A STUDY OF THE STUDENTS ENROLLED IN THE ELECTROMECHANICAL TECHNOLOGY PROGRAM AT OKLAHOMA STATE UNIVERSITY

By

JOSPEH ASHLEY PATTERSON

Bachelor of Science

Oklahoma State University

Stillwater, Oklahoma

1970

Submitted to the Faculty of the Graduate School of
The Oklahoma State University
in partial fulfillment of the requirements
for the degree of
MASTER OF SCIENCE
May, 1971

A STUDY OF THE STUDENTS ENROLLED IN THE ELECTROMECHANICAL TECHNOLOGY PROGRAM AT OKLAHOMA STATE UNIVERSITY

Thesis Approved:

Thesis Adviser

Dean of the Graduate School

ACKNOWLEDGEMENTS

The writer wishes to express his appreciation to his thesis advisor, Dr. Donald S. Phillips, for help and valuable suggestions during the study.

Much of the knowledge needed to make the study was obtained in a course entitled "Introduction to Graduate Study and Research in Education" taught by Dr. James Key. The writer owes a debt of gratitude to Dr. Key for his efforts and skill in presenting the material.

Others to whom the writer is grateful for comments, suggestions, and criticisms are Dr. Ted Ingram, Lloyd Briggs, and Roy Byrd.

A constant source of encouragement, understanding, and thoughtfulness has been supplied by my wife, Merle.

TABLE OF CONTENTS

LIST OF TABLES

CHAPTER I

INTRODUCTION TO THE PROBLEM

The United States has experienced an unprecedented technological growth since the end of World War II. This increase in technology has been accompanied by additional income for the U.S. people which allows them to buy more consumer goods, products, and services. The combination of increased consumer buying power and technology development has influenced many companies to increase their outputs to record levels.

To remain competitive, that is, to produce a quality product or to provide a reliable service, which is inexpensive and abundant, has caused many organizations to resort to automated or mechanized processes.

These complicated machines and systems are usually a combination of mechanical, electrical, and electronic units working together to perform a function, such as manufacturing and testing a product, automatically processing information and solving problems, or controlling environmental conditions. They range in size from equipment that can fit in the palm of a hand to complete manufacturing or processing facilities that may cover several acres of land.

As automation and mechanization have developed, a need has been created for a new type of technician. This individual is a semiprofessional who has a knowledge of mechanics, electronics, and electricity with an emphasis upon science based knowledge. The technician with this type of background is usually called an electromechanical technician.

Statement of the Problem

Oklahoma State University has developed a program in electromechanical technology and has established a two year pilot training project to test the feasibility of the curriculum and to observe the behavior of the participating students. An important responsibility of the project is to disseminate information about electromechanical technology so that institutions can be encouraged to establish the electromechanical technology curriculum based upon the experience and knowledge gained from the Oklahoma State University program.

A major problem of technical institutes, community colleges, and other technical education institutions is their inability to attract enough students who have the interest and capability needed to successfully complete the two-year technical programs.

The problem with which this study is concerned is to determine the type of student who is being served by the electromechanical technology program so that institutions starting electromechanical curriculums can have guidelines to use in recruiting and selecting prospective students.

It will also serve as a guide to high school administrators, high school counselors, and high school teachers who have to make recommendations about higher education to their students.

Purpose of the Study

The purpose of the study was to investigate the students who have attended the Oklahoma State University electromechanical technology pilot training project. Students were compared and characteristics associated with successful and unsuccessful participants were identified.

Need for the Study

The need for the study is supported by three factors: (a) the strong evidence that has been discovered by Roney (1966) and others which document the need for electromechanical technicians throughout the United States; (b) the more than two hundred requests that have been received by the Oklahoma State University research project from institutions for information concerning electromechanical technology; and (c) the statement of Stuckey (1970) which foresees the adoption of the electromechanical curriculum by 50 to 100 institutions within the next few years.

As institutions begin to offer electromechanical technology programs there will be a need for information about electromechanical technology students. The findings obtained in this study should provide up-to-date planning information about electromechanical technology students.

Limitations of the Study

This study is limited to the enrollees of the two-year post-secondary electromechanical technology pilot training program being conducted at Oklahoma State University(O.S.U). Two groups of students have been enrolled in the Oklahoma State University research experiment. Group 1 is identified as the 27 students who enrolled in September of 1968, and group 2 is identified as the 27 students who enrolled in September of 1969. This entire population was used in the study.

This was a descriptive study with all information being obtained from carefully maintained personnel folders for each student in the program.

Assumptions of the Study

The design of the study was based upon the following assumptions:

(1) That the two groups of students in the O.S.U. program would show similar characteristics.

(2) That other institutions will be able to attract students with similar characteristics.

Questions to be Answered

It was felt that the following questions would obtain significant information about electromechanical technology students for use by the administrators, counselors, and

teachers of high schools, technical institutes, and college technical education programs.

1. What is the distribution and average of the composite ACT (American College Test) scores for successful and unsuccessful students?

2. What is the distribution and average of the mathematics and natural science ACT scores for the successful and unsuccessful students in the Electromechanical (EMT) program?

3. What is the distribution and average of the Cooperative Algebra Test scores for the successful and unsuccessful students participating in the EMT program?

4. What is the distribution and average Grade Point Average (GPA) obtained in high school mathematics and science courses for successful and unsuccessful students?

5. What is the distribution and average GPA obtained in high school vocational-technical courses for successful and unsuccessful students?

6. What is the distribution and average number of high school mathematics and science courses taken by successful and unsucessful students participating in the EMT program?

7. What is the distribution and average number of high school vocational-technical courses taken by successful and unsuccessful students participating in the EMT program?

8. What is the distribution of the high school graduating class size for successful and unsuccessful students participating in the EMT program?

Definition of Terms

Technical Education is defined as the educational programs at the post-secondary level which combine the learning of complex skills with sufficient scientific and technological theory to prepare the technician to provide close support to the scientist and to the engineer throughout the range of scientific and technological work from basic research to industrial production. The education programs are normally two years in duration and usually lead to the associate degree.

Electromechanical Technology refers to that part of engineering technology which deals with the multidisciplinary treatment of electrical, electronic, and mechanical (including hydraulics and pneumatics) principles and applications.

Technical Institute is a post-high school institution training for occupations in which emphasis is placed on the application of the functional aspects of mathematics and science, or an officially designated separately organized technical division of a four-year institution. The primary purpose of the technical institute is training for an objective other than a baccalaureate degree.

CHAPTER II

REVIEW OF LITERATURE

In recent decades technology developments have created a new occupation requiring a semiprofessional known as the electromechanical technician.

The purpose of this study was to identify the type of student being served by the O.S.U. electromechanical technology program.

The review of literature is presented chronologically and the results are grouped into technical education student characteristics and into electromechanical technology student characteristics.

Technical Education Student Characteristics

Harrington (1956) did a review of technical education research available at that time and identified factors which influenced high school students in their choice of technical institutes. These factors were found to be the reputation and practicality of the institution, the school physical plant, and the financial problems confronting the prospective student. The decision to attend a technical institute was made in the senior year or after high school graduation.

The students commented on the lack of vocational information and the importance of prompt correspondence from technical institutions.

In a later study Schroeder and Sledge (1962) did a comprehensive review of studies since 1950 seeking factors related to collegiate academic success.

The authors found that:

> Intellective factors were found to be more predictive of collegiate achievement than non-intellective factors although the importance of the latter was not disputed. 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.

The non-intellective factors found to be predictive of collegiate achievement in decreasing order of importance were interests, motivation, attitudes, beliefs, values, and adjustment.

Several groups of New York State students in electrical and mechanical technology were studied between 1955 and 1962 by Greenwood (1963) in an effort to predict their success in technical programs. The results of that research led to the following conclusions.

(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.

(3) Shop or mechanical drawing in high school, the high school averages in these subjects, and the number of years that they were studied were suggested as predictors of success in technical curriculums.

(4) Failing students in the technical curriculums had a combination of weaknesses rather than just one.

(5) It was easier to predict levels above which most students are likely to pass than it was to find predictor levels below which most students are likely to fail. It is worthwhile to take a chance on a few doubtful applicants whenever there is room in the curriculum.

Righthand (1965) 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 student.

The American College Testing Program's research service with students enrolled in two-year occupational-terminal curriculums was reviewed by Hoyt (1966). Six groups from six different colleges in six different states were represented and quoting 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 A.C.T. 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. A.C.T. 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.

A study of men on technical and non-technical jobs by Gunderson and Nelson (1966) found that men in technical jobs consistently scored higher on scales that reflect personal values related to social participation and motivation for achievement. The non-technical group indicated greater needs for support, conformity, and rigidity in social relationships.

A similar finding was made by Miller (1966) who found the student who persisted in his program displayed nurturance type needs to a much lower degree than the technical institute students who dropped out. The successful technical institute student relied on his own interpretations, required a certain amount of privacy from others, and was somewhat

independent of the feelings of others. The technical institute dropout tended to be a conformist who found it hard to disagree with others and was dependent on them for help. This same study revealed that these students came from lower socio-economic backgrounds than engineering students.

