A FOLLOW-UP STUDY OF THE GRADUATES OF ELECTRONIC ENGINEERING TECHNOLOGY OF OKLAHOMA STATE UNIVERSITY

By

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CHAPTER I

INTRODUCTION

Background Information

During the decade of the 1970's, advancement in technology in the United States was accelerated. Today we live in an age of computers and state-of-the-art electronics, therefore it becomes essential for an educational institution to provide the state of the art educational technology and training to fulfill the needs of industry and higher education.

The quality of technician and technologist education is dependent upon several factors. Some of these factors include state-of-the-art facilities, an updated and marketable curriculum, and well-informed faculty. The faculty must not only have technical competence but must also be able to communicate this technical knowledge to others.

The Department of Electronics Engineering Technology at Oklahoma State University was initiated in the spring of 1969. The department was organized to provide high quality education for persons interested in the Electronics Technology field. Since the spring of 1974 over 800 graduates have been awarded either a Bachelor of Science degree or an Associate of Science degree in Electronics Engineering Technology from Oklahoma State University.

The Electronics Technology curriculum at Oklahoma State University must prepare students for careers not only in the electronics industry itself, but also in many other related areas in modern industry and government which depend upon electronics for control, communications or computation (O.S.U.). The work of technologists in electronics may range from assistance in the development of new equipment in the laboratory, or in the field to the operation or supervision of production operations, technical writing management, customer engineering in component reliability, quality control, and similar engineering-related activities.

To provide the student with an up-to-date education in a technical education field, the curriculum must be reviewed on a regular basis. The need for a continual graduate follow-up study had long been recognized as an essential ingredient in determining the adequateness and effectiveness of an institution of higher education (Nelson, 1964).

Purpose of the Study

The specific purpose of this study was to collect and analyze follow-up data on graduates of Electronics Engineering Technology A.S. and B.S. degree programs of Oklahoma State University. The graduate is perhaps the most important factor in determining the adequacy and effectiveness of any technician training program (Snider, 1967). The result of this study will describe:

1. The placement and employment of past graduates of the Electronics Engineering Technology program

2. The evaluation of appropriateness of curriculum, adequacy of faculty, and adequacy of laboratory resources in the existing Electronics Engineering Technology program

3. Recommendations for existing Electronics Engineering programs

4. Determination of factors which relate to recruitment of new students for the Electronics Engineering program

Questions Investigated

1. Which specific courses should be added to the curriculum?

2. Which courses in the degree program did the graduates feel were not particularly useful and should be dropped from the program?

3. How did the graduates rate the overall quality of instructors in their major field of study?

4. How did the graduates education compare with others from similar institutions?

5. What percentage of graduates are working in their college field of study?

6. What percentage of graduates have continued their education since receiving a degree from Oklahoma State University?

7. How did the graduates rate the quality of equipment and facilities used in laboratory?

8. What are the levels of those graduates with bachelors degrees only selected in sub-categories

Scope of the Study

This study was limited to the graduates of Oklahoma State University who have received either Bachelor of Science degrees, Associate of Science degrees, or both of these degrees in Electronics Engineering Technology from the spring of 1976 to summer of 1984. Only those graduates who are United States citizens were surveyed.

Definitions

Technician Education: A planned sequence of classroom and laboratory experiences at the post-secondary school level, but below the baccalaureate level which is designed to prepare persons for a cluster of job opportunities in a specialized field (Roberts, 1976).

Technologist Education: A planned sequence of classroom and laboratory experiences at the baccalaureate level to provide the graduates with a broad area of education in technology (O.S.U.).

Technical Instructor: Persons teaching in one or more areas of technical specialization in a Technical Education program (Roberts, 1976).

Communication Skills: For the purpose of this study refers to the skills of speaking, writing, and drafting (Snider, 1967).

Mathematical Skills: This refers to the use of mathematics to solve problems (Snider, 1967).

EET: For the purpose of this study refers to Electronics Engineering Technology (O.S.U.).

Theoretical Knowledge: For the purpose of this study refers to the knowledge of the basic principles and concepts underlying the EET graduate's work (Snider, 1967).

Electronics Engineering Technology Graduates: For this study refers to those persons who completed the EET curriculum as established by the staff in EET at Oklahoma State University (O.S.U.).

O.S.U.: Oklahoma State University.

Electronics Engineering Technology: A technology curriculum which provides preparation for careers not only in the electronics industry itself, but also in many other areas in modern industry and government which depend upon electronics for control, communications, or computation. The work of technologists in electronics may range from assisting in the development of new equipment in the laboratory or in the field, the operation or supervision of production operations, technical writing, customer engineering and sales engineering (O.S.U.).

CHAPTER II

REVIEW OF LITERATURE

Institutions offering programs in technical education have for many years considered graduate follow-up studies as an essential part of program evaluation. This technique is employed not only for self-evaluation purposes, but the follow-up data is often required by local, state, or federal agencies which support the institutions. These agencies are usually interested in such things as graduate employment and unemployment, job titles, and salaries (Roberts, 1976).

Nelson (1964) expresses a concern for graduates into an active suggestion for a continuing periodic follow-up:

> Generally, a continuing, periodic follow-up procedure as a means of securing evidence pertinent to the evaluation and improvement of various programs in higher education is a wise endeavor. The values accruing to the institution from complete follow-up services for graduates are great. The alumni become more closely connected with and directly interested in their alma mater. The information contained serves as one of the bases of analysis of the college programs. The college gains from public relations material. And the data provide points for comparison with other institutions (p. 112).

Previous Research

Shelton (1982) conducted a study on computer-assisted laboratory procedures. He found that the students who used the computer had a significantly higher score than the students who did not use the computer. He recommended that the utilization of computer-assisted laboratory procedures should become a permanent activity in the laboratory component of the particular course at O.S.U.

Burson (1977) examined the effects of various personal factors on the grade-point average of students in an unconventional 2 + 2 program in the School of Technology. Of all the factors studied, only marital status correlated with the student's grade-point average. Married students were found to be significantly higher than the single students.

McNeill (1973) compared academic success of native and transfer students in the School of Technology. He found no significant difference in the academic success of those students that persisted for a full four semesters.

Heiserman (1978) developed and tested a method for early identification of nonpersisting beginning students. He developed a questionnaire and states that it should be administered in the second week of the first semester of school to make more selective use of counseling.

Faber (1971) examined the effect of two algebra courses on achievement in selected courses making up the technical component of a technology curriculum. He found that there was no significant correlation between the algebra course taken and achievement in the selected technical courses.

Overall, the research that has been done on students in the School of Technology at Oklahoma State University has been concerned with academic success in technical programs.

The selected studies indicated that there is a concern for the success for students in the Technology program, and more research should be done in the technology program to strengthen the curriculum.

Review of Related Studies

Kraft (1964) discussed some of the problems of technical education as follows: "As industry is undergoing rapid change in its occupations, structure, and as technological change and automation raise the skill level of jobs, the educational system must also undergo a dynamic expansion." Roney (1969) discusses the lack of research in technical education:

> It is paradoxical, in an age of technology where new scientific achievements are becoming almost commonplace, that we have no curriculum theories in education. For a true theory must be based on established facts and we do not have enough facts in education on which to base a theory. Einstein's theory of mass-energy equivalence is a classic example of a pure theory. It consisted of known facts, maticulously assembled, carefully arranged in a new combination, and with a resultant prediction. His theory was capable of being tested and the results could be compared with the prediction. The contrast in education is sharp. We do not have comparable theories in education because we start with opinions . . . not facts. Any combination of opinions results in a new opinion . . . not theory. We have scientific data that enables us to put a man in exact orbit around the earth and to return him with still more accumulated data, but we do not have educational data that can be used to formulate a basic curriculum to the preparation of competent technicians . . . or for that matter good citizens (pp. 1-2).

The Technical Instructor

A technical program and curriculum is only as good as the quality of its instructors. At one time it was believed that a "good" technician or engineer was in turn a "good" teacher in his or her particular field of expertise. This viewpoint, however, lacks both scientific and empirical validity (Roberts, 1976).

The United States Department of Health, Education, and Welfare has published a suggested guide to technical education which outlines several qualifications needed by the technical instructor; the guide suggests:

> The educational qualifications of faculty members require that they have a mastery of their subject which is greater than the subject content they will teach to their students. They must have a knowledge and capability to use all of the appropriate apparatus, materials, equipment, procedures, techniques, measurements, and determinations and to perform the required special services with the confident skill an adequacy required of the skilled technician. They must also be proficient in, and be able to teach the interpersonal relationships and their required skills in their special field (p. 32).

The guide also suggests that the technical instructor should have recent job experience.

> The employment or experience qualifications are important for all of the teaching staff, and for instructors of technical specialty courses there are special requirements. Employment experience recent enough to be valid and representative of current practice, either as a professional or a technician, involving extensive practice of the skills and competencies they will teach, is almost mandatory. The duration of the employment experience should be sufficient for the teachers to have developed the skills and related interpretive judgments and mature capabilities expected of a technician in a particular field; from three to five years is the usual duration of such experience (p. 33).

The qualifications required of the technical instructor could be formed by analyzing the specific tasks he must perform. Tinnell (1969) conducted such a study of technical instructors in the state of Oklahoma. His findings show that the technical instructor must:

1. Read professional journals
2. Administer written tests
3. Attend faculty meetings
4. Read textbooks
5. Determine final grades
6. Prepare lecture outlines
7. Attend professional meetings
8. Give lectures
9. Present lessons with a chalkboard

10. Organize lesson plans
11. Select course content
12. Write student handout sheets
13. Write course objectives
14. Advise students with scholastic problems
15. Set up demonstrations
16. Read technical journals
17. Grade written tests
18. Give homework assignments
19. Present lessons by problem solving
20. Participate in professional organizations

It is reasonable to believe that an instructor who can perform all of these tasks with competence will be an asset to any technical curriculum.

Summary

In this review of the literature the need for continuing, periodic graduate follow-up has been established.

The follow-up at hand is concerned specifically with the graduates of the Electronics Engineering Technology program at Oklahoma State University from spring 1976 to summer 1984. These graduates often receive employment in such areas as new product design, technical writing operation and supervision of production operations, and sales engineering. Several studies have been reviewed that dealt with Electronics Engineering Technology program at O.S.U., but a follow-up study up to this time has not been done. Similar follow-up studies have been done by Roberts (1976) concerning the Technical Education program at O.S.U., and by Snider (1967) concerning the Electromechanical Technology curriculum at O.S.U. Their studies primarily dealt with salary analyses and career patterns, although Snider did perform a limited study dealing with program improvement. The instruments in the previous methodology varied from study to study, dependent upon the purpose of a given study. As Roberts (1976) suggested, a carbon copy of the methodology used in one study will probably be inadequate for use in another study.

CHAPTER III

METHODOLOGY

Classification of Respondents

This study involved the graduates of the Electronics Engineering Technology program at Oklahoma State University from the spring of 1976 to the summer of 1984 who have received either a Bachelor of Science degree or an Associate of Science degree or both. The survey included only those graduates who were United States citizens. The survey size was 687 out of 817, or 84 percent of the total graduates.

Development of the Instrument

The instruments developed for this study were structured to best seek answers to the questions of this research. A questionnaire was developed and was critiqued by several of the technology program's faculty members. A pilot test of the instrument was conducted as suggested by Tuckman (1972). The pilot questionnaire was then administered to three graduates of the Electronics Engineering Technology program to determine whether the questions in the questionnaire possessed the desired qualities of measurement, discriminability, and clarity of meaning. The questionnaire was found to be effective in terms of answering the research questions and the feedback from the pilot test was used to construct the refined questionnaire.

