AN ANALYSIS OF ENROLLMENT PATTERNS IN REQUIRED GENERAL EDUCATION COURSES AND THE RELATED SUCCESS, AS MEASURED BY GRADE POINT AVERAGE, OF TECHNICAL-OCCUPATIONAL STUDENTS IN A MULTI-CAMPUS URBAN COMMUNITY COLLEGE

DISSertation

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This study investigated the following with regard to technical-occupational students in a multi-campus urban community college: The enrollment patterns in required general education courses at specific intervals of course work; the relation between successful completion of certain required general education courses (English and mathematics) and academic success as measured by grade point average; and the profiles or basic characteristics (age, GPA, sex, and high school graduation status) of (a) the student who had completed a specified amount of general education course work and (b) the graduate who had attained a higher grade point average in technical course work than in general education course work.

The data was obtained from the academic records of 328 current student, selected by established criteria, and 284 graduates of six technical-occupational programs. The six programs were chosen by pairs to represent white-collar, technical-skilled, and blue-collar oriented occupations.

Data on enrollment patterns were analyzed according to percentage in frequency distributions. Differences in mean grade point averages for completers and non-completers of English and mathematics were
analyzed using the \textit{t}-test. Significant variance among the groups representing types of occupations was analyzed using the chi-square test for independence. The Pearson Product Moment test was used to investigate correlations between grade point average and amount of general education work completed.

Among the major findings were the following: over 57 per cent of the current students had completed general education requirements at a level proportional to their total program enrollments; current students tended to avoid enrollment in English more than in mathematics; current students who had completed mathematics had a higher mean GPA than those who had not completed mathematics; graduates who completed mathematics during the first half of the program had a higher mean GPA than those who completed mathematics later; a negative correlation was detected between GPA and the amount of general education course work completed; and more than 81 per cent of the graduates had a higher GPA in technical course work than in general education course work.
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CHAPTER I

INTRODUCTION

General education has been considered an important part of college education for many years. During the past few years the importance and value of the general education component of the college curriculum has been a major topic of discussion and writing among educators in the United States.

It is generally accepted that individual members of American society should be able to communicate effectively through reading, writing, and speech; be able to do mathematical computations and apply logic in problem solving situations; have a reasonable understanding of the culture, values, and heritage of their society; and have a working knowledge of human behavior so that they may effectively function within the society. Such knowledge and skills are considered to be general education and have been viewed as an important part of college education.

In recent years, major forces, from both within and without the American educational system, have brought the general education component of the college curriculum into focus. From within, educators realized the need for general education reform. They recognized not only a need to reaffirm the value of general education but also a need to develop a working consensus of what comprises a solid general education component in today's curriculum (14).
From outside academia, the growing economic and social problems caused national leaders to assess education's role in solving the nation's problems. The decade of the 1980s began with a report from the President's Commission for a National Agenda for the Eighties which stated, "the continued failure of the schools to perform their traditional roles adequately . . . may have disastrous consequences for this nation"(15, p.15). Although this report addressed all levels of education in the nation, it was particularly directed toward the role of higher education in producing a citizenry capable of competing in the world market of ideas, goods, and services.

During 1983 and 1984, three major reports were issued in top educational circles: "A Nation at Risk: The Imperative for Education Reform," "Involvement in Learning: Realizing the Potential of American Higher Education," and "To Reclaim a Legacy." The reports described the national situation with regard to education, emphasized that the curriculum in higher education had become excessively vocational, and focused concern on the need for general education in the curriculum. A joint effort was begun between the National Endowment for the Humanities and the American Association of Community and Junior Colleges for "Strengthening Humanities in Occupational Curricula" (20, p.6)(5, p.11)(8, p.19).

Many institutions of higher learning have had the general education of the student as part of their established mission. However, the national focus in higher education on the general education needs of all students is causing institutions to reassess the extent to which general education courses are required in each degree program and the effectiveness of the curriculum in meeting these needs(3).
These issues are particularly relevant for community and junior colleges because they offer two-year degrees in technical-occupational programs. Such programs must be tightly structured and effective in order to prepare students in their specific vocational pursuit and, at the same time, to prepare them in the realm of general education.

The student entering a technical-occupational program at the two-year community college is of particular interest. While programs may be well-designed to accomplish the stated purposes, little is known about the enrollment patterns of these students. To what extent do they take the required general education courses? Does enrollment in general education courses contribute to success?

Knowledge about the enrollment patterns and success of technical-occupational students and graduates could prove valuable; faculty, counselors, and program directors could use such information in developing programs and guiding students. This study analyzed the enrollment patterns of such students and investigated the relationship of the completion of general education courses to student success as measured by grade point average.

Statement of the Problem

This study was concerned with the enrollment patterns in required general education courses and the related success, as measured by grade point average, of technical-occupational students in a multi-campus urban community college.
**Purposes of the Study**

The purposes of this study were as follows:

1. To examine the general education course enrollment patterns of technical-occupational students in specific programs at intervals of course work

2. To determine whether successful completion (grade of C or better) of certain required general education courses is related to overall grade point average (GPA) or grade point average in technical-occupational course work for the technical-occupational student

3. To profile the basic characteristics of the technical-occupational student who enrolls to a greater extent in general education courses than the student who enrolls to a lesser extent

4. To profile the basic characteristics of the graduates who have a higher grade point average in technical-occupational courses and those who have a higher grade point average in general education courses

**Research Questions**

Research questions used to guide the study and presentation of the data were as follows:

1. Do technical-occupational students enroll in required general education courses at a semester-hour level proportional to their enrollment in technical-occupational courses?

2. Is successful completion of a required English or communications course related to overall grade point average (GPA) or grade point average in technical-occupational course work for the technical-occupational student?
3. Is successful completion of a required English or communications course early in the program related to overall grade point average (GPA) or grade point average in technical-occupational course work for the technical-occupational student?

4. Is successful completion of a required mathematics course related to overall grade point average (GPA) or grade point average in technical-occupation course work for the technical-occupational student?

5. Is successful completion of a required mathematics course early in the program related to overall grade point average (GPA) or grade point average in technical-occupational course work for the technical-occupational student?

6. What are the basic characteristics (age, sex, high school graduation, GPA) of the student who has successfully completed a minimum of seven semester hours of required general education courses versus the student who has completed six semester hours or less?

7. Is there significant variance among the groups with regard to the number of general education hours completed by students in the two programs when technical-occupational programs are grouped according to the following: (A) Mid-Management and Office Careers; (B) Electronics Technology and Drafting and Design Technology; and (C) Welding and Machine Tool Technology?

8. Is there a positive correlation between GPA and the amount of general education course work completed?

9. Is successful completion of a required English or communications course during the first half of the program related to overall
grade point average (GPA) for the technical-occupational graduate?

10. Is successful completion of a required mathematics course during the first half of a program related to overall grade point average (GPA) for the technical-occupational graduate?

11. What are the basic characteristics (age, sex, high school graduation, GPA) of the graduate who has a higher GPA in the technical-occupational course work versus the graduate who has a higher GPA in the required general education course work?

**Definition of Terms**

The following terms have restricted meanings and are thus defined for this study:

The **Associate in Arts Degree Program (AA)** is a two-year degree that includes a minimum of sixty-four semester hours of course work that will apply toward most baccalaureate degree requirements.

The **Associate in Applied Science Degree Program (AAS)** is a two-year program that includes a minimum of sixty-four credit hours of course work, designed to enable the graduate to enter an occupation with a marketable skill, an acceptable level of competency, and the ability to communicate intelligently.

**Communications courses** are English courses required as part of the general education component in some technical-occupational programs. They have an English prefix in the catalog and are taught in the English department.

**General education courses** are courses included in the AAS degree programs that are not directed toward the specialized skills and knowledge associated with occupational preparation. Examples include
English, mathematics, government, and psychology.

Technical-occupational courses are courses within the curriculum designed to provide students with specialized skills and the knowledge required for occupational preparation.

The Student Master File is the computerized data file containing student demographic information in the multi-campus urban community college.

Current Students refers to students in the population studied in Research Questions 1 through 8. They were enrolled in one of the six technical-occupational programs included in this study during Spring semester 1986, and they met established criteria.

Delimitations

The population of this study was delimited to current students and graduates of six identified technical-occupational programs at Tarrant County Junior College, Fort Worth, Texas, a multi-campus urban community college. The data did not include information regarding any courses transferred from other institutions.

Background and Significance of Study

Interest and concern in the topic of general education was renewed during the past decade. Throughout the 1970s, numerous articles, conferences, and projects dealing with general education appeared. By the start of the 1980s, the focus on general education had become clear. Gaff states, "The major task facing colleges and universities is not simply to reaffirm the values of general, or liberal, education but also to fashion a new working consensus about a sound contemporary
curriculum" (14, p.x). He identifies three separate events occurring in 1977 which touched off the current national effort to redefine and reform undergraduate general education. In 1977, general education was labeled "a disaster area" in a publication on curriculum by the Carnegie Foundation for the Advancement of Teaching. Also, the Task Force on the Core Curriculum at Harvard University finalized its report, and efforts were begun to strengthen undergraduate education at Harvard. In that same year, U.S. Commissioner of Education Ernest L. Boyer and his assistant Martin Kaplan emphasized the need for a core curriculum to address common needs and increase the chances for survival of the human species (14, p.1).

Boyer continued the emphasis for reform when in 1981 he authored *A Quest for Common Learning* with Levine. Together they emphasized the need for a strong general education component which would "concern itself with those shared experiences without which human relationships are diminished, common bonds are weakened, and the quality of life is reduced..." (3, p.35).

In 1981, Secretary of Education Terrel Bell formed the National Commission on Excellence in Education which later issued the report "A Nation at Risk: The Imperative for Education Reform." Bell hailed the report as a possible "turning point" in an era when U.S. schools face "the challenge of the postindustrial age" (15). Ernest Boyer termed 1983 a "vintage year" for educators (1, p.685). During the next two years 30 national reports and more than 250 state reports were issued (17, p.669).

Among the national reports were those prepared by the Twentieth
Century Fund, The College Board, and the Task Force on Education and Economic Growth chaired by Governor James Hunt of North Carolina (15)(6). In October 1984, the Study Group on the conditions of Excellence in American Higher Education chaired by Kenneth P. Mortimer published "Involvement in Learning: Realizing the Potential of American Higher Education." The group highlighted three major conditions of excellence: student involvement, high expectations, and assessment and feedback. This report emphasized that the curriculum in higher education had become excessively vocational and urged that students take "greater responsibility for their own learning" (9)(7).

The group noted in its report the growth and change in higher education over the past thirty years. Since 1950, enrollment was up 400%, and the number of institutions had increased by 60% to 3300. This number included over 600 two-year community colleges created since 1960. However, from 1971 to 1982, the proportion of Bachelor of Arts degrees fell from 49% to 36% and, in approximately the same time frame, the proportion of Associate of Arts degrees from two-year colleges fell from 57% to 37%. Meanwhile, the Bachelor of Science and Associate of Science degrees gained proportionately. The gain indicated a strong trend toward vocationalism as opposed to liberal education. The group saw this trend as one of the major threats to excellence in higher education (7).

Then, in November of 1984, the report "To Reclaim a Legacy" was issued by the Study Group on the State of Learning in the Humanities in Higher Education. The committee was led by William Bennett, then chairman of the National Endowment for the Humanities and later
Secretary of Education. The report emphasized the "failure of education to give college students an adequate education in the culture and civilization of which they are members" (9)(7).

According to K. Patricia Cross in *Beyond the Open Door: New Students to Higher Education*, "the two most frequently cited purposes of education are to prepare the student for a vocation and to add to general enrichment of life" (12, p.109). In the past, these may have been viewed by many as quite separate goals or purposes. However, with the rapidly changing world of work, the vocational aspects of life may be in such constant flux that only those with a broad general education will be able to cope with the changes. Cross states the following:

Narrow vocational education can be just as narrow as traditional academic education and probably considerably more damaging to the occupational futures of students. It is possible now that a narrowly trained vocational student will be outdated by the time he graduates; and with the rapid technological changes steadily taking place in industry, new job skills almost certainly will be needed several times during the lifetime of the average worker. In all probability, he will need re-training and the community colleges will need great flexibility and imagination to meet these needs. Skill training in vocational education may be but a small part of the future task. The self-confidence and flexibility to try new things and a generalized approach to problem-solving will almost certainly be requirements for both professional and skilled workers of the future (12, p.84).

This concept of rapid change was emphasized in a study by Berman, Weiler Associates of Berkeley, a research firm studying the California community college system. Of the most serious problems today in the education of community college students, those identified for vocational students included the following:

Conditions in the job market change with lightning
speed, making educational responsiveness extremely complicated.

The business community sometimes sends out conflicting messages. Some leaders say they want broadly educated, critical, and conceptual thinkers. Often their personnel managers hire narrowly specialized technicians with precisely prescribed skills. To the extent that business slavishly adheres to narrow, short-run, company-specific, exclusively bottom-line consideration, the effectiveness of community colleges (and other educational institutions) in meeting needs probably will be impaired (13, p.20).

Vocational educators also express concern that the total development of the individual is often pushed aside as programs are revised to respond to ever-changing job requirements, often resulting in trainees with "excellent entry-level job skills, but without the underlying math, science, communications and organizational skills they need to progress any further"(4, p.34).

**Scope of the Study**

This study was designed to analyze the course-taking choices being made by technical-occupational students at a community college and to determine whether successful completion of the general education requirements prescribed in the program affects success as measured by grade point average. Student records from Tarrant County Junior College were used to accomplish the study. Fifty-six technical-occupational programs were offered by the institution (22); six of these programs were included in the study. These six programs corresponded to the programs included in Stegall's 1985 study using student records from Dallas County Community College District (20). This study differed from the Stegall study in the following ways:

1. The population was drawn from the multiple campuses
of a large urban community college rather than from one campus

2. The successful completion of mathematics, in addition to English, as a required general education course was studied in relation to overall grade point average and in relation to grade point average in technical course work

3. The time period, early in the program versus late, in which the required courses in English and mathematics were completed was considered

4. Graduates of the six programs, in addition to students in the program, were studied with regard to profile and enrollment patterns

Tarrant County Junior College, a comprehensive community college, offers two degrees, the Associate of Arts (AA) degree and the Associate of Applied Science (AAS) degree. The AA degree, a preparatory degree for transfer to the four-year college, includes the general education requirements for a baccalaureate degree at most four-year institutions (21, p.35). The AAS degree is designed "to enable the graduate to enter an occupation with a marketable skill, an acceptable level of competency, and the ability to communicate intelligently"(21, p.37).

The institution has as part of its basic philosophy a commitment to the value of general education for all students, including both transfer students and students in the technical-occupational programs. At the same time, like most community colleges, it is an open door institution, and students choose to attend for a multitude of reasons. The students vary in age, ability, and background. Little is known
about the general education course-taking patterns of the technical-occupational students. The intent of this study was to analyze the general education course-taking behavior of students in given technical-occupational programs and to determine the extent to which they were taking the prescribed courses. The findings of this study should indicate whether technical-occupational students chose to take the general education courses intended for them and should provide insight into determining whether more guidance and/or requirements are necessary to expose students to general education courses. The findings should be useful to community colleges in efforts to analyze the enrollment patterns of their students and to successfully guide students as they enroll in prescribed general education courses while pursuing a technical-occupational degree.

**Procedure for Collecting Data**

The population used in this study consisted of students within one multi-campus urban community college. Two groups were identified: (1) Current students who met the criteria listed below (Research Questions 1 through 8) and (2) Graduates for 1985 and 1986 in the six selected technical-occupational programs (Research Questions 9 through 11).

**Research Questions 1 through 8**

For Research Questions 1 through 8, data was collected on students who specifically met the following criteria:

1. Enrollment in Spring semester of 1986
2. Enrollment in at least one of the courses identified
in Appendix "A" during a semester from Fall semester 1984 through Spring semester 1986

3. Completion of a minimum of fifteen semester hours of course work

4. Completion of a minimum of four courses or twelve semester hours in their major field

Six technical-occupational programs in which the Associate in Applied Science degree is offered were identified as follows: (A) Mid-Management and Office Careers, (B) Electronics Technology and Drafting and Design Technology, and (C) Welding and Machine Tool Technology. The particular programs represent a broad range of technical-occupational programs. Category A represents white-collar non-technical occupations; Category B represents technical-skill oriented occupations; and Category C represents blue-collar manual-skill oriented occupations (20, p.51).