In a presentation to the American Vocational Association in Denver, Colorado, Miller (1967) was more specific in the characteristics of the successful engineering technology student. He emphasized:

(1) The student must have an intense interest in the specialized field of technology he wishes to pursue and possess a basic minimal reading ability.

(2) The technical student must be average in terms of academic ability.

(3) The technical student must have average ability in math and science with an interest in the practical application of these skills to a specific field of technology.

(4) The technical student should be mature and have personal characteristics which enable him to work for and with others.

(5) The technical student must be able to form judgements and function effectively without excessive reliance upon others.

Van Derslice (1968) 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.

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 education student has a 2.00 or "C" average in high school and has two years of high school mathematics (algebra and geometry) and two years of high school science (general science and biology). The average technical education student is below the level of the four year college student as measured in educational characteristics. He has an interest in mathematics and science and does well above average in the ability to handle applied theory.

Using the School and College Aptitude Test (SCAT) Van Derslice (1968) 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, but reliable levels of achievements have not been established.

Psychological characteristics displayed by the 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.

Sociologically students entering technical education generally come from a lower socio-economic structure than students entering engineering programs.

Gillie (1968) 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. 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 percentiles of his secondary school class.

Characteristics of Electromechanical Technology Students

Electromechanical technology is a new emerging multi-disciplinary technical training program which is still in the developmental stage. Because of its newness the research is limited.

In September, 1968, the first class of the Oklahoma State University Electromechanical Technology program was enrolled. Some of the characteristics of these students described by Phillips (1969a) are summarized below.

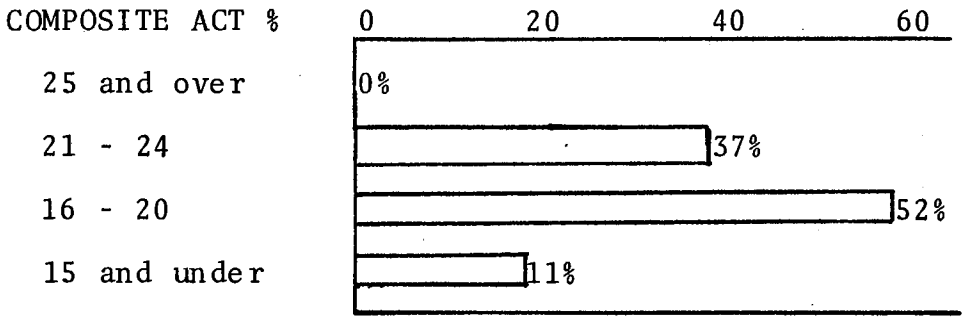
(1) All students were Oklahoma high school graduates. Ninety percent of them were recent high school graduates. They were equally divided with fifty percent of them being from large high schools and fifty percent from small high schools.

(2) Fifty-five percent of the students lived in college dormitories and ate in the dormitory dining hall; thirty percent lived in university apartments and prepared their meals at home; and ten percent lived in fraternity houses.

(3) All of the students were males, and ninety percent of them were single.

(4) All of the students had completed two semesters of high school algebra, two semesters of high school geometry, and two semesters of high school science (physics or chemistry).

(5) The distribution of the composite ACT scores were:



The mean composite ACT score for the group averaged 19.4 and ranged from 13 to 24. The average of all Oklahoma high school seniors taking the ACT tests were 19.0. The class of students could be considered as average in ability.

Comparing these students with the national average of all college-bound high school seniors Phillips (1969b) found that 22 percent rank in the lowest quartile, 52 percent were in the second quartile, 26 percent in the third quartile, and none were in the highest quartile. The academic characteristics of the Oklahoma State University electromechanical

technology student were similar to the typical junior college entering student.

Tinnell (1969) took the first step toward establishing a basis from which promising students for the emerging technologies could be identified. He studied 22 students of the Oklahoma State University electromechanical technology pilot training program and concluded that high school background in mathematics offers the most promise for identifying potentially successful students for electromechanical technology.

Summary

Technical education is relatively new and has made its biggest gains in the 1950's and the 1960's. Electromechanical technology was born in the 1960's. Because of the short existence of both types of education, there is a lack of meaningful research literature available.

However, there are threads of continuity that run through most of the literature which identifies certain characteristics more often than others and also associates certain characteristics with a certain type of technology or with a certain type of institution.

Graney (1964) suggested three areas that needed exploration in the technical education field. Where do students come from? What kind of people are they? What do they want? Little progress has been made in answering these questions at this time.

The review of literature indicates:

(1) that certain characteristics are associated with technical education students and encourages the search for characteristics associated with the electromechanical student.

(2) that research in technical education is lacking and research in electromechanical technology is just beginning, and additional research about electromechanical technology students is needed.

CHAPTER III

METHOD AND PROCEDURE

The review of literature indicates factors can be identified which are associated with technical education students.

This study was made to identify factors associated with the successful and unsuccessful students who have attended the electromechanical technology program at Oklahoma State University.

Data Collection

Two groups of students have been enrolled in the Oklahoma State University electromechanical technology program. Group 1 is identified as the 27 students who enrolled in September, 1968, and group 2 is identified as the 27 students who enrolled in September of 1969. These students, to be admitted, completed the American College Testing Program (ACT) in mathematics, English, social science, and natural science. Each student submitted official copies of his high school transcripts and completed the algebra section of the Cooperative Mathematics Test.

Studies indicate that ACT test scores, Cooperative Mathematics Test scores, and the grade point average

obtained on high school mathematics, science, and vocational-technical courses can be used to predict the success or failure of technical education students. There is some evidence that the number of high school courses completed in mathematics, science, and vocational-technical courses can also be used as predictors.

Factors

The factors selected to be used in this study were:

1. Composite ACT score
2. Mathematics ACT score
3. Natural Science ACT score
4. Cooperative Mathematics Algebra Test score
5. Grade point average of combined high school mathematics and science courses
6. Grade point average of high school vocational and technical courses
7. Number of high school mathematics courses taken
8. Number of high school science courses taken
9. Number of high school vocational-technical courses taken
10. Size of high school graduating class.

Successful and Unsuccessful Students

Official records of the O.S.U. semester grades for all EMT students were maintained. From these records the overall grade point average of each EMT student was calculated.

The successful students were defined as those with a grade point average between 2.00 and 4.00. The unsuccessful students were defined as those with a grade point average between 0.00 and 1.99.

When a student withdrew or completed the EMT program, his grade point average at that time was used to determine if he was successful or unsuccessful. Some students withdrew after one semester; some withdrew after two semesters; and others withdrew after three semesters.

Population

The first group of 27 students enrolled in September, 1968. Three withdrew before they obtained any grades, and were dropped from the study. The second group of 27 students enrolled in September of 1969, and all completed one semester or more and were included in the study.

At the time of the study, all of the group 1 students have either graduated or withdrawn from the EMT program. The group 2 students have either withdrawn or finished the first two semesters of the EMT program.

A total of 51 people make up the population of the study.

Summary

A summary of the information used in the study and how it relates to the successful and unsuccessful students is shown in Table I and Table II.

TABLE I

SUCCESSFUL STUDENTS

		ACT				H.S. GPA		COURSES			
STUDENT	EM GPA	COMP	M	NS	COOP ALG	M & S	VOC/ TECH	M	S	VOC/ TECH	H.S. SIZE
1	3.97	19	23	28	32	3.62	3.70	6	4	10	L
2	3.91	23	23	24	28	2.87	3.82	6	4	10	L
3	3.87	24	29	29	36	3.25	3.83	8	4	18	L
4	3.80	28	27	33	30	4.00	3.91	6	6	12	S
5	3.68	26	30	30	31	3.70	3.83	4	6	16	S
6	3.57	24	21	27	28	2.00	3.62	6	6	8	L
7	3.54	18	17	16	30	2.40	3.64	8	2	14	L
8	3.44	20	19	27	29	3.16	4.00	8	6	8	L
9	3.37	23	22	23	26	2.75	3.70	6	2	12	L
10	3.26	22	26	25	33	3.00	3.93	8	6	14	L
11	3.22	23	22	27	16	3.30	3.00	4	8	4	S
12	3.15	13	15	07	*	3.00	3.50	8	6	4	L
13	2.97	30	33	32	38	3.06	3.50	8	8	10	L
14	2.92	23	26	24	30	3.25	4.00	6	6	2	S
15	2.91	18	18	22	19	2.36	3.50	5	6	2	S
16	2.88	22	20	30	16	3.33	3.50	3	6	6	S
17	2.80	16	18	16	29	2.80	3.00	6	4	12	S
18	2.72	24	24	30	31	1.79	2.60	8	6	10	L
19	2.68	17	19	19	18	3.07	3.50	6	8	2	S
20	2.64	12	11	11	07	1.58	2.83	6	6	6	S
21	2.56	22	23	25	24	3.44	3.50	8	8	2	S
22	2.50	20	17	24	13	3.26	3.00	5	6	2	S
23	2.45	20	25	21	28	2.50	4.00	8	4	6	L
24	2.44	16	19	23	26	2.25	3.25	8	4	4	L
25	2.43	13	21	14	22	2.86	3.75	6	8	6	S
26	2.42	13	17	17	24	3.00	3.58	6	4	16	S
27	2.41	19	14	15	34	3.09	2.83	8	3	12	L
28	2.40	24	25	30	32	2.86	3.75	8	6	16	L
29	2.37	16	13	20	*	2.25	2.00	3	4	12	S
30	2.26	20	26	17	35	2.43	3.44	7	6	16	L
31	2.25	14	10	14	14	1.83	3.57	4	2	8	S
32	2.19	19	21	23	21	2.43	2.80	8	6	10	L
33	2.13	21	25	26	25	2.75	**	6	6	0	S
34	2.08	23	27	26	31	1.57	3.33	6	6	6	L
35	2.05	18	22	23	19	1.53	2.80	6	8	10	L
36	2.04	24	27	28	28	2.86	3.60	8	6	10	L
37	2.01	18	16	22	08	2.40	2.73	3	6	6	S
TOTAL		745	791	848	891	101.60	122.84	234	203	323	20 L 17 S
AVERAGE		20.2	21.4	22.9	25.4	2.75	3.32	6.3	5.5	8.7	