Success of graduates may be measured in several different ways as described by Roberts (1976). If graduate salary levels alone are used as a measure of success, it must be assumed the better the program is, the higher the salary levels will be. It has been found that salary levels alone may not be true indicators of success. Many graduates prefer such things as job security, job satisfaction, or geographic location to higher salaries when a choice is to be made. For these reasons, other considerations must be included. A more accurate evaluation of the program could be made by asking the graduate if the program prepared him for his occupational endeavors, assuming these endeavors are within the scope of the program objectives.

In relation to the above discussion, this study was designed to collect the following evaluation data.

1. Salary data.

2. Data inquiring graduates perceptions of whether or not the course of study adequately prepared them for their first full-time job upon graduation.

3. Data inquiring perceived essentiality of courses within the curriculum.

4. Data inquiring percentage of graduates who are working in their college field of study.

5. Data inquiring percentage of graduates who have continued their education since receiving degrees from O.S.U.

Program improvement data was sought in several ways. A method was used that was similar to the method Roberts (1976) used in which graduates were asked to indicate what additional courses added to the curriculum would have been beneficial. Data on salary was said to be kept strictly confidential to given an incentive for accurate data.

Collection of the Data

The instrument developed was mailed to the graduates and included a letter of transmittal and a stamped, self-addressed questionnaire to encourage return. An O.S.U. letterhead was used for the letter of transmittal and the research study was endorsed by Dr. Perry McNeill, department head for Electronics Engineering Technology curriculum at O.S.U. to reflect legitimacy of the study.

A follow-up letter was developed and mailed with an additional questionnaire to those graduates who had not responded to the original questionnaire within five weeks. A second and final follow-up letter was developed and mailed with an additional questionnaire within four weeks of the previous mailout.

Names, addresses, and other pertinent data on the graduates was obtained from several different sources. These included:

1. The Electronics Engineering Technology department files
2. The Oklahoma State University Alumni Association files
3. Telephone calls
4. Telephone directories
5. Other directories

Analysis of the Data

The observations and data collection used for this study were performed during the summer and fall semesters of 1984. After the completed questionnaires were received, the data was input into a computer program called "PFS files" using an Apple IIe computer. Each questionnaire of responding graduates was entered exactly as it was completed.

An examination was made of the relationships between salary levels and occupational endeavors, as well as the relationships of occupational endeavors to viewed curriculum essentiality. These results are useful for curriculum evaluation and improvement activities.

CHAPTER IV

RESULTS

The specific purpose of this study was to collect and analyze follow-up data on graduates of Electronics Engineering Technology B.S. degree program of Oklahoma State University. Since the study dealt with only those graduates from spring 1976 through summer 1984, all of the graduates were combined into one group. A follow-up survey instrument was generated for the group and mailed in October, 1984. There were a total of 366 graduates who were U.S. citizens who had received B.S. degrees, but the survey was limited to only those whose addresses were known, giving a survey size of 333, or 91 percent of the total. From the survey size of 333, there were a total of 148, or 44.4 percent return rate. The first mailout yielded 20 responses giving a return rate of 6 percent of the total. The reason for the low return rate on the first mailout was that postage had not been provided for the return questionnaires.

Four weeks after the first mailout was initiated, a second appeal was made to those graduates who had not responded. At this time 108, or 32.4 percent of the total had been collected. The reason for the large return rate as compared to the first was that postage had been provided for the return of the questionnaires. Five weeks after the second mailout was initiated a third appeal was made to those graduates who had not yet responded. At this time there were 148 responses or 44.4 percent of the total. Analysis of the data was started six weeks after the final mailout in order to allow ample time for responses.

Analysis of Data

The analysis of the data are herein arranged and presented under three subheadings: General Data, Coursework Data, and Employment Data.

General Data

The respondents return rates were grouped into graduating year from 1976 through 1984. The data from Figure 1 shows the graduates of 1976, 11 out of 36 responded or 30.6 percent; in 1977, 21 out of 46 responded or 45.6 percent; in 1978, 12 out of 40 responded or 30.0 percent; in 1979, 10 out of 31 responded or 32.3 percent; in 1980, 15 out of 29 responded or 51.7 percent; in 1981, 20 out of 46 responded or 43.5 percent; in 1982, 22 out of 55 respnded or 40.0 percent, in 1983, 23 out of 34 responded or 67.6 percent; in 1984, 14 out of 16 responded or 87.5 percent. The total return rate was 44.4 percent.

Table I indicates the decision of the graduates to pursue a degree at Oklahoma State University. The "Overall Prestige of OSU" was rated moderate to strong indicating that the majority of the graduates consider the prestige to be one of the determining factors in pursuing a college degree. The "Reputation of OSU faculty" was rated in the strong to moderate category indicating the reputation of the faculty at OSU would also be carefully considered in pursuing a college degree. The "OSU Technology Facilities" was rated in the moderate to strong level indicating that this was also a determining factor. The category "Nearest to home" was rated by the graduates as being strong to very strong;

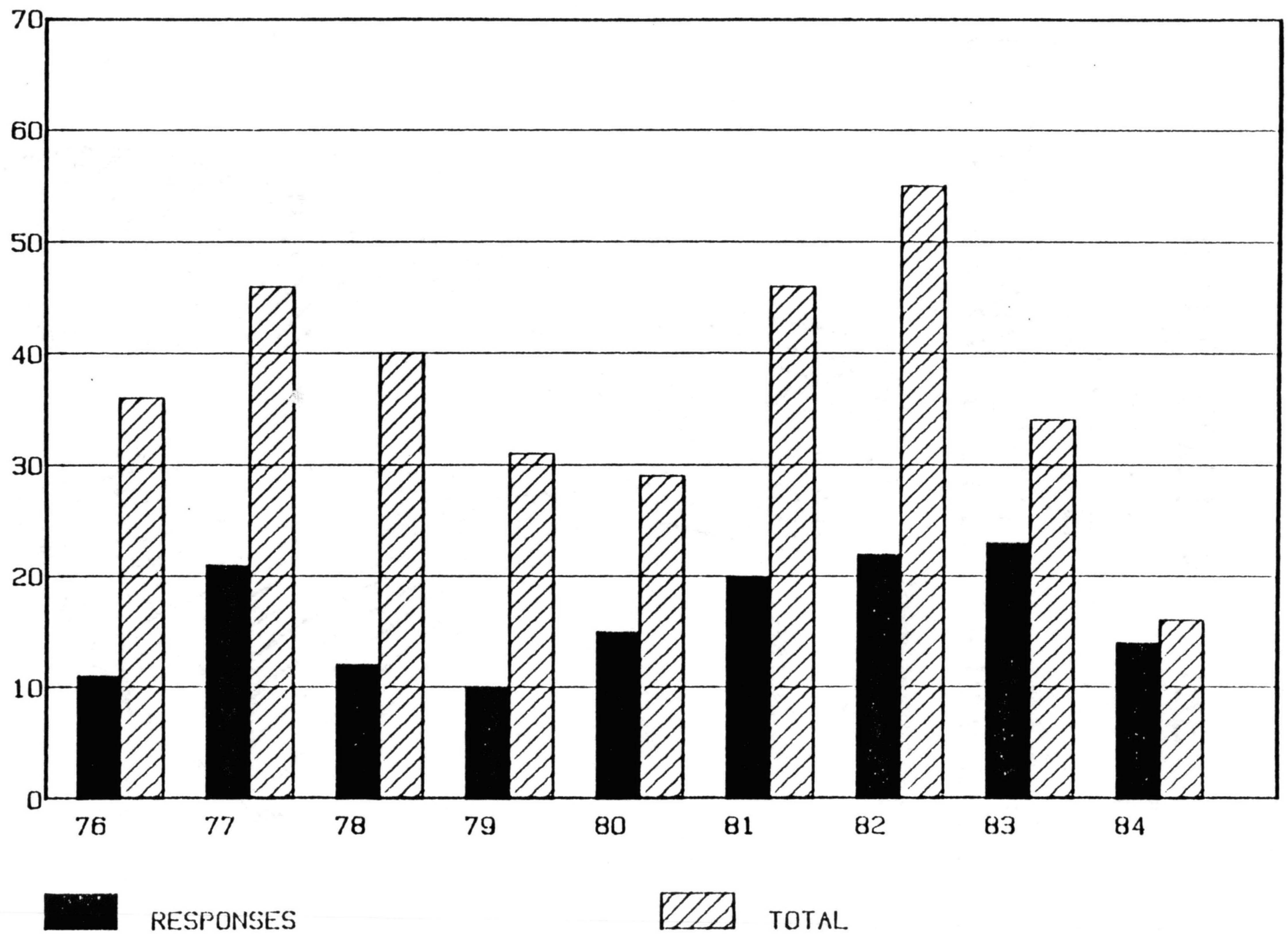

Figure 1. Response Rates of Graduates by Year

TABLE I

DECISION TO PURSUE A DEGREE AT OKLAHOMA STATE UNIVERSITY

	None	Little	Moderate	Strong	Very Strong
Overall Prestige of OSU	10	15	39	45	13
Reputation of OSU faculty	20	20	41	30	10
OSU Technology facilities	14	21	44	31	11
Nearest to home	22	16	19	40	23
Financial Assistance	59	18	19	14	7

this indicates that this is one of the most weighted factors in a decision to pursue a college degree. The last category was "Financial assistance" which was rated mostly at the none level, indicating that most of the graduates did not consider this to be a determining factor to pursue a degree at Oklahoma State University.

Table II indicates how the graduates rated each of the factors in their decision to earn a degree at Oklahoma State University. In the category of "spouse" the none level was rated the heaviest, indicating that most of the graduates are probably not married. The "parents" category was also rated in the none level indicating that the graduates parents' did not influence their decisions. The "high school counselor" was rated by the graduates as being in the none level indicating that their high school counselor did not influence their decision to earn a degree at O.S.U. The "employer" category was rated by the majority of the graduates as being none which indicates that most of the graduates were unemployed when the decision was made to earn a degree at O.S.U. "Uncertainty about vocational jobs" was also rated in the none level indicating that this was not a determining factor in their decision to earn a degree at O.S.U. In the category of "inability to find a job," the majority of the graduates rated this as being none, indicating that they were not concerned with finding a job as much as they were to earn a degree at O.S.U.