Within each program, courses were chosen (Appendix A) to represent courses typically taken by students majoring in the program; the courses were not necessarily intended to be ones taken at the beginning of study in the program. While "majors" are identified to some extent at the institution, this identification is not always complete; students often complete several semesters of work before completing a formal degree plan or declaring a "major." Therefore, the more complete and reliable method for identifying students who are majoring in a given program was to analyze the enrollment records of identified courses.

The class rolls for each identified course were reviewed for each
The academic record for each student listed on these rolls was checked, to determine whether the criteria listed above were satisfied. For each student who satisfied the criteria, a transcript was accessed for the review of enrollments in English, mathematics, technical-occupational courses, and general education courses. Grades and GPA through Spring semester 1986 were obtained. The Student Master File was accessed for demographic information. This information was manually recorded for tabulation and treatment.

Research Questions 9 through 11

For Research Questions 9 through 11, a list of graduates in each of the six technical-occupational programs for the 1985 and 1986 years was obtained. Each graduate's transcript was accessed, via the computer, and reviewed for enrollments in English, mathematics, technical-occupational courses, and general education courses. Grade point averages (GPAs) for technical-occupational course work, general education course work, and all work were calculated. Demographic information for each graduate was retrieved from the Student Master File. This information was manually recorded for tabulation and treatment.

Methods and Procedures for Treating Data

The data for each research question was treated according to the following procedures:

1. For Research Question 1, data were compiled, showing frequency and percentage of students completing specified levels of credit hours by each of the six program areas and cumulatively. Also, for each technical-occupational program, a cross-tabulation was developed, dis-
2. For Research Question 2, the frequency and percentage of students who had and students who had not completed an English or communications course and their mean GPAs, overall and in technical-occupational course work, were cross-tabulated by program area. This was done by designated level of completed course work and cumulatively. The $t$-test was applied for the two groups, using overall GPA as the variable and again using technical GPA as the variable.

3. For Research Question 3, student data were grouped to show the frequency and percentage of students who completed an English or communications course during the first fifteen hours of enrollment and students who completed it later in their work. The mean GPAs, overall and in technical-occupational course work, of each group were calculated by program area and cumulatively. The $t$-test was applied for the two groups, using overall GPA as the variable and again using technical GPA as the variable.

4. For Research Question 4, the frequency and percentage of students who had and students who had not completed a mathematics course and their mean GPAs, overall and in technical-occupational course work, were cross-tabulated by program area. This was done by designated level of completed course work and cumulatively. The $t$-test was applied for the two groups, using overall GPA as the variable and again using technical GPA as the variable.

5. For Research Question 5, student data were grouped to show the frequency and percentage of students who completed a mathematics
course during the first fifteen hours of enrollment and students who completed it later in their work. The mean GPAs, overall and in technical-occupational course work, of each group were calculated by program area and cumulatively. The t-test was applied for the two groups, using overall GPA as the variable and again using technical GPA as the variable.

6. For Research Question 6, the mean age and GPA were calculated for students who had and students who had not completed a minimum of seven semester hours of general education. Percentages by sex and high school graduation were determined. The data were calculated for each program area and cumulatively.

7. For Research Question 7, the programs were categorized as A) Mid-Management and Office Careers, B) Electronics Technology and Drafting and Design Technology, and C) Welding and Machine Tool Technology. Within each category the students were further categorized by program as to those students who had and those who had not completed six or fewer hours of general education course work. The chi-square test was used to determine whether significant variance existed in the level of general education enrollment between programs within each category.

8. For Research Question 8, the Pearson Product Moment was calculated to determine if there was a correlation between overall GPA and the amount of general education course work completed. This was done for each program and cumulatively.

9. For Research Question 9, data for graduates were grouped to show the frequency and percentage of graduates who completed an English
or communications course during the first thirty-two hours of enroll-
ment and graduates who completed it later in their work. The mean
GPA of each group was calculated by program area and cumulatively.
The \( t \)-test was applied for the two groups, using overall GPA as the
variable.

10. For Research Question 10, data for graduates were grouped to
show the frequency and percentage of graduates who completed a mathema-
tics course during the first thirty-two hours of enrollment and graduates
who completed it later in their work. The mean GPA of each group was
calculated by program area and cumulatively. The \( t \)-test was applied
for the two groups, using overall GPA as the variable.

11. For Research Question 11, the mean age and GPA were calculated
for graduates who had a higher GPA in the technical–occupational course
work and for graduates who had a higher GPA in the general education
course work. Percentages by sex and high school graduation were deter-
mind. The data were calculated for each program area and cumulatively.

Summary

This study is presented in the following manner. Chapter I intro-
duces the topic of general education and presents a statement of the
problem; the purposes of the study; the research questions; defini-
tions of the terms; delimitations of the study; background and
significance of the study; scope of the study; and methods and
procedures for collecting and treating the data. Chapter II is a
review of the literature related to the history of general education
and the issue of general education versus occupational education.
Chapter III includes methods and procedures used in the collection
and treatment of the data. Chapter IV is a presentation of the analysis and statistical treatment of the data. Chapter V presents results, interpretations, conclusions, and recommendations drawn from the study.


CHAPTER II

REVIEW OF THE LITERATURE

Introduction

This chapter reviews the literature of higher education on the topic of general education. Community college literature is considered a part of higher education literature but is also addressed in a section of its own. The relationship of general education to occupational-technical education is addressed.

Higher Education Literature

The topic of general education as discussed in the literature of higher education is presented in this section. Subtopics include the following: definitions of general education, philosophical approaches to general education, and historical perspectives on general education in America.

Definitions of General Education

General education has been defined in numerous ways by writers in the field of higher education. Much difficulty with general education arises from the varying definitions accorded it during the past century. The spectrum of definitions ranges from very narrow, relating general education to the discipline of the medieval scholars, to very broad, including the integration and unification of all knowledge (22, p.316).
The broader definitions include those given by the National Society for the Study of Education as early as 1939. General education was to provide the student with a wide range of knowledge about basic human activities and the best of current thought (22, p.316)(59). Mayhew and Ford describe it as a "set of experiences to provide a common universe of discourse—a common body of allusion, illustration, and principle—necessary for people to communicate with each other and to share the same culture" (57, p.150). Further, Mayhew and Ford point to general education as "that portion of formal education which is concerned with preparing students for their non-vocational roles as citizen, family member, leisure-enjoying individual, and problem solver" (57, p.171).

The breadth of general education is also illustrated by the Harvard Committee on the Objectives of a General Education in a Free Society in their report of 1945, General Education in a Free Society, which emphasizes that general education is to bring all knowledge together (42). Brawley refers to the breadth component of undergraduate study as he suggests that "A promising alternative to the present pattern is to provide depth of study before breadth of study" (14, p.6). He is suggesting study in the major prior to completion of the general education requirement. Eaton states, "General education refers to course work in an academic discipline or interdisciplinary studies. The goal is the development of theoretical, practical, and affective skills to lead meaningful, productive and useful lives" (32, pp.20-21).

Boyer and Kaplan saw general education as addressing common needs and increasing the chances for survival of the human species (37, p.1)
Later Boyer and Levine compared it to the spare room in a house. They state, "The purpose of this room appears vague. Though general education can be defined as the breadth component of a college education, any agreement beyond that quickly fades" (12, p.2).

Cohen and Brawer identify another approach to defining general education, that of stating what it is not. It is not specialized, not vocational, and not occupational. An example of definition by exclusion is given, based on a report written in 1976. The report, from a conference held at a community college, states that, among other things, general education is not special, not a collection of courses, not simply a rearrangement of content, and not merely being able to read, to write, and to do arithmetic (22, p.317)(77 pp.13-14).

General education has also been defined by listing the resulting competencies gained when students experience such education. Mayhew and Ford list ten such student competencies:

(1) to read, write, speak, and listen with some sophistication in subjects of concern to people living in the last half of the twentieth century; (2) to recognize personal problems and issues and to be able to resolve them with the best possible information and assistance; (3) to know and use a library and other bibliographic aids---printed matter and other media; (4) to cooperate intimately with others in solving complex problems; (5) to distinguish between cognition and affection and to be able to use both rationality and feeling for satisfaction of the total person; (6) to relate in both evaluative and nonevaluative ways to other people, and to understand the appropriateness of each; (7) to enjoy one's own activities without threat or guilt if those activities are unusual and not commonly valued by others; (8) to identify gaps in one's own experience or learning, and to find ways to fill them; (9) to understand computers and other ways of arriving at quantitative knowledge, and to recognize both the capabilities and limitations of quantification; (10) to know and express one's own values and to defend them and modify them when the occasion requires. (57, pp.163-164).
Likewise a list of twelve competencies was developed by a group studying general education in the community colleges of California. The list includes, "Exercising the privileges and responsibilities of democratic citizenship....Developing a set of sound moral and spiritual values by which the person guides his life....Expressing his thoughts clearly in speaking and writing and in reading and listening with understanding..." (22, pp.318-319).

Lists of competencies for students completing the general education component of a college curriculum often become difficult to differentiate from the lists written to describe the educated person. Bowen, in attempting to characterize the educated person, lists eleven such characteristics. In his review of literature from Plato to Kerr, Bowen compiled more than 1500 goal statements formulated by educational philosophers concerning the characteristics of the educated person; he found remarkably little disagreement on the goals. These lists, however, present an ideal for the educated person which far "surpasses practical possibilities" (11, pp.110-111).

While such lists of competencies are used by many to define general education, others approach the definition in terms of the objectives of general education. The 1947 report of the President's Commission on Higher Education gave eleven such objectives; these have served as a benchmark for the past four decades (37, p.38).

Sen. Nancy Kassebaum, in a speech delivered at the first meeting of the Commission on the Future of Community Colleges in 1986, refers to the 1947 report as providing "a marker by which to judge our progress in matching vision and reality" (51, p.30). She also notes the
warnings of the report regarding overspecialization in education and the need for transmitting a common cultural heritage (51, p.31).

Rep. Wilhelmina Delco cited the 1947 report as she addressed the questions of access and quality in a speech to kick off National Community College Week in February 1988 (30, p.33). The objectives as identified in the 1947 report continue to serve as a benchmark (37, p.38).

According to Gaff, there is much diversity in the stated aims and objectives of general education. However, he lists five categories in which the objectives can be grouped: breadth of knowledge, integration of knowledge, basic skills, advanced learning skills, and attitudes and values (37, p.38).

Gaff also states, "Yet there are commonalities, each culture has an image of what a generally educated person is, regardless of specialty. For instance, he typically is expected to be sophisticated in the use of language, to be widely knowledgeable about the society, and to have a sense of its history" (37, p.17). He further points to commonalities in the education of students regardless of their field of specialty, noting that the trivium and quadrivium were a common set of courses required of students in ancient and medieval universities (37, p.18).

Adding to the difficulty of defining general education are the longstanding comparisons between it and liberal education. In 1945 the Harvard Report, General Education in a Free Society, referred to general education and liberal education as the same thing. However, Daniel Bell in his prize-winning book, The Reforming of General Education, states that the two are not the same (8).
In an attempt to differentiate between liberal and general education, Cohen gives several contrasting descriptions. Liberal education is held to be that which frees people from the external tyrannies of caste biases and other societal constraints, enables them to deal with superstition and guilt, and affords them knowledge for its own sake. General education is gaining knowledge, working knowledge, in order to cope, understand, and master self and social interaction. Gaining the ability to act, to do, to act intelligently, and to be successful in interaction with external referents is the result of obtaining a general education (22, p.318).

Cohen concludes that "General education has remained a noble idea but a practical backwater in most of American higher education" (22, p.316). Boyer and Levine refer to general education as the "spare room of academic life" (12, p.4) and note that no one is responsible for its oversight, but yet everyone is permitted to use it as they will (12, p.3). They conclude that the long list of definitions and strategies seems to confuse rather than clarify the issue surrounding general education (12, p.3).

Boyer and Levine (12, p.2) look to scholars and educators who have over the years "championed the cause of general education" as also contributing to the difficulties in defining it. A. S. Packard, a professor at Bowdoin College, popularized the term; he viewed general education as a prerequisite for specialized study. Alexander Meiklejohn, known as father of the survey course and creator of the University of Wisconsin's famous experimental college, saw general education as an antidote to specialization (12, p.2). A different
perspective was taken by Harvard president A. Lawrence Lowell, who encouraged distribution requirements. He saw general education as the sum of several totally unrelated courses in various areas. John Stuart Mill perceived general education as that education for a satisfying private life (12, p.2).

Differing views of general education are espoused as educational leaders attempt to give meaning and direction to the college curriculum in order to better educate students. Boyer and Levine view the college curriculum as mirroring an ongoing tension between the individual and the community. In a Lockean view, they associate the elective portion of the curriculum and the choice of a major with individualism; the general education portion is seen as the relationship with a larger community. Thus, Boyer and Levine see general education as "an institutional affirmation of society's claim on its members" (12, p.19). They use the term "connectedness" in conjunction with general education, tracing this term from the Greeks, to Woodrow Wilson, and on to Mark Van Doren of Columbia University (12, p.19). Boyer more recently states, "The search for common education, in my judgment, is rooted in the need to establish our connectedness" (13, p.15).

Present understandings of what general education is and how to define it, to a great extent, relate to the various philosophical approaches to education through past centuries. Philosophical approaches beginning at the Greek and moving to the current are reviewed.

Philosophical Approaches to General Education

The philosophical underpinnings of today's views and practices regarding general education have a basis in the writings and teachings
of great thinkers throughout the centuries. Bloom states, "The study of the ancients has followed the ebb and flow of philosophic innovation in the West. Moments of great transformation have started with refreshment at the Greek source" (10, p.304). Philosophies from the Greek and Roman writers have influenced the views of more recent educational leaders who help to form the backdrop for the contemporary debates about general education.

Greco-Roman Influence

The various philosophical approaches to education date back to the Greco-Roman societies. Present day writers quote Aristotle, Plato, Cicero, and others. Brubacher quotes Aristotle from Ethics, "the activity of God, which surpasses all others in blessedness, must be contemplative; and of human activities, therefore, that which is most akin to this must be most of the nature of happiness" (14, p.77). Senator Kassebaum speaking to the Commission on the Future of Community Colleges in 1986 quoted Aristotle as observing that "All who have mediated on the art of governing mankind have been convinced that the fate of empires depends on the education of youth" (51, p.32). Bloom refers to Plato's Republic as addressing the demands of knowledge (10, p.268). This work by Plato is perhaps the most important and influential discussion of educational theory; the concept of education is viewed as an integral part of the larger social questions of politics and philosophy (17, p.56).

John Henry Cardinal Newman quoted Cicero: "This pertains most of all to human nature, for we are all of us drawn to the pursuit of
Knowledge; in which to excel we consider excellent, whereas to mistake, to err, to be ignorant, to be deceived, is both an evil and a disgrace" (60, pp.78-79). Newman noted Cicero's belief that Knowledge is the first thing to which man is attracted, after the physical needs are met. Man's animal existence requires meeting the needs of self and involves relationships with family and neighbors. Once the basic needs are met, then "the search after truth" is very important to man (60, p.79).

Clark Kerr also traced the "strands of history" to the Greeks, noting that several philosophical approaches to education were operating within the Grecian society. Plato with his Academy, which was devoted to truth primarily for its own sake, also saw truth as the necessary study for philosophers who were to be kings. There were the Sophists, detested by Plato, in whose schools were taught rhetoric and the other useful skills. Attainable success in life was more their central goal than was unattainable truth. The Pythagoreans, who were concerned with such things as mathematics and astronomy, formed a third group (52, p.9).

Gaff points to the Greeks as he addresses general education. He refers to general education as a "timeless concern," noting that "thinkers and writers in various ages and cultures have voiced ideals for individuals and societies that undergird current concepts of general education. The ancient Greeks, for example, regarded education not just as an individual pursuit but as a communal activity..." (37, p.17). Gaff quotes Jaeger regarding this communal activity as one "... by which a community preserves and transmits its physical
and intellectual character" (37, p.17). Gaff sees this as a context in which it is understandable that educated individuals were expected to provide leadership for the state, and again quotes Jaeger, "The Greek Trinity of poet, statesman, and sage embodied the nation's highest ideal of leadership" (37, p.17). Many figures in the various societies of times past, the warrior, athlete, artist, priest, scientist, and scholar, have been idealized and shaped by both formal and informal education (37, p.17).

