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THE IMPACT OF SUMMER RECRUITMENT PROJECTS ON STUDENTS FOR THE COOPERATIVE EDUCATION PROGRAM IN DESIGN TECHNOLOGY AT MACOMB COMMUNITY COLLEGE

by

David A. Feighan

A Dissertation Submitted to the Faculty of The Graduate College in partial fulfillment of the requirements for the Degree of Doctor of Education Department of Educational Leadership

Western Michigan University Kalamazoo, Michigan August 1986
THE IMPACT OF SUMMER RECRUITMENT PROJECTS ON STUDENTS FOR
THE COOPERATIVE EDUCATION PROGRAM IN DESIGN TECHNOLOGY
AT MACOMB COMMUNITY COLLEGE

David A. Feighan, Ed.D.
Western Michigan University, 1986

Cooperative education is a vital component of higher education. This is especially true in technical fields such as Design Technology. It is assumed the students who were recruited into the co-op program are better students than those who selected the program on their own. It is also assumed that men are different than women in their overall results because of their predominance in technical fields such as Design Technology.

This study investigated the differences between students who were recruited into Design Technology at Macomb Community College, Warren, Michigan, in the Cooperative Education Program between the summer recruitment years of 1977 and 1981 and those students who self-selected the same Cooperative Education Program during the same time period. It also investigated the differences between the results of men and women enrolled in the program during the same time period. It utilized data gathered from student records such as grade point averages, time to complete the program, and completion status. A survey was sent out to the program participants to gather information on employment related to education and employment status as to whether they were in full or part-time employment. The same
information was utilized to measure differences between male and female participants in the Cooperative Education Program in the same time period.

The results of the analysis of data were mixed. Differences between recruited co-op students and those students who self-selected the program were not supported by analysis of grade point averages, job placement, and employment status. Time to complete the program and completion status showed a difference between the two groups in favor of the self-selected group of students over the recruited students.

The results of the analysis of data between men and women in the program also had mixed results. Both males and females showed no difference in job placement and employment status. However, the data supported differences in grade point averages, time to complete the program, and completion status in favor of the females in the program.

Further research is recommended to address the possible differences between age at program entry and program completion status and between age and time to complete the program.
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Western Michigan University

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David A. Feighan

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CHAPTER I

INTRODUCTION

The objective of this study is to investigate the differences between students who were recruited into Design Technology at Macomb Community College, Warren, Michigan, in the Cooperative Education Program between the summer recruitment years of 1977 and 1981 and those students who self-selected the same Cooperative Education Program during the same time period.

The concept of Cooperative education or co-op is nothing new in educational circles. It is often seen as an alternative means of educating students in the more technical, business, and health related curricula. However, a comparison between students actually recruited for this type of educational formation and students who are placed through the more traditional mechanisms and choose the program on their own has yet to be thoroughly investigated. It seems plausible that students with designs on careers in technical, business, and health fields would succeed better if recruited with the co-op process as an incentive. However, this has yet to be tested to the satisfaction of educational leaders.

Statement of the Problem

The community college is faced with a very serious challenge in the next decade. Because of the expected drop in applicants due to
the declining birth rate, the 1980s will be a very competitive mar­
ketplace for available students (Guzzardi, 1979). At the university
level and at the two year community college level, there will be a
definite competition for the available students. Hence, effective
programming must be the answer to this challenge.

For this reason, cooperative education programs blossomed in the
1970s to attract capable students to the field of cooperative educa­
tion (Wilson & Lyons, 1961). Employers and educators are joined
together in a marriage of theory and skill training to produce the
best possible product needed for the technical and business occupa­
tion in the world of work. This union has cost factors not found in
regular programming. These include salaries of coordinators, support
personnel, and publicity information needed to adequately sustain
the effort.

Cooperative education is still a relatively recent phenomenon.
While its roots now go back over a half a century, the real growth
in the cooperative movement only took place within the past few
years, with the early 1970s as the start of a dramatic upsurge in
the extent of its growth (Brown & Wilson, 1975). While early pre­
cursors of the cooperative form of education, such as the apprentice
system, have been in existence for hundreds or even thousands of
years, the origin of cooperative education is often credited to Dean
Herman Schneider (1935). In 1906, Schneider established a program
at the University of Cincinnati in which engineering students re­
ceived their education by alternating periods of classroom training
with periods of full-time work in engineering companies.
Fifteen years later, in 1921, Antioch brought its liberal arts college into this new educational concept, becoming the first non-engineering institution to offer co-op. In 1924, the first industry sponsored program was started when a cooperative education program was established at the General Motors Institute. Growth over the next four decades was very slow. In 1962, there were still only about fifty institutions offering cooperative education, primarily four year schools, and with the programs largely confined to the areas of engineering and business. However, over the next fifteen years a tremendous spurt in growth occurred, both in number of schools and in the expansion into new areas and nontraditional forms of cooperative education. By 1971, there were an estimated 250 colleges offering co-op, and in 1973, after the Title IV-D program reached its full authorized funding level, 576 co-op programs were operational or in the planning stage. Currently, there are over one thousand institutions of higher education with co-op programs (Bender, Lucas, & Holsenbeck, 1975).

Just what is a post secondary co-op program? While there are many different types of programs, they nearly all have in common a commitment on the part of an institution of higher education to take primary responsibility for providing the student with a series of experiences in which academic and on-the-job learnings are integrated. In addition, there is often an arrangement--either informal or written--among a student, an employer, and an institution. Typically, this arrangement includes the following, according to Cohen, Deane, and Frankel (1977):
The student agrees to participate in a series of planned work experiences throughout his/her school career. He/she also agrees to comply with the school's requirements for the co-op work experience, which may include participation in a seminar course, and/or the submission of a report at the end of the work experience.

The employer agrees to retain the student for a specified period of time. The student's salary, benefits, and working hours are stipulated. Sometimes the agreement also covers the range of learning and work experiences which will be provided to the student. While not all work experiences are paid, the great majority of them are, and this study includes only paid work experience.

The institution agrees to monitor the work experience; usually done through periodic visits to the work site, to provide the student with support in the form of counseling or remediation should needs of these types be identified, and to attempt to ensure, through contact with the employer, that the work experience is also a learning experience. Typically, the institution also agrees to grant academic credit for the work experience, and they usually charge the student for the tuition in return for the academic credit and support services. (p. 1-3)

The importance of this three party agreement cannot be overstated. It is this agreement which differentiates cooperative education programs from ordinary part-time employment and work-study programs.

The key difference between co-op and ordinary part-time employment is that part-time employment is a two-party agreement between the student and the employer. The school plays no part in the arrangement except by sometimes assisting in the placement process. Usually, no academic credit is given, no tuition is paid, and there is no pretension that the work experience is oriented toward learning. Rather, its primary purpose is to generate income.

As stated earlier, there is a considerable cost factor involved in cooperative education (Cohen et al., 1977). Is the expense worth
the effort? Educators and business leaders alike must be aware of the facts as they proceed with the cooperative education concept. The key to all success is proper planning, intelligent implementation, and critical evaluation. These three elements must be taken into consideration in this study.

In distinguishing cooperative education from other forms of education it is particularly important to delineate from other kinds of experimental education which are usually classified as "cooperative." One criterion for cooperative education is "the work experience be considered an integral part of the educational process, and that the institution take a definite responsibility for that integration" (Wilson & Lyons, 1961, p. 191). A related feature is "the requirement that a student must perform at a satisfactory level in both academic and work aspects of the course" (Davie, 1982, p. 161).

Early proponents of cooperative education looked at the experience in terms of the four factors in cooperative education as shown in Figure 1. The figure represents the universe of all nontraditional, nonclassroom types of learning experience. The four ovals, taken as a union, represent four categories of work related experiences. It is reasonably safe to assume that all work experiences are performed for either economical, vocational, intellectual, total personal or social development, or some combination together. The original idea of cooperative education in its ideal application is indicated by cross hatched shaded intersection of all four circles. Traditionally, co-oping meant working in a paying position directly related to both the student's career ambitions and his or her aca-
Figure 1. Factors in Cooperative Education.

Source: Bender, Lucas, and Holsenbech (1975) P. 14
demic field of study with personal development the results of these real life experiences.

However, two year community colleges and vocational/technical institutes have in recent years taken a unique look at cooperative education as a positively designed program to meet the needs of the specific individuals involved (Bender et al., 1975, p. 13). This view can be seen in Figure 2 where we can see that cooperative education fulfills a variety of institutional and individual objectives for a diverse student and institutional population. Into the development of an institutional philosophy for cooperative education go the intellectual, cultural, personal, economic, and vocational motivation for work experience. Out of this foundation emerges the particular institutional program emphasis.

Definitions

The following terms are used throughout this study:

**Marketing or recruitment** according to Kotler (1975) is the analysis, planning, implementation, and control of carefully formulated programs designed to bring about voluntary exchanges of values with target markets for the purpose of achieving organization objectives. It relies heavily on designing the organization's offerings in terms of the target markets' needs and desires, and on using effective pricings, communication, and distribution to inform, motivate, and service the markets (p. 56).

**Student recruitment** refers to establishing contact with prospective client groups through accepted means or personal
Figure 2. Individual and Institutional Goals in Cooperative Education,
Source: Bender, Lucas, and Holsenbech (1975) P. 12
contact in an effort to bring relevant community college programs with prospective students.

**Employers** are those companies directly involved with student work experience placement that allows participants to have an on-the-job experience directly related to their particular field of study.


**Students** are those persons directly involved by recruitment, enrollment and participation within the cooperative education process in Design Technology.

**The Value of Recruitment**

With all this money and effort put forth in cooperative education recruitment, is the level of success of recruited students any better than that of students who self-selected cooperative education? Both receive like doses of education. The only difference is the time intervals spent away from the books and on the job. Both the recruited and self-selected student take longer to reach their goals because of the equal times required for both learning and experience. However, the final product should be the same for both—employment and satisfaction in a field of their choice.

Since 1977, Macomb Community College has made an extensive effort to recruit interested and qualified students in the fields of
Design Technology. Visitations to local high schools, meetings with parent groups at the college, and various specific contact with representatives from local industrial design firms have all gone into the effort. This creates an interesting research possibility. What impact has this special recruitment project during the summers from 1976-1981 had? Are those students who are encouraged to come to Macomb Community College because of Design Technology and cooperative education in these special summer projects really any different from the regular co-op students? A pioneer writer in cooperative education like Donald Hunt (1975) related to the process of cooperative education, but did not refer to the impact of active recruitment on students in cooperative education. Does it make a difference? It is the presumption of this study that there are definite values to an organized recruitment effort in the community to not only attract the best qualified students in all particular technical areas, but to sustain the students throughout the course of study and final completion of the program. Therefore, in order to ascertain whether or not there are any differences between recruited co-op students and those not recruited, the following research questions are asked:

1. Are students who enter the Design Technology program through the recruitment process more successful in the program than those who self-selected the program? For this study success will be looked at in terms of grade point average, time necessary to complete the program and whether or not there was a certificate, degree, or noncompletion of students involved.
2. Are students who are recruited into the Design Technology program more successful in terms of their initial entry into the world of work than those students who self-selected? Success for this dimension for entering the field of work will be based on whether the student is full or part-time employed or unemployed, and whether they are placed in an area related to the training they received through their involvement in the program.