*No Cooperative Algebra score available
**No Vocational-Technical courses completed

TABLE II

UNSUCCESSFUL STUDENTS

		ACT				H.S. GPA		COURSES			
STUDENT	EM GPA	COMP	M	NS	COOP ALG	M & S	VOC/ TECH	M	S	VOC/ TECH	H.S. SIZE
1	1.83	15	19	18	23	2.40	3.33	6	4	20	L
2	1.74	19	14	24	20	2.43	2.60	4	4	8	S
3	1.67	17	16	17	15	2.18	3.25	4	2	10	S
4	1.62	20	14	24	13	1.71	2.57	4	2	6	L
5	1.57	24	17	27	23	1.83	2.33	3	3	4	L
6	1.57	24	26	29	30	2.72	3.50	6	4	12	L
7	1.42	17	20	22	19	2.66	4.00	4	2	12	L
8	1.36	20	24	16	13	2.07	3.20	6	8	10	S
9	1.31	13	16	13	17	2.10	2.87	8	2	6	L
10	1.31	18	16	23	13	2.78	3.66	6	8	6	S
11	1.18	21	18	27	25	3.10	3.00	4	6	2	S
12	1.17	21	17	27	9	1.78	2.00	6	8	2	L
13	1.05	16	14	19	9	1.66	3.00	4	2	8	L
14	0.74	16	16	17	10	0.90	1.75	4	4	12	L
TOTAL		261	247	303	239	30.32	41.06	69	59	117	9 L 5 S
AVERAGE		18.6	17.6	21.6	17.1	2.17	2.93	5	4.2	8.4	

CHAPTER IV

RESULTS

The results of the study show how the factors selected varied among the successful and unsuccessful students enrolled in the O.S.U. EMT program.

American College Test (ACT) Scores

Table III shows the distribution of composite ACT scores for successful and unsuccessful students.

The scores for the successful students ranged from 12 to 30 with 46 percent having a score of 21 and above. The average composite ACT score was 20.2.

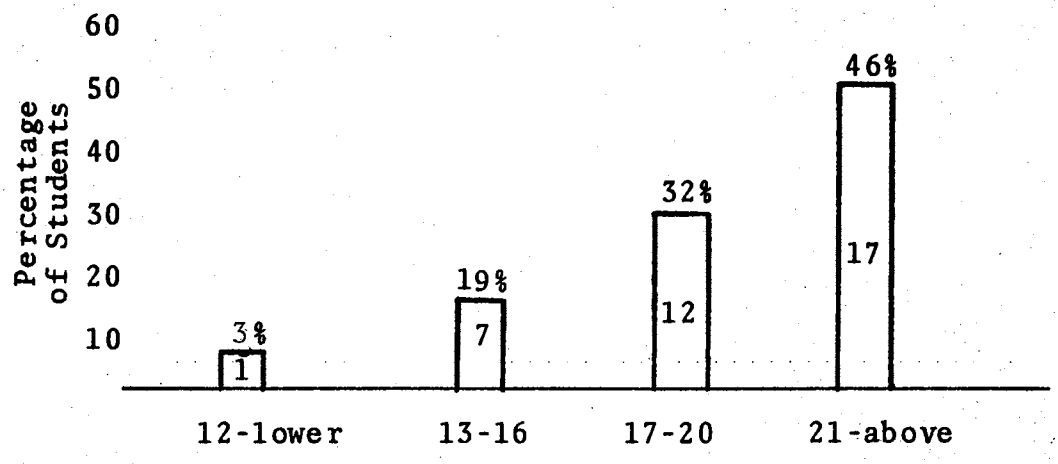
Unsuccessful students had composite ACT scores ranging from 13 through 24, with 43 percent having scores from 17 through 20. The average score was 18.6.

In Table IV the distribution of mathematics ACT scores is displayed. Sixty percent of the successful students had scores of 21 and above, and 84 percent had scores of 17 and above. Fifty percent of the unsuccessful students had scores of 16 and below. The average score for successful students was 21.4, as compared to an average score of 17.6 for the unsuccessful students.

