
17	2.15	2.15	3.16
18	3.05	2.53	3.28
19	3.55	2.58	3.19
20	3.05	2.03	3.56
21	2.50	2.33	2.69
22	3.55	3.28	3.73
23	2.00	2.60	2.38

TABLE VI (Continued)

Subject Number	Y	X ₁	X ₂
24	3.05	2.63	2.96
25	2.90	2.40	3.20
26	3.65	2.73	3.24
27	3.75	3.45	3.91
28	3.65	3.20	3.79
29	3.30	2.78	3.40
30	3.75	3.86	3.78
31	3.40	2.58	3.38
32	2.80	2.85	3.30
33	3.25	3.15	3.75
34	3.55	3.15	3.73
35	2.65	2.56	2.41
36	2.90	3.08	3.44
37	3.25	2.98	3.60
38	2.15	1.90	2.31
39	2.75	1.83	2.68
40	3.25	2.90	3.75
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Σ :	119.55	105.41	127.62
Mean:	2.99	2.64	3.19
Σ^2 :	371.85	286.16	418.50

Y = Specialty GPA

X₁ = Core Curriculum GPA

X₂ = General Education GPA

2
VITA

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