3. Is the recruitment as successful both in terms of programmatical variables found in research question one and the world of work related variables found in research question two for both males and females? In other words, are the findings obtained in the research questions one and two equally applicable to males and females?

Significance of the Study

Because of the significance of cooperative education as a determining factor in producing qualified technicians for today's needs, a study of this kind would provide educational leaders with data to proceed in the right direction into the 1980s and beyond. Far too often, the educational planner deals from intuition rather than a well thought plan. Both student and employer can benefit by this type of program. However, does it make a difference whether we recruit that student or only take those who select the program on their own? Is it worth all the effort and time involved to actually go out and sell cooperative education as the best way to go?

Participation in cooperative education programs increases the undergraduate's perception of career preparedness. Alumni of co-
operative education programs reported more complete career information and more adequate information about job opportunities after college than alumni of noncooperative education programs.

Cooperative work experience has considerable impact upon student development during college years. Participation in cooperative education has the following impacts for graduates: improved job skills; clear and more specific career objectives; and closer relationships between their college major and full-time employment after graduation (Brown & Wilson, 1975).

Summary

There seems to be a great deal of information related to cooperative education in general. To specifically relate it to the recruitment aspect of co-op education per se is another story. Therefore, it shall be the primary effort of this study to focus on recruitment as a means of drawing participants or students to programs such as Design Technology and to study the differences between these students and the regularly enrolled co-op students.

As stated in the problem statement earlier, recruited cooperative education students are assumed to be more capable students than the nonrecruited co-op students. However, evidence for this assumption has to be tested.
CHAPTER II

REVIEW OF RELATED LITERATURE

In this chapter, related literature has been reviewed to provide a framework for this study. The primary objective of this study is to investigate the differences between students who were recruited into the co-op process and those students who self-selected cooperative education between the scholastic years of 1977-1981. Traditional academic success is based on achievement as found in Scholastic Aptitude Test scores (SAT), honors received, etc. Data gathered for this study primarily focus on grade point averages, months to complete the program, completion status, and finally whether the student is in full-time employment in a field related to Design Technology.

Recruitment or marketing is reviewed in this chapter as it refers to cooperative education. Recruitment research and the use of co-op education as an incentive for obtaining students is reviewed in the next part of this chapter.

Finally, comparison studies in cooperative education are reviewed with a special emphasis on the first and second national studies and assessment of co-op education. Within this framework, the particular role that women play in the co-op process is reviewed.

The Northeastern University Center of Cooperative Education in Boston, Massachusetts has compiled a catalog of all articles and
information related to the co-op process in its history as gathered by James Wilson (1980). While there are volumes of literature defining and explaining cooperative education, very little has been actually written about the recruiting process by which students learn about cooperative education.

Most studies on cooperative education look at the results of student participation within such a program. Mary Cauley (1979) succinctly described the situation when she stated:

Until the recent decreases in enrollments in two-year public colleges, student recruitment as a research topic received little interest. (p. 64)

Much of the research reported in literature related specifically to efforts to recruit young men and women into technical training programs; these efforts were stimulated by a shortage of technical manpower.

Ernest Leach (1978) outlined a definitive marketing approach for institutional renewal, but looked specifically at such target groups as mentioned above. However, he did point out the value of marketing in days of diminishing enrollments:

As college enrollments begin to stabilize or decline, it is easy to become entrapped in a negative mentality which focuses on reduction in force policies, budget deficits, and program reductions. (p. 3)

He also states:

The discipline of marketing, applied to higher education, offers a positive alternative which has the potential for increasing enrollments, reducing attrition, and making college services more responsive to the needs of student consumers. (p. 5)

Most studies were centered around individual community colleges
and cooperative education rather than the specific topic of recruitment (Soper Associates, 1972). Also, Ellis (1969) researched student recruitment at Pasadena City College in California. His studies were helpful for general guidelines for attracting students to the community college. However, he remained general in his approach rather than specifically touching on such areas as: (a) total recruitment efforts, (b) counselor efforts, (c) recruitment of women into occupational programs, (d) reward system for successful faculty members, and (e) in-service recruitment programs.

The Cooperative Education Research Center at Northeastern University in Boston, Massachusetts has an exhaustive listing of philosophy, history, and roles played by cooperative education in the United States and throughout the world. Dr. James W. Wilson and his staff (1980) have gathered together the most comprehensive collection of articles and papers referring to cooperative education. Among the topics covered are: Philosophy and Objectives; History and Growth; Planning and Implementation; Coordinator's Role; Faculty Role; Administrator's Role; Employer Role; Student Role; Student Outcomes; and Community and Junior Colleges. With this vast storehouse of information at hand, one finds many things related to cooperative education. In the review of all the literature relating to the topic, certain groupings are important. They are: (a) recruitment or marketing; (b) cooperative education as a recruitment tool; (c) satisfaction with the program; (d) listings of institutions being served; and (e) employer satisfaction with cooperative education.

While the research questions asked in this study refer exclu-
sively to differences between recruited and nonrecruited co-op
students at Macomb Community College, a listing of terminology as
found in the research literature will be most helpful to the reader
in understanding the type of students being analyzed.

Recruitment or Marketing

In the American Heritage Dictionary by Morris (1982), the word
recruit is defined in ten different ways. Although this list of
definitions is available, it is evident that no single definition
adequately fills the meaning used in educational circles. This was
the conclusion of Cohen et al. (1977) when presenting a paper on
recruitment for technical education at the National Clinic on
Technical Education that year. They state:

There isn't one definition that really fits anything that
we think of ourselves doing in the field of technical or
occupational education when we are attempting to attract
new students. (p. 68)

However, Cohen et al. and many other educators have had to adopt
specific recruitment tools to show the value of cooperative educa-
tion to the prospective student. Each institution offers uniquely
different programs for a variety of reasons. What might be true in
employment trends in California may not be true in Michigan or Ohio.
Every community has its own defined employment needs. In South-
eastern Michigan, the employment market directly relates to the
automobile industry because a majority of the job openings are in
that area. The recruitment effort for prospective students must
somehow indicate this relationship. Design Technology is no excep-
tion. America needs new downsized, gas efficient, and competitive cars to survive in the future. To accomplish this objective, new stylists, engineers, and computer trained professionals are needed in the industry. The co-op recruiters must go to high schools to entice students to pursue careers in the various fields of Design Technology. Therefore, one of the recommendations to come out of the Community College Vocational Cooperative Education Exemplary Project Report (Ellis, 1969) was to tailor programs to fit employer needs and make the efforts as flexible as possible to increase the number of potential marketable job openings in any given area. Ellis sought to maximize this effort ascertaining factors and problems related to the particular community being served. He specifically pointed out the following important factor:

There is a definite need for the coordination of the total recruitment effort of a given Community College. (p. 105)

He also justified the related expense involved in the recruitment process:

Since student enrollment is a major determinant of financial support, a student recruitment specialist or coordinator can be readily justified on economic grounds. Student recruitment is a very complex and diffuse task that requires a unique leadership role within the college and in the community. (p. 106)

Cooperative Education as a Recruitment Tool

Most of the literature research indicates the value of recruitment as previously mentioned. However, the use of cooperative education as a tool for recruitment is quite limited. Various studies have looked at the importance of a systematic approach of bringing
new students to various two year colleges, but specific reference to the use of cooperative education as an incentive is limited. All of the research questions in the study compare recruited students to nonrecruited students. This aspect has received very little notoriety in all the literature research. Researchers looked primarily at the particulars of co-op education as it related to their own institutions. Dr. Roger Balcom Wadsworth's (1976) study identified student, faculty, and employer perceptions regarding cooperative education at Miami-Dade Community College, South Campus. It was done in order to answer the following questions: Why were so few students involved in co-op? How did students, faculty, and employers learn about the co-op program? Was the faculty supportive of the concept of cooperative education? Should the Miami-Dade program be an all inclusive developmental process or restructured, and if so, in what ways? Were the student perceptions about co-op education accurate?

After this study was completed, very little was determined except the fact that only those directly related with co-op, either students, faculty, and/or employers, were the only ones who were knowledgeable about the whole process. While all agreed a work experience situation was helpful, little else was significant between the co-op and non co-op parties involved. Little or nothing was said about recruitment except that posters found on campus informing students of the cooperative education program was one of two ways students learned about the program. The other way, and the most effective way, was through a co-op coordinator actively recruiting in the community. Employers stated that college mailers on the program
were also most helpful to them. However, attracting employers was sometimes easier than attracting students, as shown in the findings of Bender et al. (1975) of the State University System of Florida at Tallahassee.

To the surprise of many it is more difficult to recruit students than employers, this is true in most cases. One of the major problems is communications. (p. 61)

While this particular study will focus primarily on student responses in the recruitment process, it will also concern itself with employers and their reactions to the cooperative education process. As Bender stated above, the major problem facing both employers and students is communications. How do you effectively put a handle on the term "communication?" No amount of research into the literature involved will give you that all important ingredient of successful programming that is called communications for all parties concerned. One of the subjects for research in this study will be how the message is presented to the prospective cooperative education student and how successful that message is translated into action through the cooperative education process.

The American Technical Education Association in their April 1970 proceedings also stated the problem of attracting qualified students to all fields of related technical education (Marks, 1971).

Representatives from forty-two states and three foreign countries agreed at this particular conference on the growing needs of technical education that qualified students in all areas of technology were most difficult to come by because of the complexity of the various technologies involved. While most in attendance felt that
with adequate information to pretechnical institutions, such as most secondary schools, and preengineering schools, such as community colleges, an adequate supply of technicians could be trained and developed for the ever increasing market in technology and the health occupations. Much time was spent on the topic of "Student Recruitment in Occupational Education." This was previously referred to in the remarks of Cohen et al. (1977) who were also participants at this same significant conference.

Recruitment Research

Until the recent decreases in student enrollments at two year public colleges, student recruitment as a research topic received little attention or interest. Much of the research reported in the literature relates specifically to efforts to recruit only young men into technical training programs. Krejcie (1978) surveyed a national sampling of public junior colleges as it related to recruitment for industrial technical and/or engineering technician programs and the consequences for individual students involved as determined by their actual responses to encourage engineering enrollments, colleges made intensive use of such media as motion or still pictures of shop facilities and personal letters to potential students. Neither had much impact on student's decisions to enroll. Students indentified the media that had the greatest effect on their decisions to enroll as (a) college catalogs, (b) booklets, leaflets, and flyers on job opportunities, (c) articles in newspapers that described the programs and subsequent job opportunities, and (d) motion and still
pictures on career opportunities for program graduates.

