EFFECTS OF PERSONAL FACTORS ON GRADE-POINT AVERAGES OF STUDENTS MAJORING IN AN UNCONVENTIONAL 2+2 TECHNOLOGY PROGRAM

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CHAPTER I

INTRODUCTION

Background Information

One of the fastest-growing industries in the nation is the electrical power industry. This industry has expanded rapidly while the number of trained graduates from educational institutions entering the power field has declined. Shortages of personnel trained to be able to perform jobs such as relay adjustment and control, data collection and analysis, power factor correction studies and implementation, lead flow studies, maintenance of power equipment, design of large electrical installations, and control of large electrical systems are becoming more critical. This is especially true when considered in view of the electrical industries projected growth. Also of importance is the need for individuals well trained in the above-mentioned jobs in that maximum efficiency must be attained in view of the nation's increasing power demands and diminishing fuel sources.

On June 30, 1974, the National Science Foundation (NSF) approved funding for a proposal (10) written with the idea in mind to provide the electrical power industry with a source of manpower that would be functional in the jobs outlined above. This proposal dealt with the development of a national model for an electrical technology curriculum that would provide graduates from associate degree programs with majors

in Electronics Technology, Electro-Mechanical Technology, or Mechanical Technology a chance to modify their major and pursue an upper-division program in Electrical Power Technology that would culminate in a Bachelors of Science in Technology Degree at Oklahoma State University (OSU).

This unconventional approach to curriculum design was chosen primarily because OSU receives many junior college transfers at the beginning of the junior year. Some of these students typically are somewhat dissatisfied with their original major and wish to attempt a different area of study. Reasons for this are individual and complex, but in many cases it probably could be linked to the student's mistaken preconceptions of his major. Also contributing to this dissatisfaction is the variation in job market opportunities in relatively short periods of time.

The upper-division curriculum of this unconventional two-plus-two (2+2) program was developed in 1974 and 1975 by the School of Technology faculty. Much input from industrial representatives was utilized. The specific kinds of industries represented at advisory council meetings were power generation companies, power transmission cooperatives, electrical equipment manufacturers, and engineering firms dealing with power system design. This input from prospective employers of future graduates of the program was assembled into a workable curriculum by the faculty and staff of the School of Technology at OSU with invaluable assistance from educators outside the department. The curriculum was implemented in the fall semester of 1975.

As indicated earlier, the program as implemented is of a two-plus-two nature that is unconventional in the manner in which the final two

years of study are structured. The student in this program pursues a major in his junior and senior years that is different from his major in his initial two years. Quite obviously this will serve to provide the graduate with a broad technical base for his entry position in industry. Also, a substantial depth in the technical material studied in the electrical power courses is required for satisfactory performance on the job. This required depth in materials studied was foreseen by the writer of the original proposal (10). He felt that entering juniors could be upgraded to a certain level of technical competence in areas of study not congruent with their original major. This upgrading would be provided by utilization of cross-training courses in the junior (first) year of the Electrical Power Technology (EPT) program. The idea was to have holders of associate degrees in electronics take cross-training courses concerned with mechanical concepts. Also holders of associate degrees in a mechanical discipline would take electrical-electronic cross-training courses. Any associate degree graduates with a major in a combination area (electro-mechanical) would take cross-training in the areas that seemed weakest.

This cross-training approach has proven successful as will be shown later in this study. It should be noted that the cross-training courses appear to be of prime importance to the progress of the students in this program. These courses and their accompanying descriptions are included in the EPT curriculum shown in Appendix C.

The initial class of juniors was made up of nineteen students. This study will be concerned primarily with the backgrounds and performances of this set of students during their first year in the EPT program.

Statement of the Problem

The problems being studied are the effects various factors may have on grade-point averages (GPA) when transfer into this type of program is accomplished. The factors that will be considered are marital status, previous major area of study, previous industrial experience, military draft status, and previous institutional influences. The study will consider positive changes in GPA as the success index. Patterns in the above factors will be searched for as they affect the EPT GPA.

Need for the Study

This study allows insight into the relative importance of the above-mentioned factors as to their probable effect on the academic progress of future students in this type of program. If combinations can be isolated that predict success, then these combinations should serve as a useful tool to people serving as advisers or counselors in an institution offering similar programs.

Since the initial concept of the EPT program is to serve as a national model, then the importance of the background factors listed above and their effect on counseling for scholastic success is obvious.

Hypotheses Being Tested

Ho #1. There is no statistically significant correlation between EPT GPA and prior industrial experience of students in the EPT program at OSU ($\alpha = 0.05$).

Ho #2. There is no statistically significant correlation between

EPT GPA and marital status of students in the EPT program at OSU ($\alpha = 0.05$).

Ho #3. There is no statistically significant correlation between EPT GPA and previous major area of study of students in the EPT program at OSU ($\alpha = 0.05$).

Ho #4. There is no statistically significant correlation between EPT GPA and a student being an out-of-state student in the EPT program at OSU ($\alpha = 0.05$).

Ho #5. There is no statistically significant correlation between EPT GPA and prior military service by students in the EPT program at OSU ($\alpha = 0.05$).