TABLE III

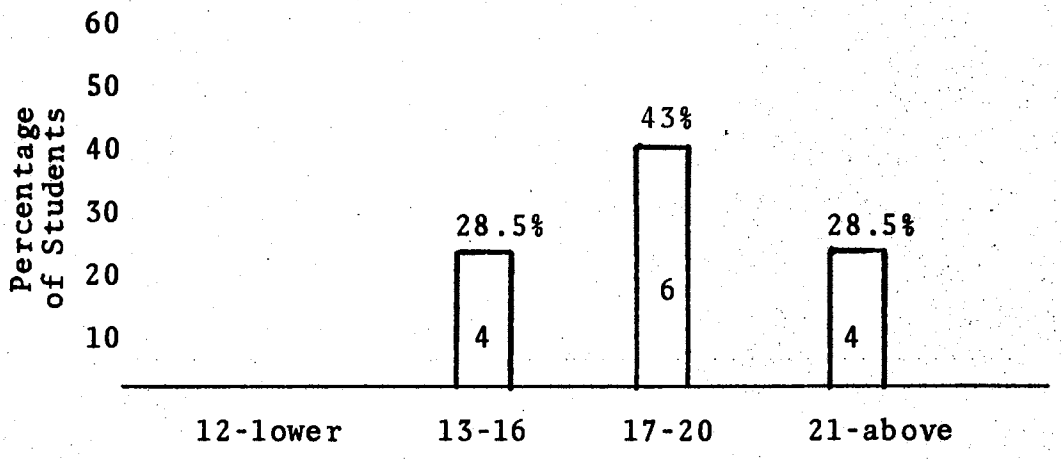
DISTRIBUTION OF COMPOSITE ACT SCORES FOR SUCCESSFUL AND UNSUCCESSFUL STUDENTS

SUCCESSFUL STUDENTS



COMPOSITE ACT SCORE
AVERAGE 20.2

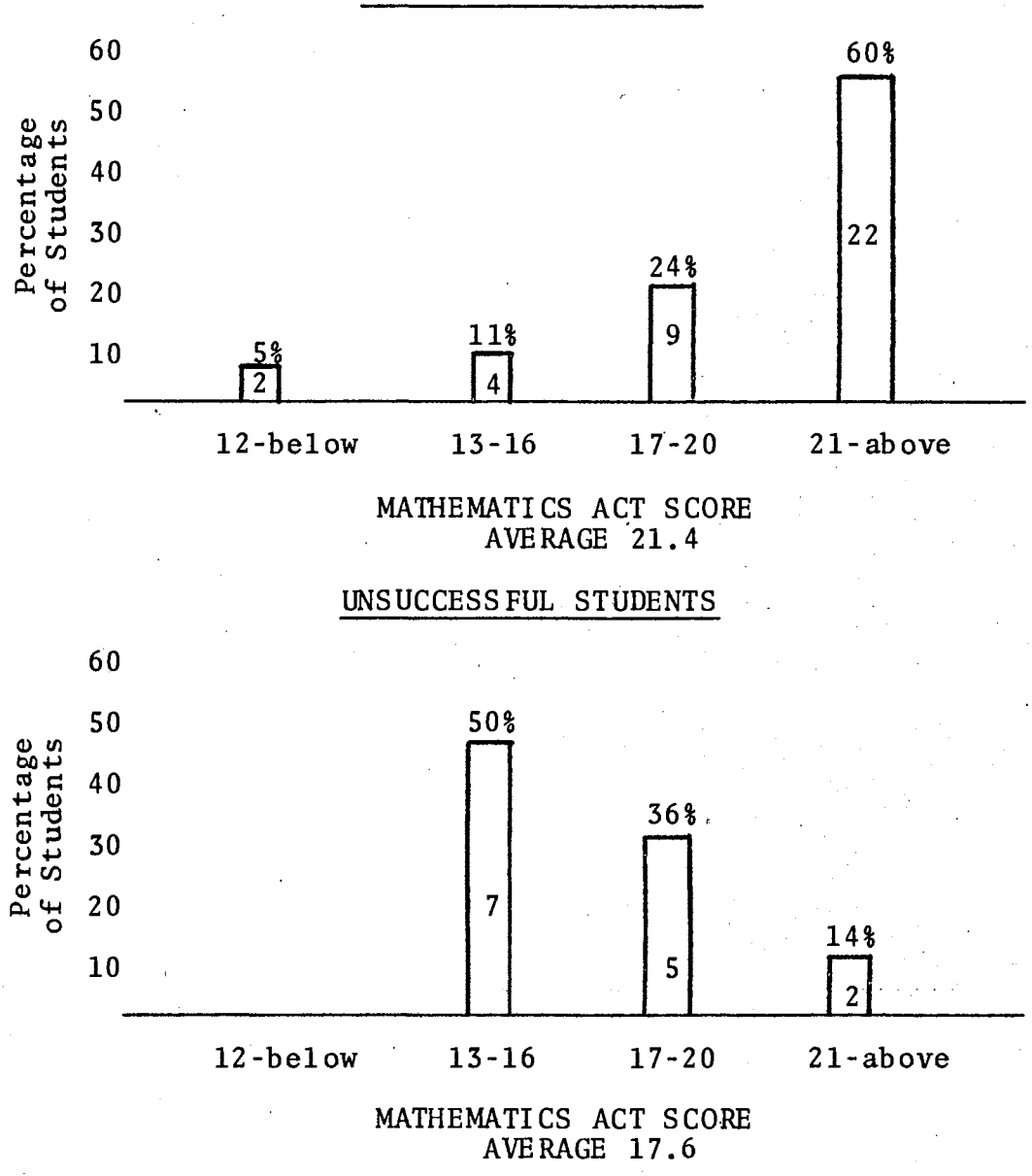
UNSUCCESSFUL STUDENTS



COMPOSITE ACT SCORE
AVERAGE 18.6

TABLE IV

DISTRIBUTION OF MATHEMATICS ACT SCORES FOR SUCCESSFUL AND UNSUCCESSFUL STUDENTS



The natural science ACT scores are shown in Table V. The distribution for successful students shows 70 percent with a score of 21 or better, and 95 percent with a score of 13 or better. The unsuccessful student distribution has 57 percent with 21 and above, and 100 percent with 13 and above. The average for successful students was 22.9, compared with an average of 21.6 for unsuccessful students.

Cooperative Algebra Test Scores

The results of the Cooperative Algebra Test Scores are presented in Table VI. Seventy-four percent of the successful students made 21 and above. The average score for successful students was 25.4. Seventy-one percent of the unsuccessful students scored 20 and below, with an average score of 17.1.

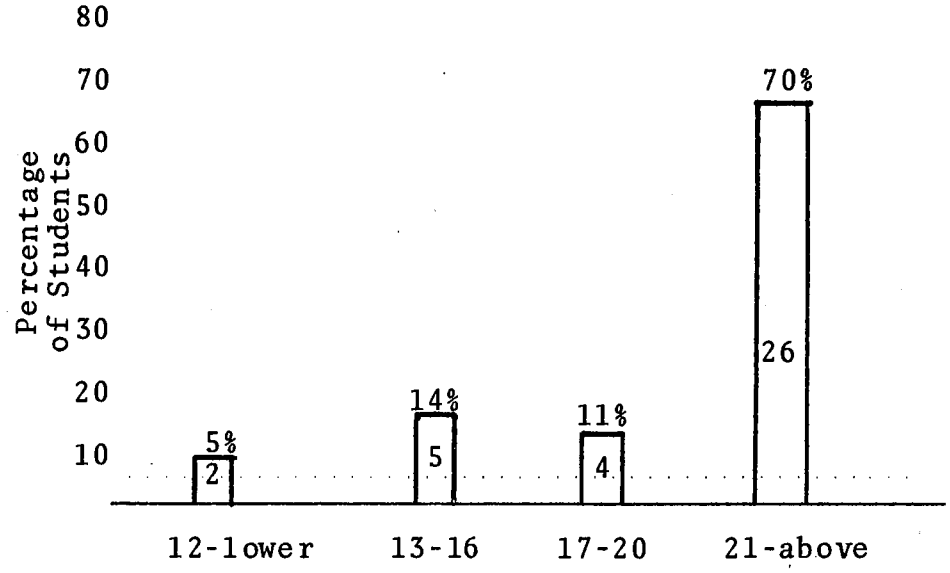
High School Grade Point Averages

The combined grade point average for high school mathematics and science courses was the factor used in Table VII. The distribution shows 43 percent of the successful students had a GPA between 3.0 and 4.0, while only seven percent of the unsuccessful students had a GPA between 3.0 and 4.0. Only fourteen percent of the successful students had a GPA from 1.99 and below, whereas, 36 percent of the unsuccessful students had a GPA of 1.99 and below. The average GPA for successful students was 2.75, and the average GPA was 2.17 for unsuccessful students.

TABLE V

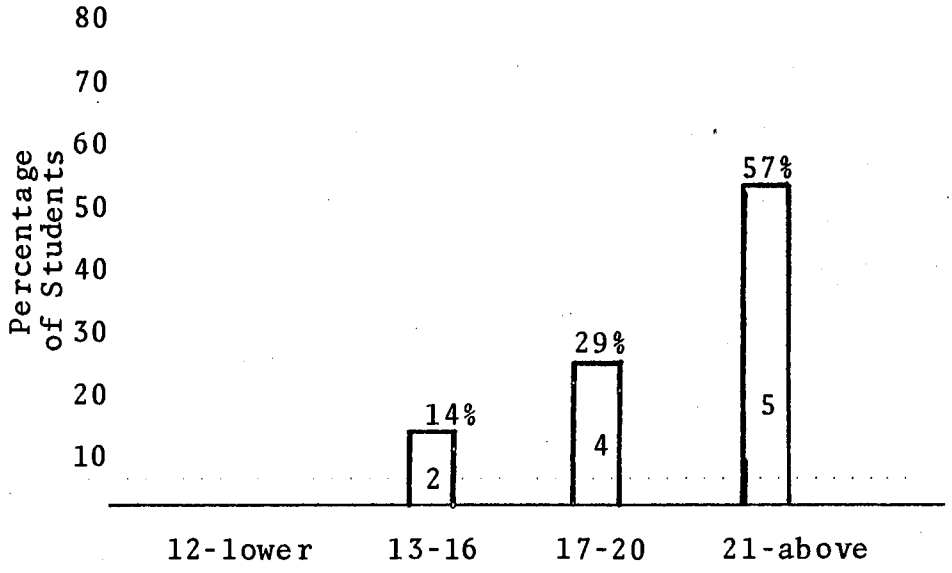
DISTRIBUTION OF NATURAL SCIENCE ACT SCORES
FOR SUCCESSFUL AND UNSUCCESSFUL STUDENTS