Krejcie's (1978) study points out the disparity between perceived influences of attracting students by college personnel and actual influences as documented by student responses. The fact that college personnel were inaccurate in judging the effects of their practices was evident in that 25% of them felt contacts with high school counselors had the greatest effect, while only 9% of the students agreed. Whereas 9% of the college personnel felt college and career days in high schools were important contacts, only 3% of the students agreed. Interviews with students in the high schools were felt to be important by 31% of the college personnel and by only slightly over 1% of the students. While only 5 and 2%, respectively, of the college personnel felt high school teachers and employers were important contacts, they were important to 12% and 6%, respectively, of the students.

It was apparent from Krejcie's (1978) findings that exhibits, open houses, career days, conferences at both the colleges and the high schools, and interviews with interested students had much less impact on prospective enrollees than they should have based upon the college's working through high school teachers in sponsoring contests for high school seniors and in providing open houses to shop areas. Instead, these contacts had proportional impact. Finally, Krejcie concluded:

Since the college representatives reported extensive and moderate use of more practices and media than those reported as influential by students, it would appear that many of the reporting colleges are spending money and wasting time on certain nonproductive practices and media. (p. 83)
Various recruitment studies such as Campbell (1977) at Northwestern University, Richards (1969) at New York Community College, and Blai (1974) at Harcum Junior College in Pennsylvania, indicate media techniques used to attract students to their particular institutions. However, none mentions the possibility of a Cooperative Education program except where specifically mentioned in printed flyers and for catalogs for interested students. Most studies, such as the one completed by Sheaton and Wagner (1976) in their Wisconsin recruitment study, found that the institutional characteristic that most influenced the respondents' enrollment decision was the programs available. Second in importance was the proximity of the institution to the respondents' residences, and third, reasonable cost. Campbell's (1977) findings compare favorably with those of Sheaton and Wagner (1976) in that the program available was the most influential institutional characteristic. Few, if any, studies cite the factor of cooperative education as a factor in drawing students to the institution or holding them there once enrolled.

Comparison Studies in Cooperative Education

Several studies have been carried out in the U.S. which considered differences in academic performances between students in standard courses and students in cooperative courses. For example, Smith (1965) compared two groups of students who differed only in whether they were enrolled in a cooperative course or in a standard course; they did not differ on initial grade index, mean IQ or mean T scores (a measure of academic performance). Smith (1965) reported
a trend that in junior and senior years, and especially in the latter, cooperative students had an advantage over full-time students with respect to cumulative grade index. Similar results were obtained by Lindenmeyer (1967). Marks and Wohlford (1971) also found cooperative students to have better academic performance than students in standard courses. However, in contrast to the results of Smith (1965) and Lindenmeyer (1967), the differences were greater at first and second year levels. The researchers suggested an interpretation in terms of the possible greater vocational orientation of the cooperative students on entry to the course. The interpretation highlights a common problem, namely that it is not always possible to distinguish the effects of the cooperative course from the effects of differing personal characteristics between the two (cooperative and full-time) groups—effects which are not easily measured or controlled.

There are few studies to date that compare various types of cooperative education students who have been recruited and those who become involved in co-op after a period of time in school. Most studies compare the cooperative education student with the non co-op student as to completion, social development as described by Tyler (1971) or their maturation as outlined by Marks and Wohlford (1971).

A different approach was used by Smithers (1976), who analyzed cooperative students before industrial experience and after each industrial period. Students had high expectations of industrial experience with regard to its effect on social skills and self-confidence, and the high ratings were matched by the ratings of
actual experience.

The review of related literature with regards to the research questions being asked, such as comparative grade point averages (gpa's), program completion, initial job placement and economic factors involved, show little or no research in these areas. In the attempt to research these particular concerns, certain literature findings became helpful. For approximately fifty years, cooperative education operated with only assumed advantages to students. Only a few research studies were undertaken prior to 1961 (Baskin, 1954; Coleman, 1974; Mosbacker, 1957; Smith, 1944). These studies indicated that cooperative education provided realistic orientation to work, effective interpersonal relationships, and academic values. However, there were serious methodological problems with these studies. On the golden anniversary in 1956 of the founding of the cooperative education at the University of Cincinnati, Charles Kettering called for the substantiation of the advantages of cooperative education. As a result, the First National Assessment of Cooperative Education (Wilson & Lyons, 1961) was commissioned.

Another such study was not undertaken until sixteen years later. These two national assessments of cooperative education (Cohen et al., 1977; Wilson and Lyons, 1961) have provided the principal documentation of the value of cooperative education to college students.

The First National Assessment of Cooperative Education

The purpose of the First National Assessment of Cooperative
Education was to substantiate previously undocumented benefits to the student, to the employer, and to the academic institution. The study was concerned with only those findings relevant to the student population (Wilson and Lyons, 1961).

Both mailed questionnaires and personal interviews were used to collect the data. Questionnaires were mailed to 4012 students. A total of 2476 students responded. Data gathered on students were analyzed by means of descriptive statistics and were tested in the study in regards to benefits to the student, to the employer, and to the academic institution.

One outcome of the analysis was that the participants and non-participants in cooperative education did not differ distinctly with respect to: (a) high school achievement, (b) activities engaged in during the high school years, (c) honors received, (d) Scholastic Aptitude Test (SAT) scores, (e) academic achievement as measured by Graduate Record Examination (GRE) scores, and (f) education beyond the bachelor's level. In addition, Wilson and Lyons (1961) identified five areas in which a significant difference was found between the responses of cooperative education students and those of non-cooperative education students. As a result, Wilson and Lyons concluded that:

1. Theory and practices were more closely integrated for the co-op student.

2. The coordination of work and study increased student motivation.

3. Work experience contributed to a greater sense of responsi-
bility for the student's own effort, greater dependences on their own judgment and development of maturity.

4. Students developed greater understanding of other people and greater skills in human relations.

5. Cooperative education helped to orient college students to the world of work (p. 56).

These areas were subsequently identified as the advantages that accrue to students in cooperative education.

Wilson and Lyons (1961) also identified five "assumed advantages" to students. The designation of "assumed advantages" was given to those areas of inquiry which did not prove to be significantly different for the two groups of students, but to which more cooperative education students, than noncooperative education students, responded. The "assumed advantages" were:

1. Students' earnings contribute to financing their own education.

2. Students, carried as productive employees, with period ratings of their performance usually developed good work habits.

3. As team members in a real and productive working environment, students developed a seriousness of life and purpose.

4. As a result of alternating between the college and the cooperative position, students tended to appreciate better the role of each environment.

5. Students experienced a smoother transition into full-time employment after their cooperative experience (p. 58).

This study proposes that there is a difference between recruited
co-op students and students who self-selected the program in the comparison of data as to completion status (noncompletion, certificate, or degree), related job placement, and full or part-time employment. Further research is needed to clarify these points.

The Second National Assessment of Cooperative Education

Beginning in 1974, Frankel undertook the second national assessment of cooperative education. This study had four areas of inquiry: (a) an analysis of costs and benefits of cooperative education, (b) an assessment of the potential to expand cooperative education at the postsecondary level, (c) an assessment of the effectiveness of the federal funding mechanism, (d) an assessment of the role of cooperative education as a career education mechanism. Results of the fourth area of inquiry were of interest to this study.

Data relevant to the issue of cooperative education as a career education experience were collected by means of questionnaires and personal interviews. Respondents included cooperative education students (n=1560), noncooperative education students (n=2303), graduates of cooperative education programs (n=2212).

Cohen et al. (1961) viewed the primary objectives of career education as: (a) providing students with opportunities to explore and prepare for a variety of available careers, and (b) preparing students to cope with the occupational and nonoccupational characteristics of our society. Results of the inquiry were reported under three headings: (a) career selection and preparation, (b) career plans, and (c) career advancement.
Analysis of the data was performed using descriptive statistics to test differences regarding career selection and preparation, career plans, and career advancement. There were four findings of interest with regard to career selection and preparation.

1. Students in cooperative education programs had a better chance of obtaining a relevant job while in school. The difference was found within each of the five occupational areas studied.

2. More cooperative education graduates were able to obtain jobs related to their major (58%) that were noncooperative education graduates from the same school and same major.

3. The employer was the component of the cooperative education system which provided much of the career education.

4. Support was found for the contention that participation in cooperative education assisted the graduate in obtaining the first related job through cooperative employer contact and "in-school" efforts.

Brown (1976) reported specific outcomes associated with women in cooperative education. While this particular study focuses on both men and women and their comparison, the female aspect of women in cooperative education revealed the following data:

1. They married later.

2. They had children later.

3. They pursued careers for longer periods of time prior to starting a family.

4. They were employed ten years after graduation in more non-traditional jobs than the noncooperative education alumnae (p. 72).
These outcomes replicated Mosbacker's (1957) findings in a follow-up study of 306 women graduates of the cooperative education program at the University of Cincinnati. In addition, she found that 60.8% of these women indicated that they entered the same career and continued in that career. Twelve and seven-tenths percent entered related careers. In addition, 75.5% did not change jobs during the first two years and 18% made only one job change. Brown (1975) studied the impact of cooperative education on women's career choices. A total of 629 women responded to the questionnaire. The following findings were among those reported by Brown:

1. A greater proportion of women who participated in cooperative education reported career related reasons for changing majors than did women who did not have cooperative education experience.

2. A greater proportion of women in cooperative education programs changed undergraduate majors than did non co-ops.

3. Considering the variables examined in this research, the prime determinant is whether a woman pursued a traditional or nontraditional career path as her choice of an undergraduate college major.

4. Participation in cooperative education also influenced some women to choose nontraditional careers.

5. Alumnae who had undergraduate job experiences that related to their major perceived their career preparation more favorably than alumnae with unrelated experiences (pp. 1-10).

Conclusions of Women in Cooperative Education

Brown (1975) concluded that academic major impacted on a women's undergraduate work experience, including cooperative education, as well as the career choices following graduation. The conclusion was
drawn that work experience, particularly cooperative education, had a positive impact on the career development of college women. This compares favorably to other studies on men who shared the same cooperative education and experiences as noted by Marks and Wohlford (1971). Cooperative education was also a most positive experience.

Kany (1973) was interested in determining whether trends noted in the interviews were attributable to the variable of sex or to the variable of cooperative education experience. No statistical procedures were used to analyze the data. Kany reported observed differences between men and women in the studies. Two differences were reported. The first difference was the tendency for men to have more significant early jobs, and to continue to build career plans on these experiences. The second difference was that males in the study exhibited more awareness of a concern about job market realities in their field. According to Kany, the central impression emerging from these two studies was that "while the cooperative system seems to offer potential benefits to both men and women students, outcomes differ" (p. 60). No studies were found which accounted for the effects of cooperative education on the career development process of men or women. Nonetheless, there were tentative indications that participation in cooperative education related to career selection and preparedness.

Summary

Several differences are thought to exist between recruited and self-selected students in the co-op process. Recruited students are
assumed to be of greater capability, complete their studies with a certificate or degree at a faster rate than the self-selected student and obtain a full-time position in the field they studied in Design Technology. It is also thought that women do not fare as well as men in this whole process because they are in a nontraditional role for women. Empirical evidence indicates that students who have been wooed into cooperative education have a better chance of success than those who merely happen upon the program.