The Greco-Roman influence is further explained by Alfred North Whitehead. He referred to the Roman Empire as "the bottleneck through which the vintage of the past has passed into modern life" (80, p.101). As he addressed the aims of education and the place of classics in education, Whitehead convincingly conveyed that Latin literature was the work of vigorous authors who mightily displayed the Roman mentality on a variety of topics and, in particular, an appreciation of Greek thought (80, p.103).

While the many influences on general education date through the ages, the current views of general education have been influenced heavily by four persons who represent different views and times: John Henry Cardinal Newman, writing in 1873, represents idealism; Alfred North Whitehead (1929), represents the progressive era; Robert Maynard Hutchins (1936), is viewed as a revisionist; and Clark Kerr (1964), is seen as a pragmatist (37, p.18). The basic philosophy and setting of each is presented here.

**Idealism**

John Henry Cardinal Newman, one of the great masters of English
prose, wrote The Idea of a University which has been ranked with Aristotle's Ethics as among the most valuable of all works on the aim of education (60, p.vii). The book is derived from ten lectures, some of which were given in Dublin, Ireland in 1852 at the founding of the Catholic University of Ireland (60, pp.xii-xiii).

Newman entitled one essay as Knowledge Its Own End and stated that knowledge "has a very tangible, real, and sufficient end, though the end cannot be divided from that knowledge itself" (60, p.77). He expressed an idealized vision of learning and the university. The university's purpose was defined simply as a setting for teaching and learning. He defined the context in which teaching and learning ought to occur as that of a community of scholars. Gaff notes that Newman would not consider research an appropriate function in the university and would have been appalled at recent proposals to use the university as a remedy for social ills, whether for liberal or conservative purposes. Also, current practices of awarding credit for prior experience and testing for competencies that permit individuals to avoid participation in the community of scholars would be anathema. The goal according to Newman was a liberal education, without direct practical or vocational applications, but one which prepared individuals for all of life. Newman advocated humanistic study, especially of religion and literature, rather than science as the best vehicle to this end (37, p.18).

Newman wrote at a time when interest and concern with the humanities were at a peak. The age of science was soon to emerge with the
discoveries in atomic structure and Darwin's theory on evolution.

Once this age of scientific thought and discovery began, the university setting became the scene for a new rush of learning and activity. Objectivity in analysis and the use of inductive reasoning were in vogue. There was a major shift in interest from the humanities to the sciences; herein the emphasis on technology had its roots (43, pp.15-16).

Progressivism

Alfred North Whitehead, mathematician and philosopher, bridged the realms of pragmatism and philosophy. As a Fellow of Trinity College in the University of Cambridge and a Professor of Philosophy in Harvard University, he represented both the useful and the philosophical. He did not differentiate between the study of specialized knowledge and study of general education (37, p.18). He viewed education as an experience in the joy of discovery, and viewed education as "understanding" in the greatest sense (80). He perceived education as useful and stated, "It is useful, because understanding is useful" (80, p.3). Gaff refers to the "idealism" of Newman and to the "progressivism" of Whitehead (37, p.18).

Whitehead viewed education as a "seamless coat of learning" (37, p.18). The most striking phenomenon in the history of education was "that schools of learning, which at one epoch are alive with a ferment of genius, in a succeeding generation exhibit merely pedantry and routine. The reason is, that they are overladen with inert ideas" (80, p.2). He stated, "In training a child to activity of thought, above all things we must beware of what I will call 'inert ideas'
that is to say, ideas that are merely received into the mind without being utilised, or tested, or thrown into fresh combinations". (80, pp.1-2). He argued that general education should concentrate on the present. Study and understanding of the past should prepare one to deal with the present. He referred to an "insistent present" which contains all there is, past and future (80, pp.3-4).

Thought and action mingled, as described by Whitehead, was also proclaimed by Ralph Waldo Emerson. Brubacher refers to Emerson's nineteenth-century manifesto, "The American Scholar" (15, p.23). And, Yarmolinsky states, "But 'The American Scholar' ... is an affirmation of the social role of the scholar, of his capacity and his obligation to participate in the life of action, in the world of affairs—to join the study of the past with practice in the present" (34, p.14). Emerson saw action as subordinate with the scholar, but "Without it thought can never ripen into truth" (34, p.14).

This same pragmatism was a strong point with John Dewey, who was to be the "standard-bearer" for Whitehead. Dewey developed a philosophy of experimentalism, including pragmatism and instrumentalism, which was to dominate American educational philosophy in the twentieth century (15, p.23). John Dewey's view of general education as "an integrative experience underlying the unity of knowledge" (12, p.2) became the view of others. The progressive spirit represented by Whitehead's ideas was carried forth with the ideas of Dewey (37, p.18).

John Dewey (1916) saw the scientific method as a way of thinking, one in which critical inquiry is used to think in comprehensive and
accurate ways. The scientific method is useful in all areas of thinking and is certainly not confined to the subject matter of science. Dewey also advocated the transfer of skills from college to post-college activities in order for them to be more useful. Training in problem solving was encouraged, thus using the higher level skills of analysis and synthesis (43, p.16).

The ideas of Whitehead, Dewey, and others contributed to the progressive spirit of higher education and played a large part in the establishment of some unique "experimental" colleges during the 1920s and 1930s, including Bard, Bennington, and Sarah Lawrence (37, p.18).

**Revisionism**

Robert Maynard Hutchins is probably the person most clearly identified with general education in the United States. His ideals and approaches to education were more similar to Newman's than to Whitehead's. He saw the training of the intellect as the goal of general education. Hutchins' primary way of accomplishing this goal would be through a study of the great books, those that have become the classics and are "contemporary with every age" (37, pp.18-19).

The humanists contended that if man knew what was good and what was bad man would choose the good. From such a philosophical approach, Hutchins concluded that a study of the great books, which contained the best thinking of which men have been capable, would reveal to the student that which was good and how men who wrote these books arrived at the refined ideas presented in them (43, pp.16-17).

Other educators who disagreed with Hutchins' idea of a great
books curriculum viewed such a program as heavily devoted to facts, many of which had been disproved and discarded as new understanding had been gained. Subjects such as anthropology, economics, and physics were rapidly changing as newer facts and theories were disclosed. To clutter the mind with outdated facts did not seem best to these educators. Yet, to increase the store of knowledge, it was so often necessary to know what had been known before. The storehouse of accumulated wisdom found in the great literature served as one of the best sources for acquiring the best knowledge. Thus, the acquisition of the best knowledge and, in turn, the production of the best possible man were the goals. Reading great literature was a means to that end (43, p.17).

Hutchins advocated hiring faculty with a wide range of intellectual interests who also felt a devotion to educating undergraduates through a great books curriculum. He realized that the university was not amenable to such a version of general education. He criticized the university for teaching subjects vocational in nature and employing those who specialized in research or had very narrow interests rather than an interest in teaching. Attempts to qualify instruction by counting credits or units was to undermine education (37).

He saw the subject of education as related to the curriculum. Although he lost the battle with the university as a whole, he was able to create a separate college at the University of Chicago which used his approach to general education (37, p.19). It included a common core curriculum required of all students, issue-oriented interdisciplinary courses, separate faculty to teach the general
education, and early admission of select students (37, p.20)(12, p.8). This separate college functioned much like an "enclave for general education," while the remainder of the institution went about its business (37, p.19).

Boyer refers to Mark Van Doren of Columbia University as an "eloquent exponent" of general education, one who saw "the connectedness of things" in the realm of learning as a concern for educators (12, p.19). Mark Van Doren saw the aim of liberal education, which can be viewed as the idealized end of general education, as the perfecting of "one's own excellence" and "one's intellectual character." This was not merely a learning "to know" or "to do" but primarily learning "to be" (43, p.17).

Van Doren's concept corresponded closely to those of Hutchins and Newman. Yet there was a new dimension when compared to the British education which had been so closely related to the genteel of society in Newman's time. Van Doren was expressing the need for something more than that which Henderson refers to as a "cultural veneer" (43, p.17). Van Doren related his concept of the perfection of intellectual character to the ability to make value judgments and to use them in living the good life (43, p.17). Everett Dean Martin, while proposing a similar aim for the educated person, saw the need for a person who could not only do something, such as run a train or give a lecture on poetry, but also know the significance of what he does. The acquisition of a set of values was essential in becoming an educated person, according to Martin (43, p.17).

The attempt by Hutchins and others to re-orient the curriculum
toward the humanities resulted from the consequences of the Great Depression of the 1930s and of the tragedies of the war of the 1940s (43, p.16). The wrongs of the economic system were disheartening enough, but the devastation of war added to the grave concern about man's sense of values and methods of settling disputes between civilized nations (43, p.16).

**Pragmatism**

Clark Kerr has been called "the philosopher of the modern university" by Levine in 1978. Kerr's recognition of academic pluralism, his use of the term "multiversity" to describe the modern-day university, and his strong sense of pragmatism were distinctive (37, p.19)(52, pp.18-19).

Kerr saw the modern university as an inconsistent institution, not a single community but several communities. He identified communities related to the undergraduate, the graduate, the humanist, the social scientist, the scientist, the professional schools, the administrators, and others (52, pp.18-19). Rather than a community with common interests like the medieval communities of masters and students, he viewed the multiversity as a conglomerate of communities with varied, overlapping, and even conflicting interests. The complexities of the institution cause it to be difficult to understand and control (52).

Kerr saw the university not only as several communities but also as performing several functions. However, others questioned the role of the university with regard to liberal education, professional education and/or research. Veblen writing, in 1918, thought it "was a
relic of barbaric times to keep professional education on the academic campus. He felt that liberal education, too, though worthwhile for the preparation of citizens, should be separated from the university" (15, p.4)(79). Levine describes Veblen as one who made a call for a pure research university (53, p.21). On the other hand, Ortega y Gasset, writing in 1946, saw liberal and professional education as the business of the university, but he excluded research. Nisbet, viewing the university in the 1970s, considered research a legitimate function of the university but expressed concern over the use of the university to do tasks for industry and the government as degrading the academic dogma. Clark Kerr, however, believed that these three functions along with other activities are appropriate to the university and can be held together on the academic campus and thus he gave the title of "multiversity" to the modern university (15, p.4).

Whereas Hutchins desired radical restructuring, Kerr suggested modest improvements which could be made in undergraduate education, such as giving attention to the preparation of generalists and attempting to personalize the large and complex multiversities (37, p.10). Under Kerr's leadership, Berkeley became the top-rated graduate school in America, with twelve Nobel Laureates, the greatest number of Guggenheim Fellows in the country, and other first-rated achievements. However, at the same time Kerr stressed teaching quality and student life, and he attempted to make the university setting smaller and more close-knit for the student at a time when enrollment was increasing (53, p.22). Kerr's roles in California, as President of Berkeley and as leader of masterplanning in higher education, were
followed by a role at the national level (53, pp.22-23). As head of the Carnegie Council for Policy Studies in Higher Education, Kerr has done much to renew the interest in general education (37, p.10).

Historical Perspectives for General Education in America

Present concern for general education, its meaning, purpose, and future, represents a period of revival. Two such revivals have occurred in American higher education since the turn of the century. Each revival has included a national debate, the production of numerous articles and books, curriculum reviews and revisions, and a specific proposal, like the recent one at Harvard, serving to epitomize the movement (12, p.9).

The activity in general education is ongoing and certainly not limited to these periods of national revival. Significant changes and writings occur at times when little attention, nationally, is focused on general education. The institution of the "Great Books" curriculum at St. Johns and the writing of Daniel Bell's The Reforming of General Education occurred when overall interest in general education was not at a peak (12, p.9).

Bonham sees this on-going self-questioning of the basic purposes of education as an extremely healthy aspect of American higher education. Whether a major report occurs at a time of revival, as did the Harvard report, or at a time when interest is less intensified, as did Daniel Bell's Columbia report, it is important to have "internal ability to re-ask the fundamental question: How effectively do we prepare our students for a rapidly changing world?" (20, pp.2-3).

In this rapidly changing world, with explosions of knowledge,
technology, and population, a continued need exists for all Americans to be generally educated. However, general education has experienced two previous revivals since the turn of the century and is presently undergoing a third.

**First Revival**

The first general education revival of this century occurred about the time of World War I. In 1902, Dewey blamed the disarray and congestion of the college curriculum on the rapid expansion of knowledge, not on poor teaching. This led to the idea of the survey course, which would give the student a view of the universe and thus enable him to gain an orientation to the larger world (12, p.19). President Alexander Meiklejohn of Amherst College introduced, in 1914, a survey course entitled “Social and Economic Institutions.” This course was designed to introduce students to the humanistic sciences in a very broad sense. This was an attempt to put into practice the ideas of John Dewey (12, p.9).

The ideas of Dewey and Meiklejohn gained momentum following World War I, and, in 1919, Columbia University introduced a survey course, “Contemporary Civilization,” to be required of all freshmen. The course was a combination of a wartime army training class, “War Issues,” and a post-war part called “Peace Issues” (12, p.10). A four-semester course, required of all students, this course became the center of general education at Columbia (37, p.20). The course was described in the catalogue as a course which would give the student, early in his college studies, material regarding his physical and social environment and features of the intellectual, economic,
and political life, in order for the student to be able to intelligently participate in the civilization of the day (12, pp.9-10).

Other schools, Dartmouth and Reed, developed their own survey courses. At least 30 schools copied the Columbia or Reed model (12, p.10). During the 1920s and 1930s the survey courses became quite popular. Courses in the social sciences fit into the "Individual in Society" type of course while those in the humanities came under the "Modern Culture and the Arts" category. Attempts were made to develop separate survey courses in the natural, physical, and biological sciences, but these met with less success (22, p.315).

Near the end of this revival, some well-known experimental colleges were begun. At the University of Wisconsin, the Meiklejohn College was begun in 1927. The survey course became a two-year study of Greece in the Age of Pericles and of the contemporary United States. In Missouri, Stephens College, a two-year college for women, based its curriculum on "life needs" (12, p.10).

Probably the most widely known and debated experiment was "the College" established at the University of Chicago. Although it was begun before Robert Hutchins arrived, his name and philosophies are somewhat synonymous with this school (12, p.10). Gaff refers to it as "the laboratory for Hutchins to experiment with his ideas" (37, p.20). It was a radical approach to general education and included a great books curriculum, interdisciplinary courses, early college admission, and comprehensive examinations. It was a four-year fully-required course of study (12, p.10). Boyer and Levine point to the prestige of the University of Chicago and the charisma of Robert Hutchins as having a great influence on courses and programs in
general education at various schools across the nation.

Boyer and Levine see these experiments in general education approaches as a reflection of the times. The movement dealt with social concerns of the era, occurring in a period of social drift and personal preoccupation. The war had destroyed community, political participation declined, government efforts to set a common social agenda weakened, international isolation was on the rise, and individual altruism decreased (12, p.17). The vigorous and activist leadership of Theodore Roosevelt, with his "Square Deal," and Woodrow Wilson, with his "New Freedom," had served the reform impulse in American politics (12, p.11).

With the disillusionment that followed the First World War, many Americans turned to more hedonistic concerns. Calls for social justice, civic responsibility, and commitment to the common good were quieted. Americans were wearied of the excitements of war and heavy tension brought on by the Red Scare. They hoped for personal and national isolation. It was in the midst of this drift that general education was revived (12, p.11).

The general education component of the college was an attempt to answer almost every major academic and social problem. Many believed that the typical college curriculum of the 1920s catered too much to individual interests, was overspecialized and excessively vocational, and ignored the broad purposes of education (12, pp.11-12). Kerr points to Abraham Flexner as seeing the university as changing, particularly in the direction of the social evolution of which they were a part (52, p.4); Levine notes that Flexner advocated a pure research university (53, p.23).
The social concerns which general education would supposedly help to address included machine politics, municipal corruption, cynicism and disillusionment among the younger generation, and the integration of newly arrived immigrants. Boyer and Levine list fourteen purposes for general education cited during the World War I era revival (1910-1930) (12, pp. 54-55).