SUCCESSFUL STUDENTS



NATURAL SCIENCE ACT SCORE
AVERAGE 22.9

UNSUCCESSFUL STUDENTS

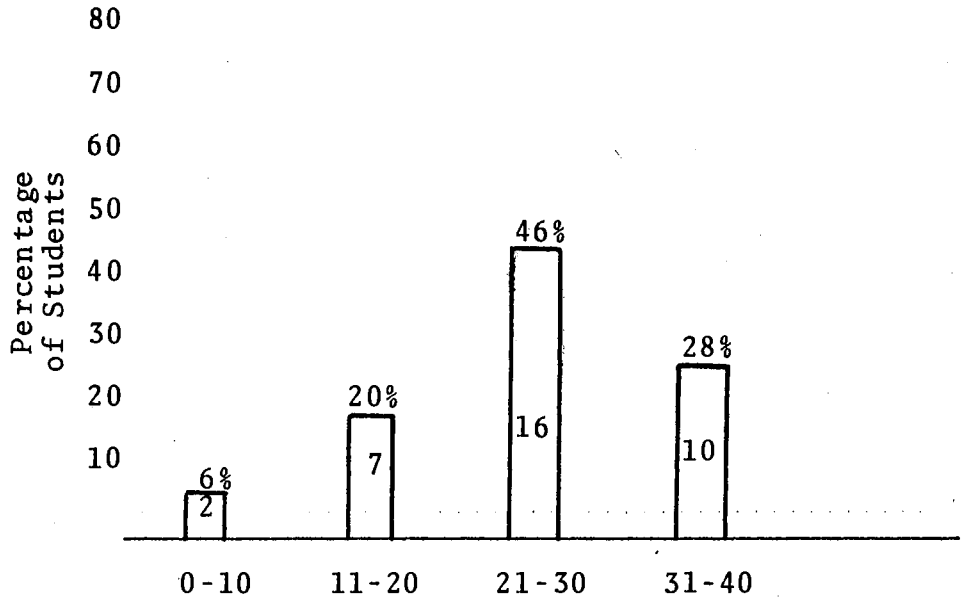


NATURAL SCIENCE ACT SCORE
AVERAGE 21.6

TABLE VI

DISTRIBUTION OF THE COOPERATIVE ALGEBRA TEST SCORES FOR SUCCESSFUL AND UNSUCCESSFUL STUDENTS

SUCCESSFUL STUDENTS



UNSUCCESSFUL STUDENTS

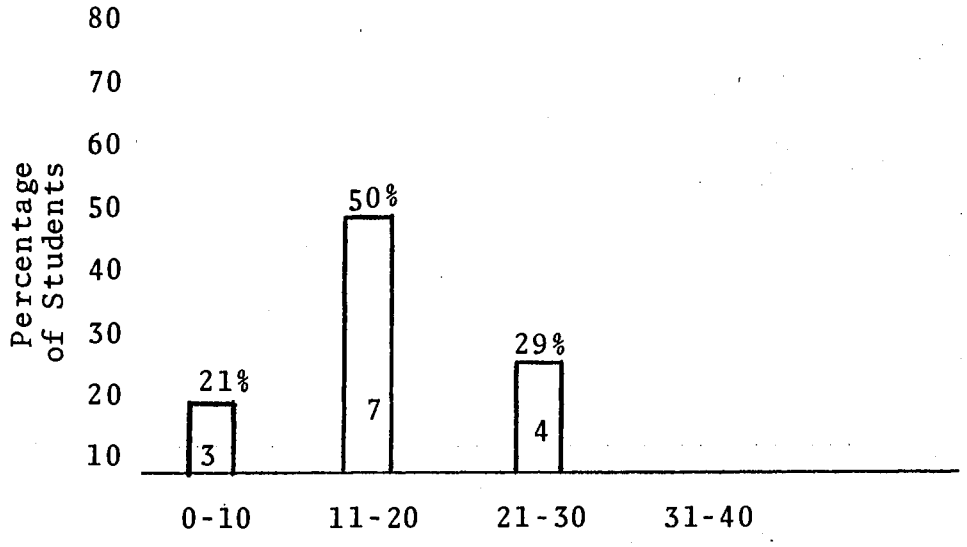
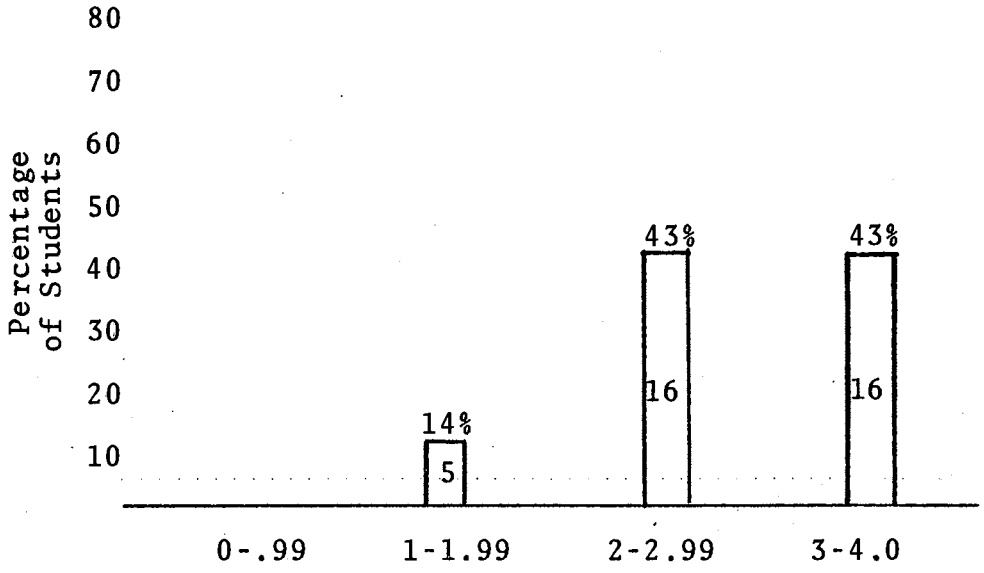


TABLE VII

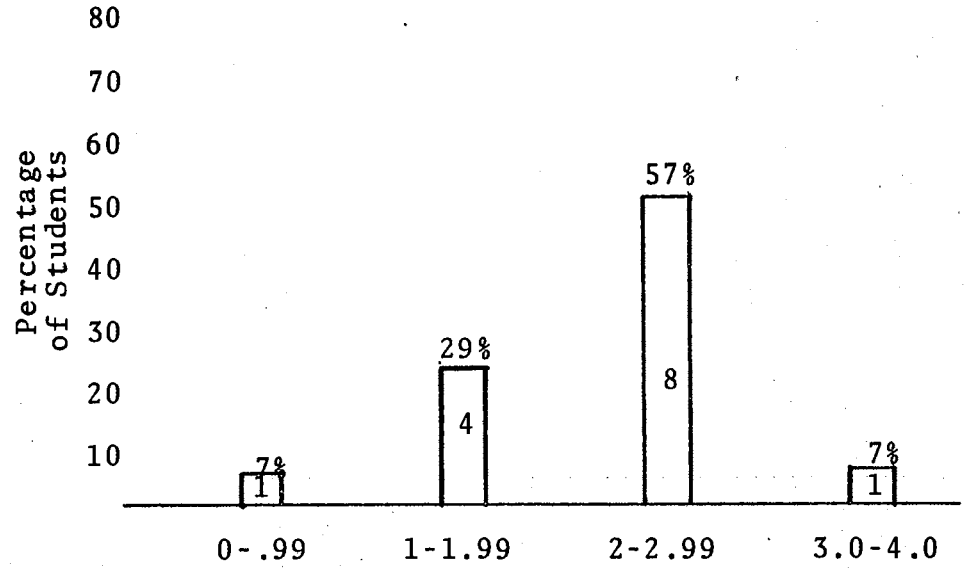
DISTRIBUTION OF GPA OBTAINED IN COMBINED HIGH SCHOOL MATHEMATICS AND SCIENCE COURSES FOR SUCCESSFUL AND UNSUCCESSFUL STUDENTS

SUCCESSFUL STUDENTS



COMBINED MATHEMATICS AND SCIENCE HIGH SCHOOL GPA AVERAGE 2.75

UNSUCCESSFUL STUDENTS



COMBINED MATHEMATICS AND SCIENCE HIGH SCHOOL GPA AVERAGE 2.17

The average GPA in high school vocational-technical courses for successful students was 3.32, as compared with an average of 2.93 for unsuccessful students. Table VIII also shows that 80 percent of the successful students had GPA's between 3.0 and 4.0, and 57 percent of the unsuccessful students had GPA's between 3.0 and 4.0.

Number of High School Courses

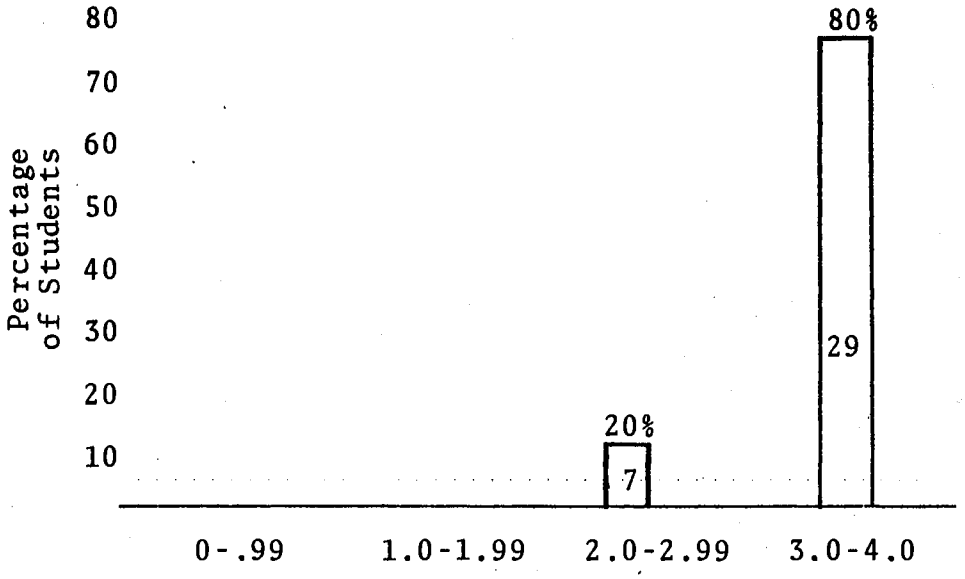
Table IX is a distribution of high school mathematics courses that were completed. Eighty-four percent of the successful students completed five or more mathematics courses. Fifty-seven percent of the unsuccessful students finished four or less mathematics courses. The successful student finished an average of 6.3 math courses, while the unsuccessful student finished an average of five math courses.

Another interesting comparison shown in Table X is the distribution of the number of high school science courses completed. Eighty-nine percent of the successful students finished between four and eight high school science courses. Seventy-two percent of the unsuccessful students took four or less high school science courses.

The distribution of the number of completed high school vocational-technical courses appears approximately the same for both successful and unsuccessful students. Table XI shows an average of 8.7 vocational-technical courses for successful students, and an average of 8.4 vocational-technical courses for unsuccessful students.