Ho #6. There is no statistically significant correlation between EPT GPA and the type of educational institution previously attended by EPT majors at OSU ($\alpha = 0.05$).

CHAPTER II

REVIEW OF LITERATURE

Identification of the Need for the Study

The original concept of the study was initiated by the proposal to National Science Foundation written by P. R. McNeill ("Development of an Upper-Division Electrical Power Technology Curriculum Utilizing Two-Year Electronic, Electro-Mechanical, and Mechanical Graduates") (10). This proposal as originally written had a provision for evaluation where:

> The students who enter the program direct from other technical curricula will be compared with students who have had intervening industrial experience. An evaluation will also be made on individual achievements compared to ACT scores, entering GPA (Grade-Point Average) and high school record.

The need to fulfill these provisions of the proposal as well as to compare this kind of transfer student (one also undergoing a change in major in the transition from one institution to another) with students investigated in other studies was obvious.

Results of Previous Research

Several studies done in the past have been concerned with factors that inherently affect a student's GPA. Some of these studies have been concerned with institutional influences while others have been concerned primarily with personal factors and their impact on a

student's performance. Results of some studies that have been done in the past are presented below.

Knoell and Medsker (11) in 1964 studied students in ten states who transferred from two-year institutions into four-year institutions and found that the cumulative GPA of transfer students dropped from an incoming figure of 2.56 at the beginning of the junior year to a value of 2.34 for work done at the four-year college.

Hoeman (8) in 1967 compared junior college transfers and native students in the School of Arts and Sciences at OSU. He found that (1) junior college transfers had a higher GPA than native students at the end of the sophomore year, (2) the junior college transfer's GPA dropped the first semester after transfer to OSU, and (3) the male transfer student had a higher GPA than the native student after two years at OSU. The junior college that the student transferred from had no effect on GPA attained at OSU.

In 1968 Hartmann (7) matched two groups of students at the University of Missouri. The students that he investigated were transfer and native students. These groups were matched according to high school rank, high school size, age of the student at the time of entrance into college, the student's sex, and the major pursued after entry into the university. The students were studied in their junior year only; and the majors studied were arts and sciences, business, or education. Hartmann found that (1) the GPA of transfer students from rural junior colleges was equal to the GPA of native students for the two semesters studied, (2) the GPA of transfer students from private schools was lower than the GPA of native students, and (3) the GPA of transfer students from urban junior colleges was lower during the initial

semester but equal to the GPA of native students during the second semester.

A study done in 1970 at OSU was made by Zweiacker (15) on academic achievement of native and transfer students in the College of Agriculture. This study found that the transfer student came into the system with a higher GPA than the native student, but that there was no significant difference in the final cumulative GPA of the two groups.

Also at OSU, McNeill (9) in 1973 found that there was no difference in success patterns of native students and transfer students in the School of Technology. However, the transfer students did significantly better in all other courses after enrolling in the School of Technology than they had done prior to transfer. The origin of the transfers was also examined, and it was found that there was a significant difference between transfer students' GPA in Technology courses and native students' Technology GPA. Oklahoma junior college transfers exhibited the lowest four-semester cumulative GPA when compared to all other students in the School of Technology. Foreign students with college hours from their home institutions had the highest four-semester cumulative GPA.

Gold (5) in a study in Los Angeles, California, in 1973 found that the grades of students transferring from Los Angeles City College (LACC) to California State University at Los Angeles (CSLA) tended to drop slightly (-0.05 points) below the average GPA of 2.49 during the first quarter after transfer. The overall effect was judged negligible by the author who concluded that the students transferring from LACC to CSLA incurred little, if any, transfer shock.

Some studies have delved into individual differences between students that transfer into a four-year institution and native students who

initially start at the four-year institution. These results are also pertinent with regard to this study.

Medsker and Trent (11) assessed characteristics of high school students who entered a two-year college in 1965. The study showed that there was a wide variance among these students as to their interests, socio-economic background, parents' educational level, and type of curriculum completed in high school.

Cooley and Becker (3) in a study discussed in 1966 concluded that the students who attended junior colleges were more closely aligned to high school graduates who did not continue their education at a post-secondary level than to students who attended four-year institutions. Cross (11) indicated in 1968 that there were differences in the socio-economic backgrounds of junior college students compared to four-year colleges and universities. The junior college student came from a lower socio-economic setting.

Phillips (13) in 1968 noted that students entering technician education programs in junior colleges in Oklahoma were significantly different from students entering Technical Institutes operated by OSU. The junior college programs attracted students with lower technical scores on tests along with lower reading ability scores.

A study by Wermers (14) made in 1973 concurred with the above studies. This study investigated achievements of transfers from junior colleges, transfers from four-year institutions, and native university students. This study found that junior college transfers had a lower score on academic ability than either of the other two groups. Junior college transfers also came from a lower socio-economic background. In

general the junior college students scored lower on the CLEP tests than the other two groups.

CHAPTER III

METHODOLOGY

Definitions

Associate Degree: the degree conferred upon successful completion of a prescribed curriculum. The curriculum usually requires two years to complete and is approximately seventy semester hours in length.