The long list of purposes and the wide spectrum of problems identified as needing to be addressed indicates that reformers had varied notions about the role of higher education in society. The central contradiction appears to be between the demand for higher education to aid in adapting to the very complex modern world and the call to recapture the idealism and cultural unity of the days before the war (12, p. 12).

The Great Depression hastened the decline of the first revival. Students left campus for business and industry. Students needed jobs. In 1935 an estimated one-third of the previous year's graduating class was unemployed and another third had jobs for which they had not trained and held little interest. The result of the economic depression was a shift from general to vocational education. From 1933 to 1937 the drop in enrollment in arts and sciences was from 75 percent to 64 percent (12, p. 13).

The general education movement was intended to provide greater integration in the curriculum by stressing common bodies of knowledge. The proposals for accomplishing this ranged from the conservative proposals of Robert Hutchins to the experimentalist proposals of the progressives. The progressive educators took their cues from the philosophies of John Dewey. Attempts to rework the college curriculum
often resulted in compromises between the principle of election and prescription (17, p.580). One approach stemmed from the efforts of A. Lawrence Lowell who led Harvard to a compromise between prescription and election by having some courses be in the area of concentration and others from areas of distribution with the student having some choices (17, p.581). Lowell saw general education as the sum total of "a number of general education courses in wholly unrelated areas" (12, p.2).

Individualized instruction was another approach attempted by Princeton, Harvard, and Vassar. Tutors, or preceptors, were assigned to students. These helpers were to advice and assist students with their classwork or in preparing for final exams. The design of an honors program is an approach strongly identified with Swarthmore. The independent-study plan of Leland Stanford gave students a great deal of freedom to work out an individual program of study and is associated with colleges such as Bennington, Sarah Lawrence, and Bard which were conceived during this revival period (17, p.582).

Another approach to reforming the curriculum was to center the study in a culture, epoch, or civilization. The Experimental College which Alexander Meiklejohn lead from 1927 to 1932 at the University of Wisconsin is perhaps the most complete example of this less popular approach. Other attempts centered the study around pressing personal needs such as physical health, sex, and marriage and home or around social, civic, and religious concerns (17, p.583).

Cohen states, "All curriculum is, at bottom, a statement a college makes about what it thinks is important" (22, pp.313-314). Whether it be a free-elective system, a curriculum based on the Great Books, or
one concerned primarily with occupational education, the shaping of the curriculum and the setting of course requirements makes a philosophical statement (22, pp.313-314). This first revival was a strong effort on the part of educators to recapture the idealism and cultural unity which had been a part of the prewar period. However, the Depression caused a tremendous shift from general to vocational education on the part of the students. The large increases in engineering and business administration and commerce enrollments represented the need to find jobs. This enrollment shift, caused by the severe economic conditions, brought a halt to the revival (12, pp.12-13).

Second Revival

The second general education revival of this century followed World War II. Strong political leadership had put into place The New Deal in an attempt to bring the nation out of difficult economic and social times. The war overshadowed everything and took the nation's time, energy, and resources. In the years after the war, Americans again turned inward. Their preoccupations seemed more personal and less social as they attempted to catch up for the years of dearth brought on by the Great Depression and World War II (12, pp.13-14).

Among educators a very reflective and somber attitude was forthcoming. The atrocities of the war; death camps at Buchenwald, Auschwitz, and other sites; the looming power struggle with the Soviet Union; and the power of the new atomic bomb caused grave
concerns. The question was "How could education direct mankind to humanistic endeavors, avoiding future problems of such proportions?" (37, p.14).

In 1945, a report of a faculty committee at Harvard, General Education in a Free Society, was published. It was more popularly known as the "Redbook." This report became widely influential, more because of what it advocated than by action taken at Harvard. Stressing core courses in Western civilization to be taken by all students, literary texts, scientific principles, and English composition, it also called for one additional course to be taken in each of three divisions: humanities, social sciences, and natural sciences. Many of the courses were to be of an interdisciplinary construction. While Harvard adopted only a modified version of the proposal, many other institutions across the country embraced the committee's proposals (37, p.20).

Paralleling the second revival in general education, a "second transformation" occurred in the American University. Kerr identified the "first transformation" as occurring roughly during the last quarter of the nineteenth century when a combination of the land grant movement and German intellectualism brought about extraordinary change in American higher education. The "second transformation," occurring for approximately a quarter of a century after World War II, brought unprecedented numbers of students to the campus and called on higher education to respond to the expanding claims of national service and to link with industry in activities as never before (52, p.86). He states, "...the university must serve a
knowledge explosion and a population explosion simultaneously" (52, p.37). However, he saw the American university as responding to these various needs and referred to the American university as coming into its own by the end of the period. He paralleled the influence of the American university, serving as a model for universities in all parts of the world, to those of nations which in years past had become influential. Greece, the Italian cities, France, Spain, England, Germany, and now the United States developed the leading intellectual institutions of its world (52, p.87). Kerr, in 1963, stated, "Today, more than ever, education is inextricably involved in the quality of a nation. It has been estimated that over the last thirty years nearly half of our national growth can be explained by the greater education of our people and by better technology, which is also largely a product of the educational system" (52, p.87).

Thus, while the general education revival was causing familiar themes to be dusted off and readdressed, the American university was fast developing to meet the needs of a highly technological nation. Added to the more familiar themes of training for public responsibility, promoting "self-realization," and continuing the common heritage, were added the updating of immigrant newcomers and the helping of returning veterans. Also, an urgent effort was needed to deal with world communism and to sustain democracy and a free society. Boyer and Levine state, "The Cold War did not alone cause the general education revival in the late 1940s and the 1950s, but it gave it a sense of urgency and historic purpose" (12, p.15).

The grave concern over communism helped to cement the need for a general education revival, but Russia's scientific advancements, namely Sputnik, helped to turn the tide away from general education (12, pp.15-16). The launching of Sputnik sparked the "greatest surge of public support that education has ever received. Sputnik was a scientific threat of mystifying proportions, and the nation was convinced that the surest way to counter it was by developing American science precipitously" (58, p.17). Following the 1957 space triumph of the Soviets, a wave of specialization occurred in American education. Science, foreign languages, and programs for the gifted were emphasized (12, pp.15-16). Congress appropriated huge sums of money to strengthen science education, at both the college and high school levels. Research and development contracts were funded at spiraling rate. Salaries for scientists and science professors increased drastically (58, p.17).

Those who thought that higher education had reached its zenith were to view new heights for the American university. Archibald MacLeish wrote in 1941 that Harvard like other major institutions had most likely seen a peak in gifts during the 1920s, experienced the peak in enrollments, and conquered the new frontiers. But since that time Harvard, like many other institutions, has benefited from federal grants, obtained private gifts beyond expectation, and experienced new frontiers (52, p.85)(55). Universities have great drawing
power for industry. Kerr refers to the new connection of the university and the rise and fall of industrial areas as "unmatched in history except by the universities and their Lander in nineteenth-century Germany" (52, p.90). New industrial laboratories often seek sites near major universities, and industrial agents reach to extract the latest ideas from the university laboratory as they are born and to hire the latest graduates (52, pp.89-90). The scientific era sparked by Sputnik had a major effect on emphasis in higher education.

General education was further affected by the turbulence of the sixties (12, pp.15-16)(57, p.139). The erosion of the general education requirements that took place in the 1960s and 1970s was less publicized than the highly publicized reshaping of the course of study that occurred in the 1940s and 1950s (22, p.316).

Third Revival

The decade of the 1970s had seen a growing number of articles, conferences, and projects dealing with general education, but three particular events of 1977 touched off the current national effort to redefine and reform undergraduate general education. The Carnegie Foundation for the Advancement of Teaching, in a publication on curriculum, labeled general education "a disaster area." The Task Force on the Core Curriculum at Harvard University finalized its report, and efforts were begun to strengthen undergraduate education at Harvard. And, in that same year U.S. Commissioner of Education Ernest L. Boyer and his assistant Martin Kaplan emphasized the need for a core curriculum to address common needs and increase the
chances for survival of the human species (37, p.1).

Soon after Derek Bok became President of Harvard University he began to focus attention on undergraduate education. From the early 1970s until the beginning of implementation of Harvard's new core curriculum in the fall of 1979, President Bok, Dean Rosovsky, and Professor James G. Wilson led in efforts to address the problems in undergraduate education at Harvard (20, pp.5-7). Harvard's unparalleleled wealth and academic riches, as well as its approach to the central questions concerning the vitality of its educational offerings, caused its 1978 Harvard Report on the Core Curriculum to gain the attention of the nation's leaders and a third revival to begin (20, pp.3-4).

George Bonham in The Great Core Curriculum Debate identified "the fundamental question: How effectively do we prepare our students for a rapidly changing world?" (20, pp.2-3). He was one of many concerned that institutions of higher education were turning out legions of technocrats and specialists who were not prepared to survive in the rapidly changing world where civic competence is all too necessary (20, p.4). Bonham quotes Father Theodore M. Hesburgh as saying, "In a world of sudden and cataclysmic change, simple sanity requires some fixed constants. Navigation requires reasonably fixed points of reference. Without navigation life today becomes irrational wandering, a journey without a homecoming, a voyage with no port of call, a story without meaning or ending" (20, p.1).

Outside the doors of academe, the growing economic and social problems caused national leaders to assess education's role in solving
the nation's problems. The President's Commission for a National Agenda for the Eighties reported that a continued failure on the part of the schools to prepare students adequately might yield disastrous consequences for the nation (40, p.15). While the report spoke to all levels of education, a heavy implication related to higher education's responsibility to produce a citizenry capable of competing in the world market of ideas, goods, and services (40).

One of the most pressing concerns was the rapid advances being made in technology by other countries such as Japan; the effect of these advances was that American industries were being outpaced and thus were losing the market share necessary for their survival (65) (40, p.15). The concern was great, and American managers began to look for solutions. As Peters and Waterman wrote, "The dearth of practical additions to old ways of thought was painfully apparent. It was never so clear as in 1980, when U.S. managers, beset by obvious problems of stagnation, leaped to adopt Japanese management practices, ignoring the cultural difference, so much wider than even the vast expanse of the Pacific would suggest" (65, pp.4-5).

Another major concern related to a bent in the United States toward consumerism and the American people's growing dependency on consumer goods. The complexities of a highly technical and industrial society had been developing for nearly two centuries and in heightened proportions since the end of World War II. Thus, the citizens of the U.S. had become more urbanized; more dependent on utility systems; more reliant on individual vehicles for transportation; and far removed from the concept of gaining their living
from the family's small plat of earth. Added to these more natural results in the society were the strong tendencies toward faddish and disposable consumerism brought about by the age of synthetics, a television in every home, and the astute marketing strategies employed by the nation's industries via television and other media. Boyer and Levine refer to the "Me Generation" and believed that reform in general education is one way to strengthen the concept of community versus self (12, p.7).

Among the major concerns was the state of the American Family. Divorce, separation, alcoholism, drugs, child abuse, mobility, effects of television, and numerous other factors were so impacting the American family that no one could accurately describe, much less predict, what the results would be. But, one thing most could agree on was that many of the problems experienced by children in the home were in no way advantageous to them in the classroom (74, p.50)(10).

Within the classrooms, many students had become discipline problems or candidates for special education programs. For those remaining in school and on the normal tracks, the courses taken were often those requiring less rigor. Standardized testing showed that achievement was slipping. From 1963 to 1980 there was a continual decline in the Scholastic Achievement Test results (40, p.15).

Teaching had become fraught with problems; the working environment was far from ideal for most public school teachers. Discipline problems, lack of motivation, unconcerned parents, multiple preparations, lunch duty, low salaries and loss of prestige in the pro-
fession discouraged many (74, pp.184-187); those best prepared to teach often left the classroom for more money or better conditions in the business world (40, p.16).

Thus, with knowledge of the many problems within education and the many problems facing the nation, Secretary of Education Terrel Bell formed, in 1981, a committee known as the National Commission on Excellence in Education. Two years later on April 26, 1983, some 200 leaders from the fields of education, industry, and government were present at the White House as this committee made its report to President Reagan. The report, *A Nation at Risk: The Imperative for Education Reform*, gained the attention of not only those present but also of most educators and leaders across the nation (40, p.14).

The report gave a clear and straight-forward message as indicated by the preface:

"Our nation is at risk. Our once unchallenged pre-eminence in commerce, industry, science, and technological innovation is being overtaken by competitors throughout the world. This report is concerned with only one of the many causes and dimensions of the problem, but it is the one that undergirds American prosperity, security, and civility. We report to the American people that while we can take justifiable pride in what our schools and colleges have historically accomplished and contributed to the United States and the well-being of its people, the education foundations of our society are presently being eroded by a rising tide of mediocrity that threatens our very future as a nation and a people. What was unimaginable a generation ago has begun to occur—others are matching and surpassing our education attainments. If an unfriendly foreign power had attempted to impose on America the mediocre education performance that exists today, we might well have viewed it as an act of war. As it stands, we have allowed this to happen to ourselves. We have even squandered the gains in student achievement made in the wake of the Sputnik challenge. Moreover, we have dismantled essential support systems which helped make those gains possible. We have, in effect, been committing an act of unthinking, unilateral educational disarmament" (4).
This report emphasized that while America had become a complex, sophisticated, and powerful society and nation, it was yet very vulnerable. The report drew attention to the importance of education in maintaining America's stature in the world.

The report set off a chain of reaction, and Secretary of Education Terrel Bell hailed the report as a possible "turning point" in an era when U.S. schools face "the challenge of the postindustrial age" (40, p.14). Termed a "vintage year" for educators, 1983 was a year when committees and groups at the state and national levels further focused attention on undergraduate education. (1, p.685).

The third revival of emphasis on general education in the undergraduate curriculum continues. Across the nation, colleges and universities are attempting to define or redefine the goals of general education within the curriculum. Programs and courses are being defined or reshaped in an attempt to meet the goals of general education.

Boyer and Levine list fifteen purposes for general education, identified in the literature, for the current era (1971-1981). These purposes range from efforts in responding to ethics and values implied by Watergate to improving an institution's marketing position. Countering overspecialization and the new vocationalism; developing a global perspective and overcoming the current "cultural crisis;" and combating narcissism and "self-centeredness" are among current purposes for revitalizing general education in the college curriculum (12, pp.56-57).

Community College Literature

The topic of general education as discussed in the literature
pertaining to the community college is presented in this section. Subtopics include the following: community college growth, growth in occupational education, and the general education dilemma.

The community colleges of the 1980s play a unique role in the hierarchy and mission of American higher education. Concerns about the undergraduate curriculum and the preparedness of students to cope with the rapidly changing world are not unique to Harvard; these concerns are the focus of reality in the community college sector also. The dramatic growth of the community college in this century has impacted significantly on the scene of higher education in America; however, the impact has not been one of greater focus on general education.

Community College Growth

The community college is an outgrowth and expansion of the junior college idea. Near the beginning of the century the first junior college was formed. William Rainey Harper, known as the father of the junior college, encouraged the formation of the first junior college in Joliet, Illinois. Harper, as President of the University of Chicago, saw the benefits of two-year schools that could provide prepared students for the senior colleges (39, p.5). Once established, the junior college was to await changes in the social and economic life of America (39, p.5) before blossoming into the full-fledged community college of the present.

Following World War II, the Truman Commission report recommended that the number of community colleges be increased and their activities be multiplied in order to expand and diversify educational
opportunity (30, p.33). Removal of geographic and economic barriers was stressed in the report. Further emphasis was placed on providing both two years of a baccalaureate education and postsecondary vocational technical education (30, pp.33-34). Truman's report and efforts gave impetus to community college growth (30, p.33).

Cohen and Brawer identified three major social forces which contributed to the rise of the community college: the need for workers trained for the nation's expanding industries, a lengthened period of adolescence, and a drive for social equality (22, p.1). However, they conclude that the "simplest overarching reason" for the tremendous growth of the community colleges is the demand on schools at every level to solve the many social and personal problems at hand (22, p.2).

Thus America was led to a period, following Sputnik, when education became everybody's business (39, p.5). Gleazer states, "The nation put its faith in education as a means to many ends: a good job, national security, leadership in the space race, the skilled manpower needed for expanded medical programs" (39, p.6). Also, education was perceived as the individual's pathway to economic and social advancement (39, p.6).