TABLE VIII

DISTRIBUTION OF GPA OBTAINED IN HIGH SCHOOL VOCATIONAL-TECHNICAL COURSES FOR SUCCESSFUL AND UNSUCCESSFUL STUDENTS



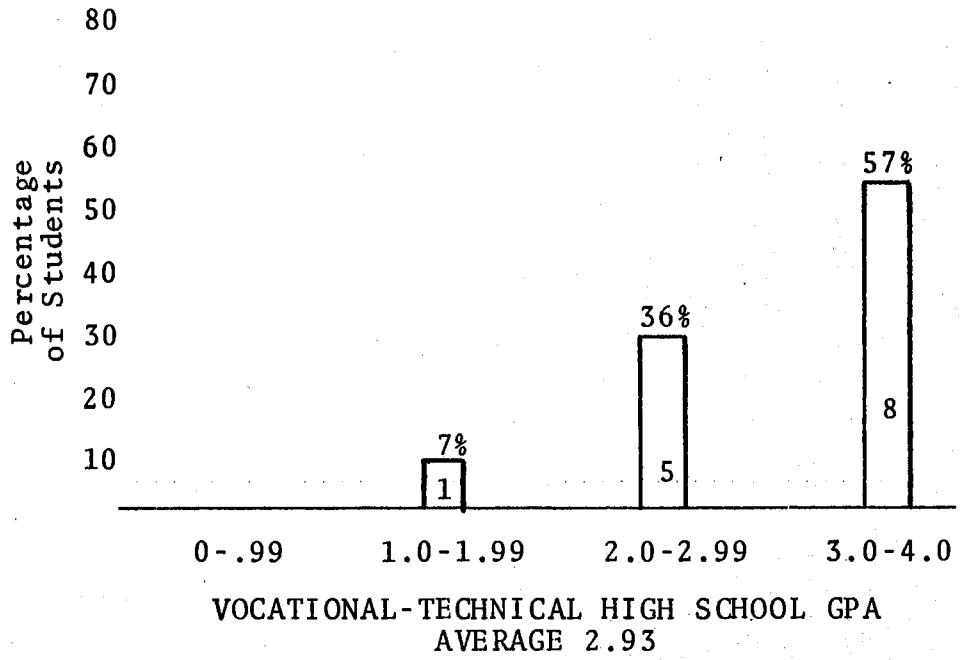
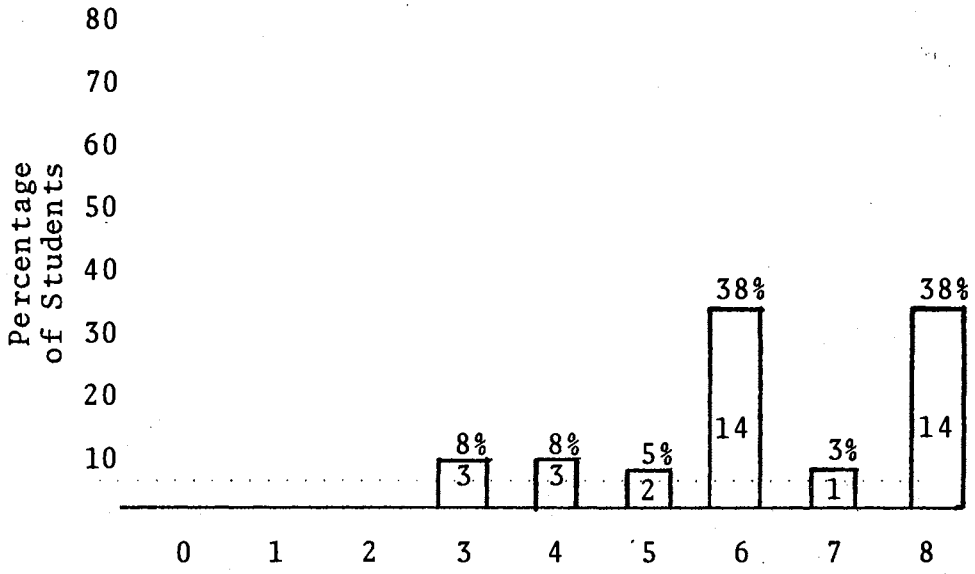


TABLE IX

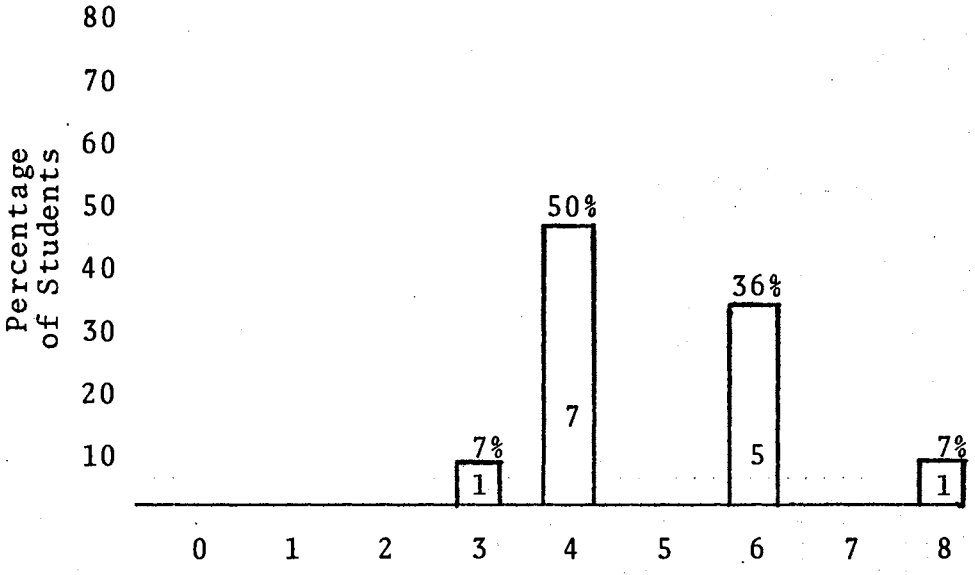
DISTRIBUTION OF NUMBER OF HIGH SCHOOL MATHEMATICS COURSES COMPLETED BY SUCCESSFUL AND UNSUCCESSFUL STUDENTS

SUCCESSFUL STUDENTS



MATHEMATICS COURSES COMPLETED
AVERAGE 6.3

UNSUCCESSFUL STUDENTS

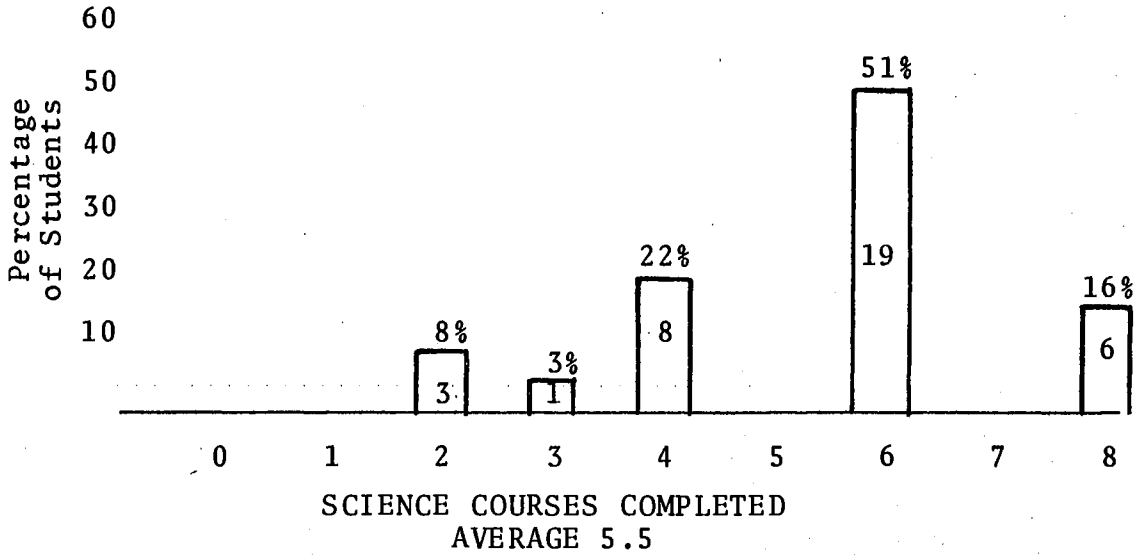


MATHEMATICS COURSES COMPLETED
AVERAGE 5.0

TABLE X

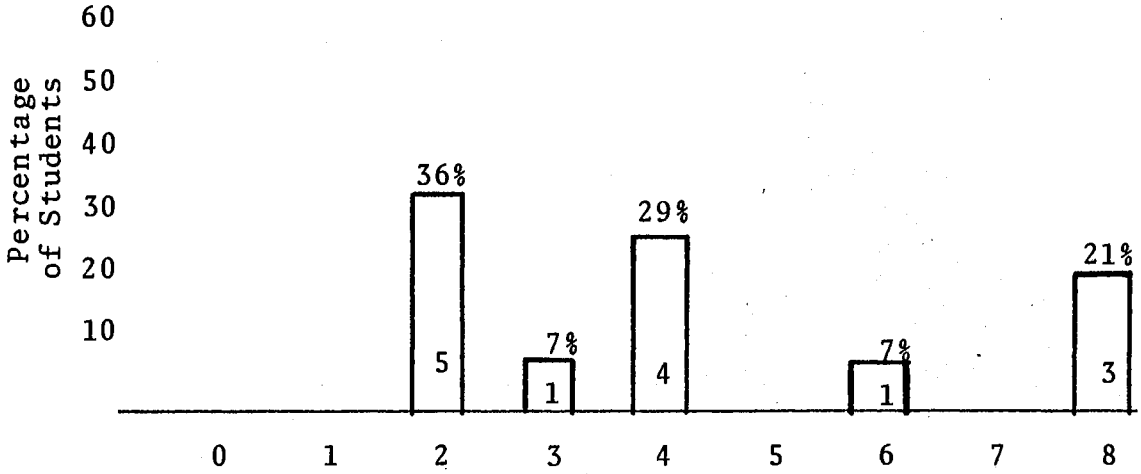
DISTRIBUTION OF NUMBER OF HIGH SCHOOL SCIENCE COURSES COMPLETED BY SUCCESSFUL AND UNSUCCESSFUL STUDENTS