TABLE II

DECISION TO EARN A DEGREE AT OKLAHOMA STATE UNIVERSITY

	None	Little	Moderate	Strong	Very Strong
Spouse	99	6	8	3	4
Parent(s)	52	20	28	14	7
High School Counselor	87	15	13	4	2
Employer	101	10	6	27	2
Friend	52	15	27	16	11
Uncertainty about vocational goals	63	18	22	18	5
Inability to find job	98	8	4	4	2

The data shown in Figure 2 is the percentage of graduates continuing their education above the B.S. degree. The pie chart shows that 27.7 percent of the total number of graduates have pursued masters

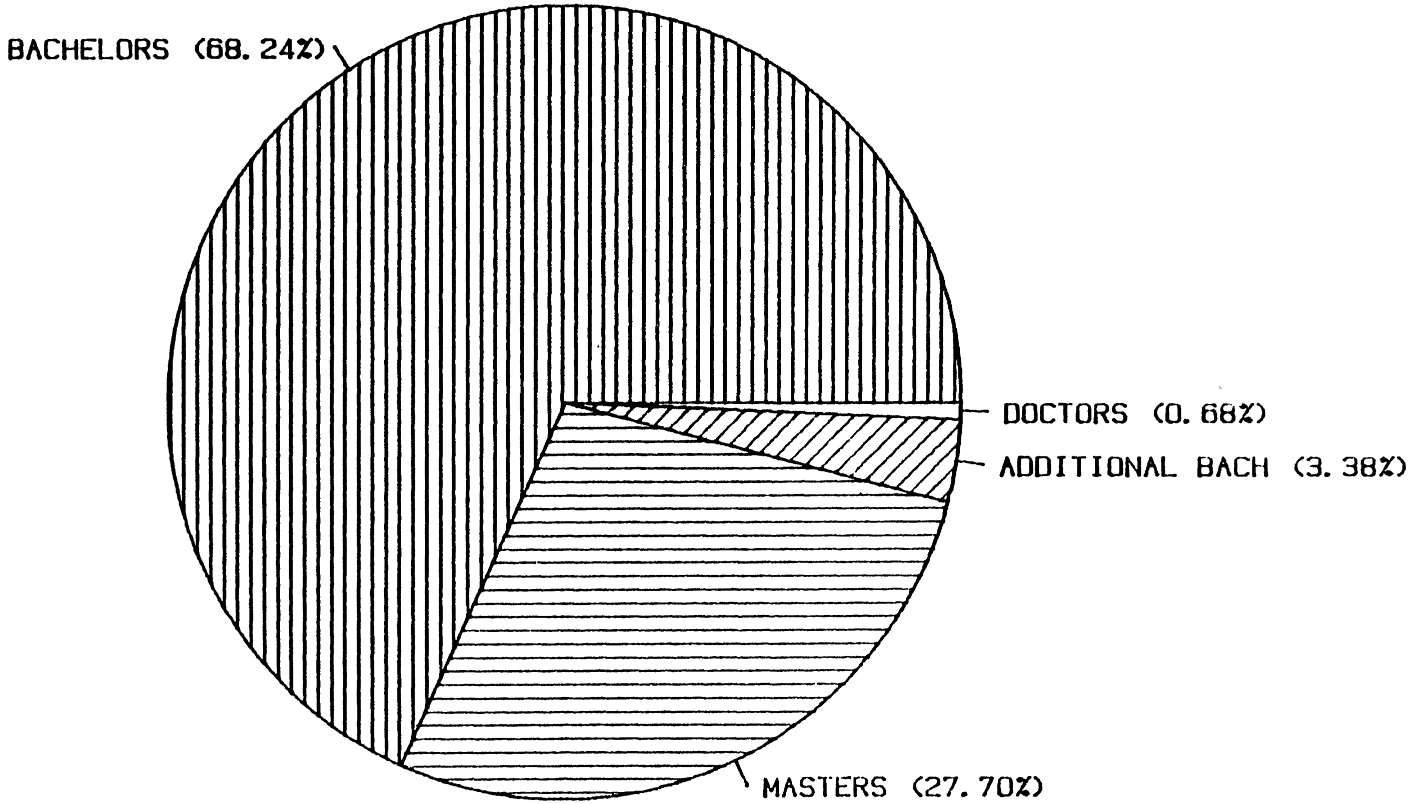

Figure 2. Percent of Degrees Attained by Graduates

degrees and .68 percent have pursued doctorial degrees. The percentage of graduates who pursued or achieved a master's degree in Electrical Engineering is 50.0 percent; Master of Business Administration is 22.5 percent; Computer Science is 20.0 percent; and Technical Education is 7.5 percent. This can be seen in Figure 3.

The Data shown in Figure 4 are the percentages of the graduates decision if they could repeat their college degree. The graduates would seek the same degree at Oklahoma State University decision was 95 out of 140, or 67.9 percent; 43, or 30.7 percent said they would seek a degree outside the area of technology; and two, or 1.43 percent said they would seek a degree in Electrical Power Technology. Of the 30.7 percent responding that they would seek a degree outside the area of technology, 30 out of 43, or 69.8 percent said they would enter into the Electrical Engineering program; 11, or 25.8 percent said they would enter into Computer Science; and 2, or 4.7 percent said they would enter into the Business curriculum at Oklahoma State University. This can be seen in Figure 5.

Educational Data

Figure 6 shows the graduates perceptions of additional coursework needed for the curriculum of Electronic Engineering Technology. Twenty-four out of 110, or 21.8 percent said more computer science courses should be added; 22, or 20.0 percent said more digital design courses should be added; 21, or 19.1 percent said more business courses should be added; 19, or 17.3 percent said more mathematics should be added; 14, or 12.7 percent said more technical speciality courses should be added; 6, or 5.5 percent said telecommunications should be added; and 4, or 3.6 percent said fiber optics should be added to the curriculum.

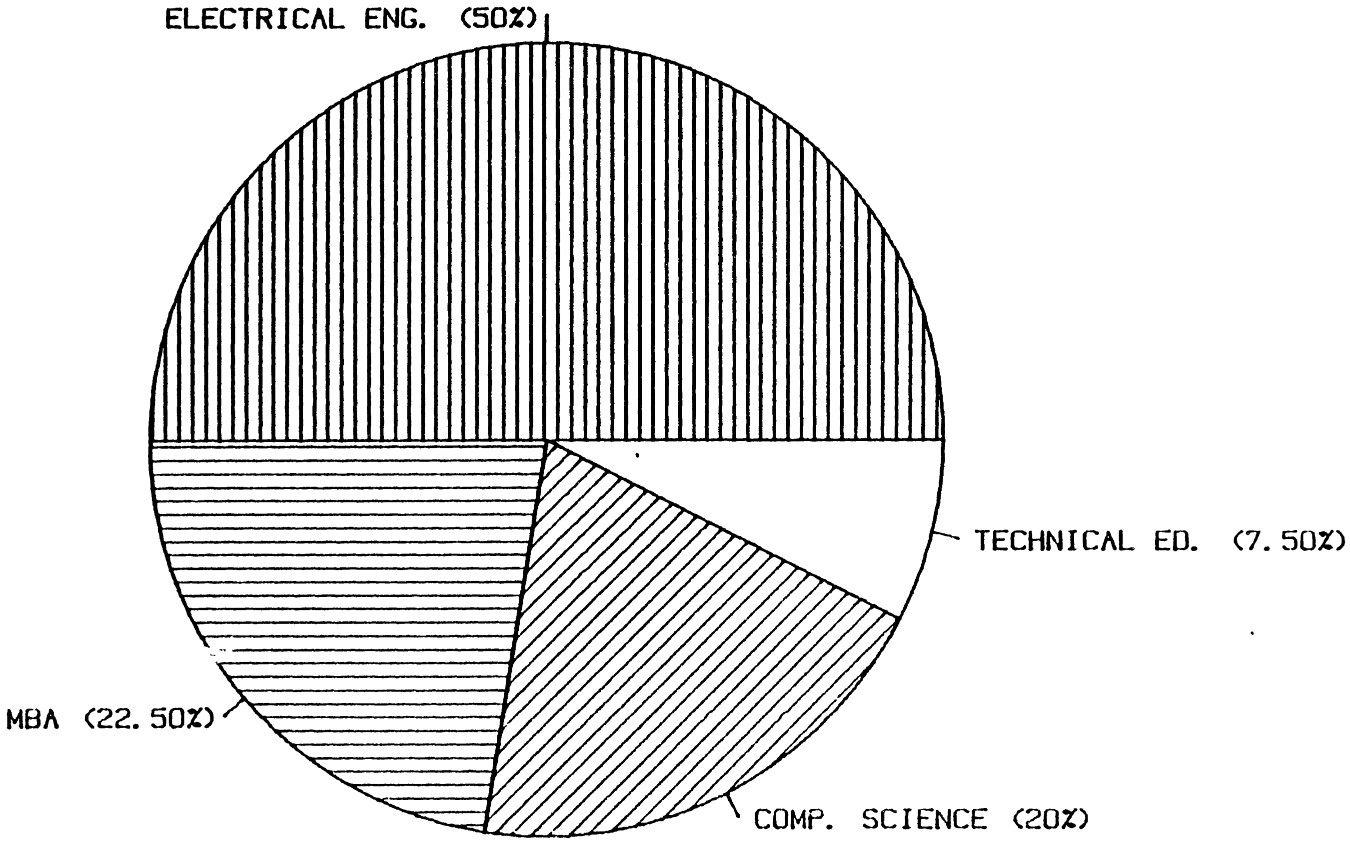

Figure 3. Percent of Master Degrees Attained by Graduates

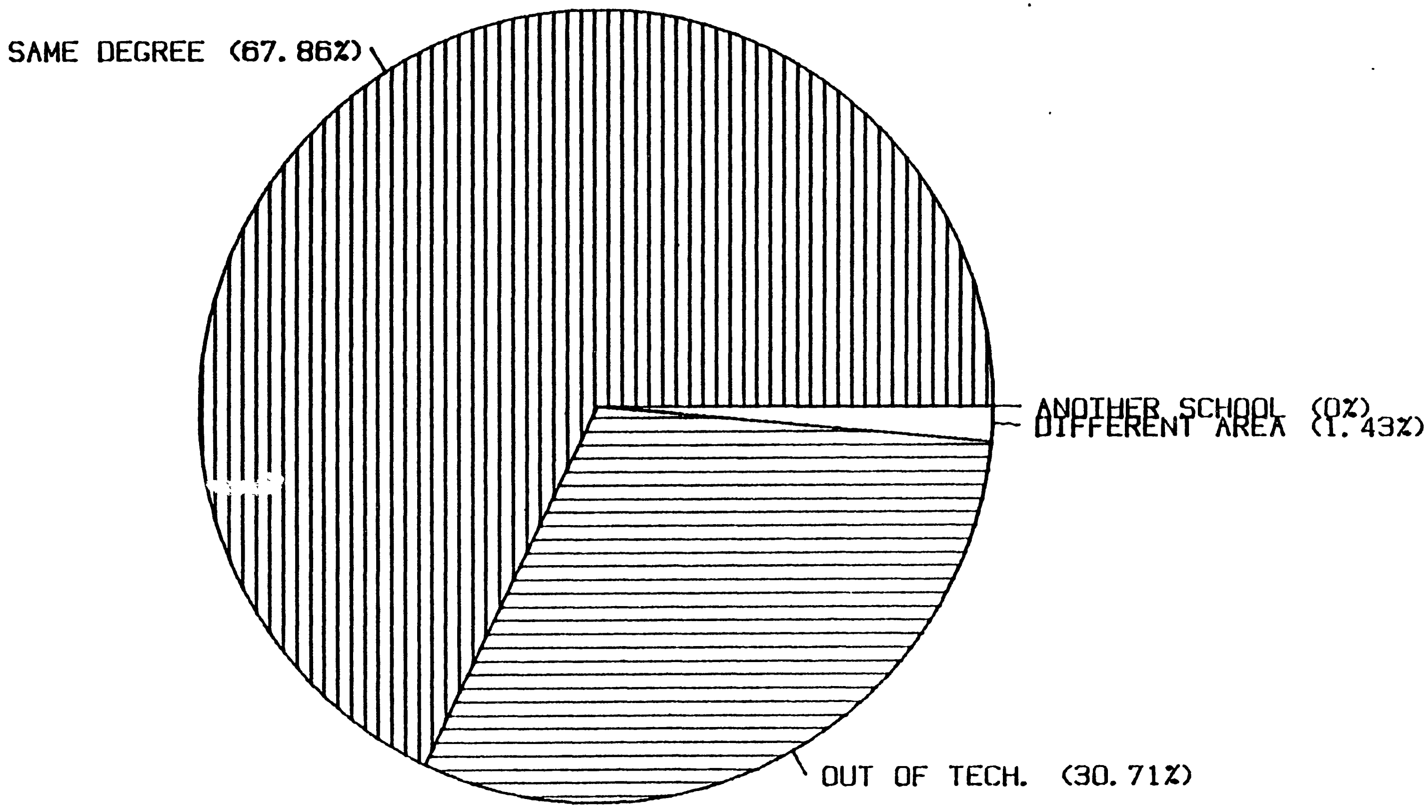

Figure 4. Response to the Question, "If you could repeat your college degree at O.S.U., what would you do?"