Postsecondary education issues moved into the political arena at the state and national levels. Inventories of educational needs, resources, and future requirements were made in state after state; California led the way with an open-access public model (39, pp.6-8) (53, p.24). State planning for education emerged, and the community colleges emerged as an integral part of higher education (39, pp.6-8). Dramatic expansion of the community college occurred during the
In 1968, Edmund J. Gleazer stated, "Five hundred new community colleges have sprung up in the last ten years" (39, p.4). Further, he had a list of 200 more community colleges which would open before the decade ended (39, p.v). As Executive Director of the American Association of Junior colleges, Gleazer led at a time when growth was rapid in the community college segment of higher education. Major cities such as Miami, St. Louis, Dallas, Cleveland, and Seattle were establishing community colleges and enrolling tens-of-thousands of students. Education was becoming available to the students in their own community (39, pp.4-5).

The growth continued into the 1970s. In 1978 there were 1,234 two-year institutions in the United States and outlying areas enrolling 4,034,058 (3, p.3). This is in contrast to 1960, when there were 678 such institutions enrolling 660,216 (3, p.3). The American Association of Community and Junior Colleges (AACJC), in May 1979, projected, "The only segment of postsecondary education to have growth from 1976 to 1986 was the two-year college; this growth would be 35 percent" (3, p.3). Levine, in 1987, noted that there were nearly 1,300 community colleges enrolling over half of America's college students (53, p.12).

Boyer, addressing the sixty-fifth annual meeting of AACJC during 1985, perceived the community college as "one of the nation's most exciting and essential institutions" (13, p.14). More than eight million students were enrolled, and more than half of all first-time freshmen began their post-secondary education at two-year institutions. On a trip to India, Boyer found that educators were
particularly interested in learning about America's two-year institutions. Boyer states, "The simple truth is that America's community colleges are the envy of the world. If we did not have these remarkable institutions in America, we would be enormously impoverished" (13, p.14).

The growth and development of the university in America took place over three centuries. In contrast, the community college developed during the present century. The purposes of the university developed from the academic cloister, to the research organism, and, further, to the multiversity described by Kerr in The Uses of the University. In comparison, the community college developed from the "junior" institution, which could provide a supply of students to the four-year colleges, to the present day comprehensive community college with several purposes (52)(39). The curricular functions of the community college include academic transfer preparation, vocational-technical education, continuing education, remedial education, and community service.

While the community colleges have enjoyed much growth, they have also been a part of the questions related to general education in higher education. John F. Grede writing in 1981 stated, "The community college is not only the fastest-growing component of the American educational hierarchy, it is probably also the most rapidly changing element in that Hierarchy" (41, p.1). He identified the shift in educational mission over a three-decade period as de-emphasizing liberal arts and transfer-oriented education while emphasizing occupational and community service programs (41, p.1).
Growth in Occupational Education

The shift to more vocationally oriented curriculums and the corresponding de-emphasis on general education at all levels of higher education prompted the Third Revival. Community colleges are presently focusing on needed reform, along with four-year colleges and universities. The dilemma is often amplified for the community college because of the time constraint (two years) to accomplish both general education and occupational education of the student. The comprehensive community colleges have had as part of their mission the occupational education of the student, and emphasis on occupational education seems likely to continue.

Cohen, Brawer, and Lombardi, writing in 1971, found that community college educators expended more energy on developing and promoting the vocational portion of the curriculum than on other portions. The reason given was that the vocational function is an outstanding characteristic of the community college in its role within higher education. This role is not paralleled by lower divisions of four year schools (23, p.137). The time and energy devoted to vocational programs is necessary because they are less stable than transfer programs; rapid technological and sociological changes impact directly on them (23, p.138).

Since the mid-sixties, occupational enrollment not only increased in numbers, it increased at a higher rate than either total enrollment or transfer enrollment. In 1972-73, for the first time, more than half (51 percent) of the degree awards were in occupational categories (2, p.12). Men and women were moving away from the arts and science and general programs to occupational curriculum. By 1975-76 this had grown to 57.5 percent (2, p.12).
This focus on occupational education is a result of the occupational structure of the country. Numerous aspects are a part of America's work place: job retraining needs, technological innovations, expanded social services, entry and reentry of women, longer life, and growth of leisure time (2, p.13). All these point to the need for occupational training. In 1978 the AACJC projected that 40 million adults would be going through a career change in the ten year period from 1978 to 1988. The community college would be training and/or retraining 24 million of them (2, p.13). Thus, as a provider of occupational training, the community college seemed likely to prosper.

The shift to vocational-technical education occurred over the long haul. In 1929, according to Eells, the public junior colleges of California enrolled 80 to 20 in favor of collegiate or transfer studies. In Texas municipal junior colleges this ratio was 77 to 23 (23, p.17). By the 1970s the vocational enrollment equaled the transfer enrollment (23, p.17)(2, p.12).

Contributing to this shift toward vocational emphasis was the GI Bill. As the first large-scale financial aid package to students from various backgrounds, the GI Bill enabled veterans to enroll in higher education. Prior to World War II, only one young person in seven went to college, and most students were from middle and upper socioeconomic classes. By the 1970s, three in every eight persons attended college (23, p.19).

Kassebaum states, "The community college is a uniquely democratic institution" (51, p.3). Cohen and Brawer perceive the community
college as contributing the most in higher education to opening the system. Located in large metropolitan areas, the community colleges are accessible to the masses, including groups who have not had access: minorities, women, low ability students, low achievers, and "new students" (23, p.19).

The growth of the community colleges and the shift to vocational emphasis have been accompanied by a major change in composition of student body. K. Patricia Cross wrote in 1974 that there was a "New Student" to higher education. Most institutions of higher education were not prepared to educate the New Student as they had been the traditional student (27, p.xii). Cross defined the New Students as those scoring in the lowest third of the sample on a conventional test of academic achievement. The traditional students were those scoring in the upper third (27, p.xiii). The New Students of either high or low socioeconomic status are likely to be found in technical and vocational curricula of two-year colleges (27, p.41). Cross identifies the better comprehensive community college as the institution favored by New Students (27, p.77).

The community colleges attracted students from the various socioeconomic and ability levels. Community colleges were an avenue to individual mobility. Students saw the community college as a vehicle for social mobility and as a training ground for the professions, business, and industry (23, p.20).

Jencks and Riesman, authors of The Academic Revolution (1968), note that programs such as business, education, and engineering got more than their share of upwardly mobile students. One reason for the appeal of these programs to first-generation college students
was that they led directly to a job. Jobs were very much on the mind of the upwardly mobile (46, p.146).

Jencks and Riesman relied on Flanagan's information from One Year Follow-Up Studies to draw the conclusion that, contrary to popular myth, it did not seem to be mainly the poor who attended the junior college. The highest rates of enrollment were among the affluent but academically inept (46, p.146).

Flanagan's data revealed that women in the top quartile (socio-economic) and the second and bottom quartiles (ability) had the highest probability of attending junior college after graduation. The second highest probability was for men in the top quartile (socioeconomic) and the third quartile (ability) (46, p.145).

This information does not appear to conflict with that provided by the National Center for Education Statistics (NCES). NCES divides students into high, middle, and low ability levels. About 39 percent of the students attending community colleges are from the high ability level (2, p.9).

Women had, by 1978, become the majority group among all undergraduate learners in the traditional age group of 21 years or under. Also, women, minorities, and persons over 24 years of age became the "traditional" student by 1978. Between 1972 and 1978 the number of women in post-secondary education doubled while men only increased by one-fourth (2, p.13). At the community college, 58 percent of the associate degrees in 1976-77 were for occupational curriculum and over half of these were in the fast growing science and engineering curriculum; women accounted for nearly half of these (2, p.7).
General Education Dilema

Community colleges attained growth and success, but a dilemma with regard to general education developed. The growth was based on open access, low cost, geographic accessibility, developmental and remedial education, and paraprofessional and technology training. The prices of "ongoing success and vocational thrusts" included "neglect of and some indifference toward humanities education" (31, pp.xi-xii). In 1979 a position paper, "Why All CCC Students Need General Education," was presented by the City Colleges Study Group from the City Colleges of Chicago (CCC). The decline in the transfer function associated with decline of general education courses was of concern. This decline was attributed to the acceptance of a market-oriented vocational philosophy and was noted as educationally unsound and socially unjust (70). The CCC had nearly 200 occupational programs leading to the AAS degree or shorter-term certificates (70, p.2). The concept of terminal degree was becoming just that and discouraging "further upward mobility by means of additional higher education" (70, p.3).

The City Colleges Study Group saw the idealism of youth being "thwarted by the harsh realities of the job market, and by the market philosophy current in American education" (70, p.12). They emphasized the need for students to be educated beyond the narrowly specialized aspects of work to the widening perspectives of life in an industrial civilization. They encouraged general education as a means to providing the widened perspective (70, pp.13-15).

Other community colleges across the nation began to assess the status of general education within the curriculum. An Assessment
Committee at Maricopa County Community College in Phoenix, Arizona, began work in 1982. Data gathered showed that enrollment in arts and sciences fell from 56.7 to 44.9 percent (1971-1981), while occupational areas had an increase from 30 to 40 percent in the same period. Students were older, more likely to be female, occupationally oriented, and non-degree oriented than in former periods. Numerous additional studies were suggested for the college district (69).

Miami-Dade Community College, founded in 1960, initially adopted a university model for its general education program. Internal and external pressures created a need to address the general education question. Internally, the pressure resulted from the drastic change in the student population. External pressures, according to Lukenbill, related to three issues: vocational education, basic skills, and academic quality. Miami-Dade's response to the emphasis of career training and the production of specialists was to reaffirm the priority and value of general education and to increase the general education requirements for students pursuing the AAS degree (21, pp.7-8). A general education core, made up of five interrelated courses, are required of all degree-seeking students (21, p.11). A second level of the general education program contains distribution courses designed to meet the general education goals (21, p.12).

McCabe, of Miami-Dade, came to feel that the changes in general education requirements turned out to be the least important part of the reforms. Basic skills, testing and placement, and academic standards became the focus of attention by faculty and administrators. The college proceeded to address these issues. National recognition
followed; Miami-Dade came to be viewed as "number one" in America's community colleges (82, pp.22-23).

Dallas County Community College District (DCCCD) approached the general education question by determining educational outcomes relevant to goals for effective living and responsible citizenship (21, p.15). Efforts were begun in 1977 (21, p.15), and a document, "Skills for Living," was developed. Since 1981 the document has been used to bring about curriculum revisions and an ongoing review process (13, p.18). Skills for living were identified as the following: living with yourself, living with others, living with environments, living as a producer, living as a consumer, living in the community, living creatively, and living as a learner (13, p.18). The question asked by DCCCD participants was, "Can we combine technology, our relationships with the corporate world, and our own skills to shape lifelong learning?" (21, p.19). The DCCCD believes it has the ingredients to shape lifelong learning for its students in the future (13, p.19).

Individual community colleges and districts addressed the issue of strengthening general education in the curriculum on an individual basis, but the AACJC also took action. Following publication of William J. Bennett's, "To Reclaim a Legacy," the AACJC called together, in 1985, a group of education leaders who had demonstrated both their commitment to the humanities and to the two-year college. This group, the Humanities Roundtable, reaffirmed the centrality of the humanities education (2, p.xiii). A policy statement was developed which emphasized the importance of humanities in the community college curriculum.
The need was seen as particularly critical in the community, technical, and junior colleges because of the student's interest in practical education. Twelve recommendations were put forth in an effort to strengthen general education in the community college, particularly in vocational programs (2, pp.3-8).

William Bennett, in "To Reclaim a Legacy," cited Kirkwood Community College as a community college which had become a "bright spot" in relation to humanities studies. Kirkwood had begun, in 1979, a review of the state of humanities. It was found that fewer and fewer students were taking the humanities. After much study and analysis, Kirkwood instituted a program known as Encounters in Humanities and a new associate of arts core program. The success of these two programs was the key to Bennett's reference to Kirkwood as a "bright spot" (2, p.68).

In Kirkwood's efforts to strengthen the humanities, no change in the degree requirements were made for the associate of applied science degree. The impetus for the Kirkwood project came from a conference on strengthening the humanities in vocational education (2, pp.67-68). Yet, no change affecting vocational education came from the project (2, pp.67-68). The AACJC's 1986 policy statement insists that students in vocational programs not be shortchanged (2, p.68).

Strength in requiring that vocational programs contain general education components also comes from regional accrediting associations. The Southern Association of Colleges and Schools (SACS) in its 1987 Criteria for Accreditation emphasizes that undergraduate degree programs must contain general education courses. At the associate
degree level, the minimum is fifteen semester hours. For baccalaureate programs, the minimum is thirty semester hours (24, p.45)(81).

Individual institutions, national organizations, and state agencies may address the issue from their various directions of influence. However, David Yeilding perceives that the only workable method for achieving some uniformity in emphasis on general education for the vocational student is requirements set by regional accrediting associations like SACS (81). Institutions are voluntary members of their regional accrediting associations and are delegate members deciding their own rules and restrictions. Therefore, in a collective way the institutions impose upon themselves rules for quality.

The literature reveals that the general education dilemma is being addressed by individual institutions, by regional accrediting associations, and by national organizations. Sources refer to characteristics of student leavers and the importance of general education or to views of graduates and leavers of occupational programs (5)(3)(56). However, the only definitive study found which dealt with the enrollment pattern of technical-occupational students was Stegall's (1985).

Summary

The literature indicates that there is currently a revival of interest in general education. This is the third such revival in American higher education during the twentieth century. While general education has remained in the college curriculum, the proportion and purposes have varied over the years among institutions.
Among the factors contributing to the cycles of interest in general education have been the differing philosophical approaches of educators; institutional purposes and departmental influences; national developments in security, economics, and technology; and educational interests and needs of students as they interpret their vocational futures. Educators are attempting to find that delicate balance in the curriculum that will prepare the student for all of life in a humanistic way, for that first employer, and for the prospect of changing jobs or careers several times during the work years.

Community colleges face the challenge of curriculum planning to an ever greater extent, perhaps, than other segments of higher education. The large number and variety of students served, the two-year program, and the demands for vocational preparation make the educational task of the community college a special challenge.

The renewed emphasis on general education represents a revival. Individuals, institutions, and groups at various levels are attempting to influence the direction of the college curriculum. Many believe that general education is essential for all students and that students in technical-occupational programs must not be short-changed.
CHAPTER BIBLIOGRAPHY


CHAPTER III

METHODS AND PROCEDURES

Introduction

The purpose of this chapter is to present the methods and procedures for the collection and analyses of the data. This was primarily a descriptive study and the data were obtained by a review and analysis of student academic records. The purposes of the study, as stated in Chapter I, were (1) to examine the general education course enrollment patterns of technical-occupational students in specific programs at intervals of course work; (2) to determine whether successful completion (grade of C or better) of certain required general education courses is related to overall grade point average (GPA) or grade point average in technical-occupational course work for the technical-occupational student; (3) to profile the basic characteristics of the technical-occupational student who enrolls to a greater extent in general education courses than the student who enrolls to a lesser extent; and (4) to profile the basic characteristics of the graduates who have a higher grade point average in technical-occupational courses and those who have a higher grade point average in general education courses.

Population

The population involved in this study were students at Tarrant County Junior College, Fort Worth, Texas. Two groups were identified
for study. The first group consisted of current students who met the following criteria: (1) enrollment in Spring semester of 1986; (2) enrollment in at least one of the courses identified in Appendix A during a semester from Fall semester 1984 through Spring semester 1986; (3) completion of a minimum of fifteen semester hours of course work; and (4) completion of a minimum of four courses or twelve semester hours in their major field. The second group consisted of graduates for 1985 and 1986 of the six identified technical-occupational programs.

The six programs used in the study were chosen because they represent a broad range of technical-occupational programs and because they correspond to the programs included by Stegall in her study of 1985, thus allowing a comparison of findings. The programs were grouped in the manner of Stegall's to form three categories: (A) Mid-Management and Office Careers to represent white-collar non-technical occupations, (B) Drafting and Electronics to represent technical-skill oriented occupations, and (C) Machine Tool and Welding to represent blue-collar manual-skill oriented occupations.