SUCCESSFUL STUDENTS



SCIENCE COURSES COMPLETED
AVERAGE 5.5

UNSUCCESSFUL STUDENTS

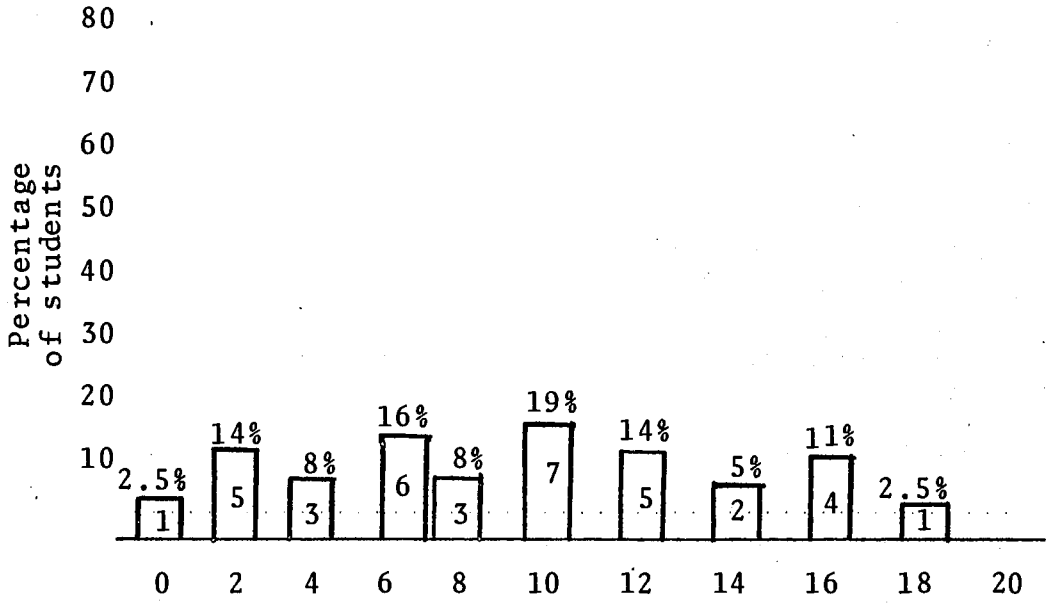


SCIENCE COURSES COMPLETED
AVERAGE 4.2

TABLE XI

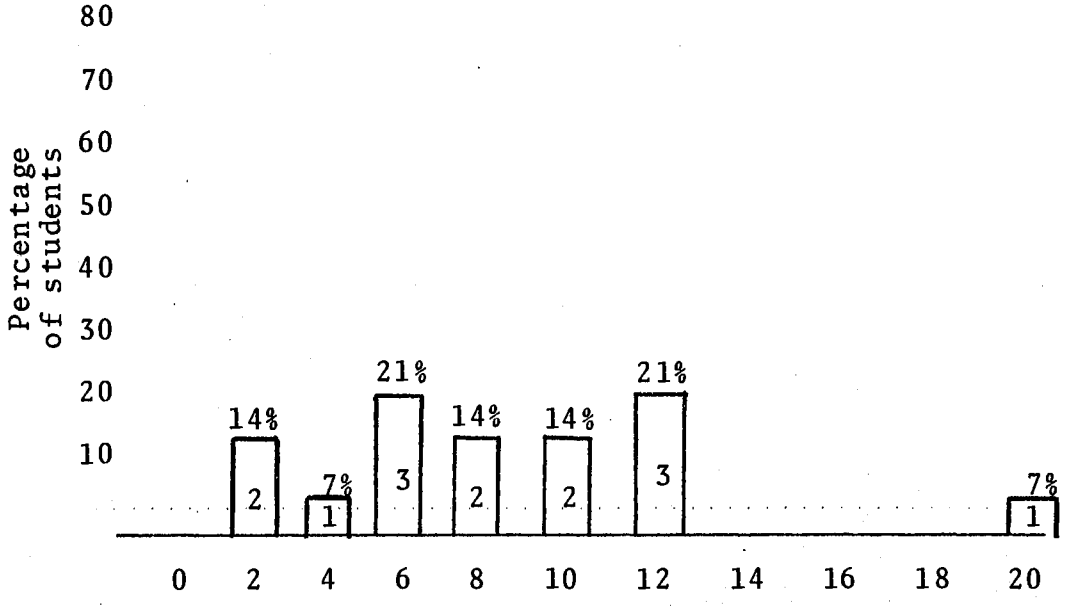
DISTRIBUTION OF NUMBER OF HIGH SCHOOL VOCATIONAL-TECHNICAL COURSES COMPLETED BY SUCCESSFUL AND UNSUCCESSFUL STUDENTS

SUCCESSFUL STUDENTS



VOCATIONAL-TECHNICAL COURSES COMPLETED
AVERAGE 8.7

UNSUCCESSFUL STUDENTS



VOCATIONAL-TECHNICAL COURSES COMPLETED
AVERAGE 8.4

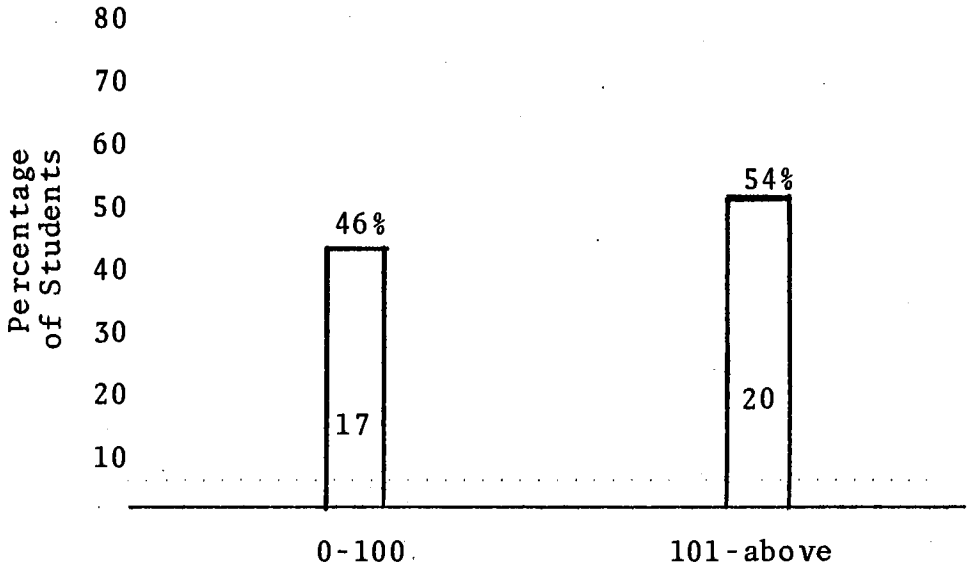
Graduating Class Size

A total of fifty-one students are covered in this report. Twenty-nine students (57 percent) came from schools with a graduating class of 101 and above. Twenty-two students (43 percent) came from schools with a graduating class of 100 or less. From the distribution shown in Table XII, the size of the graduating class does not appear to be an important factor between successful and unsuccessful students.

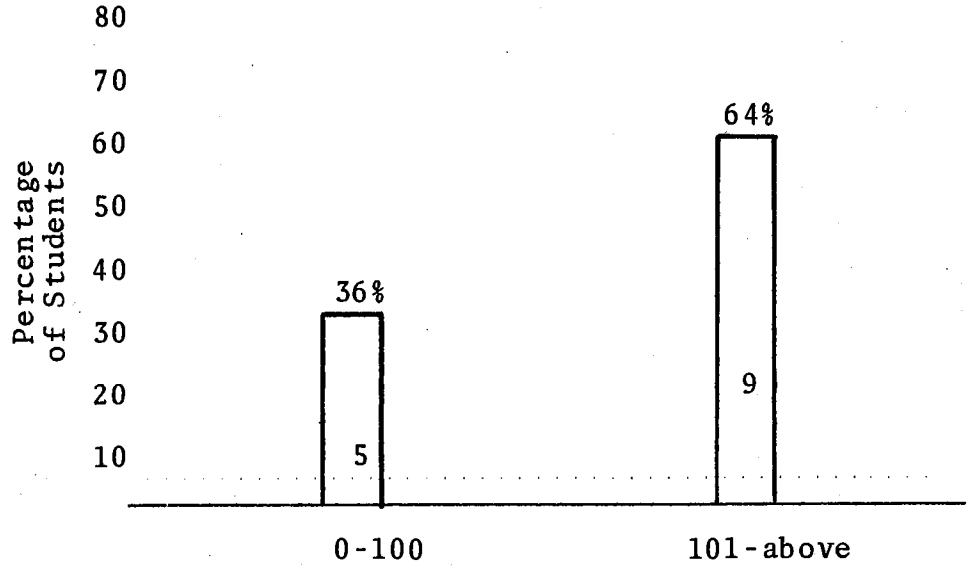
TABLE XII

DISTRIBUTION OF HIGH SCHOOL GRADUATING CLASS SIZE FOR SUCCESSFUL AND UNSUCCESSFUL STUDENTS

SUCCESSFUL STUDENTS



UNSUCCESSFUL STUDENTS



CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Fifty-one students who participated in the Oklahoma State University EMT program were studied to determine the difference between successful and unsuccessful students.