Statement of the Research Hypotheses

With presumed belief that students who are enticed into cooperative education will have a decided advantage over those who self-selected cooperative education, differences that actually exist between the two groups need to be identified.

This study, therefore, conjectures the following research hypotheses to be tested and analyzed:

1. There is a difference in the grade point average for those students who are recruited into the Cooperative Education Program in Design Technology versus those student who self-selected the program.

2. There is a difference in the time necessary to complete the program for those students who are recruited into the Cooperative Education Program in Design Technology versus those students who self-selected the program.

3. There is a difference in completion status between those students who are recruited and those who self-selected.

4. There is a difference in the proportion of initial job
placements which are program related for those who have been recruited versus those who have self-selected the program.

5. There is a difference in the proportion of full-time placements for those who have been recruited versus those who have self-selected the program.

6. There is a difference in the proportion of males and females who are successful in the program and the world of work. This difference is based on the following factors: (a) grade point average, (b) time to complete, (c) completion status, (d) related placement, and (e) full-time placement.

Chapter Summary

This chapter has presented a review of literature related to recruitment, cooperative education as a recruitment tool, comparison studies in cooperation education, and the National Assessments of Cooperative Education as they all relate to the success within the educational process. It also looked at women in cooperative education and their success in the process.

Success is measured in terms of academic achievement, completion time, and status. It is also determined by successful full-time employment in areas directly related to prescribed fields of study. Those who are drawn to the program with the enticement of these successes are presumed to be a more capable student than those who merely enter the process by their own volition and choice.

Differences are considered to exist between the recruited and self-selected students in cooperative education. These are possibly
due to the emphasis that is placed upon these highly recruited students as compared to their counterparts who choose the program on their own volition. This study is designed to test these differences and has proposed six research hypotheses.

Chapter III will discuss the specific methodology of this study.
Chapter III contains an overall view of the various components and methods to be used in the study. The information covered in this chapter includes the data collection processes in which all the various types of information were found so that adequate testing and analysis were performed. The second aspect of this chapter is the actual delineation of the design of the study in which the various hypotheses tested are stated and explained, identifying the variables concerned and method of measurement involved. Finally, the chapter concludes with a description of analyses concerned in testing and evaluating the hypotheses found in this study. The population described throughout this chapter is from the Cooperative Education Program in Design Technology at Macomb Community College (MCC). The study looked at the success of various categories of students who were in the program to see if there are any differences between recruited co-op students and students who self-selected the co-op program. It asks the basic question: Are there any differences between the students who are recruited into the program and those who self-selected the program on their own?

The Population

The recruited co-op students are usually high school drafting
students who are visited by one of two co-op coordinators. They are presented with program information sheets which outline how they will alternate classes with the co-op learning experience. They are given the assurance that after successfully completing certain preliminary courses in Design Technology in the previously mentioned programs, they will be placed in a co-op experience. These students are usually the successful high school students who have had a good drafting experience in their high school vocational program. They have shown an aptitude and desire to become proficient in this area. An added factor of recruitment is the situation whereby these students are taught by a high school faculty member who also teaches on a part-time basis at MCC in the Design Technology programs. Each student and the student's parents attend an information meeting on a selected date in May each year to meet with faculty representatives, co-op advisors, and members of the co-op advisory board. Often there is a representative group of current students also on hand to inform prospective students of the role that cooperative education plays in their development. The various handouts distributed by co-op staff completely explain the co-op program in detail to the interested students. One hypothesis in this study deals with the differences between recruited and nonrecruited students who self-selected cooperative education as a means to achieve their goals. The literature research also deals with success, program completion, job placement, and sex. However, the results of prior research fail to give an adequate answer to the questions being asked in this study.

The other group of students involved in this study are students
who came to MCC through the normal channels to begin their studies. They enrolled in courses and programs similar to those of the recruited students, but were not specifically recruited into the co-op program. For our particular purposes in this study, these students are called those who self-selected the co-op program.

Non-recruited students are not necessarily recent high school graduates. They may be older students who vary in age from twenty to thirty-five. They may be the nontraditional college student such as a returning housewife, laid off factory worker, or a career change individual seeking new opportunities and skills. They are more of a collection of individuals seeking to better their employment skills by learning through the cooperative education program. Eventually, some of these students find their way into the Cooperative Education program. However, some will complete their education before entering the job market, or will pursue a four year degree at an institution of higher learning in the area. Those not involved in the co-op program are not included in the study. A total of 250 students were surveyed. One hundred ninety-three were males and 57 were females. One hundred fifty-one were recruited co-op students and 99 were self-selected co-op students.

Data Collection Process

The data base came from those students who attended MCC between 1977 and 1981. Each student has an unofficial transcript that includes all the pertinent data needed for the sample. This includes combined grade point average, program completion, credit hours com-
pleted, recruitment status, sex, and program completion status. Records also include social security numbers, home addresses, and personal data for tracking students. Transcripts do not include job placement status of either the initial or present job. This information was gleaned from data stored in the co-op office. A short informational survey to former students was necessary to complete this data gathering process. Fortunately, the accurate attention to detail regarding each student involved in the co-op process proved most helpful in gathering the information needed to complete this study. By identifying each student with care, important data were available for comparison and analysis in this study. Also, other information in the Registrar's office, such as certificates awarded and degrees granted, were additional data sources needed to complete this research. A third data collection source was the Technical Education office itself. That is the home base for the Design Technology program where these students receive advice and direction in such things as course offerings, scheduling, and faculty assignments. The Technical Education office also houses the student records on program completion. So in essence, there were several areas concerned in collecting the data needed to adequately list and analyze the information sought.

Design of the Study

The research focused on six different hypotheses that take their emphasis from the research questions as detailed in Table 1 in their operational form. There is one independent variable with two cate-
gories. The first category is the recruited co-op student. The second category is the student who self-selected the program after enrolling at the college apart from the recognized recruitment process. The dependent variables concerned in all the hypotheses are grade point averages (gpa), time to complete the program, and whether or not they received a certificate, degree or merely dropped out before completion. Other comparisons of groups tested are related or unrelated initial job placements in either a full- or part-time capacity. The final hypothesis compares the differences between the males and the females in the program to see if there is any difference as to all the variables tested in the earlier hypotheses.

Therefore, this is basically a two group design intended to provide information as to the value of the recruitment process used in Design Technology at MCC. There are two dichotomous variables with two levels: participation by the recruitment process and those who merely self-selected the program. A second independent variable, which is also dichotomous in nature with two levels, is the sex of the participant concerned, male or female.

A summary of this study design is presented in Table 1.
Table 1
Summary of Study Design

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Variable</th>
<th>Source of Data</th>
<th>Acceptable Values</th>
<th>Operational Values</th>
<th>Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Program Entry</td>
<td>Co-op Office, Registrar, Tech Ed. Office</td>
<td>1 = Recruited, 2 = Self-Selected</td>
<td>Mean of G.P.A.'s Recruited Co-op, Self-Selected Co-op</td>
<td>t-Test 1 Tailed, .05 Significance</td>
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<td>G.P.A.</td>
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<td>Range 0.00 to 4.00</td>
<td>Mean of G.P.A.'s Recruited Co-op, Self-Selected Co-op</td>
<td>t-Test 1 Tailed, .05 Significance</td>
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<td>II</td>
<td>Program Entry</td>
<td>Co-op Office, Registrar, Tech Ed. Office</td>
<td>1 = Recruited, 2 = Self-Selected</td>
<td>Average Length in Program Recruited Co-op, Self-Selected Co-op</td>
<td>t-Test 1 Tailed, .05 Significance</td>
</tr>
<tr>
<td></td>
<td>Program Completion</td>
<td>Co-op Office, Registrar, Tech Ed. Office</td>
<td>Range 1-60 Months</td>
<td>Average Length in Program Recruited Co-op, Self-Selected Co-op</td>
<td>t-Test 1 Tailed, .05 Significance</td>
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<td>III</td>
<td>Program Entry</td>
<td>Co-op Office, Registrar, Tech Ed. Office</td>
<td>1 = Recruited, 2 = Self-Selected</td>
<td>Recruited Co-op, Self-Selected Co-op</td>
<td>Chi-Square, .05 Significance</td>
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<td></td>
<td>Completion Status</td>
<td>Co-op Office, Registrar</td>
<td>Status: 1 = Non Complete, 2 = Certificate or 31 sem. hrs., 3 = Degree, 4 = Both, 5 = Other</td>
<td>Proportion of Group Total</td>
<td>Chi-Square, .05 Significance</td>
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</table>
Table 1 - Continued

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Variable</th>
<th>Source of Data</th>
<th>Acceptable Values</th>
<th>Operational Values</th>
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<td>1 = Recruited 2 = Self-Selected</td>
<td>Recruited Co-op Self-Selected Co-op</td>
<td>Chi-Square .05 Significance</td>
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<td>Related to Program of Study</td>
<td>Surveys to Former Co-op Students</td>
<td>Status 1 = Related 2 = Not Related</td>
<td>Proportion of Group Total</td>
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<td>V</td>
<td>Program Entry</td>
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<td>Full or Part-time Placement</td>
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<td>Program Entry</td>
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<td>Gender</td>
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<td>Mean G.P.A.</td>
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<td>Hypothesis</td>
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<td>Acceptable Values</td>
<td>Operational Values</td>
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<tr>
<td>C) Completion</td>
<td>Status</td>
<td>Co-op Office</td>
<td>Status</td>
<td>Proportion of Group Total</td>
<td>Chi-Square .05 Significance</td>
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<td>Surveys to</td>
<td>Status</td>
<td>Proportion of Group Total</td>
<td>Chi-Square .05 Significance</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Former Co-op</td>
<td>1 = Related</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Students</td>
<td>2 = Not Related</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E) Full or</td>
<td>Part-time Placement</td>
<td>Surveys to</td>
<td>Status</td>
<td>Proportion of Group Total</td>
<td>Chi-Square .05 Significance</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Former Co-op</td>
<td>1 = Full-time</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Students</td>
<td>2 = Part-time</td>
<td>Employment</td>
<td></td>
</tr>
</tbody>
</table>
The following are operational versions of the research hypotheses listed in this study:

**Hypothesis I:** There is a difference in the mean grade point average for those students who are recruited into the Design Technology program versus those students who self-selected the program.

**Hypothesis II:** There is a difference in the mean time required for program completion for those students who are recruited into the Design Technology program versus those students who self-selected the program.

**Hypothesis III:** There is a difference in the proportion of completion status for those students who are recruited into the Design Technology program versus those students who self-selected the program.

**Hypothesis IV:** There is a difference in the proportions of initial job placements which are program related for those who have been recruited into the Design Technology program versus those who have self-selected the program.

**Hypothesis V:** There is a difference in the proportions of full-time placements for those who have been recruited versus those who have self-selected the Design Technology program.

**Hypothesis VI:** There is a difference in the proportions of males and females who are successful in the Design Technology program and the world of work. This difference is based on the following factors: (a) gpa, (b) time to complete, (c) completion status, (d) related placement, and (e) full-time placement.