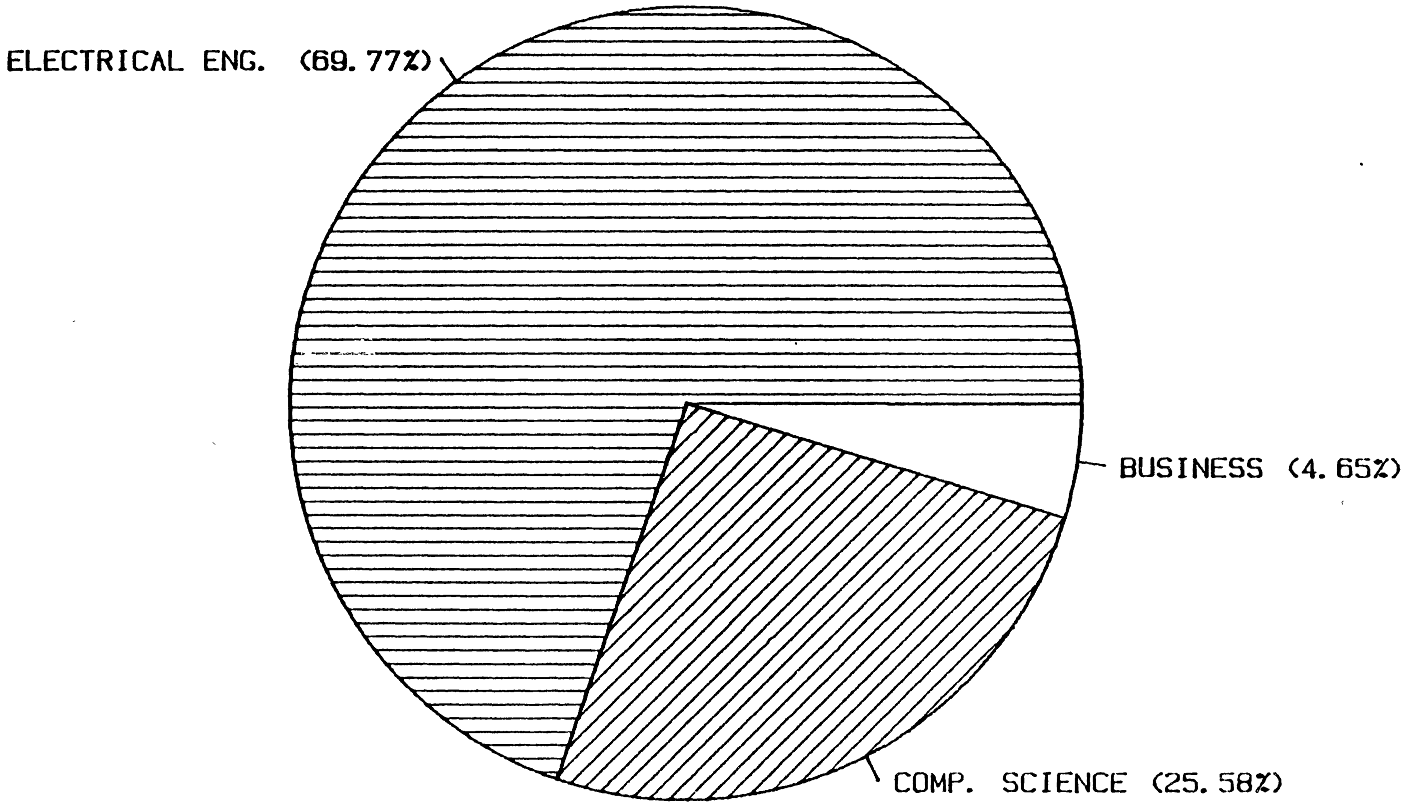

Figure 5. Percentage of Graduates that would Seek a Degree in a Different Area at O.S.U.

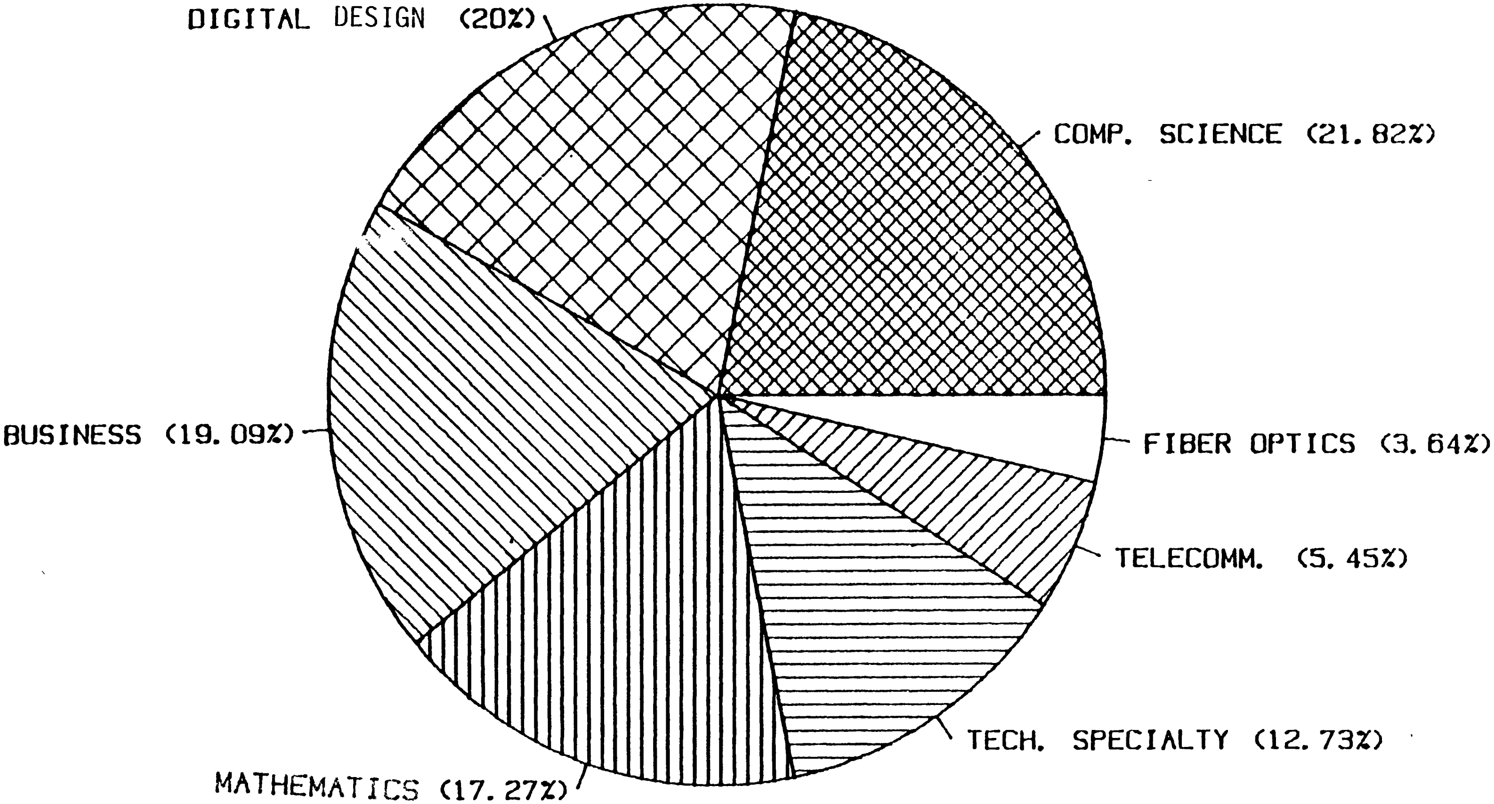

Figure 6. Graduates' Perception of Additional Coursework Needed in EET

The data in Figure 7 indicates the majority of courses that should be excluded from the curriculum as determined by the graduates; 17 out of 67 respondents, or 25.4 percent said Industrial Sociology; 14, or 20.9 percent said Machine Tools; 10, or 14.9 percent said Statics; 8, or 11.9 percent said the OSHA class; 6, or 8.9 percent said Humanities; 5, or 7.5 percent said microwaves; 4, or 5.9 percent said drafting; and 3, or 4.5 said Data Aquisitions.

Figure 8 indicates how the graduates rated the quality of equipment and facilities used in the laboratory. Of the 141 graduates responding, 53, or 37.6 percent said average, 38, or 26.9 percent said fair, and 31, or 22.0 percent said poor; and 14, or 9.9 percent said good; and 5, or 3.6 percent said the facilities and equipment were excellent.

Table III indicates how the graduates rated the laboratory by year in which they graduated. Most of the graduates rated the laboratory facilities and equipment as being average to fair, except the graduates of 1982 who gave a rating of fair to poor.

The results of the question, "In general, how would you rate the course content (usefulness and quality of information) of courses in your major field of study," are shown in Figure 9. Of the 150 respondents, 85, or 56.7 percent said good; 35, or 23.3 percent said average; 24, or. 16.0 percent said excellent, and 6, or 4.0 said fair. There were no responses saying the course content was poor.

The graph in Figure 10 illustrates how the graduates rated the instructors in terms of quality. Of the 150 respondents, 94, or 62.7 percent said good; 27, or 18.0 percent said excellent; 24, or 16.0 percent said average; 4, or 2.7 percent said fair; and 1, or .7 percent said the quality of instructors was poor.