The review of literature suggested certain factors which are associated with technical education students. Tinnel (1969) concluded that high school background in mathematics would offer promise as a tool for identifying potentially successful students for electromechanical technology.

The factors selected for the study were:

1. Composite ACT score, mathematics ACT score, and natural science ACT score;
2. Cooperative Mathematics Algebra Test score;
3. Grade point average of combined high school mathematics and science courses, as well as the grade point average of high school vocational-technical courses;
4. Number of high school mathematics, science, and vocational-technical courses completed; and
5. Size of the high school graduating class.

The original purpose of the study was to find factors which would be useful in identifying successful and unsuccessful students in the O.S.U. EMT program.

The data from the population were gathered from the personnel files maintained on each student. The results are presented in Chapter IV of the thesis.

Findings

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

A. The mathematics ACT scores suggest a difference in trend between successful and unsuccessful EMT students. Sixty percent (22) of the successful students made a score of 21 and above while only 14 percent (2) of the unsuccessful students made a score of 21 and above.

Eleven percent (4) of the successful students had mathematics ACT scores between 13 and 16 and 50 percent (7) of the unsuccessful students had scores between 13 and 16. The average mathematics ACT score for the successful students was 21.4 compared to an average score of 17.1 for the unsuccessful students. The distribution shown in Table IV suggests that as the EMT student's mathematics ACT score goes up his chance of being a successful student is increased.

B. The Cooperative Algebra Test scores showed a slight trend. Seventy-four percent (26) of the successful students scored 21 and above. Twenty-nine percent (4) of the

unsuccessful students scored 21 and above. Twenty-six percent (9) of the successful students scored 20 or below and 71 percent (10) of the unsuccessful students scored 20 or below. This seems to indicate that the EMT student who scores 21 or better on the Cooperative Algebra Test is more likely to be a successful student while the EMT student who scores 20 or less is more likely to be an unsuccessful student.

C. The number of high school mathematics and science courses completed appears to influence the distribution between successful and unsuccessful students.

Eighty-four percent (31) of the successful students had completed 5 or more high school mathematics courses and 57 percent (8) of the unsuccessful students had completed 4 or less. The successful students averaged 6.3 high school mathematics courses, while the unsuccessful students averaged only 5.0 courses.

Eighty-nine percent (34) of the successful students completed 4 or more high school science courses, while 72 percent (10) of the unsuccessful students completed 4 or less. The average was 5.5 high school science courses for the successful students and 4.2 courses for the unsuccessful students.

The data suggests that the student who successfully completes the greatest number of high school mathematics and science courses has a better change of success in the EMT program.

D. Any trends between the other factors and student success or failure in EMT were not apparent by the analysis used.

Conclusions

The greatest difference between successful and unsuccessful students in electromechanical technology appeared in the mathematics ACT scores.

Only very small differences between successful and unsuccessful EMT students appear in the distribution of results from:

1. The Cooperative Mathematics Algebra scores;
2. The number of high school mathematics and science courses completed;
3. The composite ACT scores;
4. The natural science ACT scores;
5. The combined high school GPA for mathematics and science courses;
6. The number of high school vocational-technical courses completed;
7. The high school GPA for vocational-technical courses;
8. The high school graduating class size.

Blai (1966) made the following statement which seems appropriate for the conclusions of this thesis.

> In the following analysis college admission is evaluation rather than measurement. Unquestionably, carefully derived measure-

> ment can improve the "batting average" for admission selection. However, any mathematical formula developed must be supplemented by judgements of experienced, professional educators. All other reliable data about a student must be considered.

Recommendations

Due to the limited number of students involved in this project and the newness of the EMT program additional studies using more students and different institutions are needed to support or refute the findings of this thesis.

As electromechanical technology continues to grow and the number of graduates increase, there will be a need for studies to determine where graduates go, what they do, how much money they make and how successful they are on the job.

Research is needed to identify why some students withdraw from the EMT program and where they go.

Finally, studies are needed to determine why certain students fail and how to prevent or minimize these failures.

BIBLIOGRAPHY

Blai, Boris Jr. "Expectancy Tables and College Admissions." Junior College Journal. Vol. 36. February, 1966. 27.

Gillie, Andelo C. "Recruiting Students for Technical Programs." Technical Education Yearbook, 1967-1968. Ann Arbor, Michigan: Prakken Publications, Inc. 1968. Section 6, 185-188.

Graney, Maurice R. The Technical Institute. New York: The Center for Applied Research in Education, Inc. 1964. 87.

Greenwood, R. Leroy. "Predicting Success in Technical Programs." Technical Education News. Vol. 23. 1963. 22-23.

Gunderson, E. K. Eric, and Paul D. Nelson. "Personality Differences Among Navy Occupational Groups." The Personnel and Guidance Journal. Vol. 44. May, 1966. 956-961.

Harrington, Gordon M. "Technical Education." Review of Educational Research. Vol. 26. 1956. 398-403.

Hoyt, Donald P. "Predicting Grades in Two-Year Terminal Programs." Junior College Journal. Vol. 36. February, 1966. 20-22.

Miller, Aaron J. "A Study of Engineering and Technical Institute Freshman Enrollees and Dropouts in Terms of Selected Intellective and Non-Intellective Factors." (Unpublished doctoral dissertation, Oklahoma State University, 1966).

Miller, Aaron J. "Characteristics of the Successful Engineering Technology Student." Journal of Industrial Teacher Education. Vol. 4, NR. 4. 1967. 31-34.

Phillips, Donald S. "Electromechanical Technology Student Selection." Stillwater, Oklahoma: Oklahoma State University. 1969b.

Phillips, Donald S. "Electromechanical Technology--An Exciting New Program in One of the Newest and Most Interesting Technician Occupations." Stillwater, Oklahoma: Oklahoma State University. 1969a.

Righthand, Herbert. "Identifying Technical Institute Dropouts." Personnel and Guidance Journal. Vol. 44. September, 1965. 68-72.

Roney, Maurice W. "Electromechanical Technology. A Field Study of Electromechanical Technician Occupations, Part I." Stillwater, Oklahoma: Oklahoma State University. 1966.

Schroeder, Wayne L., and George W. Sledge. "Factors Related to Collegiate Academic Success." The Journal of College Student Personnel. Vol. 7. March, 1966. 97-104.

Stuckey, William K. "Guide to the TERC Curriculum." Rough draft of Unpublished Report. Cambridge, Massachusetts: Technical Education Research Center. 1970.

Tinnell, Richard W. "An Examination of Relationships Between Selected Student Entry Parameters and Achievement in an Electromechanical Technology Program." Unpublished masters thesis, Oklahoma State University, 1969.

Van Derslice, John F. "Technical Students' Characteristics." Industrial Arts and Vocational Education. Vol. 57. February, 1968. 81-83.

VITA

Joseph Ashley Patterson

Candidate for the Degree of

Master of Science

Thesis: A STUDY OF THE STUDENTS ENROLLED IN THE ELECTRO-MECHANICAL TECHNOLOGY PROGRAM AT OKLAHOMA STATE UNIVERSITY

Major Field: Technical Education

Biographical:

Personal Data: Born in Wilmer, Texas, February 14, 1919, the son of Joseph and Ruby Patterson.

Education: Attended and graduated from Wilmer-Hutchins High School in Wilmer, Texas, in 1936; graduated from Oklahoma State University with a Bachelor of Science from Oklahoma State University in 1970, with a major in technical education; completed requirements for the Master of Science Degree in Technical Education in May 1971.

Professional Organizations: Phi Delta Kappa; Texas Technical Society; Instrument Society of America.

Professional Experience: Electronic Maintenance Technician for Civil Aeronautics Administration, 1950-1953; Electronic Technician for Texas Instruments, Inc., 1953-1957; Executive Positions for Texas Instruments, Inc., 1957-1969; Research Associate, Electromechanical Technology, Oklahoma State University, Stillwater, Oklahoma, 1969-1970; Associate Professor, Texas State Technical Institute, Waco, Texas, 1970-.

Publications: 1966: "An Employer's Viewpoint on Technicians and Technical Education," a paper prepared for the 1966 National Clinic on Technical Education, Cocoa Beach, Florida, October, 1966. 1968: "What Industry Expects from Occupational Graduates," a paper prepared for the Vocational-Technical Education Seminar held at the New Mexico Junior College, Hobbs, New Mexico, 1968. 1968: "Technicians and Industry," a paper prepared for the 1968 National Conference of the American Vocational Association held in Dallas, Texas, December, 1968. 1969: "Electromechanical Technology Student Recruiting," Oklahoma State University, Stillwater, Oklahoma, October, 1969.