In addition to responding directly to the hypotheses of this
study, the researcher obtained other demographic information, such as age, sex, and race for a more complete profile.

Analysis of Data

In Hypotheses I and II, the independent variable is the type of program entry, recruited or self-selected. The source of data was records found both in the Co-op office and Registrar's office, as well as the Technical Education office. The dependent variables are the grade point average for Hypothesis I and the time to complete for Hypothesis II—both are interval levels of measurement. The acceptable values are a range of 0.00 to 4.00 in testing the gpa's and one to sixty months in testing the completion time. The analysis used a one-tailed t-test to test for a difference between the independent means of the gpa's and to test for a difference in the number of months to complete the program. An alpha level of .05 for committing type I error was used.

In Hypotheses III, IV, and V, the independent variables are again the type of program entry, recruited or self-selected. The level of measurement is nominal. The dependent variables are the completion status (Hypothesis III), initial job placements which are relevant to the field of study (Hypothesis IV), and full-time or part-time placements (Hypothesis V).

This level of measurement is nominal with acceptable values as determined by the hypothesis. The analysis for each of these hypotheses was tested by a Chi-square test with an alpha level of .05.

In Hypothesis III, the dependent variable is trichotomous with
the levels of noncompletion, certificate, and associate degree. In Hypothesis IV, the dependent variable is dichotomous with two concerns, related job placement or not related. In Hypothesis V, the dependent variable is dichotomous based on whether final job placement position is full or part-time. Hypothesis VI is a combination of the other five hypotheses, because the information tested is based on the male/female factor which impacts on the first five hypotheses.
CHAPTER IV

RESULTS

This chapter contains the findings of the study. The data were analyzed by using the SPSS analytical data system currently being used by Macomb Community College in collaboration with Wayne State University, (Nie, Hull, Jenkins, Steinbrenner, & Brent, 1975). The main purpose of this study was to determine differences between students who were recruited into the cooperative education process in Design Technology and those who self-selected co-op education as a means to obtaining an education and a good paying employment opportunity.

General Characteristics of the Population

For purposes of this study, the entire population of 250 students in the Cooperative Education Program from 1977-81 were analyzed. The recruited students in this group numbered 151. The self-selected students numbered 99. All these students were analyzed as to the first three hypotheses involved in the study. These concern gpa's, months to complete the program, and type of completion (non-completion, certificate, associate degree, or both associate degree and certificate).

Surveys were sent to all the participants to test the fourth and fifth hypotheses as the employment related to their particular field
of study and as to whether or not they were in full or part-time positions.

In Hypothesis VI, all 250 students are involved in the comparison analysis between males and females within the Cooperative Education Program between the years of 1977-81. Of this grouping, 193 were male participants and 57 were female participants.

Grade Point Averages

Grade point averages are one of the best indicators of one's scholastic achievements. With a range from 0.00 to 4.00, students are scholastically measured as to their achievements within the classroom. Students maintaining a 4.00 grade point average have achieved a perfect academic record of excellence. Most students range somewhere between 2.00 and 4.00. By measuring the means of the recruited and self-selected co-op students with respective grade point averages, a representative average is obtained. This gpa is based on the total accumulative courses taken by the students involved. Table 2 reports the mean and median gpa's of recruited co-op students, of students who self-selected co-op programs and an overall combination of both recruited and self-selected students.

By looking at three different aspects of gpa's, which number 250 overall, the comparison is made to show how each group compares to one another for purposes of the study. One hundred fifty-one of these students are recruited students and 99 are self-selected students.
Table 2
Grade Point Average of Co-op Students

<table>
<thead>
<tr>
<th>Grade Point Average</th>
<th>All Co-op Students</th>
<th>Recruited Co-op Students</th>
<th>Self-Selected Co-op Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>3.11</td>
<td>3.08</td>
<td>3.15</td>
</tr>
<tr>
<td>Median</td>
<td>3.19</td>
<td>3.17</td>
<td>3.22</td>
</tr>
<tr>
<td>Standard Dev.</td>
<td>0.55</td>
<td>0.56</td>
<td>0.54</td>
</tr>
<tr>
<td>N</td>
<td>250</td>
<td>151</td>
<td>99</td>
</tr>
</tbody>
</table>

Time to Complete Program

Time to complete a program at Macomb Community College is based on the number of months involved to finish the program. Usually after thirty-one (31) credit hours a student is eligible for a certificate in General Studies. However, a student may formally request a certificate in a particular area of study after completing prescribed credit hours in required courses. For the purposes of this study, completion can be achieved in one of three ways: (1) certificate or 31 credit hours earned, (2) associate degree in area of specialization, (3) both associate degree and certificate. A fourth way of completing is a degree in an unrelated area. In this study less than 1% fall into this category. The other variable not considered in Table 3 is the student who does not complete either through a certificate or associate degree or 31 earned credit.
hours. These students are recorded as non-completers in Table 4.

The months to complete could vary from a minimum of 24 (two years) to a maximum of 96 (eight years). Most students in the co-op program finish somewhere between 24-48 months because of the time they spend in co-op assignments apart from the classroom semesters. Co-op students usually begin their work experiences after one successful year in the classroom to prove they can achieve competence in the workplace. Some rare students co-op after one successful semester depending on need and availability of co-op assignments.

Table 3 of this study includes only the 216 students who completed the program with some type of certificate, degree, or both. One hundred twenty-six of these students were recruited co-op students and 90 were students who self-selected the co-op program as mentioned earlier. Non-completers or those who have received no certificate or degree are justly classified in this category as referenced in Table 4 of this study. This distinction was done to clarify the actual time delineated to successfully complete the program with some type of recognition. By separating this data, a true comparison of information can be generated that accurately reflects the months it took for a student to complete the program. Months are used because they can be used as an indicator of the student's time to complete the program in some measurable data form.
### Table 3
**Time to Complete Program**

<table>
<thead>
<tr>
<th>Months</th>
<th>All Co-op Students</th>
<th>Recruited Co-op Students</th>
<th>Self-Selected Co-op Students</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>12</td>
<td>2</td>
<td>0.9%</td>
<td>1</td>
</tr>
<tr>
<td>24</td>
<td>72</td>
<td>33.3%</td>
<td>56</td>
</tr>
<tr>
<td>30</td>
<td>6</td>
<td>2.8%</td>
<td>2</td>
</tr>
<tr>
<td>36</td>
<td>61</td>
<td>28.2%</td>
<td>37</td>
</tr>
<tr>
<td>42</td>
<td>1</td>
<td>0.5%</td>
<td>1</td>
</tr>
<tr>
<td>48</td>
<td>40</td>
<td>18.5%</td>
<td>18</td>
</tr>
<tr>
<td>54</td>
<td>1</td>
<td>0.5%</td>
<td>0</td>
</tr>
<tr>
<td>60</td>
<td>21</td>
<td>9.7%</td>
<td>10</td>
</tr>
<tr>
<td>66</td>
<td>1</td>
<td>0.5%</td>
<td>0</td>
</tr>
<tr>
<td>72</td>
<td>3</td>
<td>1.4%</td>
<td>0</td>
</tr>
<tr>
<td>84</td>
<td>6</td>
<td>2.8%</td>
<td>1</td>
</tr>
<tr>
<td>96</td>
<td>2</td>
<td>0.9%</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>216</td>
<td>100.0%</td>
<td>126</td>
</tr>
<tr>
<td>Mean # of Months</td>
<td>38.9</td>
<td>34.6</td>
<td>44.9</td>
</tr>
<tr>
<td>Standard Dev.</td>
<td>15.79</td>
<td>12.24</td>
<td>18.11</td>
</tr>
</tbody>
</table>

**Program Completion Status**

Program completion status may be ascertained in one of five ways. The first category is that of a student who simply drops out before completing a certificate or thirty-one (31) earned credit hours. This student is categorized for this study as a non-completer.
They do not obtain a certificate or an associate degree. The second category is that of one who completes with either 31 earned credit hours or a certificate which is granted after one successfully passes certain core courses. The third category is that of one who fulfills both core courses and required General Education requirements which usually are 18 credits in selected courses in Liberal Arts. These students receive an Associate Degree in the field of their particular study. The fourth category is that of one who receives both a certificate and an associate degree. The final classification, which is minimal, is those students who complete with an associate degree in an entirely unrelated field of study.

The total number of students involved in Table 4 includes all who were in the program: 250. One hundred fifty-one of these students were recruited co-op students while 99 were self-selected students in the same time period. Completion status takes on greater meaning when the data show the percentage of those students who did not complete the program as compared to those who did complete the whole process. This is a distinction from Table 3 where only those students who completed in a time frame of 1977-81 were compared.
Table 4

Program Completion Status

<table>
<thead>
<tr>
<th>Status</th>
<th>All Co-op Students</th>
<th>Recruited Co-op Students</th>
<th>Self-Selected Co-op Students</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>Non-Complete</td>
<td>34</td>
<td>13.6%</td>
<td>25</td>
</tr>
<tr>
<td>Certificate or 31 Credit Hrs.</td>
<td>76</td>
<td>30.4%</td>
<td>57</td>
</tr>
<tr>
<td>Associate Degree</td>
<td>94</td>
<td>37.6%</td>
<td>48</td>
</tr>
<tr>
<td>Certificate &amp; Degree</td>
<td>43</td>
<td>17.2%</td>
<td>19</td>
</tr>
<tr>
<td>Other</td>
<td>3</td>
<td>1.2%</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>250</td>
<td>100.0%</td>
<td>151</td>
</tr>
</tbody>
</table>

Employment Related to Co-op Program

Table 5 pertains to employment related to specific programs in Design Technology; it shows 96.4% of all employed co-op students to be in a related field. Students have the option of several programs including Auto Body Design, Tool & Fixture Die Design, Special Machine Design, and programs in Technical Illustration. Any one of these programs prepares one for related work in industry. Co-op students specifically study for these areas of employment. However, because economic downturns and competition within the work world, some students have to settle for employment opportunities outside their field of training and study. For example, if a student trains and studies
for a career in Auto Body Design and takes a job as a manager of a fast food restaurant, he or she is not in a field of employment related to their specific field of study. This is an obvious case of non-related employment.