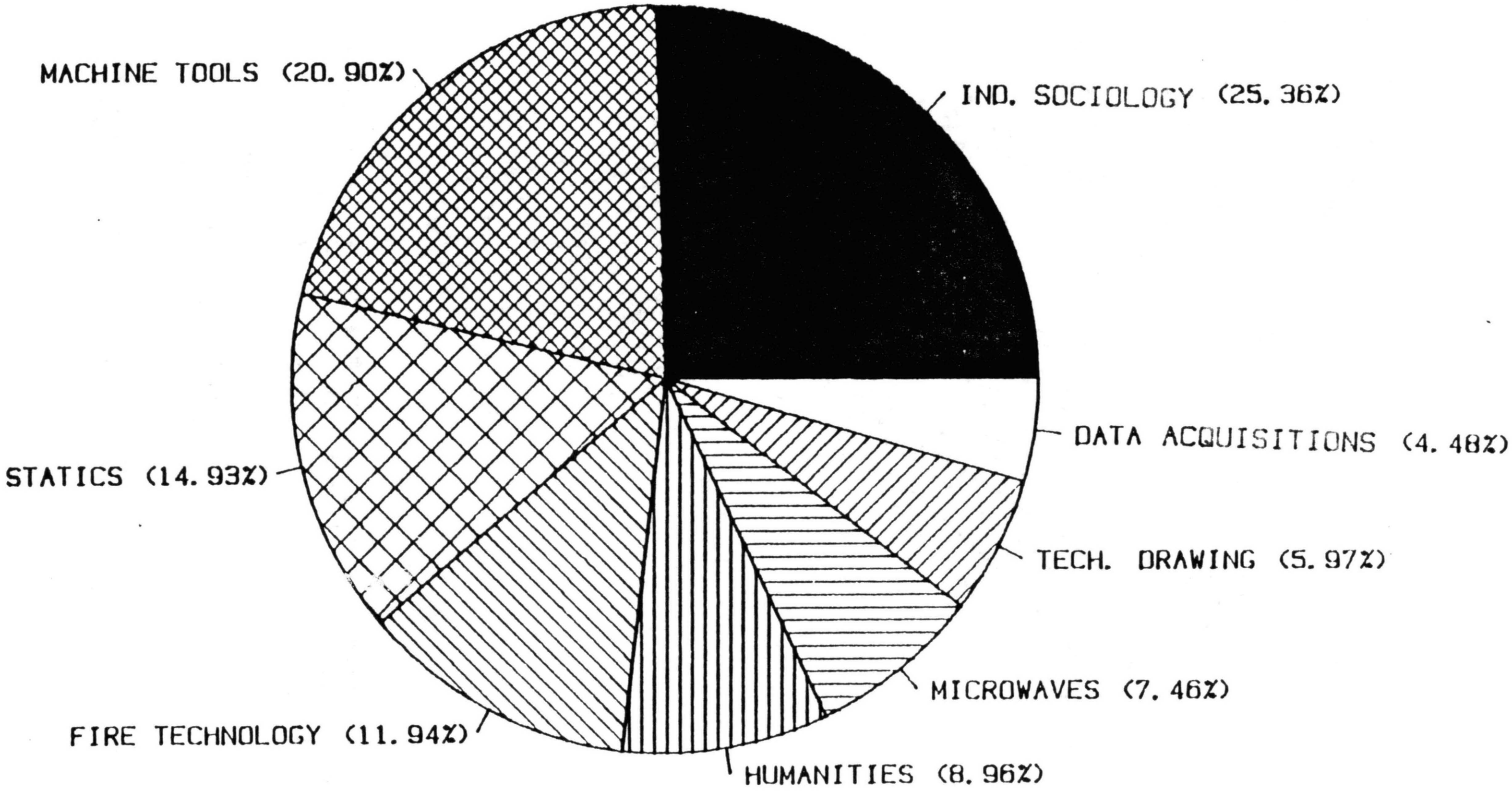

Figure 7. Graduates' Perception of Coursework that Should be Excluded in EET

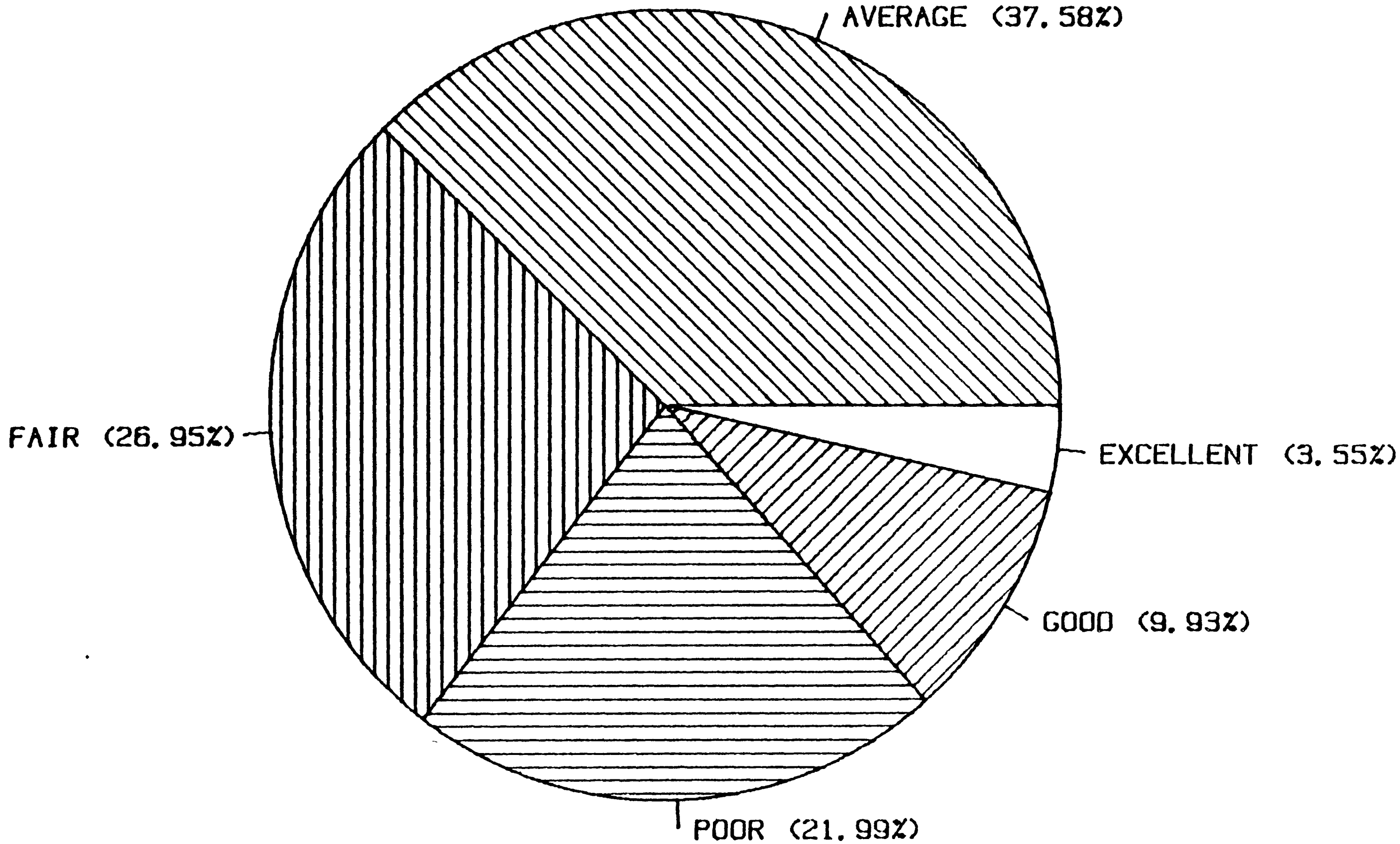

Figure 8. Overall Rating of Laboratory Equipment and Facilities by Graduates

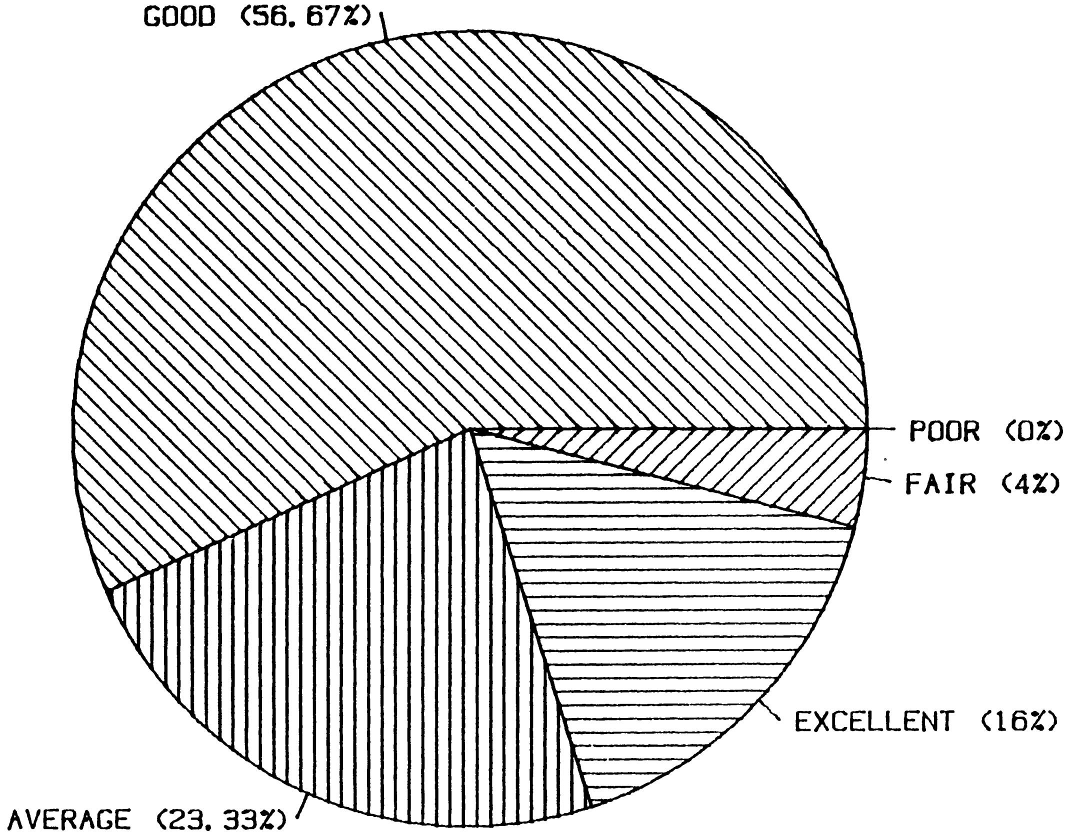

Figure 9. Response to the Question, "How would you rate the course content of courses in your major field of study?"

TABLE III

LABORATORY RATING BY YEAR

Year	Poor	Fair	Average	Good	Excellent
76	2	2	6	1	0
77	3	5	9	2	0
78	3	3	5	1	0
79	2	3	5	0	0
80	3	5	4	1	1
81	3	3	9	3	0
82	7	8	5	2	0
83	5	5	6	2	2
84	5	3	5	1	0

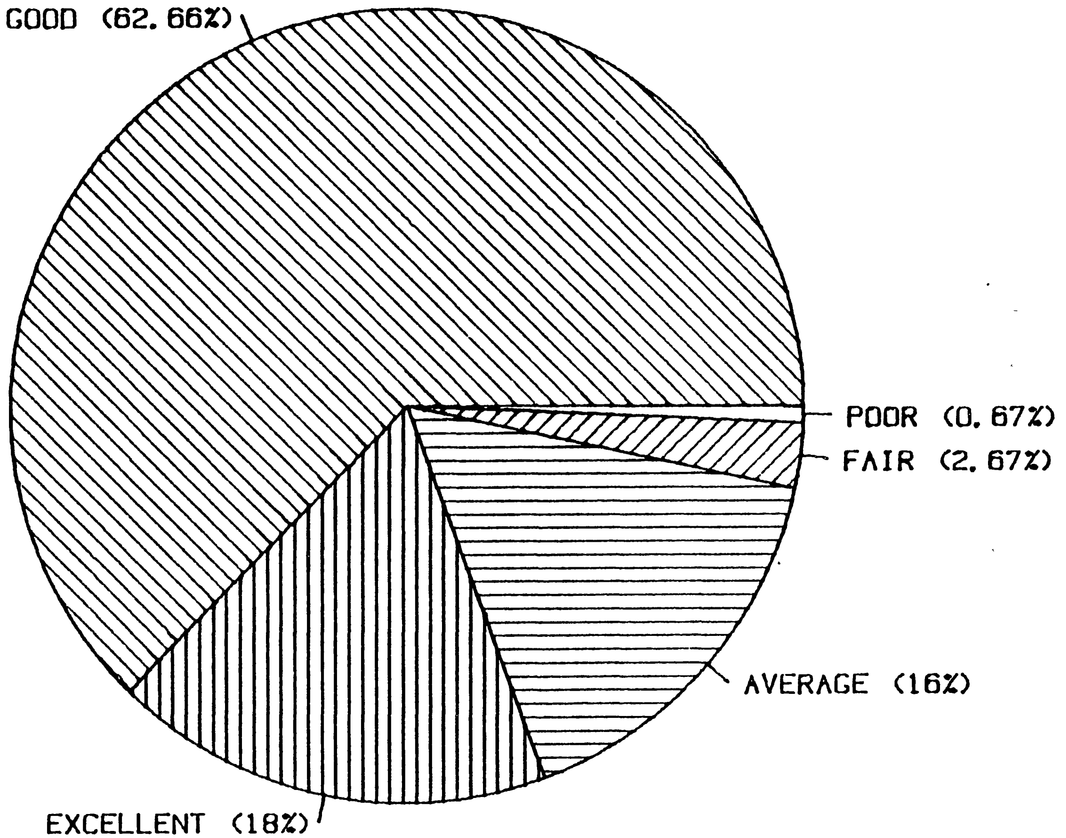

Figure 10. Response to the Question, "How would you rate the overall quality of instructors in your major area of study?"