Within each of the six technical-occupational programs, specific courses were chosen (Appendix A) that represent courses typically taken by students majoring in the program; the courses were not necessarily intended to be the beginning course for a student enrolled in a program. While "majors" are identified to some extent at the institution, this identification is not always completed early in the students's enrollment. Students often complete several semesters of work before filing a formal degree plan or declaring a "major." Therefore, the identification of students in a given program was accomplished by analyses of the enrollment records in
identified courses within the program.

Current Student Population

The population for the first group, current students, was identified in the following manner. Class rolls were obtained for all sections of courses listed in Appendix A and taught in a semester from Fall semester 1984 through Spring semester 1986. Rolls were provided by the Office of Research at the institution. Due to large enrollments in both programs in Category A (Mid-Management and Office Careers) a sample of these students was obtained prior to checking for the stated criteria. Students who met the first two criteria were identified by computer search. An academic record was obtained for these students. These records were checked to determine which students met the other two criteria: (1) completion of a minimum of fifteen semester hours and (2) a minimum of four courses or twelve semester hours in their major field. The academic record included all course work taken at any campus of Tarrant County Junior College, as well as grades, GPA, sex, birthyear, and entrance status. The Student Master File was reviewed to determine high school graduation status for transfer students. The final population included 328 current students.

Graduate Population

The population of the second group, graduates, was identified by computer search. A complete academic record was obtained for each graduate who received the AAS degree in 1985 or 1986 in one of the six technical-occupational programs identified for use in the study. These records contained all course work completed at Tarrant
County Junior College, as well as grades, GPA, sex, birthyear and entrance status. The Student Master File was reviewed to determine high school graduation status for transfer students. The final population consisted of 284 graduates.

**Analyses of Student Records**

The academic record for each member of the first group, current students, was manually analyzed. Only course work, and the associated GPA, completed at Tarrant County Junior College through Spring semester 1986 was counted. General education courses were determined by those listed in the approved program. With regard to mathematics and English courses, if a higher level course than the one listed in the program was taken as the first course then it was counted. No English or mathematics of remedial nature was counted. For each student, the following data elements were determined for the study: (1) program (2) total hours of course work completed, (3) overall GPA, (4) hours of course work completed in technical-occupational courses, (5) GPA in technical-occupational course work, (6) hours of course work completed in general education, (7) GPA in general education course work, (8) English grade of C or better, (9) English taken during first fifteen hours of enrollment, (10) mathematics grade of C or better, (11) mathematics taken during first fifteen hours of enrollment, (12) sex, (13) age, and (14) high school graduate.

The academic record for each member of the second group, graduates, was manually analyzed. Only course work, and the associated GPA, completed at Tarrant County Junior College through the semester
of graduation was counted. With regard to mathematics and English courses, if a higher level course than listed in the program was the first taken then it was counted. No English or mathematics of remedial nature was counted. For each graduate the following data elements were determined for the study: (1) program in which degree was received, (2) English successfully completed in first 32 hours of enrollment, (3) mathematics successfully completed in first 32 hours of enrollment, (4) GPA in general education course work, (5) GPA in technical-occupational course work, (6) overall GPA, (7) sex, (8) age, and (9) high school graduate. Graduates who had transferred work from other institutions often showed no English or mathematics work completed at Tarrant County Junior College. It was assumed that these requirements had been met; otherwise, a degree would not have been granted. These students were given a special code in data element numbers (2) and (3) above so that they could be accounted for in terms of total number of graduates.

Statistical Treatment of Data

The data elements identified above were entered into the computer and processed using the Statistical Package for the Social Sciences (SPSS) at Tarrant County Junior College District. Statistical tests used were the t-test for independent samples, the chi-square test of independence, and the Pearson Product Moment test for correlations. The .05 level of significance was established as acceptable.

The following statistical treatment was applied to address the research questions:
(1) Research Question 1 was addressed by cross-tabulation of six programs by number of semester hours completed in general education. Frequency and percentage were computed by three levels of enrollment. These are reported by program and cumulatively.

(2) Research Question 2 was addressed by cross-tabulation and calculation of a mean overall GPA and a mean technical GPA for students who had and had not completed a required English or communications course. Frequency and percentage were computed by three levels of enrollment. These are reported by program and cumulatively. The t-test was applied using overall GPA as the variable and again using technical GPA as the variable; the two independent groups were students who had successfully completed English and students who had not.

(3) Research Question 3 was addressed by cross-tabulation and calculation of mean overall GPA and mean technical GPA for students who had and had not successfully completed a required English or communications course during the first fifteen hours of enrollment. The data were computed and reported for each program and cumulatively. The t-test was applied using overall GPA as the variable and again using technical GPA as the variable; the two independent groups were students who had successfully completed English during the first fifteen hours and students who had not.

(4) Research Question 4 was addressed by cross-tabulation and calculation of mean overall GPA and mean technical GPA for students who had and had not completed a required mathematics course. Frequency and percentage were computed by levels of enrollment, and reported by program and cumulatively. The t-test was applied
using overall GPA as the variable and again using technical GPA as the variable; the two independent groups were students who had successfully completed mathematics and students who had not.

(5) Research Question 5 was addressed by cross-tabulation and calculation of mean overall GPA and mean technical GPA for students who had and had not successfully completed a required mathematics course during the first fifteen hours of enrollment. The data were computed and reported for each of the six programs and cumulatively. The $t$-test was applied using overall GPA as the variable and again using technical GPA as the variable; the two independent groups were students who had successfully completed mathematics during the first fifteen hours and students who had not.

(6) Research Question 6 was addressed through cross-tabulation of data by program area. The mean age and GPA were calculated for each group, students who had and had not completed a minimum of seven semester hours of general education courses. Frequency and percentage were calculated by sex and high school graduation status. The $t$-test was applied using overall GPA as the variable and again using technical GPA as the variable; the two independent groups were students who had successfully completed a minimum of seven semester hours in general education courses and students who had not.

(7) Research Question 7 was addressed through calculation of the chi-square values comparing the frequency of general education hours completed by program area within specified categories of programs. The credit hours were categorized into two groups of six or less hours and seven or more hours. These data were computed and reported by the program categories of (A) Mid-Management and Office
Careers; (B) Electronics and Drafting; and (C) Welding and Machine Shop.

(8) Research Question 8 was addressed through calculation of the Pearson Product Moment to determine if a correlation existed between current student GPA and the amount of general education course work completed. These data were computed and reported for each of the six programs as well as cumulatively.

(9) Research Question 9 was addressed by cross-tabulation and calculation of mean overall GPA for graduates who had and had not completed a required English or communications course during the first 32 hours of enrollment. Frequency and percentage were reported by program and cumulatively. The t-test was applied; the two independent groups were students who had successfully completed English during the first 32 hours and students who had not. Overall GPA was the variable.

(10) Research Question 10 was addressed by cross-tabulation and calculation of mean overall GPA for graduates who had and had not completed a required mathematics course during the first 32 hours of enrollment. Frequency and percentage were reported by program and cumulatively. The t-test was applied; the two independent groups were students who had successfully completed mathematics and students who had not. Overall GPA was the variable.

(11) Research Question 11 was addressed through cross-tabulation of data by program area. The mean age and GPA were calculated for each group (graduates with GPA in general education greater than or equal to GPA in technical course work and graduates with GPA in technical course work greater than GPA in general education).
Frequency and percentage by sex and high school graduation status were calculated for each of the two groups.

Permission

Permission to conduct this study in the Tarrant County Junior College District was obtained from the Chancellor. Much cooperation was given by the Director of Research and the Assistant to the Director of Research.

Summary

Academic records and demographic information were reviewed and analyzed for two groups, current students and graduates, in six technical-occupational programs at Tarrant County Junior College. The current student population consisted of 328 members; this was the result of screening 2596 student academic records. The graduate population consisted of 284 graduates of the six technical-occupational programs.
CHAPTER BIBLIOGRAPHY

CHAPTER IV

PRESENTATION AND ANALYSES OF DATA

Introduction

The purpose of this chapter is to present the findings of the study based on the analyses of data gathered from student academic records. Eleven research questions were proposed in Chapter I. Research Questions 1 through 6 and 9 through 11 are analyzed according to percentage in frequency distributions. Differences in means are analyzed using the t-test in Research Questions 2 through 5, 9, and 10. Research Question 7 is analyzed by the chi-square test for independence. Research Question 8 is analyzed through calculation of the Pearson Product Moment to determine if correlations exist. A .05 statistical level of significance was established.

Description of the Population

The population of this study consisted of two groups: (1) Current students and (2) Graduates. The academic records of 328 current students and 284 graduates of Tarrant County Junior College, Fort Worth, Texas were used for this study.

Current Student Population

Characteristics of the current students chosen for this study are presented in Table I. Frequency, percentage, mean GPA, mean age, and high school graduation status are shown both by program and cumulatively.
### TABLE I

**CHARACTERISTICS OF CURRENT STUDENT POPULATION**

<table>
<thead>
<tr>
<th>Program</th>
<th>N</th>
<th>%</th>
<th>Mean GPA</th>
<th>Mean Age</th>
<th>Sex</th>
<th>Male</th>
<th>Female</th>
<th>High School Graduate</th>
<th>Yes</th>
<th>%</th>
<th>N</th>
<th>%</th>
<th>No</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mid-Management</td>
<td>71</td>
<td>21.65</td>
<td>3.00</td>
<td>36.21</td>
<td>39</td>
<td>55.93</td>
<td>32</td>
<td>45.07</td>
<td>54</td>
<td>76.06</td>
<td>17</td>
<td>23.95</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Office Careers</td>
<td>51</td>
<td>15.55</td>
<td>2.93</td>
<td>25.47</td>
<td>2</td>
<td>3.92</td>
<td>49</td>
<td>96.08</td>
<td>44</td>
<td>86.27</td>
<td>7</td>
<td>13.73</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electronics</td>
<td>149</td>
<td>45.43</td>
<td>3.10</td>
<td>30.29</td>
<td>133</td>
<td>89.26</td>
<td>16</td>
<td>10.74</td>
<td>127</td>
<td>85.23</td>
<td>22</td>
<td>14.77</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Machine Tool</td>
<td>15</td>
<td>4.57</td>
<td>3.26</td>
<td>29.47</td>
<td>14</td>
<td>93.33</td>
<td>1</td>
<td>6.67</td>
<td>11</td>
<td>73.33</td>
<td>4</td>
<td>26.67</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Welding</td>
<td>10</td>
<td>3.05</td>
<td>2.86</td>
<td>26.40</td>
<td>10</td>
<td>100.00</td>
<td>0</td>
<td>0.00</td>
<td>10</td>
<td>100.00</td>
<td>0</td>
<td>0.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>328</td>
<td>100.00</td>
<td>3.05</td>
<td>30.47</td>
<td>223</td>
<td>67.99</td>
<td>105</td>
<td>32.02</td>
<td>275</td>
<td>83.84</td>
<td>53</td>
<td>16.16</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The current student population consisted of 37.20 per cent from the white-collar, non-technical programs (Mid-Management and Office Careers), 55.18 per cent from the technical-skills oriented programs (Drafting and Electronics), and 7.62 per cent from the blue-collar manual-skills oriented programs (Machine Tool and Welding).

Presented in Table II is a summary of total number of semester hours earned by current students according to program. Frequency and percentage are shown for each level of completion.

**TABLE II**

SUMMARY OF CREDIT HOURS COMPLETED BY CURRENT STUDENTS ACCORDING TO PROGRAM ENROLLMENT

<table>
<thead>
<tr>
<th>Program</th>
<th>Credit Hours Completed</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>[15-30]</td>
<td>[31-45]</td>
</tr>
<tr>
<td>Mid-Management</td>
<td>22</td>
<td>30.99</td>
</tr>
<tr>
<td>Office Careers</td>
<td>19</td>
<td>37.25</td>
</tr>
<tr>
<td>Drafting</td>
<td>2</td>
<td>6.25</td>
</tr>
<tr>
<td>Electronics</td>
<td>27</td>
<td>18.12</td>
</tr>
<tr>
<td>Machine Tool</td>
<td>6</td>
<td>40.00</td>
</tr>
<tr>
<td>Welding</td>
<td>7</td>
<td>70.00</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>83</td>
<td>25.30</td>
</tr>
</tbody>
</table>

In all programs except Welding at least 60 percent of the students had completed 31 semester hours of course work. In only one program, Electronics, had a majority of the students completed more than 45 semester hours of course work.
Graduate Population

Characteristics of the graduates included in this study are presented in Table III. Frequency, percentage, mean GPA, mean age, and high school graduation status are shown by program and cumulatively.
TABLE III
CHARACTERISTICS OF GRADUATE POPULATION

<table>
<thead>
<tr>
<th>Program</th>
<th>N</th>
<th>%</th>
<th>Mean GPA</th>
<th>Mean Age</th>
<th>Sex</th>
<th>Male</th>
<th>Female</th>
<th>High School Graduate</th>
<th>Yes</th>
<th>%</th>
<th>No</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mid-Management</td>
<td>110</td>
<td>38.73</td>
<td>3.25</td>
<td>36.47</td>
<td>64</td>
<td>58.18</td>
<td>46</td>
<td>41.82</td>
<td>97</td>
<td>88.18</td>
<td>13</td>
<td>11.82</td>
</tr>
<tr>
<td>Office Careers</td>
<td>56</td>
<td>19.72</td>
<td>3.17</td>
<td>31.88</td>
<td>0</td>
<td>0.00</td>
<td>56</td>
<td>100.00</td>
<td>54</td>
<td>96.43</td>
<td>2</td>
<td>3.07</td>
</tr>
<tr>
<td>Drafting</td>
<td>27</td>
<td>9.51</td>
<td>3.14</td>
<td>29.30</td>
<td>16</td>
<td>59.26</td>
<td>11</td>
<td>40.74</td>
<td>20</td>
<td>74.07</td>
<td>7</td>
<td>25.93</td>
</tr>
<tr>
<td>Electronics</td>
<td>79</td>
<td>27.81</td>
<td>3.21</td>
<td>30.71</td>
<td>71</td>
<td>89.87</td>
<td>8</td>
<td>10.13</td>
<td>63</td>
<td>79.75</td>
<td>16</td>
<td>20.25</td>
</tr>
<tr>
<td>Machine Tool</td>
<td>8</td>
<td>2.82</td>
<td>3.23</td>
<td>39.00</td>
<td>6</td>
<td>75.00</td>
<td>2</td>
<td>25.00</td>
<td>5</td>
<td>62.50</td>
<td>3</td>
<td>37.50</td>
</tr>
<tr>
<td>Welding</td>
<td>4</td>
<td>1.41</td>
<td>3.51</td>
<td>33.00</td>
<td>4</td>
<td>100.00</td>
<td>0</td>
<td>0.00</td>
<td>3</td>
<td>75.00</td>
<td>1</td>
<td>25.00</td>
</tr>
<tr>
<td>Total</td>
<td>284</td>
<td>100.00</td>
<td>3.22</td>
<td>33.30</td>
<td>161</td>
<td>56.69</td>
<td>123</td>
<td>43.31</td>
<td>242</td>
<td>85.21</td>
<td>42</td>
<td>14.79</td>
</tr>
</tbody>
</table>
The graduate population consisted of 58.45 per cent from the white-collar non-technical programs (Mid-Management and Office Careers), 37.32 per cent from the programs representing technical-skills oriented occupations (Drafting and Electronics), and 4.23 per cent from the blue-collar manual-skills oriented programs (Machine Tool and Welding.)