College: a four-year educational institution that confers a baccalaureate degree as its highest degree offering.

Cross-Training Courses: a course designed specifically to strengthen a student's educational background in a given subject area in a minimum length of time. The material studied is not typically from the student's previous major area of endeavor.

EET: Electronic Engineering Technology.

EMT: Electro-Mechanical Technology.

EPT: Electrical Power Technology.

Grade-Point Average (GPA): the numerical mean of grades attained by a student. This figure is found by assigning integers for a given letter grade and calculating the mean by use of the following equation:

$$GPA = \frac{\sum_{i=1}^{n} (C.H. \times G)_i}{N}$$

where

C.H. = credit hours of a course i

G = point value of grade received in course i (A = 4.0, B = 3.0, C = 2.0, D = 1.0, F = 0.0)

n = number of courses on transcript

N = total credit hours on the student's transcript

J.C.: Junior College--a two-year educational institution granting the associate degree as its highest degree offering.

MECH: Mechanical Technology.

Out-of-State Student: a student who has completed his previous course of study at a higher education facility in any state other than Oklahoma.

Transfer GPA: grade point accrued in another program and then transferred into the EPT program.

University: educational institution offering degree programs beyond the baccalaureate degree. An institution offering both undergraduate and graduate programs.

Assumptions

The assumptions made for this study are:

1. The students who constitute the initial class in the EPT

program are representative of all students who are currently enrolled or who will subsequently enroll in the EPT program.

2. The transfer GPA's brought into the EPT program all represent a degree of relative difficulty that is the same as the degree of course difficulty at Oklahoma State University (Technology Department).
3. The factors selected for evaluation in this study are among the major items that would be available and of interest in counseling situations.
4. The factors selected for evaluation in this study are key items relative to a student's success at an institution.
5. Relative success in the EPT program is reflected by an increase in GPA.

Subject Selection

The total EPT class entering Oklahoma State University in the fall semester, 1975, was used for this study. These students were the first individuals participating in the unique two-plus-two concept and therefore because of the relatively small size of this group, the entire entering group of EPT students was used. There were nineteen subjects in this group.

At the present time there is another group enrolled, but no effort has been made to study these students.

Development of the Instrument

A questionnaire was developed to supply data for this study. This instrument was also used to glean information that could prove helpful

in future recruitment efforts for the School of Technology.

The major thrust of the instrument was to provide data pertinent to this study in the following areas:

1. Personal information such as marital status and age.
2. Educational information (this section was used ultimately to check the accuracy of departmental files on the students).
3. Industrial experience.
4. Prior military service.

Other questions contained in the instrument were used for activities within the EPT program other than this study.

A copy of the questionnaire is included in Appendix A.

Data Collection

The questionnaires were distributed to the EPT class by the instructor of EPT 3103 (Introduction to Electrical Power). This was done at the beginning of the Fall Semester, 1975. The students were requested to complete the items on the instrument and to return the questionnaire within one week. Subsequent collection and evaluation indicated that a second reminder was needed in order to approach the necessary completion date. The author then approached the remaining abstainers and solicited the completed instruments. This third attempt finally yielded one hundred percent participation. The questionnaires were completed at the end of the 1975 fall semester.

Attention was then shifted to the departmental records kept by the School of Technology. The records of the EPT students were examined and data pertaining to transfer GPA, previous major areas of study, number of hours attained, and previous institutions attended were

obtained for each student. This information was collected in the Spring Semester, 1976, and was accomplished with the assistance of the EPT departmental secretary.

The EPT GPA was calculated by re-examining the departmental records after the fall and spring semester grades were posted. This was done to give a two-semester value for the EPT GPA that could be compiled into the student's mean EPT GPA. This step was completed in July, 1976.

Data Analysis

The departmental data used in this study were collected during the summer semester of 1976. Each student's transfer GPA, overall GPA, and EPT GPA were found using the standard methods for finding GPA values. A table containing the factors and data being examined was constructed and is included as Appendix B. The specific factors used were EPT GPA, industrial experience, prior military service, type of institution(s) previously attended, location of previous educational institution, and marital status.

The data shown in Appendix B contains additional information such as change in overall GPA, number of hours completed, and age. These were not all used for the statistical analysis, but they are included for comparison purposes.

The hypotheses were tested by use of the Point-Biserial Coefficient of Correlation. This statistical correlation coefficient is appropriate if one of the variables is interval level data (continuous) and the second variable is a true dichotomy (6). In this study, the EPT GPA variable is treated as an interval level factor while the other items may be forced into a dichotomous situation as required for this

statistical method.

The calculations were performed with the following equations (6):

$$r_{pbi} = \frac{\bar{M}_P - \bar{M}_T}{\sigma_T} \sqrt{\frac{p}{q}}$$

where

r_{pbi} = Point-Biserial Coefficient of Correlation

$\bar{M}_P$ = mean of X values for the higher group in the dichotomized variable

$\bar{M}_T$ = mean of X values for total sample

p = proportion of cases in the higher group

q = proportion of cases in the lower group

σ_T = standard deviation of the total sample in the continuously measured variable X

The test of the hypotheses ($\bar{r}_{rbi} = 0$) was then done using the t-test as outlined below. A t value was calculated by use of (6)

$$t = r_{pbi} \sqrt{\frac{N - 2}{1 - (r_{pbi})^2}}$$

where

t = distribution being tested

r_{pbi} = Point-Biserial Coefficient of Correlation

N = number of subjects

A value of $t_{critical}$ using degrees of freedom (D.F.) of N - 2 was then obtained from a table of coefficients of correlation and t-ratios (6). This was then compared with the t being tested to see whether or not the null hypothesis could be rejected.