Table 5
Employment of Survey Respondents

<table>
<thead>
<tr>
<th></th>
<th>All Co-op Students</th>
<th>Recruited Co-op Students</th>
<th>Self-Selected Co-op Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>Related Field</td>
<td>80 96.4%</td>
<td>45 100.0%</td>
<td>35 92.1%</td>
</tr>
<tr>
<td>Non-Related Field</td>
<td>3 3.6</td>
<td>0 0.0</td>
<td>3 7.9</td>
</tr>
<tr>
<td>Total</td>
<td>83 100.0%</td>
<td>45 100.0%</td>
<td>38 100.0%</td>
</tr>
</tbody>
</table>

Full-Time Employment From Program

Full-time employment in a related position to the co-op student's training is determined by the amount of hours one is currently working per week. If one is working 35 or more hours per week, this individual is considered to have a full-time job. Part-time work would be anything less than this. Students who co-op while attending classes sometimes work on a part-time basis. This study is concerned with initial job placement or employment after participation in the program. Table 6 indicates that 92.8% of all employed co-op students are full-time employed.
Table 6  
Employment Status of Survey Respondents

<table>
<thead>
<tr>
<th>Employment</th>
<th>All Co-op Students</th>
<th>Recruited Co-op Students</th>
<th>Self-Selected Co-op Students</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>Full-Time</td>
<td>77</td>
<td>92.8%</td>
<td>41</td>
</tr>
<tr>
<td>Part-Time</td>
<td>6</td>
<td>7.2</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>83</td>
<td>100.0%</td>
<td>45</td>
</tr>
</tbody>
</table>

Male vs. Female Co-op Students

Table 7 separates the male and female students to ascertain the gender composition of the two groups. Apart from the Technical Illustration positions in industry which have been filled by women in a more proportionate number than other fields of Design Technology, a predominate number of males are employed in these fields. An increasing number of women has proved not only capable, but even in demand because of academic achievements and successful co-op internships.

Table 7 of this study shows the predominance of males over females who were recruited into the program (88% males versus 12% females). The predominance is not as great among the self-selected group.
Table 7
Gender of Co-op Students

<table>
<thead>
<tr>
<th>Gender</th>
<th>All Co-op Students</th>
<th>Recruited Co-op Students</th>
<th>Self-Selected Co-op Students</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>Male</td>
<td>193</td>
<td>77.2%</td>
<td>133</td>
</tr>
<tr>
<td>Female</td>
<td>57</td>
<td>22.8%</td>
<td>18</td>
</tr>
<tr>
<td>Total</td>
<td>250</td>
<td>100.0%</td>
<td>151</td>
</tr>
</tbody>
</table>

Grade Point Averages for Male-Female Co-op Students

As with Table 2 of this study where gpa's of recruited co-op students were compared with those who self-selected the program, Table 8 separates the males from the females and compares specific grade point averages on a scale from 0.00 to 4.00. There is a higher proportion of males to females because of the male dominated fields involved in Design Technology. However, scholastic achievement is not a perogative of any one sex. It is a measure of one's abilities and talents and how one successfully uses them. Table 8 shows a slightly higher gpa for women (3.25) as compared to men (3.06) in the program.
Table 8
Grade Point Average For Male and Female Co-op Students

<table>
<thead>
<tr>
<th>Gender</th>
<th>N</th>
<th>Mean gpa</th>
<th>Standard Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>193</td>
<td>3.06</td>
<td>0.57</td>
</tr>
<tr>
<td>Female</td>
<td>57</td>
<td>3.25</td>
<td>0.47</td>
</tr>
<tr>
<td>Total</td>
<td>250</td>
<td>3.10</td>
<td>0.52</td>
</tr>
</tbody>
</table>

Time to Complete Program as Regards Male-Female Components

As in Table 3 of this study, time to complete the program is measured in months instead of semesters. Two years would be the equivalent of four semesters. Table 9 shows that the range of months can go from 12 to 96 months, depending on how long it took for a student to finish either 31 earned credit hours or a certificate. Again, the normal co-op student divides his or her time between the workplace and the classroom which would tend to extend the time of completion for the individual student involved. The mean number of months for completion is 42 months.
Table 9

Time to Complete Program

<table>
<thead>
<tr>
<th>Months</th>
<th>Female</th>
<th></th>
<th>Male</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>Less than 12</td>
<td>3</td>
<td>5.3%</td>
<td>32</td>
<td>16.6%</td>
</tr>
<tr>
<td>12</td>
<td>1</td>
<td>1.8</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>24</td>
<td>14</td>
<td>24.6</td>
<td>58</td>
<td>30.1</td>
</tr>
<tr>
<td>30</td>
<td>2</td>
<td>3.5</td>
<td>4</td>
<td>2.1</td>
</tr>
<tr>
<td>36</td>
<td>14</td>
<td>24.6</td>
<td>47</td>
<td>24.4</td>
</tr>
<tr>
<td>42</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>48</td>
<td>11</td>
<td>19.3</td>
<td>29</td>
<td>15.0</td>
</tr>
<tr>
<td>54</td>
<td>1</td>
<td>1.8</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>60</td>
<td>6</td>
<td>10.5</td>
<td>15</td>
<td>7.8</td>
</tr>
<tr>
<td>66</td>
<td>1</td>
<td>1.8</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>72</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>1.6</td>
</tr>
<tr>
<td>84</td>
<td>3</td>
<td>5.3</td>
<td>3</td>
<td>1.6</td>
</tr>
<tr>
<td>96</td>
<td>1</td>
<td>1.8</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>Total</td>
<td>57</td>
<td>100.0%</td>
<td>193</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Mean # of Months

Female: 42.0
Male: 37.9

Standard Dev.

Female: 18.16
Male: 14.825

Program Completion Status for Male-Female Co-op Students

As in Table 4 of this study, Table 10 shows that program completion for both male and female students involved in the co-op program can be considered in one of five ways. The first category is non-completion, and includes 3 women and 31 men who attended classes for less than 31 earned credit hours and did not earn a certificate. The second category includes those who complete the program with a certificate or at least 31 credit hours. The third is when the student completes with an associate degree. The fourth is a completion with both an associate degree and certificate. The
fifth is when one completes with a degree in another unrelated field of study. Women tend to get an associate degree (49%) while men tend more equally toward an associate degree (34%) or a certificate (33%).

Table 10
Program Completion Status

<table>
<thead>
<tr>
<th>Status</th>
<th>Female</th>
<th>Male</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>Non Complete</td>
<td>3</td>
<td>5.3%</td>
</tr>
<tr>
<td>Certificate or 31 Credit Hours</td>
<td>12</td>
<td>21.3</td>
</tr>
<tr>
<td>Associate Degree</td>
<td>28</td>
<td>49.1</td>
</tr>
<tr>
<td>Certificate &amp; Degree</td>
<td>14</td>
<td>24.6</td>
</tr>
<tr>
<td>Other</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>57</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Employment Status Related to the Co-op Program Male-Female

As in Table 5, employment status is measured in terms of related work appropriate to one's field of study, as identified by the co-op student through a survey. Related work would be positions in specific areas of industry that relate directly to curriculum studied while the student was in the co-op program. Unrelated positions would be those jobs that are specifically different than training received. Table 11 shows that women co-op students are employed in a field related to their training less often than are men.
Table 11

Employment of Male/Female Components

<table>
<thead>
<tr>
<th>Status</th>
<th>Female</th>
<th></th>
<th>Male</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>Related Field</td>
<td>18</td>
<td>85.7%</td>
<td>62</td>
<td>100.0%</td>
</tr>
<tr>
<td>Non Related Field</td>
<td>3</td>
<td>14.3%</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>21</td>
<td>100.0%</td>
<td>62</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Employment Full or Part-Time Male-Female

As in Table 6 of this study, full-time employment is considered anything above 35 hours per week. Anything less than this would have to be considered part-time employment. Only those students who are currently working above 35 hours are considered full-time workers in the positions in industry which they now hold. Table 12 shows that full-time employment status is similar for both men and women of the program.

Table 12

Employment Status of Male/Female Components

<table>
<thead>
<tr>
<th>Employment</th>
<th>Female</th>
<th></th>
<th>Male</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>Full-Time</td>
<td>20</td>
<td>95.2%</td>
<td>57</td>
<td>91.9%</td>
</tr>
<tr>
<td>Part-Time</td>
<td>1</td>
<td>4.8</td>
<td>5</td>
<td>8.1</td>
</tr>
<tr>
<td>Total</td>
<td>21</td>
<td>100.0%</td>
<td>62</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

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Test of Hypotheses

The following hypotheses previously stated offer an analysis of the variables which are of interest in this study for the researcher because they compare the differences in means and percentages of two groups of students in our co-op program, namely, the recruited and the self-selected student.

Each of the six hypotheses will be presented and a statement of statistical significance will follow as needed for clarity. The probability used for committing of type I error is .05.

Hypothesis I - Grade Point Averages

It is hypothesized that there is a difference in the mean grade point average for those students who are recruited in the Design Technology Program versus those students who self-selected the program.

As seen in Table 13, no support was found in the data to indicate a difference in mean grade point averages between those who are recruited and those who self-selected the program.

Based on a .05 probability level, the statistical analysis indicates a probability 0.620 for the one tailed t test that the differences in the means of grade point averages of the two groups would occur at random. Therefore, we fail to reject the null hypothesis that there is no difference between the mean grade point average of the two groups tested.
Table 13
Differences in Grade Point Averages Between Recruited and Self-Selected Students

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>X</th>
<th>SD</th>
<th>t</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recruited</td>
<td>151</td>
<td>3.08</td>
<td>0.56</td>
<td>-1.01</td>
<td>248</td>
<td>.62*</td>
</tr>
<tr>
<td>Self-Selected</td>
<td>99</td>
<td>3.15</td>
<td>0.54</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: A .05 probability for committing a Type I error was used.

*p > .05

Hypothesis II - Time to Complete Program

It is hypothesized that there is a difference in the mean number of months necessary to complete the program for those students who are recruited in Design Technology Program versus those students who self-selected the program. This categorization excludes the non-completers even though each group had non-completers in their total numbers.

The mean number of months for program completion for the recruited co-op student is found to be different from the mean for the self-selected student. The analysis shown in Table 14 displays a t test value of 4.99 and a probability of .001. Therefore, the null hypothesis is rejected. This supports the research hypothesis of the study that there is a difference in time to complete between the recruited student and the self-selected student.
Table 14

Differences in Time to Complete the Program Between Recruited and Self-Selected Students

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>X</th>
<th>SD</th>
<th>t</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recruited</td>
<td>125</td>
<td>34.61</td>
<td>12.24</td>
<td>4.99</td>
<td>213</td>
<td>0.001*</td>
</tr>
<tr>
<td>Self-Selected</td>
<td>90</td>
<td>44.93</td>
<td>18.11</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non Completers</td>
<td>35</td>
<td>NA</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: A .05 probability for committing a Type I error was used.

*p < .05

Hypothesis III - Completion Status

It is hypothesized that there is a difference in the proportion of students who completed the program between those students who are recruited and those who self-selected. Non-completers are those who fail to receive a certificate or complete 31 earned credit hours. Completers are those who received a certificate, completed at least 31 hours, received an associate degree, or received both an associate degree and a certificate. There are some who completed the program but are in an entirely separate field, such as Liberal Arts or General Education. These students are categorized as "other" for purposes of distinguishing them from the Design Technology degree or certificate.

The analysis using the $X^2$ test as shown in Table 15 supports the research hypothesis that there is a difference in the proportion
of program completers between the recruited co-op students and the self-selected students. The null hypothesis is rejected based on the $X^2$ value of 17.42 and probability of 0.002 at the .05 alpha value. The percentage difference shown in Table 15 is in favor of the self-selected group, which had a lower rate of non-completers than the recruited group.