Employment Data

The results from the question "How did your education compare to others working in your area from other technology programs" can be seen in Figure 11. Of the 136 respondents, 73, or 53.7 percent said about the same; 58, or 42.7 percent said they were better qualified; and 5, or 3.7 percent said they were less qualified.

Figure 12 shows how the respondents' college educations relate to their present positions. Of the 146 graduates responding, 66, or 45.2 percent said their present position was in the field of college study; 40, or 27.4 said it is somewhat related to their college study; 29 or 19.9 percent said it is closely related to their field of college study; 7, or 4.8 percent said that it has little relationship to their college field of study; and 4, or 2.7 percent said it has no relationship to their college field of study.

On the subject of salary, data was extracted from only those graduates who had responded to their present position either being closely related or in the field of their college study to get an accurate picture of starting and present salary. Let it also be noted that data was only used on those graduates having a bachelor's degree or those working on an advanced degree but not having completed the degree. There was an inadequate number of respondents having completed their advanced degrees to perform a separate analysis. Of the 93 respondents that meet the above conditions, the average starting salary for the graduates of 1976 was $13,749 and their present salary is $43,499. For the 1977 graduates the starting salary was found to be $15,356 and the present salary is $37,499. The graduates starting salary of 1978 was found to be $16,665 and the present salary is $36,249. The graduates of 1979 starting

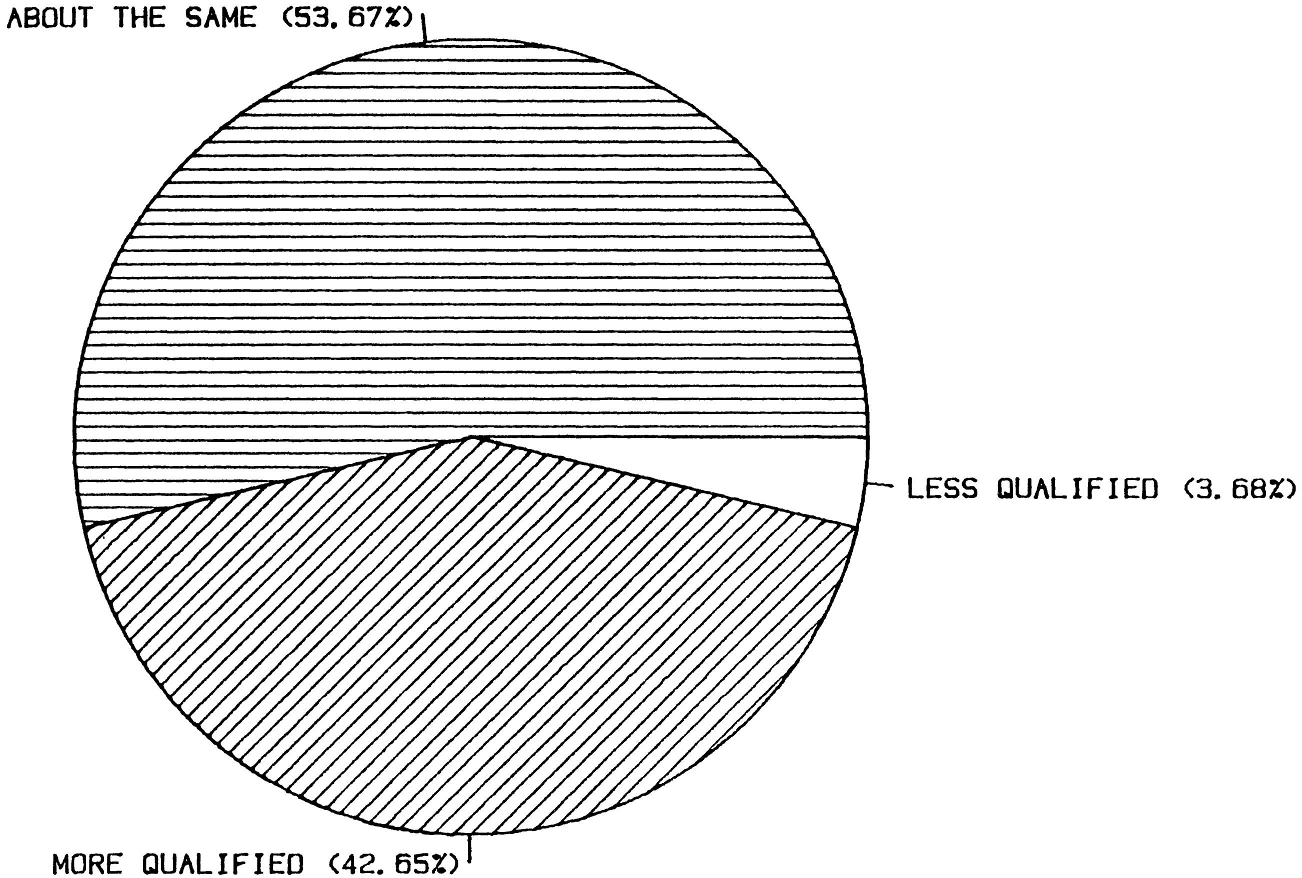

Figure 11. Response to the Question, "How did your education compare with others working in your area?"

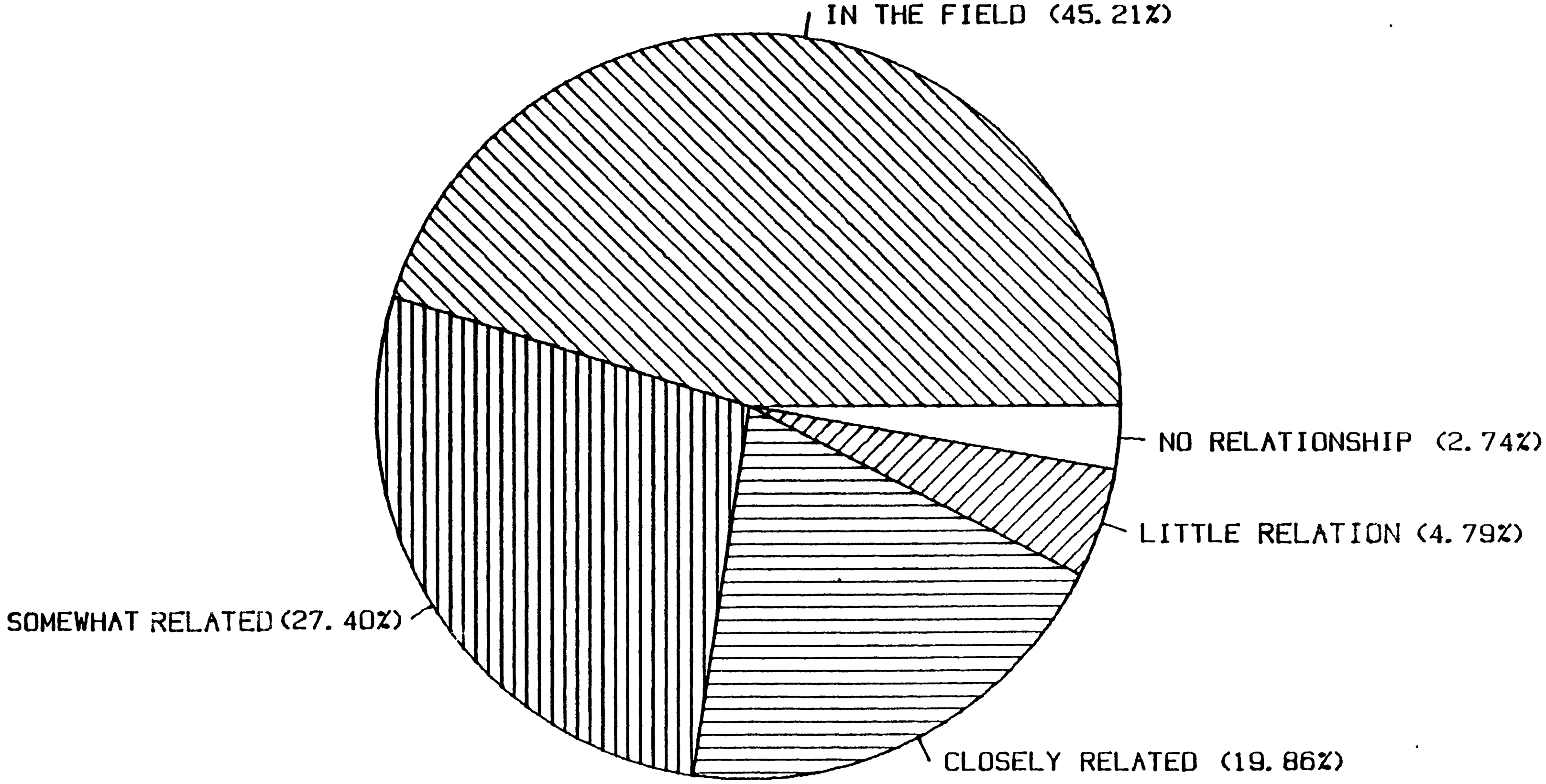

Figure 12. Percentage of Graduates Working in their College Field of Study

salary can be seen to be $17,499 and their present salary is $35,832. The 1980 graduates starting salary was $17,953 and their present salary is $32,044. The graduates of 1981 starting salary was $22,726 and their present salary is $28,135. The 1982 graduates starting salary was $21,499 and their present salary is $24,721. The graduates of 1983 starting salary was found to be $24,077 and their present salary is $26,972. The 1984 graduates starting salary was $23,213 and their present salary is $23,927. Let it be noted that the validity is directly related to the number of graduates responding. There is also a line that represents the difference between the starting salary and the present salary; this is used to indicate how the salary increases with experience. There is a large change between four and five years of experience. The difference between the start and present salary of the 1981 graduates is $5,409 compared with the 1980 graduates of $14,091, which indicates after four years the graduates should expect to see a larger than normal increase in salary. All of the salary information can be seen in the line graph in Figure 13.