Table IV presents the characteristics of each population (current student and graduate) by program and total. Frequency, percentage, mean GPA, mean age, and high school graduation status are shown by program and cumulatively.
### TABLE IV

**COMPARISON OF CURRENT STUDENT AND GRADUATE POPULATIONS**

<table>
<thead>
<tr>
<th>Program</th>
<th>N</th>
<th>%</th>
<th>Mean GPA</th>
<th>Mean Age</th>
<th>Male</th>
<th>%</th>
<th>Male</th>
<th>N</th>
<th>%</th>
<th>Female</th>
<th>N</th>
<th>%</th>
<th>Female</th>
<th>N</th>
<th>%</th>
<th>High School Graduate</th>
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</thead>
<tbody>
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<td><strong>Mid-Management</strong></td>
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<tr>
<td>Student</td>
<td>71</td>
<td>21.65</td>
<td>3.00</td>
<td>36.21</td>
<td>39</td>
<td>55.93</td>
<td>32</td>
<td>45.07</td>
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<td>76.06</td>
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<td>23.09</td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>Graduates</td>
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<td>38.73</td>
<td>3.25</td>
<td>36.47</td>
<td>64</td>
<td>58.18</td>
<td>46</td>
<td>41.82</td>
<td>97</td>
<td>88.18</td>
<td>13</td>
<td>11.82</td>
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<tr>
<td><strong>Office Careers</strong></td>
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<tr>
<td>Student</td>
<td>51</td>
<td>15.55</td>
<td>2.93</td>
<td>25.47</td>
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<td>3.92</td>
<td>49</td>
<td>96.08</td>
<td>44</td>
<td>86.27</td>
<td>7</td>
<td>13.73</td>
<td></td>
<td></td>
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<tr>
<td>Graduates</td>
<td>56</td>
<td>19.72</td>
<td>3.17</td>
<td>31.88</td>
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<td>56</td>
<td>100.00</td>
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<td>3.07</td>
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<tr>
<td><strong>Drafting</strong></td>
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<tr>
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<td>9.51</td>
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<td>59.26</td>
<td>11</td>
<td>40.74</td>
<td>20</td>
<td>74.07</td>
<td>7</td>
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<td><strong>Electronics</strong></td>
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<tr>
<td>Students</td>
<td>149</td>
<td>45.43</td>
<td>3.10</td>
<td>30.29</td>
<td>133</td>
<td>89.26</td>
<td>16</td>
<td>10.74</td>
<td>127</td>
<td>85.23</td>
<td>22</td>
<td>14.77</td>
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<tr>
<td>Graduates</td>
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<td>3.21</td>
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<td>16</td>
<td>20.25</td>
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<td></td>
<td></td>
</tr>
<tr>
<td><strong>Machine Tool</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Students</td>
<td>15</td>
<td>4.57</td>
<td>3.26</td>
<td>29.47</td>
<td>14</td>
<td>93.33</td>
<td>1</td>
<td>6.67</td>
<td>11</td>
<td>73.33</td>
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</tr>
<tr>
<td>Graduates</td>
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<td>2.82</td>
<td>3.23</td>
<td>39.00</td>
<td>6</td>
<td>75.00</td>
<td>2</td>
<td>25.00</td>
<td>5</td>
<td>62.50</td>
<td>3</td>
<td>37.50</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Welding</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Students</td>
<td>10</td>
<td>3.05</td>
<td>2.86</td>
<td>26.40</td>
<td>10</td>
<td>100.00</td>
<td>0</td>
<td>0.00</td>
<td>10</td>
<td>100.00</td>
<td>0</td>
<td>0.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Graduates</td>
<td>4</td>
<td>1.41</td>
<td>3.51</td>
<td>33.00</td>
<td>4</td>
<td>100.00</td>
<td>0</td>
<td>0.00</td>
<td>3</td>
<td>75.00</td>
<td>1</td>
<td>25.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student</td>
<td>328</td>
<td>100.00</td>
<td>3.05</td>
<td>30.47</td>
<td>223</td>
<td>67.99</td>
<td>105</td>
<td>32.02</td>
<td>275</td>
<td>83.84</td>
<td>53</td>
<td>16.16</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Graduates</td>
<td>284</td>
<td>100.00</td>
<td>3.22</td>
<td>33.30</td>
<td>161</td>
<td>56.69</td>
<td>123</td>
<td>43.31</td>
<td>242</td>
<td>85.21</td>
<td>42</td>
<td>14.79</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Analyses of Data

Eleven research questions were stated in Chapter 1. These questions are restated below, and tables, interpretation, and analyses of the data are presented for each of the questions.

For each program, the required number of hours in technical-occupational courses, general education courses, and total courses were determined from the college catalog and are presented in Appendix B. The proportion of general education hours required to total hours was calculated for three levels of enrollment. Appendix C presents these ratios for each of the six programs studied. Appendix D presents a list of specified courses required to meet the general education requirements in each program.

Research Question 1

Research Question 1 is concerned with whether technical-occupational students enroll in required general education courses at a semester-hour level proportional to their enrollment in technical-occupational courses. The data presented in Table V show the frequency and percentages of students in each program who enrolled in required general education courses proportional to their enrollment in the technical-occupational program.
TABLE V

COMPLETION OF PRESCRIBED LEVEL OF GENERAL EDUCATION HOURS
BY PROGRAM AND LEVEL OF CREDIT HOURS COMPLETED

<table>
<thead>
<tr>
<th>Program</th>
<th>Prescribed Level of General Education Hours</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(Gen. Ed. Hrs. Com.)</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>MID-MANAGEMENT [N=71]</td>
<td></td>
<td>13</td>
<td>18.31</td>
</tr>
<tr>
<td>(5)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[34-48]</td>
<td></td>
<td>7</td>
<td>9.86</td>
</tr>
<tr>
<td>(11)</td>
<td></td>
<td>13</td>
<td>18.31</td>
</tr>
<tr>
<td>[49-]</td>
<td></td>
<td>0</td>
<td>14.08</td>
</tr>
<tr>
<td>(16)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Program Total</td>
<td></td>
<td>33</td>
<td>46.48</td>
</tr>
<tr>
<td></td>
<td></td>
<td>38</td>
<td>53.52</td>
</tr>
<tr>
<td>OFFICE CAREERS [N=51]</td>
<td></td>
<td>9</td>
<td>17.65</td>
</tr>
<tr>
<td>[15-33]</td>
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<td>12</td>
<td>23.53</td>
</tr>
<tr>
<td>(4)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>[34-48]</td>
<td></td>
<td>5</td>
<td>9.80</td>
</tr>
<tr>
<td>(9)</td>
<td></td>
<td>7</td>
<td>13.73</td>
</tr>
<tr>
<td>[49-]</td>
<td></td>
<td>12</td>
<td>23.53</td>
</tr>
<tr>
<td>(13)</td>
<td></td>
<td>6</td>
<td>11.77</td>
</tr>
<tr>
<td>Program Total</td>
<td></td>
<td>26</td>
<td>50.98</td>
</tr>
<tr>
<td></td>
<td></td>
<td>25</td>
<td>49.02</td>
</tr>
<tr>
<td>DRAFTING [N=32]</td>
<td></td>
<td>2</td>
<td>8.33</td>
</tr>
<tr>
<td>[15-33]</td>
<td></td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td>(4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[34-48]</td>
<td></td>
<td>1</td>
<td>3.13</td>
</tr>
<tr>
<td>(10)</td>
<td></td>
<td>8</td>
<td>25.00</td>
</tr>
<tr>
<td>[49-]</td>
<td></td>
<td>13</td>
<td>40.63</td>
</tr>
<tr>
<td>(14)</td>
<td></td>
<td>8</td>
<td>25.00</td>
</tr>
<tr>
<td>Program Total</td>
<td></td>
<td>16</td>
<td>50.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>16</td>
<td>50.00</td>
</tr>
<tr>
<td>ELECTRONICS [N=169]</td>
<td></td>
<td>21</td>
<td>14.09</td>
</tr>
<tr>
<td>(4)</td>
<td></td>
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<td>[34-48]</td>
<td></td>
<td>22</td>
<td>14.77</td>
</tr>
<tr>
<td>(8)</td>
<td></td>
<td>11</td>
<td>7.38</td>
</tr>
<tr>
<td>[49-]</td>
<td></td>
<td>60</td>
<td>40.27</td>
</tr>
<tr>
<td>(12)</td>
<td></td>
<td>26</td>
<td>17.45</td>
</tr>
<tr>
<td>Program Total</td>
<td></td>
<td>103</td>
<td>69.13</td>
</tr>
<tr>
<td></td>
<td></td>
<td>46</td>
<td>30.87</td>
</tr>
<tr>
<td>MACHINE TOOL [N=15]</td>
<td></td>
<td>4</td>
<td>26.67</td>
</tr>
<tr>
<td>[15-33]</td>
<td></td>
<td>5</td>
<td>33.33</td>
</tr>
<tr>
<td>(3)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[34-48]</td>
<td></td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td>(6)</td>
<td></td>
<td>1</td>
<td>6.67</td>
</tr>
<tr>
<td>[49-]</td>
<td></td>
<td>2</td>
<td>13.33</td>
</tr>
<tr>
<td>(9)</td>
<td></td>
<td>3</td>
<td>20.00</td>
</tr>
<tr>
<td>Program Total</td>
<td></td>
<td>6</td>
<td>40.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9</td>
<td>60.00</td>
</tr>
<tr>
<td>WELDING [N=10]</td>
<td></td>
<td>3</td>
<td>30.00</td>
</tr>
<tr>
<td>[15-33]</td>
<td></td>
<td>5</td>
<td>50.00</td>
</tr>
<tr>
<td>(3)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[34-48]</td>
<td></td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td>(8)</td>
<td></td>
<td>1</td>
<td>10.00</td>
</tr>
<tr>
<td>[49-]</td>
<td></td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td>(11)</td>
<td></td>
<td>1</td>
<td>10.00</td>
</tr>
<tr>
<td>Program Total</td>
<td></td>
<td>3</td>
<td>30.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7</td>
<td>70.00</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>187</td>
<td>57.01</td>
</tr>
<tr>
<td></td>
<td></td>
<td>141</td>
<td>42.98</td>
</tr>
</tbody>
</table>
An examination of the data shows that in three of the six programs half or more of the students completed the prescribed level of general education; these programs were Office Careers, Drafting, and Electronics. The Electronics program had the highest percentage (69.13) of students who completed the prescribed level of general education; the Welding program had the lowest percentage (30.00).

Cumulative data by program are displayed in Table VI. Frequency and percentages are shown for current students who had completed and who had not completed required general education courses at a semester-hour level proportional to their enrollment in the technical-occupational program.

**TABLE VI**

**COMPLETION OF PRESCRIBED LEVEL OF GENERAL EDUCATION HOURS PROPORTIONAL TO CREDIT HOURS COMPLETED BY PROGRAM**

<table>
<thead>
<tr>
<th>Program</th>
<th>Prescribed Level of General Education Hours</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Completed (N)</td>
<td>%</td>
<td>Not Completed (N)</td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>-----------------</td>
<td>-----------------</td>
<td>-----------------</td>
</tr>
<tr>
<td>Mid-Management</td>
<td>33</td>
<td>46.48</td>
<td>38</td>
</tr>
<tr>
<td>Office Careers</td>
<td>26</td>
<td>50.98</td>
<td>25</td>
</tr>
<tr>
<td>Drafting</td>
<td>16</td>
<td>50.00</td>
<td>16</td>
</tr>
<tr>
<td>Electronics</td>
<td>103</td>
<td>69.13</td>
<td>46</td>
</tr>
<tr>
<td>Machine Tool</td>
<td>6</td>
<td>40.00</td>
<td>9</td>
</tr>
<tr>
<td>Welding</td>
<td>3</td>
<td>30.00</td>
<td>7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>187</strong></td>
<td><strong>57.01</strong></td>
<td><strong>141</strong></td>
</tr>
</tbody>
</table>

Approximately 57 per cent of all students completed general education course requirements at a level proportional to their total program.
enrollments. In contrast, Stegall (1985) found that only 20 per cent of the students had completed general education enrollment at a level prescribed by their degree plan.

Research Question 2

Research Question 2 was concerned with whether successful completion of a required English or communications course is related to overall grade point average (GPA) or grade point average in technical-occupational course work for the technical-occupational student. The data presented in Table VII show the frequency, percentage, mean overall GPA, and mean GPA in technical course work for current students by program who completed English and who did not complete English by level of credit hours completed.
The data show that in four of the programs (Mid-Management, Office Careers, Drafting, and Electronics) more than 50 per cent of the current students had completed a required English or communications course. It is notable that the two programs in which more than 50 per cent of the
current students had not completed English (Machine Tool and Welding) form Category C; Category C represents blue-collar manual-skills oriented occupations. Also, in four programs (Drafting, Electronics, Machine Tool, and Welding) the overall GPA for current students who had completed English was lower than for students who had not completed English. For both programs from Category A (Mid-Management and Office Careers) current students who had completed English had a higher GPA than students who had not completed English; these programs represent white-collar non-technical occupations.

Cumulative data by program are displayed in Table VIII. Frequency, percentage, mean overall GPA, and mean GPA in technical course work are shown for current students who had completed and who had not completed a required English or communications course.

### TABLE VIII

**COMPLETION OF REQUIRED ENGLISH OR COMMUNICATIONS COURSE WITH MEAN GPA BY PROGRAM**

<table>
<thead>
<tr>
<th>Program</th>
<th>Completion of English or Communications Course</th>
<th>Mean GPA</th>
<th>Total N</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Completed</td>
<td>Not Completed</td>
<td></td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>Mean GPA</td>
</tr>
<tr>
<td>Mid-Management</td>
<td>37</td>
<td>52.11</td>
<td>3.05</td>
</tr>
<tr>
<td>Office Careers</td>
<td>29</td>
<td>56.86</td>
<td>2.99</td>
</tr>
<tr>
<td>Drafting</td>
<td>20</td>
<td>62.50</td>
<td>2.97</td>
</tr>
<tr>
<td>Electronics</td>
<td>81</td>
<td>54.36</td>
<td>3.05</td>
</tr>
<tr>
<td>Machine Tool</td>
<td>6</td>
<td>40.00</td>
<td>3.12</td>
</tr>
<tr>
<td>Welding</td>
<td>1</td>
<td>10.00</td>
<td>1.65</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>174</td>
<td>53.05</td>
<td>3.03</td>
</tr>
</tbody>
</table>

Data show that approximately 53 per cent of the current students had successfully completed an English or communications course. In com-
parison, Stegall found that 59 per cent had successfully completed an English or communications course. Students who had not completed an English or communications course had a slightly higher GPA (3.08) in overall course work than those who had completed English or communications (3.03). Likewise, students who had not completed an English or communications course had a slightly higher GPA (3.28) in technical course work than those who had completed English or communications (3.24). When the t-test was applied, neither of these differences was significant at the .05 level. Stegall had a similar finding with regard to mean overall GPA; students who had not completed English or communications had a slightly higher GPA (3.20) than those who had completed English or communications (3.04).

Summary data by level of total hours completed are presented in Table IX. Frequency and percentage are displayed for each of the three levels of enrollment.

<table>
<thead>
<tr>
<th>Completion of Required English or Communications Course</th>
<th>By Level of Credit Hours Completed</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Credit Hours Completed</td>
<td>Completion of English or Communication Course</td>
<td>Total</td>
</tr>
<tr>
<td></td>
<td>Completed</td>
<td>Not Completed</td>
</tr>
<tr>
<td>[15-30]</td>
<td>18</td>
<td>21.69</td>
</tr>
<tr>
<td>[31-45]</td>
<td>35</td>
<td>47.95</td>
</tr>
<tr>
<td>[46- ]</td>
<td>121</td>
<td>70.35</td>
</tr>
<tr>
<td>Total</td>
<td>174</td>
<td>53.05</td>
</tr>
</tbody>
</table>
Approximately 22 per cent of the students completed a required English or communications course during the first thirty hours of enrollment, and 48 per cent completed this required course during the first forty-five hours of enrollment.

Research Question 3

Research Question 3 was concerned with whether successful completion of a required English or communications course early in the program is related to overall grade point average (GPA) or grade point average in technical-occupational course work for the technical-occupational student. The data presented in Table X show the frequency, percentage, mean overall GPA, and mean GPA in technical course work for current students by program who did and who did not complete English during the first fifteen hours of enrollment.