Table 15

<table>
<thead>
<tr>
<th>Program Entry</th>
<th>Non Complete</th>
<th>Certificate or 31 cr. hrs.</th>
<th>Assoc.</th>
<th>Both</th>
<th>Other</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recruited</td>
<td>25</td>
<td>16.5%</td>
<td>57</td>
<td>37.7%</td>
<td>48</td>
<td>31.7%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>19</td>
<td>12.6%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td>.01%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>151</td>
</tr>
<tr>
<td>Self-Selected</td>
<td>9</td>
<td>9.0</td>
<td>19</td>
<td>19.1</td>
<td>46</td>
<td>46.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>24</td>
<td>24.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>.01%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>99</td>
</tr>
<tr>
<td>Total</td>
<td>34</td>
<td>13.6%</td>
<td>76</td>
<td>30.4%</td>
<td>94</td>
<td>37.6%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>43</td>
<td>17.2%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td>.01%</td>
</tr>
<tr>
<td>Total</td>
<td>250</td>
<td>13.6%</td>
<td>76</td>
<td>30.4%</td>
<td>94</td>
<td>37.6%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>43</td>
<td>17.2%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td>.01%</td>
</tr>
</tbody>
</table>

$X^2 = 17.42$

$df = 4$

$p = 0.002^*$

Note: A .05 probability for committing a Type I error was used.

*p < .05

Hypothesis IV - Job Placement

It is hypothesized that there is a difference in the proportion of initial job placements which are program related for those who have been recruited versus those who have self-selected the program.
These data are collected as the result of survey responses from both groups as to whether they are currently working in a curriculum related position.

As shown in Table 16, no support was found to indicate a difference in the proportion of students employed in a field related to their training between those who were recruited and those who self-selected the program. The probability of .21 determines that we fail to reject the null hypothesis stating that there is no difference between the two groups.

Table 16

\( \chi^2 \) Test of Independence for Related Employment

<table>
<thead>
<tr>
<th>Program Entry</th>
<th>Related to Co-op</th>
<th>Not Related</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>Recruited</td>
<td>45</td>
<td>100.0%</td>
<td>0</td>
</tr>
<tr>
<td>Self-Selected</td>
<td>35</td>
<td>92.1%</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>80</td>
<td>96.3%</td>
<td>3</td>
</tr>
</tbody>
</table>

\( \chi^2 = 3.69 \)
\( df = 1 \)
\( p = 0.21^* \)

Note: A .05 probability for committing a Type I error was used.

*p > .05
Hypothesis V - Full-Time Employment

It is hypothesized that there is a difference in the proportion of full-time job placement for those who have been recruited versus those who have self-selected the program. These data are collected as the result of survey questions from both groups as to whether they are now in full or part-time employment related to the co-op program.

The analysis of data by the $X^2$ test does not support that there is a difference in the proportion of students who are employed full-time or part-time between the recruited co-op student and the self-selected co-op student. Based upon a probability of .46 as shown in Table 17, we fail to reject the null hypothesis.

Table 17

$X^2$ Test of Independence for Employment Status

<table>
<thead>
<tr>
<th>Program Entry</th>
<th>Employment Status</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Full-Time</td>
<td>Part-Time</td>
<td>Total</td>
<td></td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>Recruited</td>
<td>41</td>
<td>91.1%</td>
<td>4</td>
<td>8.9%</td>
</tr>
<tr>
<td>Self-Selected</td>
<td>36</td>
<td>94.7%</td>
<td>2</td>
<td>5.3%</td>
</tr>
<tr>
<td>Total</td>
<td>77</td>
<td>92.8%</td>
<td>6</td>
<td>7.2%</td>
</tr>
</tbody>
</table>

$x^2 = 0.55$

$df = 1$

$p = 0.46^*$

Note: A .05 probability for committing a Type I error was used.

*p > .05
Hypothesis VI - Male and Female Co-op Students

It is hypothesized that there is a difference in the proportion of males and females who are successful in the co-op program. This hypothesis is based on the following factors: (a) grade point average, (b) time to complete, (c) completion status, (d) related job placement, and (e) full-time employment status.

This is a comprehensive comparison that analyzes the male and female components in the co-op program. This analysis includes both the recruited and self-selected students as a group with sex being the independent variable. Because jobs in the design technology area have traditionally gone to male applicants, the emergence of women in this field makes this statistical analysis revealing and practical for leaders in both education and industry.

First of all, the proportion of male co-op students is 77.2% of all co-op students surveyed in this study, indicating a predominance of males in the program as well as in the industries which eventually employ these students.

The analysis of the data in Table 18 indicates there is a difference between male and female grade point averages. Based upon a probability of .046, the null hypothesis is rejected and the alternate hypothesis is accepted. It is a difference in favor of the females in the program. The female not only holds her ground in grade point average, but is slightly superior among this group of students.
Table 18
Comparison of Grade Point Average of Male and Female Co-op Students

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>X</th>
<th>SD</th>
<th>t</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>193</td>
<td>3.06</td>
<td>0.57</td>
<td>-2.28</td>
<td>248</td>
<td>0.046*</td>
</tr>
<tr>
<td>Female</td>
<td>57</td>
<td>3.25</td>
<td>0.47</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: A .05 probability for committing a Type I error was used.
*p < .05

It is hypothesized that there is a difference in the time to complete the program for males and females in the program. This analysis is based on the mean number of months to complete the program.

The analysis of the male and female students and the mean number of months to complete does not show a difference based on the t test results in Table 19. We fail to reject the null hypothesis that there is no difference between the two groups tested, based on a .198 probability.

Table 19
Comparison of Time to Complete the Program for Male and Female Co-op Students

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>X</th>
<th>SD</th>
<th>t</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>193</td>
<td>37.90</td>
<td>14.83</td>
<td>-1.66</td>
<td>213</td>
<td>0.198*</td>
</tr>
<tr>
<td>Female</td>
<td>57</td>
<td>42.00</td>
<td>18.17</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: A .05 probability for committing a Type I error was used.
*p > .05
Analysis of data in Table 20 supports that there is a difference between males and females in the proportions by completion status. The null hypothesis is rejected based upon a probability of 0.02. The alternate hypothesis is accepted in favor of the females.

Table 20

$X^2$ Test of Independence for Completion Status of Men and Women Co-op Students

<table>
<thead>
<tr>
<th></th>
<th>Non Complete</th>
<th>Certificate or 31 cr. hrs.</th>
<th>Assoc.</th>
<th>Both</th>
<th>Other</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N %</td>
<td>N %</td>
<td>N %</td>
<td>N %</td>
<td>N %</td>
<td>N %</td>
</tr>
<tr>
<td>Male</td>
<td>31 16.0%</td>
<td>64 33.1%</td>
<td>66 34.2%</td>
<td>29 15.0%</td>
<td>3 1.7%</td>
<td>193</td>
</tr>
<tr>
<td>Female</td>
<td>3 5.3</td>
<td>12 21.0</td>
<td>28 49.2</td>
<td>14 24.5</td>
<td>0 0.0</td>
<td>57</td>
</tr>
<tr>
<td>Total</td>
<td>34 13.6%</td>
<td>76 30.4%</td>
<td>94 37.7%</td>
<td>43 17.2%</td>
<td>3 1.0%</td>
<td>250</td>
</tr>
</tbody>
</table>

$X^2 = 11.71$

$df = 4$

$p = 0.02^*$

Note: A .05 probability for committing a Type I error was used.

$p < .05$

Table 21 shows the results of a $X^2$ test of the null hypothesis that states there is no difference between men and women students in the proportion of those employed in a field related to their training. Based upon a probability of .75, we fail to reject this null hypothesis.
Table 21

$X^2$ Test of Independence of Type of Employment of Men and Women Co-op Students

<table>
<thead>
<tr>
<th>Gender</th>
<th>Related Field</th>
<th>Not Related</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>Male</td>
<td>62</td>
<td>100.0%</td>
<td>0</td>
</tr>
<tr>
<td>Female</td>
<td>18</td>
<td>85.7%</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>80</td>
<td>96.4%</td>
<td>3</td>
</tr>
</tbody>
</table>

$x^2 = 1.09$

$df = 1$

$p = 0.75^*$

Note: A .05 probability for committing a Type I error was used.

* $p > .05$

Data analysis in Table 22 shows that there is no significant difference between the proportion of males and females in whether they are in full-time or part-time employed. We fail to reject the null hypothesis, based upon a $X^2$ value of 0.57 and a probability of 0.45 at the .05 alpha level.
Table 22

$X^2$ Test of Independence for Employment Status of Men and Women

<table>
<thead>
<tr>
<th></th>
<th>Full-Time</th>
<th></th>
<th>Part-Time</th>
<th></th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>57</td>
<td>91.9%</td>
<td>5</td>
<td>8.1%</td>
<td>62</td>
</tr>
<tr>
<td>Female</td>
<td>20</td>
<td>95.2</td>
<td>1</td>
<td>4.8</td>
<td>21</td>
</tr>
<tr>
<td>Total</td>
<td>77</td>
<td>92.7%</td>
<td>6</td>
<td>7.3%</td>
<td>83</td>
</tr>
</tbody>
</table>

$X^2 = 0.57$

df = 1

$p = 0.45^*$

Note: A .05 probability for committing a Type I error was used.

*p > .05

Summary

The results mentioned in this chapter compared recruited co-op students with students who self-selected co-op in terms of grade point averages (gpa's), months to complete the program, completion status, related employment to curriculum studied, and whether they are in full or part-time employment. Finally, it analyzed the male and female students of the program in all the aspects mentioned above.

The tables used within this chapter serve as guides to understanding the relationships between recruited and self-selected co-op
students at Macomb Community College between 1977-81.

The last section in this chapter reviewed the hypotheses offered in this study as to their validity according to the data gathered for the study.

The hypotheses concerning means of grade point averages, job placement, and employment status were not supported in the data tested. The hypotheses concerning time to complete the program and completion status were supported. The data showed there was a difference between the two groups tested in time to complete and completion status.

In the comparison of the male and female participants in the program, the hypotheses of differences relating to mean grade point average, time to complete the program, and completion status were supported by the data analyzed. However, the hypotheses concerning job placement and employment status were not supported, finding no differences between the two groups.

The interesting aspect of the male and female comparison is that the difference was in favor of the females. Their percentages were more favorable than the males in the hypotheses that were supported.