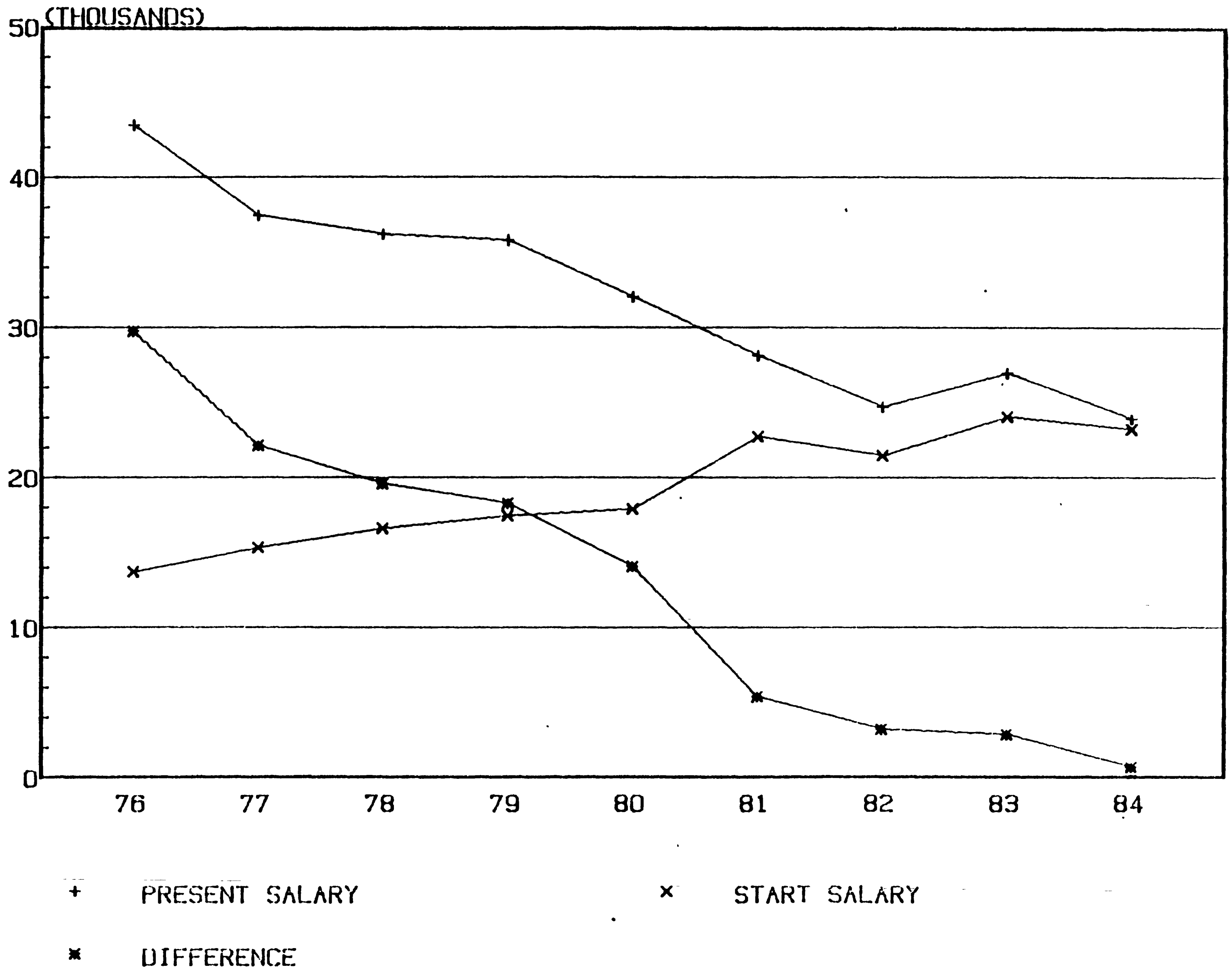

Figure 13. Line Graph of Present, Starting, and Difference in Salary for Graduates by Year

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

The purpose of this study was to collect and analysis follow-up data on graduates of the Electronic Engineering Technology program of Oklahoma State University. A questionnaire was developed and mailed to the graduates of spring 1976 to summer 1984. Let it be noted that the questionnaires were also sent to the graduates of the Electrical Power Technology program at Oklahoma State University. Since this study only delt with those graduates of Electronics Engineering Technology the data from the EPT graduates were not used, it was however, retained for the departments records. The overall response was 148 out of a total of 333 for a return rate of 44.4 percent.

Conclusions and Recommendations

The finding of this study can be most effectively reported by responding to the research questions posed in Chapter 1. The answers to the following questions are based on an analysis of the information contained in the preceding chapter.

Research Question One

Which courses in the Electronic Engineering Technology curriculum were not included that the graduates feel should be included? Twenty-four out of one hundred ten or 21.8 percent said more computer science courses should be added, dealing with the most popular and up to date languages and software, twenty-two or 20.0 percent said more digital design courses, dealing with state of the art design procedures and microprocessors, twenty-one or 19.1 percent said more business courses should be added, dealing with management and financing engineering projects, nineteen or 17.3 percent said more mathematics should be added, including differential equations and statistics, fourteen or 12.7 percent said more technical specialty courses should be added, including testing IC constructions and failure analysis, six or 5.5 percent said telecommunications courses should be added, and four or 3.6 percent said fiber optics should be added to the curriculum.

Research Question Two

Which courses in the degree program did the graduates feel were not particularly useful and should be dropped from the program? Seventeen or 25.4 percent said that Industrial Sociology (SOC 4623) should be dropped, fourteen or 20.9 percent said Machine Tool Practices (GENT 1222) should be dropped, ten or 14.9 percent said Statics (GENT 2323) should be dropped, eight or 11.9 percent said the Fire Technology course (FIRET 3013) was not useful, six or 8.9 percent said humanities course (SOC 1113) was not particularly useful, five or 7.5 percent said Microwaves Techniques (EET 4654) was not useful, four or 5.9 percent said Technical Drawing course (GENT 1153) was not useful, and three or 4.5 percent said Data Acquisitions (EET 3363) was not useful.

Research Question Three

How did the graduates rate the overall quality of instructors in their major field of study? Ninety four out of one hundred ten or 62.7 percent said the instructors quality was good, twenty-seven or 18.0 percent said the instructors quality was excellent, twenty-four or 16.0 percent said they were average, four or 2.7 percent said they were fair, and one or .7 percent said the quality of the instructors was poor. This analysis indicates that the quality of the instructors in Electronic Engineering Technology are good to excellent.

Research Question Four

How did the graduates education compare with others from similar institutions? Seventy-three or 53.7 percent said their education compared to others was about the same, fifty-eight or 42.7 percent said they were better qualified than their co-workers, five or 3.7 percent said they were less qualified. This seems to indicate that the majority of the graduates are as good or better than their co-workers from other institutions.

Research Question Five

What percentage of graduates are working in their college field of study? Sixty-six out of one hundred forty six or 45.2 percent said their present position was in their college field of study, forty or 27.4 percent said that their present position was somewhat related to their college field of study, twenty-nine or 19.9 percent said that it is closely related to their field of college study, four or 2.7 percent said it has no relationship to their college field of study. This analysis shows that the majority of the graduates, 65.1 percent, are working in the college field of study or closely related fields.

Research Question Six

What percentage of the graduates have continued their education since receiving their degree from Oklahoma State University? Forty-one or 27.7 percent have pursued masters degrees, five or 3.4 percent have pursued an additional bachelors degree, and one or .7 percent have pursued doctorial degrees. It should also be noted that of the forty-one pursuing masters degrees, 50 percent of these entered the program of Electrical Engineering; nine or 22.5 percent entered into a MBA program; eight or 20.0 percent entered into computer science; and 3 or 7.5 percent entered into technical education. This analysis shows that the majority of the graduates have not pursued higher degrees, and that the majority who have pursued higher degrees entered into Electrical Engineering.

Research Question Seven

How did the graduates rate the quality of equipment and facilities used in laboratories? Fifty-three or 37.6 percent said that the equipment was average, thirty-eight said that the equipment was poor, fourteen or 9.9 percent said the equipment and facilities were good, and five or 3.6 percent said the facilities and equipment were excellent. This analysis illustrates that almost half of the graduates in Electronic Engineering Technology said the equipment and laboratory facilities were either fair or poor.

Other Recommendations

On the basis of the information compiled in this study, the following recommendations are suggested:

1. A data bank of graduates' names and addresses should be maintained in the Electronic Engineering Technology department and an effort should be made to periodically update this file

2. The patterns utilized in this study should serve as guidelines in conducting future follow-up surveys in Electronic Engineering Technology

3. Several areas of content should be added to the curriculum including newer software languages and operating systems. More emphasis should be placed on digital design and state-of-the-art microprocessors, as well as mathematics and business-related courses

4. Several courses should be reviewed for possible exclusion from the curriculum including Industrial Sociology (SOC 4623), Machine Tool Practices (GENT 1222), and Statics (GENT 2323)

5. The laboratory facilities and equipment should be reviewed for appropriate updating and staffing

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APPENDIX A

COURSE DESCRIPTIONS

ELECTRONICS ENGINEERING TECHNOLOGY (EET)

1104 FUNDAMENTALS OF ELECTRICITY. Lab 3. Elementary principals of electricity covering basic electric units. Ohm's law, Kirchoft's law, circuit solutions, network solutions, magnetism, inductance, and capacitance.

1112 ELECTRONIC DEVICES AND AMPLIFIERS. Lab 3. Co-requisite: 1104. The operating principles of solid state components as used in elementary amplifiers circuits. Also includes a brief description of power supplies.

2224 ELECTRONIC AMPLIFIERS I. Lab 3. Prerequisite: 1112; Co-requisite: 2244. A study of the theory and application of amplifiers using biploar and FET transistors. RC coupled, direct coupled, and transformer coupled circuits. Bias stabilizing and feedback techniques.

2244 CIRCUIT ANALYSIS I. Lab 3. Prerequisites: 1104 and MATH 1716 or equivalent. Co-requisite: 2224. Transient analysis or electric circuits. The use of network theorems. Introduction to resonant circuits and filters, and AC power including three-phase.

2303 INSTRUMENTS AND MEASUREMENTS I. Lab 3. Prerequisites: 2224 and MATH 2373. Electrical and electronic measurement techniques. The operating principles and application of meters, bridges, oscilloscopes, and attenuators.

2544 PULSE AND DIGITAL TECHNIQUES. Lab 3. Prerequisite: 2224. A study of electronic circuits used in digital control and computation. Includes pulse generation, Boolean algebra, and logic circuits.

2633 MICROCOMPUTER PRINCIPLES AND APPLICATIONS. Lab 3 Prerequisits: 2544 and COMSCI 2113. Course introduces microcomputers from a hardware point of view, combining a study of machine language programming and microcomputer hardware in a highly laboratory oriented presentation. Study emphasizes interfacing the microcomputer as a programmable controller of external system and devices.

2634 COMMUNICATION CIRCUITS AND SYSTEMS. Lab 3. Prerequisite: 2224. An introduction to receiver and transmitter circuits, modulation and detection systems, oscillators, and tuned amplifiers.

2731 ELECTRONIC DESIGN. Lab 3. Prerequisites: 2303 and 2634. Laboratory projects involving techniques required of modern electronics engineering technicians. Circuit test, development and fabrication in wired and printed form.

3113 CIRCUIT ANALYSIS II. Prerequisites: 2544 and MATH 2573 and COMSC 2113. Application of elementary switching functions and Laplace transforms to electronic circuit analysis. Includes circuit analysis in the S-plane, transfer functions, and computer applications.

3153 DATA COMMUNICATIONS. Lab 3. Prerequisites: 2633 and 2634. The field of data communications including multiplexing concepts, sampling techniques, encoding techniques, and various forms of data communication will be covered. Emphasis will be placed on techniques applicable to telemetry, digitized voice TTY and bulk transmission systems.