Limitations

The interpretion of the results is relatively straightforward. The major concern is that the students comprising the EPT class investigated in this study are truly representative. As previously mentioned, a second class is presently enrolled in EPT; and the faculty has indicated that the philosophy, background, and attitudes of this second group appear to be somewhat different from the group studied. This may be due to some changes in backgrounds such as may be found from Table I.

TABLE I

COMPARISON OF STUDENTS IN THE JUNIOR AND SENIOR EPT CLASSES CURRENTLY ENROLLED AT OSU (1976)

Factor Being Examined	Class 1 (Class Being Studied) Number of Students	Class 2 (Second Group) Number of Students
Previous Major		
EET	12	5
EMT	3	8
MECH	3	3
Transfer Information		
Mean Number of Hours Transferred to OSU	77.3	71
Mean Transfer GPA	2.72	2.59
Type of Institution Previously Attended:		
University	4	3
Junior College	13	12
College	1	1
Out-of-State Transfers	6	0
Mean Age	23.8	24.8

CHAPTER IV

RESULTS

Return Rates

Two data collection methods were used. One method was to examine each student's departmental folder and obtain data such as transfer GPA, previous institutions attended, and EPT scores. The second method was to develop and distribute an instrument to the EPT class that would disclose personal factors such as previous industrial experience, marital status, prior military service, and age. Some questions on the instrument were included for departmental use and were not used in this study.

Follow-up was done by individually approaching students that were delinquent in their return of the instrument. This yielded a one hundred percent return.

One return was omitted from the data analysis since this student exited from the program before the end of the initial semester. This student's retirement from the class left eighteen returns to work with. It should be noted that three students entered the program at the beginning of the spring semester. These students were polled with the same questionnaire and their data included in the results. These three students are included as part of the eighteen students studied.

Data Summary

Table II contains the pertinent data and factors that were used in the study. This is summarized from Appendix B.

Results of Analysis

The hypotheses tested in this study were stated in Chapter I. In each case the hypothesis was written in null form. Each of the six hypotheses are listed again in this section, and the data used to test for correlation significance are tabulated below each null hypothesis. The rejection or failure of rejection of each hypothesis is indicated.

Hypothesis number 1 states that there is no statistically significant correlation between EPT GPA and prior industrial experience of students in the EPT program at OSU ($\alpha = 0.05$). The results of the tests are shown below:

Mean EPT GPA	2.750
Mean EPT GPA of Students with Industrial Experience	2.859
Ratio of Students with Industrial Experience to Total	0.5556
Ratio of Students Without Industrial Experience to Total	0.4444
r_{pbi}	0.10649
t	0.4284
$t_{critical}$ (Degrees of Freedom = 16)	2.120

Conclusion: $t < t_{critical}$. Therefore Fail to Reject Hypothesis Number 1.

Hypothesis number 2 states that there is no statistically

TABLE II

SUMMARY OF DATA USED IN THE STUDY

Student	EPT GPA	Marital Status	Industrial Experience	Previous Major	In-State Resident	Prior Military Service	Previous School Type
A	0.83	S	Yes	EET	Yes	No	J.C.
B	3.13	S	Yes	EET	Yes	No	Univ.
C	3.91	M	No	EMT	Yes	No	Coll.
D	4.00	M	Yes	EET	Yes	Yes	J.C.
E	3.43	M	Yes	EET	Yes	No	Univ.
F	3.34	M	Yes	MECH	Yes	Yes	J.C.
G	3.46	S	No	EET	No	No	J.C.
H	3.36	S	No	EET	No	No	J.C.
I	2.26	S	No	MECH	Yes	No	J.C.
J	3.83	M	Yes	EET	Yes	Yes	Univ.
K	1.66	M	Yes	EMT	Yes	Yes	J.C.
L	3.82	M	Yes	EET	Yes	Yes	J.C.
M	3.50	S	Yes	MECH	No	No	Univ.
N	2.42	S	No	EET	No	No	J.C.
O	0.50	S	No	EMT	Yes	No	J.C.
P	1.00	S	Yes	EET	No	No	J.C.
Q	3.33	M	No	EET	No	Yes	J.C.
R	1.75	S	No	EET	Yes	Yes	J.C.
S	-	S	-	MECH	Yes	No	Univ.
	Mean = 2.750	44% Married	56% Yes	EET = 67%	72% Yes	39% Yes	J.C. = 68%
		56% Single	44% No	EMT = 17%	28% No	61% No	Coll. = 5%
				MECH = 17%			Univ. = 26%

significant correlation between EPT GPA and marital status of students in the EPT program at OSU ($\alpha = 0.05$). The results of the tests are shown below:

Mean EPT GPA	2.750
Mean EPT GPA of Unmarried Students	2.221
Ratio of Unmarried Students to Total Enrollment	0.5556
Ratio of Married Students to Total Enrollment	0.4444
r_{pbi}	-0.5174
t	-2.4184
$t_{critical}$ (Degrees of Freedom = 16)	2.120

Conclusions: $t > t_{critical}$. Therefore Reject Hypothesis Number 2.