Chapter 5 offers a discussion concerning the conclusions that can be drawn from the data analysis in this chapter. Also, recommendations are offered for future consideration and studies concerning co-op education.
CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

As stated earlier in this study, community colleges are faced with declining enrollments and increasing competition from four year schools for students. The Cooperative Education Program offers an interesting alternative to the traditional education delivery systems by offering alternating periods of learning and doing. This study investigated differences between recruited co-op students and students who self-selected cooperative education. It is the value of recruitment to bring high school seniors to Macomb Community College with the enticement of cooperative education in Design Technology. However, while students are recruited to come to Macomb Community College for a chance to be placed in a cooperative education assignment after one semester, other students self-selected co-op programs as the best means to reach their goal of both good educational skills and employment opportunities in fields looking for talented and qualified applicants. A summary of recommendations and conclusions are presented that might yet be accomplished in light of this particular study. Certain key elements stand out as a result of this study. For purposes of clarity, each topic discussed in the results of Chapter IV will be reviewed, discussed, and commented on as to the value of these results and what further can be done to enhance the Cooperative Education Program in Design Tech-
Academic Excellence in Recruited and Self-Selected Students in Co-op Education

The results of our study show a striking similarity of results in academic achievements among students who are recruited for co-operative education and those who self-selected the program. The differences are so slight, it is noteworthy to ask why all the time and effort has been expended to recruit these students when those who enlist in the program of their own volition seem to fare as well or better on some occasions.

The answers to these questions are not as easy as they may seem. The very fact that all co-op students do well in academic achievement speaks well for the Cooperative Education Program as a whole. The courses and matter covered in the program must be academically sound. Both groups analyzed had a grade point average of over 3.00 and the differences between the recruited co-op students was within 2% (3.07 for recruited students) of the self-selected students (3.14). The combined averages for both groups was 3.10. The conclusion here is that students do well academically in the program. Based on student success, the program is sound and should be continued at its present excellence. These data compare favorably to the literature research in Chapter II. Most studies pointed out the excellence of cooperative education as a tool. Studies by researchers such as Cohen et al. (1977) as well as Marks and Wohlford (1971), consistently indicated this excellence. This data indicated this
excellence for both the recruited and the self-selected groups.

**Time to Complete Program**

This area of the study showed there was a difference between the recruited co-op student and the self-selected student, based upon means of 34.6 to 44.9 in months to complete the program. This reflects the fact that the self-selected student has more concerns such as home, family, or other factors that delay completion in the program. However, this might be expected as other data collected for this study such as age of particular students involved indicate the self-selected student to be an older student for the most part than the recruited student who usually comes to the program right from high school. Further study might be helpful as to the relationship between age and completion of the program. This would also provide helpful information that could aid directors of co-op programs in further programming of co-op.

Another factor to consider is that while self-selected students took longer to complete their program of studies in Design Technology at Macomb Community College, they did complete the program at a higher rate than the recruited students as reflected in our observations on completion status in Hypothesis III. The research hypothesis presumed a difference between the two groups. The literature consistently pointed out the fact that all co-op students took longer to complete their programs. The intent of this study was to show a difference in favor of recruited students. The fact that self-
selected students took longer is influenced by previously mentioned factors.

Completion Status

The conclusions found from the statistics regarding completion status are probably the one most disturbing result of the whole study of comparison between recruited and self-selected students in co-op education. The study showed there was a difference between the two groups, but the difference was in favor of the self-selected student over the recruited student. The fact that 25 of 151 or 16.6% of recruited students failed to complete with some type of certificate, degree, or at least 31 earned credit hours as compared to 9 of 99 or 9.1% of self-selected students in the same completion goals indicated some of the same concerns as previously mentioned in observations on time to complete the program.

I would suggest that further study be made on the value of high school recruitment in light of the fact that self-selection seems to be as well or better in regards to program completion status.

The real value of high school recruitment is that it brings the college to the student. Coordinators have the chance to present the co-op program to eager young men and women with the hopes of luring them to Macomb Community College in Design Technology. Unfortunately, many of these students have not seen the other opportunities that are available to them. Once enrolled in college, many factors come into play. Students can see other programs, talk to other students, and broaden their horizons by being exposed to the whole
range of programs and curricula. Because of age, some might become discouraged or disenchanted once enrolled in the program. Older students for the most part are more sincere and dedicated to their task. They are single minded in their determination to finish their program once begun. However, in defense of the recruited student, some might have transferred to another school or taken a position in industry before completing certificate or degree requirements. Further research with drop outs would be helpful to give answers to these questions. Until these answers are given, reasons why these students left the program will not be known. As with program completion in time, completion status has a correlation with age on entering the co-op program. Younger students tend to give up quicker than older students.

For these reasons and for what the study has uncovered, it would be worth further research to explore the success of students from an age point of view, especially in cooperative education. The research in Chapter 2 did point out the fact that most co-op students received their degrees after their formal education process and co-op experiences were over. The First Assessment of Cooperative Education (Wilson and Lyons, 1961) and the Second Assessment of Cooperative Education (Cohen and Ali, 1977) presented this information.

**Employment Related to Co-op**

Of all the statistics gathered in this study, employment related to the co-op program was most significant. Both recruited and self-selected students were in employment fields directly related to
their co-op experience and fields of study. Ninety-six percent of both groups are employed in related fields. Only 4% were in fields of employment not directly related to their co-op experience. This was equally true of the male and female aspects of the study related to employment. Both males and females were employed at well over the ninety-five percentile in positions directly related to their co-op experience and field of studies. The co-op experience obviously is a plus in one's preparation for the world of work because it gives the student the necessary work experience that so many companies ask for from their applicants.

It would be well for all leaders of college educational programs to see the success rate of co-op students in landing successful positions after their co-op experience.

**Full-Time Employment Related to Program**

The study showed that well over 90% of all students questioned from both groups were in full-time employment. Only a very small percentage of respondents were in fields of employment on a part-time basis. Most of these students have successfully gone from classroom and co-op experiences into full-time employment in firms directly related to Design Technology in the world of work. Obviously, there was a very close relationship between their field of studies, the co-op experience, and full-time employment. Most of these students, no matter whether they were recruited or whether they self-selected the co-op program, have been very successful in obtaining full-time positions within the industry.
Hopefully, this close relationship between Industry and Coopera-
tive Education can continue to grow as colleges and universities
continue to seek successful means of motivating students into educa-
tional programs.

**Male/Female Co-op Students**

The results of this statistical reference were to ascertain any
noticeable differences between the male and female components of the
co-op program. The study separated the differences between recruited
and self-selected and looked primarily at the male/female issues.
Coincidentally, the results between recruited and self-selected
paralleled the male-female comparison. The study showed a consis-
tency in gpa's. Males showed an average of 3.0 while females aver-
aged 3.2.

In time to complete, both males and females were comparable.
The mean of the male (37.9 months) compared to the mean of the
female (42.0 months) was very comparable although some women still
have home responsibilities as well as academic goals.

The surprising outcome of this study is that women complete at a
better rate than men. Thirty-one out of 193 or 16.1% of men were
categorized non-completers. Three out of 57 or 5.3% of women did
not complete. The overall completion status of women was in favor
of women. Women do exceptionally well in both time to complete the
program and program completion status indicating an equality here
that in some cases was superior to their male counterparts.

In the relationships to positions related to their co-op train-
ing and full or part-time employment, both men and women fared very well. All the males surveyed were in a related field of work and all but 8% were in full-time work. Females were a little less successful with 86% of completers in related work and 95% in full-time work.

The researchers such as Brown (1976) and Kany (1973) looked at the overall value of cooperative education for women. They reached conclusions similar to the hypotheses tested in this study. While they looked at the overall value of co-op education, this study looked at particulars such as grade point average, time to complete, completion status, and employment related to their studies.

Summary

Cooperative education is a vital component of higher education. This is especially true in technical fields such as Design Technology. It is assumed the students who were recruited into the co-op program are better students than those who self-selected the program on their own. It is also assumed that men are different than women in their overall results because of their predominance in technical fields such as Design Technology.

This study investigated the differences between students who were recruited into Design Technology at Macomb Community College, Warren, Michigan, in the Cooperative Education Program between the summer recruitment years of 1977 and 1981 and those students who self-selected the same Cooperative Education Program during the same time period. It also investigated the differences between the
results of men and women enrolled in the program during that period. It utilized data gathered from student records such as grade point averages, time to complete the program, and completion status. A survey was sent out to the program participants to gather information on employment related to education and employment status as to whether they were in full or part-time employment. Of the 250 surveys sent out 83 responded. The same information was utilized to measure differences between male and female participants in the Cooperative Education Program in the same time period.

The results of the analysis of data were mixed. Differences between recruited co-op students and those students who self-selected the program were not supported by analysis of grade point averages, job placement, and employment status. Time to complete the program and completion status showed a difference between the two groups in favor of the self-selected group of students over the recruited students.

The results of the analysis of data between men and women in the program also had mixed results. Both males and females showed no difference in job placement and employment status. However, the data supported differences in grade point averages, time to complete the program, and completion status in favor of the females in the program.

Further research is recommended to address the possible differences between age at program entry and program completion status and between age and time to complete the program.

This study has attempted to answer a simple question of whether
the recruited co-op student is any different or more successful than those who self-selected the co-op program. Obviously, there are some differences; but there are also many similarities. It is hoped that this study will further the cause of cooperative education as a moving force in the field of education. The big winner in this whole process is the student who, by education, training, and developed skills, can become a useful citizen and a productive member of our society.
APPENDICES
Appendix A

Letter of Return by August 16, 1985
Co-op Research Center
32101 Caroline
Fraser, MI 48026
July 8, 1985

Dear Former Co-op Student:

We are in the process of updating our cooperative education information system so we can improve on our educational programs here at Macomb Community College.

Would you please take a few moments of your time and complete the enclosed informational survey. Your prompt attention would be most helpful to our research department that will be compiling this data. Please put the completed survey in the envelope that accompanies the survey and return it to us by August 16, 1985.

Thank you for your generous cooperation. We sincerely hope your present endeavors are fruitful and satisfying and in many ways relate to your experiences we shared together with you while at Macomb Community College in the Co-op program. Thanks again!

Sincerely,

Walt Prowalny
Paul Gould
Co-op Coordinators
Appendix B

Letter of Return by September 20, 1985
September 6, 1985

Co-op Research Center
14500 Twelve Mile
Warren, MI 48093

Dear Former Co-op Student:

In July we sent you a research survey aimed at gathering important data for the future successes of our Co-op program.

Unfortunately, we have not heard from you as of this date. Would you please take a brief moment of your time and complete the enclosed survey and return it in the envelope provided by September 20, 1985.

Your cooperation in this matter is greatly appreciated. Hope all continues to go well in your careers.

Sincerely,

Walt Prowalny
Paul Gould
Co-op Coordinators

/bs
Appendix C

Survey Form
STUDENT IDENTIFICATION (Social Security Number)

SEX
1. Male
2. Female

YEAR OF BIRTH (1960 = 60)

PROGRAM COMPLETION STATUS
1. I did not complete the program
2. I received a certificate
3. I received an associate degree
4. I received both a certificate and degree
5. Other

ARE YOU CURRENTLY EMPLOYED?
1. Yes
2. No

NUMBER OF HOURS WORKED PER WEEK

YEARLY SALARY

IS YOUR JOB RELATED TO YOUR CO-OP TRAINING EXPERIENCE?
1. Yes
2. No

ARE YOU EMPLOYED WITH THE ORGANIZATION THAT YOU CO-OPED WITH?
1. Yes
2. No

Current Employer

Last Co-op Employer

THANK YOU FOR COMPLETING THE SURVEY
BIBLIOGRAPHY