3354 ELECTRONIC AMPLIFIERS II. Lab 3. Prerequisite: 2224. Advanced topics in amplifiers bias stabilizing; stability of feedback amplifiers, DC amplifiers; differential amplifiers and operational amplifiers.

3363 INSTRUMENTS AND MEASUREMENTS II. Lab. 3. Prerequisites: 2303, 2544, and 3354. Further consideration of principles and practices in instruments and in measurement techniques. A survey of instruments including wide-bank oscilloscopes, digital read-out equipment, spectrum analyzers, and other appropriate equipment.

4263 ELECTRONIC DIGITAL SYSTEMS. Lab 3. Prerequisite: 2633. A study of micro and minicomputer systems from a technological point of view. Emphasis is on using both mini and microcomputers in control and data acquisition applications. Students will be required to develop interface circuitry in a project setting to meet assigned specifications.

4314 CONTROL CIRCUITS. Lab 3. Prerequisite: 3113. A study of the components, principles, and techniques basic to electronic control systems. Includes feedback control theory, transducers, servos, and motors.

4656 MICROWAVE TECHNIQUES. Lab 3. Prerequisite 2634. Communications principles and measurement techniques in the UHF and microwave spectrum, coaxial and waveguide transmission lines, antenna systems and signal transmission, modulation and detectors, oscillators and amplifiers, introduction to signal and network measurement methods.

4832 SENIOR PROJECTS. Lab 3. Prerequisites: 16 credit hours of upper-division Electronics courses. This course is the synthesizing element in the electronics study plan. Pertinent topics from the first 3 years will be reviewed and integrated into a senior designed project.

GENERAL TECHNOLOGY (GENT)

1153 TECHNICAL DRAWING. Lab 6. Fundamentals of drawing and drafting room practices, procedures and techniques. Emphasis on drafting interpretation of typical industrial drawings. A student with two years high school or one year practical drafttime should elect an advanced course in Mechanical Design Technology with the consent of his advisor.

1222 MACHINE TOOL PRACTICES. Lab 3. Fundamental hand and machine tool processes, such as correct usage of tools and instruments; cutting, filing, squaring, drilling, reaming, tapping, threading, boring, milling, and precision inspection.

2323 STATICS. Prerequisites: MATH 1613 and PHYSC 1114. Forces acting on bodies at rest; forces, moments of force, distributed forces, reactions, free body diagrams, friction, internal forces, and moments of inertia. Applications.

APPENDIX B

THE INSTRUMENT FOR GRADUATES

QUESTIONNAIRE

1. In what year, semester and degree did you receive from O.S.U.?

19__	____	Spring	____	A.D.	____
1979	____	Fall	____	B.S.	____
1980	____	Summer	____	M.S.	____
1981	____				
1982	____	EET	____		
1983	____	EPT	____		
1984	____				

2. Have you worked on an advanced or other degree since completing your degree at OSU?

____ Yes (If yes, go to Question 3)
____ No (If no, go to Question 6)

3. If yes, what was your major field of study? ____________________

4. Please give the name of the institution where work on the additional degree has, or is being done.

____

5. What degree have you worked on since completing your degree at O.S.U.?

____ Bachelor's
____ Additional Bachelor's
____ Master's
____ Doctorate
____ Other (specify) ________________________________

Has the degree been completed?

____ Yes
____ No

6. If you could repeat your college degree at O.S.U., what would you do?

____ A. Seek the same degree at O.S.U.
____ B. Seek a degree in a different area at O.S.U. If so, what area? ________________________________
____ C. Seek a degree in Technology at another institution
____ D. Seek a degree in an area outside of Technology. If so, what area? ________________________________

7. Please rate applicable items by circling your choice. Rate the degree of influence each of the following had on your decision to pursue a degree at O.S.U.:

	None	Little	Moderate	Strong	Very Strong
A. Overall prestige of O.S.U.	1	2	3	4	5
B. Reputation of O.S.U. faculty in your field	1	2	3	4	5
C. O.S.U.'s Technology facilities	1	2	3	4	5
D. Nearness to home	1	2	3	4	5
E. Financial assistance, scholarships	1	2	3	4	5
F. Other (specify) ________________________________	1	2	3	4	5

8. Please rate applicable items by circling your choice. Rate the degree of influence each of the following persons or factors had on your decision to earn a degree in Technology at O.S.U.:

	None	Little	Moderate	Strong	Very Strong
A. Spouse	1	2	3	4	5
B. Parent(s)	1	2	3	4	5
C. High school counselor	1	2	3	4	5
D. Employer	1	2	3	4	5
E. Friend	1	2	3	4	5
F. Uncertainty about vocational goals	1	2	3	4	5
G. Inability to find a job	1	2	3	4	5
H. Other (specify) ________________________________	1	2	3	4	5

9. List all courses that your degree program did not include that you feel should have been included.

____

10. List all courses from your degree program you feel should be dropped from the degree program (courses that were not particularly useful).

____

11. In general, how would you rate the overall quality of instructors in your major area of study?

____ A. Poor
____ B. Fair
____ C. Average
____ D. Good
____ E. Excellent

Why? ____

12. In general, how would you rate the course content (usefulness and quality of information) of courses in your major field of study?

____ A. Poor
____ B. Fair
____ C. Average
____ D. Good
____ E. Excellent

13. In general, how would you rate the quality of equipment and facilities used in LABORATORY in your major area of study at O.S.U.?

____ A. Poor
____ B. Fair
____ C. Average
____ D. Good
____ E. Excellent

14. How did your education compare to others working in your area from other technology programs?

____ A. Better qualified
____ B. About the same
____ C. Less qualified

15. How many years (nearest whole number) have you worked for your present employer?

____ A. One
____ B. Two
____ C. Three
____ D. Four or more

16. Please list your current employer and supervisor.

Company: ______________________________

Supervisor: ______________________________

Address: ______________________________

City: ______________________________

State: ______________________________

Zip Code: ______________________________

17. Check the statement which most closely applies to your present position.

____ A. It is in the field of my college study.
____ B. It is closely related to my field of college study.
____ C. It is somewhat related to my field of college study.
____ D. It has little relationship to my field of college study.
____ E. It has no relationship to my field of college study.

18. New and prospective students often want to know what salary range they can hope to be in after completion of a degree in Technology at O.S.U. Please help us in this area by checking the annual gross salary range (income before taxes, and including commission and profit sharing) for your first and present position after receiving your B.S. degree.

First Position	Present Position	
____	____	A. Below $5,000
____	____	B. $ 5,000 - $ 9,999
____	____	C. $10,000 - $14,999
____	____	D. $15,000 - $19,999
____	____	E. $20,000 - $24,999
____	____	F. $25,000 - $29,999
____	____	G. $30,000 - $34,999
____	____	H. $35,000 - $39,999
____	____	I. $40,000 - $44,999
____	____	J. $45,000 - $49,999
____	____	K. $50,000 - or more

Electronics/Electrical
Power Technology
Oklahoma State University
202 Crutchfield Hall
Stillwater, OK 74078

APPENDIX C

LETTER OF TRANSMITTAL

Oklahoma State University

ELECTRICAL TECHNOLOGY DEPARTMENT

STILLWATER, OKLAHOMA, 74078
CRUTCHFIELD HALL 202
(405) 624-5716, 5717, 5720

October 25, 1984

Dear Graduate,

Greetings from the Technology Department at Oklahoma State University. We hope you are doing well and would like to hear from you.

A research study is currently being conducted to evaluate the curriculum in the Electronics/Electrical Power Technology program at Oklahoma State University. Enclosed you will find a questionnaire which will help us evaluate the strengths and weaknesses of the program. All your responses will be kept strictly confidential.

I will appreciate your taking five minutes of your valuable time to answer the questions. The questionnaire is already addressed and postage is attached so all you need to do is fold and staple it and drop it in the mail.

Thank you,

Perry

Dr. Perry McNeill
Department Head
Electronics/Electrical Power
Technology
Oklahoma State University

Attachment

P.S. Thank you for your cooperation. You will be receiving a news letter in the mail soon.

CENTENNIAL DECADE
1980 • 1990

APPENDIX D

FIRST FOLLOW-UP LETTER

Oklahoma State University

ELECTRICAL TECHNOLOGY DEPARTMENT

STILLWATER, OKLAHOMA, 74078
CRUTCHFIELD HALL 202
(405) 624-5716, 5717, 5720

November 19, 1984

Dear Graduate,

We need your help! A few weeks ago we mailed you a questionnaire which seeks information needed if we are to be of better service to you and at the same time provide a better program for students enrolled in Electronics/Electrical Power Technology.

If your completed questionnaire is already in the mail we appreciate it. If you have misplaced it, or if it never reached you, please take a few minutes of your valuable time to fill out and return the enclosed copy as soon as possible. The questionnaire is already addressed and postage is attached so all you need to do is to write your return address and fold and staple it and drop it in the mail.

We will send you free of charge the Directory of Electronics/Electrical Power Technology Graduates and a Technology Newsletter when your questionnaire is returned and the data from the questionnaires are tabulated.

We wish you and yours a Happy Holiday Season.

Sincerely,

Perry

Dr. Perry McNeill
Department Head
Electronics/Electrical
Power Technology
Oklahoma State University

Attachment

CENTENNIAL
DECADE
1980 • 1990

APPENDIX E

SECOND FOLLOW-UP LETTER

Oklahoma State University

ELECTRICAL TECHNOLOGY DEPARTMENT

STILLWATER, OKLAHOMA, 74078
CRUTCHFIELD HALL 202
(405) 624-5716, 5717, 5720

December 14, 1984

Dear Graduate:

We sincerely need your help! Before we can complete a follow-up study of all Electronics/Electrical Power Technology graduates we need to receive select information from you.

If your completed questionnaire is already in the mail we appreciate it. If you have misplaced it, or if I never reached you, please take a few minutes of your valuable time to fill out and return the enclosed copy as soon as possible. The questionnaire is already addressed and postage is attached so all you need to do is to write your return address and fold and staple it and rop it in the mail.

We will send you free of charge the Directory of Electronics/Electrical Power Technology Graduates and a Technology Newsletter when your questionnaire is returned and the data from the questionnaires are tabulated. But we cannot unless we hear from you. Thank You.

We wish you and yours a Happy Holiday Season.

Sincerely,

Perry

Perry R. McNeill, Ed.D., P.E.
Professor and Head

Enclosures

CENTENNIAL DECADE
1980 • 1990

VITA 2

James David Bennett

Candidate for the Degree of

Master of Science

Thesis: A FOLLOW-UP STUDY OF THE GRADUATES OF ELECTRONIC ENGINEERING TECHNOLGY OF OKLAHOMA STATE UNIVERSITY

Major Field: Technical Education

Biographical:

Personal Data: Born in DeRidder, Louisiana, June 25, 1960, the son of Robert Allen Bennett Jr. and Ruby Elizabeth.

Education: Graduated from DeRidder High School, DeRidder, Louisiana in 1978; received Associate of Science degree in Electronic Technology from McNeese State University in 1980; received Bachelor of Science degree from Oklahoma State University in 1983; completed the requirements for Master of Science degree at Oklahoma State University in May, 1985.

Professional Experience: Vice-President, Bennett Timber Co., Inc., 1978 -present; Computer System Administrator, North American Indigo, Inc., April 1 -November 5, 1984; Senior Engineer, Harris Corporation, March 1, 1985 -present.