This indicates that there is a significant correlation between EPT GPA and a student's marital status. The married students achieve a better EPT GPA than the unmarried students.

Hypothesis number 3 states that there is no statistically significant correlation between EPT GPA and the major course of study that the student previously pursued. This hypothesis is limited to the three majors found present in this class. The method of testing was somewhat different than the method used in testing Ho #1 and Ho #2. The Point-Biserial figure was calculated for each major (EET, EMT, and MECH). Then each figure was tested by calculating t and comparing this to the critical t from a table. This is the same process used before except that each major was dichotomized against the other two majors.

The results of these tests are presented below:

Mean EPT GPA	2.750

Mean EPT GPA of Students Previously Majoring in EET	3.002
Mean EPT GPA of Students Previously Majoring in EMT	2.023
Mean EPT GPA of Students Previously Majoring in MECH	3.033
Ratio of Students Previously Majoring in EET to Total Enrollment	0.6667
Ratio of Students Previously Majoring in EMT to Total Enrollment	0.1667
Ratio of Students Previously Majoring in MECH to Total Enrollment	0.1667
r_{pbi} (for EET)	0.3112
r_{pbi} (for EMT)	-0.28374
r_{pbi} (for MECH)	0.1093
t (for EET)	1.3095
t (for EMT)	-1.1836
f (for MECH)	0.43983
$t_{critical}$ (Degrees of Freedom = 16)	2.120

Conclusion: t (All Majors) < $t_{critical}$. Therefore Fail to Reject Hypothesis Number 3.

The results indicate that there is no significant correlation between the major of students and the mean EPT GPA. However, investigation of the GPA's of EPT students that previously majored in EET compared with EPT students with previous majors in each of the other two specialties shows that there may be a relationship here that might prove significant. However, the number of students involved in each major in this class is small; therefore, additional testing with this fraction of the sample might not have statistical validity (6).

Hypothesis number 4 states that there is no statistically

significant correlation between EPT GPA and a student being an out-of-state resident in the EPT program at OSU ($\alpha = 0.05$). The results of the tests are shown below:

Mean EPT GPA	2.750
Mean EPT GPA of In-State Students	2.705
Ratio of In-State Students to Total Enrollment	0.6667
Ratio of Out-of-State Students* to Total Enrollment	0.3333
r_{pbi}	0.05551
t	0.2226
$t_{critical}$ (Degrees of Freedom = 16)	2.120

Conclusion: $t < t_{critical}$. Therefore Fail to Reject Hypothesis Number 4.

Summarizing, the test of hypothesis number 4 shows that there is no significant correlation between a student's EPT GPA and his previous resident status.

Hypothesis number 5 states that there is no statistically significent correlation between EPT GPA and prior military service by students in the EPT program at OSU ($\alpha = 0.05$). The results of the tests are shown below:

Mean EPT GPA	2.750
Mean EPT GPA of Military Veterans	3.104
Ratio of Military Veterans to Total Enrollment	0.3889

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* One "out-of-state student" in this study was an international student. This individual was treated the same as the rest of the out-of-state students in the calculations.

Ratio of Non-Military Veterans to Total Enrollment	0.6111
r_{pbi}	0.24656
t	1.0176
$t_{critical}$ (Degrees of Freedom = 16)	2.120

Conclusion: $t < t_{critical}$. Therefore Fail to Reject Hypothesis Number 5.

Hypothesis number 6 states that there is no statistically significant correlation between EPT GPA and the type of educational institution previously attended. This hypothesis is limited to the three kinds of institutions outlined in the data, namely, junior colleges, universities, and colleges.

The method of testing followed is the same as that used for evaluating hypothesis number 3. The results are tabulated below:

Mean GPA	2.750
Mean GPA of Students Transferring from Junior Colleges	2.441
Mean GPA of Students Transferring from Universities	3.470
Mean GPA of Students Transferring from Colleges	3.910
Ratio of Students Transferring from Junior Colleges to the Total Enrollment	0.7222
Ratio of Students Transferring from a University to the Total Enrollment	0.2222
Ratio of Students Transferring from a College to the Total Enrollment	0.0556
r_{pbi} (for Junior College)	-0.4349
r_{pbi} (for University)	0.3360
r_{pbi} (for College)	0.2456

t (for Junior College)	1.9319
t (for University)	1.4276
t (for College)	1.0134
$t_{critical}$ (Degrees of Freedom = 16)	2.120

Conclusion: $t < t_{critical}$. Therefore Fail to Reject Hypothesis Number 6.

The results of this test indicate that there is no statistical correlation between EPT GPA and the type of educational institution previously attended. This indicates that in this program the students from junior colleges, universities, and colleges all perform equally well.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The purpose of this study was to evaluate the relationship that certain factors such as marital status, selective service status, previous major area of study, previous type of institution attended, and previous industrial experience might have upon a student's GPA when he transfers into an unconventional 2+2 program.

The group used for this study was the initial class enrolling in 1975 in the upper-division EPT program at OSU. All incoming students were ones who had not previously majored in EPT but instead had majored in electronics, electro-mechanical, or a mechanical-related technology. Most of these were transfer students from off campus.

Data was obtained by use of a questionnaire issued to the EPT class. Other data such as GPA was obtained from departmental files kept on each student.

Six hypotheses were formulated and tested. These hypotheses are listed below:

Ho #1. There is no statistically significant correlation between EPT GPA and prior industrial experience of students in the EPT program at OSU ($\alpha = 0.05$).

Ho #2. There is no statistically significant correlation between EPT GPA and marital status of students in the EPT program at OSU ($\alpha = 0.05$).

Ho #3. There is no statistically significant correlation between EPT GPA and previous major area of study of students in the EPT program at OSU ($\alpha = 0.05$).

Ho #4. There is no statistically significant correlation between EPT GPA and a student being an out-of-state student in the EPT program at OSU ($\alpha = 0.05$).

Ho #5. There is no statistically significant correlation between EPT GPA and prior military service by students in the EPT program at OSU ($\alpha = 0.05$).

Ho #6. There is no statistically significant correlation between EPT GPA and the type of educational institution previously attended by EPT majors at OSU ($\alpha = 0.05$).

The analysis of the data as applied to the hypotheses revealed that there was no significant difference between a student's EPT GPA and his previous major or institution attended, military status, industrial experience, or residency status. There was a significant difference between a student's EPT GPA and his marital status. Married students perform significantly better than single students in this program.

Conclusions

This section is devoted to reporting conclusions that may be made

in view of the data analysis done in this study.

1. The fact that students without prior industrial experience do as well as students with industrial experience would seem to imply that the courses may not be as practical (job oriented) as many educators assume technology courses to be. An evaluation of job titles for those students with prior industrial experience also indicates that much of this experience has been in trades-related jobs rather than technician-technologist level jobs. The experience may not be directly applicable to this program.
2. The fact that married students perform significantly better than single students would lead one to assume a maturity factor to be in operation here. Married students are generally more settled and often are chronologically older. That is the case here for the average class age is 25.0 years, while the average married student is 28.5 years and the average single student is 21.6 years old.
3. No significant correlation was found between EPT GPA and a student's previous major. This may be related to the worth or effectiveness of the cross-training courses in the curriculum. As discussed in Chapter I, these courses are aimed at bringing non-majors up to a sufficiently high technical level so that they may continue in EPT courses. Apparently these courses are either serving their purpose or else they are not needed at all.
4. The fact that in-state resident students perform at the same level of GPA as those students transferring in from out of

state implies that the level of training being transferred into the EPT program from all sources is equal or else no prior technical background is necessary.

5. No significant difference between EPT GPA's of students with previous military service and students with no previous military service was noted. This might be somewhat of a surprise, but in a class of this size a considerable amount of pairing is done by the students. In many cases the older students and the younger students tend to form study sessions, and this may tend to stabilize the younger students and help them form better study habits.

6. There was no significant correlation found between junior college transfer and EPT GPA. There was no significant correlation found between university transfer and EPT GPA. Also, there was no significant correlation found between EPT GPA and college transfers. The results found here are converse to those reported by McNeill in his study in 1973. He concluded that a transfer student's origin will affect his grades. This difference in conclusions may be due to the fact that the EPT program is aimed at non-majors and is therefore attracting students who want to change their previous career choice for some reason. Also, McNeill's study was concerned more with a group of students who were not so strongly committed to technical education as the students in this study in that many of the students that he investigated were transfers from programs other than Technology. The EPT students all have a previous background in Technology programs.

Recommendations

Several items may be discussed in view of the results of this study.

1. For counseling purposes, the course material contained in the body of the EPT curriculum should not be considered as insurmountable to students interested in this field, but somewhat afraid to tackle such a task. The amount of previous industrial experience in the field does not appear to significantly affect a student's final GPA. Also a previous major in either EET, EMT, or MECH is adequate for successful progress in the EPT program. A student's previous school type and that school's geographical location does not significantly affect his progress. Prior military service does not seem to account for any significant change in the student's EPT GPA.
2. The original proposal and the curriculum that it lead to dealt with taking students that had not majored in EPT in their first two years but who had majored in a closely related major. These students were to be upgraded in areas of weakness in their technical background as it related to EPT by means of cross-training courses. The results of this study indicate that this is a viable method and that the cross-training concept is either valid or not needed.
3. A further study of this type should be made at a later date and the sample enlarged to include the additional EPT students who will follow the first group through the program. Also a correlation should be investigated between two or more factors and

their combined effect on a student's EPT GPA using the larger sample made up from the additional EPT classes.

4. This study revealed an inherent weakness in the typical method of calculating GPA in this type of study. The method used was to treat all students as though they had the same number of credit hours in their major. Unfortunately, this assumption was not true as some subject students with high EPT GPA's also had completed more credit hours than some students with low EPT GPA's. The choices were (1) either omit some of the subjects with low EPT credit-hour counts, (2) to consider a new means of weighing the scores based on hours completed and EPT GPA, or (3) treat this problem as trivial and use the EPT GPA as it would be normally used in such a study. The author chose to use the third option primarily because of the limited sample size and the assumption that this problem might be stabilized with a larger N.

If the EPT GPA is calculated using

$$\text{EPT GPA} = \frac{\sum_{i=1}^{n} [(GPA_1 \times hours_1) + (GPA_2 \times hours_2)]_i}{N}$$

where

n = number of students in group

GPA_1 = fall semester EPT GPA

GPA_2 = spring semester EPT GPA

$hours_1$ = fall semester credit hours attempted

$hours_2$ = spring semester credit hours attempted

N = total number of hours taken by the entire sample

the mean EPT GPA is found to be 2.94. The method used in this study however was to find the mean of the group by

$$\text{EPT GPA} = \frac{\sum_{i=1}^{n} (\text{EPT GPA})_i}{n}$$

where

EPT GPA = each student's GPA for the academic year

n = number of students in group

This method yielded a mean EPT GPA of 2.750.

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APPENDIX A

QUESTIONNAIRE

As you know, the EPT curriculum was originally funded by the National Science Foundation (NSF) in response to a proposal written by Dr. Perry R. McNeill. This proposal had several items contained within it that stipulated certain action on the part of the university. One such item was to investigate the industrial and/or educational experiences of the students who initially enrolled in the program. This form is part of that study. Your assistance in filling out this question sheet will be greatly appreciated.

A. Personal Data

Name _____ Age _____

Marital Status _____ Number of children (if married) ___

B. Education Information

1. List previous majors, approximate number of semester hours attained in that major, and college or university name

Major Area of Study	Credits attained*	Institution

*Circle one of these: semester, quarter, trimester

2. List other training that you have had, such as military schools, vocational-technical schools, correspondence courses or technical high school courses.

Area of Study	Type of program	Total time in program

3. Number of students in your high school graduating class _____

C. Work Experience

List all jobs that you have worked at since high school

Name of job and your duties	Employing Firm	From	To

D. Specific questions concerning the EPT curriculum.

1. How did you first find out about the EPT program? _____
_____
_____

2. Has the program been about what you expected? _____

3. Do you feel you were adequately prepared for the demands of this progra
_____. If not, what subject areas are giving you trouble?

4. Please note any subject areas that you feel might give you trouble at a later date.

5. Do you feel that the cross training course (EPT 2115) is of value as it is presently being taught?

6. What part of your previous training has been most helpful to this point in the EPT program?

7. Please indicate briefly the reasons that caused you to enter into this program.

8. Did you encounter any Oklahoma State University policies or regulations that gave you trouble when you transferred into the EPT program? _____
If yes, please list these trouble areas.

9. Do you feel that you will graduate in the school year 1977 with a Bachelors Degree in EPT? _____. If no, please explain why.

10. What type of industry do you think you will work for upon graduation?

APPENDIX B

RAW DATA

DATA CONCERNING EPT STUDENTS (INITIAL CLASS)

Student	Age	Marital Status	Experience in Field	Military Veteran	Previous Major*	Hours Transferred	Transfer GPA	Type of Institution**	EPT Hours	Total Hours Attained
A	21	S	Yes	No	EET	62	1.4	J.C.	25	87
B	20	S	Yes	No	EET	65	3.3	Univ.	29	94
C	21	M	No	No	EMT	92	3.88	Coll.	35	127
D	24	M	Yes	Yes	EET	68	3.77	J.C.	33	101
E	35	M	Yes	No	EET	130	1.77	Univ.	22	152
F	26	M	Yes	Yes	MECH	65	3.26	J.C.	29	94
G	21	S	No	No	EET	75	3.15	J.C. (OS)	35	110
H	20	S	No	No	EET	65	3.28	J.C. (OS)	30	95
I	21	S	No	No	MECH	65	2.45	J.C.	34	99
J	38	M	Yes	Yes	EET	145	2.32	Univ.	31	176
K	30	M	Yes	Yes	EMT	68	2.64	J.C.	28	96
L	30	M	Yes	Yes	EET	65	3.85	J.C.	17	82
M	28	S	Yes	No	MECH	141	2.65	Univ. (OS)	14	156
N	20	S	No	No	EET	69	2.38	J.C. (OS)	33	102
O	20	S	No	No	EMT	71	2.2	J.C.	6	77
P	21	S	Yes	No	EET	65	2.5	J.C. (OS)	8	
Q	24	M	No	Yes	EET	65	3.0	J.C. (OS)	30	95
R	24	S	No	Yes	EET	56	2.04	J.C.	26	82
S				No	MECH			Univ.		
Averages and Ratios	25	44% M 56% S	56% Yes 44% No	39% Yes 61% No	EET 67% EMF 17% MECH 17%	77.3	2.72	J.C. 69% Coll. 5% Univ. 26%		1,825

* Three majors considered (EET, EMT, MECH).

** J.C. = Junior College, Coll. = 4-Year Institution, Univ. = University, OS = Out of State.

DATA CONCERNING EPT STUDENTS' GPA (INITIAL CLASS)

Student	Transfer GPA	Present GPA	Net Change	Fall		Spring		EPT GPA
				GPA	Hours	GPA	Hours	
A	1.44	1.28	-1.2	1.40	12	0.3	13	0.83
B	3.30	3.26	-0.04	3.26	15	3.00	14	3.13
C	3.88	3.88	0	4.00	18	3.82	17	3.91
D	3.77	3.81	+0.04	4.00	16	4.00	17	4.00
E	1.77	1.88	+0.11	3.77	9	3.21	14	3.43
F	3.26	3.34	+0.08	3.50	12	3.23	17	3.34
G	3.15	3.20	+0.05	3.50	18	3.41	17	3.46
H	3.28	3.30	+0.02	3.30	13	3.41	17	3.36
I	2.45	2.44	-0.01	2.11	17	2.41	17	2.26
J	2.32	2.46	+0.14	3.85	14	3.82	17	3.83
K	2.64	2.50	-0.14	1.92	14	1.40	14	1.66
L	3.95	3.94	-0.01	-	-	3.82	17	3.82
M	2.65	2.67	+0.02	-	-	3.50	14	3.50
N	2.37	2.38	+0.01	2.43	16	2.41	17	2.42
O	2.20	2.08	-0.12	-	-	0.5	6	0.5
P	Not Available	Not Available	-	2.00	4	0.0	4	1.0
Q	3.30	3.32	+0.02	3.36	13	3.32	17	3.33
R	2.05	2.04	-0.01	2.44	9	1.38	17	1.75
S	Withdrew							

APPENDIX C

EPT CURRICULUM AND COURSE DESCRIPTIONS

EPT CURRICULUM

This program is upper division (Junior-Senior years) only. Students completing two years training in a technically allied program such as Electronics, Electro-Mechanical, Mechanical, Radiation and Nuclear, and many others may enter this program directly in the junior year.

Junior Year

First Semester		T	L	C
MATH 2373	Calculus for Technology I	3	0	3
GENAD 3113	Written Communications	3	0	3
EPT 3103	Introduction to Electrical Power	2	3	3
EPT 3123	Electrical Power Generation	3	0	3
				12

Cross-Training Courses*

EPT 3135	Electrical Principles	3	6	5
EPT 3145	Mechanical Principles	3	6	5
	(Typical load 17 credit hours)			

Second Semester

MATH 2383	Calculus for Technology II	3	0	3
EPT 3214	Transformers and Three-Phase Circuits	3	3	4
EPT 3224	Electrical Machines and Controls	3	3	4
EPT 3233	Computer Techniques in Electrical Power	2	3	3
				14

Cross-Training Courses*

EPT 3243	Introduction to Electronics	2	3	3
EPT 3253	Structures for Electric Power	2	3	3
	(Typical load 17 credit hours)			

Senior Year

First Semester

EPT 4113	Power Transmission and Distribution	3	0	3
EPT 4124	Switchgear and Protective Relaying	3	3	4
EPT 4134	Industrial Controls	3	3	4
GENT 3112	Principles of Supervision	2	0	2
HUMAN ---4		4	0	4
				17

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* Students with Electrical/Electronics background will normally take Mechanical Cross-Training. Students with non-electrical backgrounds will take Electrical Cross-Training.

Second Semester		T	L	C
EPT 4212	Special Problem Design	0	6	2
EPT 4224	Systems Planning	3	3	4
EPT 4234	Electrical Power Data Communications	3	3	4
RNT 4003	Nuclear Power	2	3	3
				13

EPT COURSE DESCRIPTIONS

EPT 3135 ELECTRICAL PRINCIPLES. Lab. 6.

A study of DC and AC circuit theory for non-electrical students entering the EPT program. Specific topics to be studied are: Ohm's Law, Kirchoff's Circuit Law, loop and node equations, wye-delta, and delta-wye transformations, magnetism reactances and impedance, single-phase AC network solution methods.

EPT 3145 MECHANICAL PRINCIPLES. Lab. 6.

A course designed to present mechanical concepts to non-mechanical students entering the EPT program. Course will cover basic material science and principles of statics.

EPT 3243 INTRODUCTION TO ELECTRONICS. Lab. 3. Prerequisite: 3135 or Basic Electricity.

Introduction to electronic devices and circuitry for non-electronic/electrical majors. Topics covered will be solid state device characteristics, power supplies, and introduction to amplifiers.

EPT 3253 STRUCTURES FOR ELECTRICAL POWER. Lab. 3. Prerequisite: 3145.

Analysis of the behavior of structures used in the electrical power industry. Topics include force and deformation analysis, foundations, types of structures, and erection procedures.

VITA

Jack David Burson

Candidate for the Degree of

Master of Science

Thesis: EFFECTS OF PERSONAL FACTORS ON GRADE-POINT AVERAGES OF STUDENTS MAJORING IN AN UNCONVENTIONAL 2+2 TECHNOLOGY PROGRAM

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