TABLE X

COMPLETION OF REQUIRED ENGLISH OR COMMUNICATIONS COURSE DURING FIRST FIFTEEN HOURS OF ENROLLMENT WITH MEAN GPA BY PROGRAM

<table>
<thead>
<tr>
<th>Program</th>
<th>Completion of English or Communications Course During First Fifteen Hours</th>
<th>Mean GPA</th>
<th>Overall</th>
<th>Technical</th>
<th>Mean GPA</th>
<th>Overall</th>
<th>Technical</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Completed</td>
<td>N</td>
<td>%</td>
<td>Overall</td>
<td>Technical</td>
<td>Not Completed</td>
<td>N</td>
</tr>
<tr>
<td>Mid-Management</td>
<td>21</td>
<td>29.58</td>
<td>2.94</td>
<td>3.41</td>
<td>50</td>
<td>70.42</td>
<td>3.04</td>
</tr>
<tr>
<td>Office Careers</td>
<td>24</td>
<td>47.06</td>
<td>2.94</td>
<td>3.06</td>
<td>27</td>
<td>52.94</td>
<td>2.91</td>
</tr>
<tr>
<td>Drafting</td>
<td>8</td>
<td>25.00</td>
<td>2.84</td>
<td>3.10</td>
<td>24</td>
<td>75.00</td>
<td>3.07</td>
</tr>
<tr>
<td>Electronics</td>
<td>36</td>
<td>24.16</td>
<td>2.99</td>
<td>3.13</td>
<td>113</td>
<td>75.84</td>
<td>3.14</td>
</tr>
<tr>
<td>Machine Tool</td>
<td>3</td>
<td>20.00</td>
<td>3.22</td>
<td>3.62</td>
<td>12</td>
<td>80.00</td>
<td>3.28</td>
</tr>
<tr>
<td>Welding</td>
<td>0</td>
<td>0.00</td>
<td>----</td>
<td>----</td>
<td>10</td>
<td>100.00</td>
<td>2.86</td>
</tr>
<tr>
<td>Total</td>
<td>92</td>
<td>28.05</td>
<td>2.49</td>
<td>3.19</td>
<td>236</td>
<td>71.95</td>
<td>3.05</td>
</tr>
</tbody>
</table>

Approximately 28 per cent of the students had completed English or communications during their first fifteen hours of enrollment while
approximately 72 percent had not. Students who had not completed a required English or communications course during the first fifteen hours of enrollment had a higher overall GPA (3.05) than those who had completed a required English or communications course (2.49). The t-test was applied, and this difference was found to be significant at the .05 level.

Students who had not completed English or communications during the first fifteen hours of enrollment had a slightly higher GPA (3.28) in technical course work than those who had completed English or communications (3.19). The t-test was applied, but the difference was not found to be significant at the .05 level. In all programs, except Office Careers, the mean overall GPA was higher for students who had not completed English or communications during the first fifteen hours of enrollment.

Research Question 4

Research Question 4 was concerned with whether successful completion of a required mathematics course is related to overall grade point average (GPA) or grade point average in technical-occupational course work for the technical-occupational student. The data presented in Table XI show the frequency, percentages, mean overall GPA, and mean GPA in technical course work for students who completed mathematics and who did not complete mathematics. The data are shown by program and by level of credit hours completed.
It is notable that in all six programs students who had completed a required mathematics course had a higher overall GPA than students who had not completed a required course in mathematics. The two programs in which the difference in the mean overall GPA was greatest between the students who had and who had not completed mathematics were Draft-
ing (difference = 0.63) and Welding (difference = 0.73). In five of the six programs students who had completed a required course in mathematics had a higher GPA in technical course work than students who had not completed a required course in mathematics. The only program for which this was not true was Electronics.

Cumulative data by program are displayed in Table XII. Frequency, percentage, mean overall GPA, and mean GPA in technical course work are shown by program and cumulatively.

TABLE XII
COMPLETION OF REQUIRED MATHEMATICS COURSE
WITH MEAN GPA BY PROGRAM

<table>
<thead>
<tr>
<th>Program</th>
<th>Completion of Mathematics Course</th>
<th>Mean GPA</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Completed</td>
<td>Not Completed</td>
<td></td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>Overall</td>
</tr>
<tr>
<td>Mid-Management</td>
<td>30</td>
<td>42.25</td>
<td>3.14</td>
</tr>
<tr>
<td>Office Careers</td>
<td>17</td>
<td>33.33</td>
<td>3.02</td>
</tr>
<tr>
<td>Drafting</td>
<td>28</td>
<td>87.50</td>
<td>3.13</td>
</tr>
<tr>
<td>Electronics</td>
<td>12</td>
<td>81.88</td>
<td>3.11</td>
</tr>
<tr>
<td>Machine Tool</td>
<td>7</td>
<td>46.67</td>
<td>3.38</td>
</tr>
<tr>
<td>Welding</td>
<td>3</td>
<td>30.00</td>
<td>3.27</td>
</tr>
<tr>
<td>Total</td>
<td>207</td>
<td>63.11</td>
<td>3.10</td>
</tr>
</tbody>
</table>

Approximately 63 percent of the current students had successfully completed a required mathematics course. Students who had successfully completed a mathematics course had a higher overall GPA (3.10) than those who had not completed a required mathematics course (2.93). The t-test was applied, and the difference in mean GPAs was found to be significant at the .05 level.

Students who had successfully completed a required mathematics
course had a higher GPA (3.30) in technical course work than students
who had not completed a required mathematics course (3.19). However,
when the t-test was applied the difference was not found to be sig-
nificant at the .05 level.

Summary data by level of total hours completed are presented in
Table XIII. Frequency and percentage are displayed for each of the
three levels of enrollment.

<table>
<thead>
<tr>
<th>TABLE XIII</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMPLETION OF REQUIRED MATHEMATICS COURSE BY</td>
</tr>
<tr>
<td>LEVEL OF CREDIT HOURS COMPLETED</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total Credit Hours</th>
<th>Completion of Mathematics Course</th>
<th>Not Completed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>[15-30]</td>
<td>32</td>
<td>38.55</td>
</tr>
<tr>
<td>[31-45]</td>
<td>40</td>
<td>54.79</td>
</tr>
<tr>
<td>[46-]</td>
<td>133</td>
<td>77.33</td>
</tr>
<tr>
<td>Total</td>
<td>205</td>
<td>62.50</td>
</tr>
</tbody>
</table>

The data show that approximately 39 per cent of the students com-
pleted a required mathematics course during the first thirty hours of
enrollment, and 55 per cent completed the required course during the
first forty-five hours of enrollment.

Research Question 5

Research Question 5 was concerned with whether successful completion
of a required mathematics course early in the program is related to overall
grade point average (GPA) or grade point average in technical-occupational
course work for the technical-occupational student. Data results are presented in Table XIV.

**TABLE XIV**

**COMPARISON OF CHARACTERISTICS OF STUDENTS BY COMPLETION OF GENERAL EDUCATION HOURS BY PROGRAM**

<table>
<thead>
<tr>
<th>Program</th>
<th>Completion of Mathematics Course During First Fifteen Hours</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Completed Mean GPA Overall Technical</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>N   Mean GPA</td>
<td>N   Mean GPA</td>
<td>N   Mean GPA</td>
<td>N   Mean GPA</td>
<td>N   Mean GPA</td>
<td>N   Mean GPA</td>
<td></td>
</tr>
<tr>
<td>-----------------</td>
<td>---------------</td>
<td>---------------</td>
<td>---------------</td>
<td>---------------</td>
<td>---------------</td>
<td>---------------</td>
<td></td>
</tr>
<tr>
<td>Mid-Management</td>
<td>11  15.49</td>
<td>60  84.51</td>
<td>11  15.49</td>
<td>60  84.51</td>
<td>11  15.49</td>
<td>60  84.51</td>
<td></td>
</tr>
<tr>
<td>Office Careers</td>
<td>9   17.65</td>
<td>42  82.35</td>
<td>9   17.65</td>
<td>42  82.35</td>
<td>9   17.65</td>
<td>42  82.35</td>
<td></td>
</tr>
<tr>
<td>Drafting</td>
<td>10  31.23</td>
<td>22  68.75</td>
<td>10  31.23</td>
<td>22  68.75</td>
<td>10  31.23</td>
<td>22  68.75</td>
<td></td>
</tr>
<tr>
<td>Electronics</td>
<td>77  51.68</td>
<td>72  48.32</td>
<td>77  51.68</td>
<td>72  48.32</td>
<td>77  51.68</td>
<td>72  48.32</td>
<td></td>
</tr>
<tr>
<td>Machine Tool</td>
<td>4   26.67</td>
<td>11  73.33</td>
<td>4   26.67</td>
<td>11  73.33</td>
<td>4   26.67</td>
<td>11  73.33</td>
<td></td>
</tr>
<tr>
<td>Welding</td>
<td>2   20.00</td>
<td>8   80.00</td>
<td>2   20.00</td>
<td>8   80.00</td>
<td>2   20.00</td>
<td>8   80.00</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>113 34.45</td>
<td>215 65.55</td>
<td>113 34.45</td>
<td>215 65.55</td>
<td>113 34.45</td>
<td>215 65.55</td>
<td></td>
</tr>
</tbody>
</table>

Approximately 34 per cent of the students completed a required mathematics course during their first fifteen hours of enrollment, while approximately 66 per cent did not. Students who completed mathematics early in the program had a higher overall GPA (3.12) than students who completed mathematics later in the program (3.01). The t-test was applied; the difference in mean GPAs was not found to be significant at the .05 level.

Students who completed a required mathematics course early in the program had a slightly higher GPA (3.27) in technical course work than students who did not complete a required mathematics course early in the program (3.24). The t-test was applied; the difference in mean GPAs was not found to be significant at the .05 level.
a required course in mathematics later in the program had a slightly higher overall GPA than students who completed a required mathematics course early in the program. Electronics was also the only program in which more than half the students completed mathematics early in the program.

Research Question 6

Research Question 6 was concerned with the basic characteristics (age, sex, high school graduate, GPA) of the student who has successfully completed a minimum of seven semester hours of required general education courses versus the student who has completed six semester hours or less. Data results are presented in Table XV by program.
<table>
<thead>
<tr>
<th>Program</th>
<th>N</th>
<th>%</th>
<th>Mean GPA</th>
<th>Mean Age</th>
<th>Sex Male</th>
<th>Sex Female</th>
<th>High School Graduate Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mid-Management</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 or More</td>
<td>42</td>
<td>59.15</td>
<td>2.98</td>
<td>35.52</td>
<td>21</td>
<td>29.58</td>
<td>21</td>
<td>29.58</td>
</tr>
<tr>
<td>6 or Less</td>
<td>29</td>
<td>40.85</td>
<td>3.04</td>
<td>37.21</td>
<td>18</td>
<td>25.35</td>
<td>11</td>
<td>15.49</td>
</tr>
<tr>
<td>Program Total</td>
<td>71</td>
<td>100</td>
<td>3.00</td>
<td>36.21</td>
<td>39</td>
<td>55.93</td>
<td>32</td>
<td>45.07</td>
</tr>
<tr>
<td><strong>Office Careers</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 or More</td>
<td>26</td>
<td>50.98</td>
<td>2.95</td>
<td>23.54</td>
<td>1</td>
<td>1.96</td>
<td>25</td>
<td>49.02</td>
</tr>
<tr>
<td>6 or Less</td>
<td>25</td>
<td>49.02</td>
<td>2.90</td>
<td>27.48</td>
<td>1</td>
<td>1.96</td>
<td>24</td>
<td>47.06</td>
</tr>
<tr>
<td>Program Total</td>
<td>51</td>
<td>100</td>
<td>2.93</td>
<td>25.47</td>
<td>2</td>
<td>3.92</td>
<td>49</td>
<td>96.08</td>
</tr>
<tr>
<td><strong>Drafting</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 or More</td>
<td>28</td>
<td>87.50</td>
<td>3.02</td>
<td>28.18</td>
<td>22</td>
<td>65.75</td>
<td>6</td>
<td>18.75</td>
</tr>
<tr>
<td>6 or Less</td>
<td>4</td>
<td>12.50</td>
<td>3.09</td>
<td>28.75</td>
<td>3</td>
<td>9.38</td>
<td>1</td>
<td>3.13</td>
</tr>
<tr>
<td>Program Total</td>
<td>32</td>
<td>100</td>
<td>3.04</td>
<td>28.25</td>
<td>25</td>
<td>78.13</td>
<td>7</td>
<td>21.88</td>
</tr>
<tr>
<td><strong>Electronics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 or More</td>
<td>97</td>
<td>65.10</td>
<td>3.01</td>
<td>29.85</td>
<td>84</td>
<td>56.38</td>
<td>13</td>
<td>8.72</td>
</tr>
<tr>
<td>6 or Less</td>
<td>52</td>
<td>34.90</td>
<td>3.27</td>
<td>31.12</td>
<td>49</td>
<td>32.89</td>
<td>3</td>
<td>2.01</td>
</tr>
<tr>
<td>Program Total</td>
<td>149</td>
<td>100</td>
<td>3.10</td>
<td>30.29</td>
<td>133</td>
<td>89.26</td>
<td>16</td>
<td>10.74</td>
</tr>
<tr>
<td><strong>Machine Tool</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 or More</td>
<td>2</td>
<td>13.33</td>
<td>2.97</td>
<td>33.50</td>
<td>2</td>
<td>13.33</td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td>6 or less</td>
<td>13</td>
<td>86.67</td>
<td>3.31</td>
<td>28.85</td>
<td>12</td>
<td>80.00</td>
<td>1</td>
<td>6.67</td>
</tr>
<tr>
<td>Program Total</td>
<td>15</td>
<td>100</td>
<td>3.26</td>
<td>29.47</td>
<td>14</td>
<td>93.33</td>
<td>1</td>
<td>6.67</td>
</tr>
<tr>
<td><strong>Welding</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 or More</td>
<td>0</td>
<td>0.00</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td>6 or Less</td>
<td>10</td>
<td>100</td>
<td>2.86</td>
<td>26.40</td>
<td>10</td>
<td>100.00</td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td>Program Total</td>
<td>10</td>
<td>100</td>
<td>2.86</td>
<td>26.40</td>
<td>10</td>
<td>100.00</td>
<td>0</td>
<td>0.00</td>
</tr>
</tbody>
</table>
The data show that in two of the six programs, Machine Tool and Welding, more than half of the students had completed six or fewer hours in required general education courses. None of the students in the Welding program had completed more than six hours in general education courses. Office Careers is the only program of the six in which the students are predominantly female (96%) and the only program in which students with seven or more hours in general education had a higher GPA than students with six or less hours in general education. In all programs more than 73 per cent of the students are high school graduates. The Machine Tool program has the greatest percentage (26.67) of students who did not graduate from high school.

Cumulative data results are shown in Table XVI. Frequency, percentage, mean GPA and age, sex, and high school graduation status are shown for students who had completed a minimum of seven semester hours and those who completed less.

**TABLE XVI**

**COMPARISON OF CHARACTERISTICS OF STUDENTS BY COMPLETION OF GENERAL EDUCATION HOURS**

<table>
<thead>
<tr>
<th>N</th>
<th>Mean GPA</th>
<th>Mean Age</th>
<th>Sex</th>
<th>High School Graduate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>males</td>
<td>females</td>
<td></td>
<td>yes</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>X</td>
<td>N</td>
<td>X</td>
</tr>
<tr>
<td>7 or More</td>
<td>195</td>
<td>59.45</td>
<td>3.00</td>
<td>30.03</td>
</tr>
<tr>
<td>6 or Less</td>
<td>133</td>
<td>40.55</td>
<td>3.12</td>
<td>31.11</td>
</tr>
<tr>
<td>Total</td>
<td>328</td>
<td>100.00</td>
<td>3.05</td>
<td>30.47</td>
</tr>
</tbody>
</table>

Examination of the cumulative data show that the student who has successfully completed a minimum of seven semester hours of required
general education courses is younger (30.03 years of age), is likely to be male (66.67%), and has a lower GPA (3.00) than the student who has completed six or fewer hours of required general education courses. In contrast, the student who has completed six or fewer hours of required general education courses is slightly older (31.11 years of age), is more likely to be male (69.92%), and has a slightly higher GPA (3.12) than the student who has completed seven or more semester hours in required general education.

Research Question 7

Research Question 7 was concerned with whether there is significant variance among the groups with regard to the number of general education hours completed by students in the two programs when technical-occupational programs are grouped according to the following: (A) Mid-Management and Office Careers; (B) Electronics Technology and Drafting and Design Technology; (C) Welding and Machine Tool Technology. Categories A, B, and C, were formed for the identified pairs of programs.

Frequencies of students completing specified levels of general education hours (six or less versus seven or more) were cross-tabulated between programs within each category. The chi-square test was applied. The chi-square value and level of significance is shown in Table XVII for each category.
TABLE XVII

CHI-SQUARE VALUES FOR CROSS-TABULATION OF GENERAL EDUCATION HOURS COMPLETED BETWEEN PROGRAMS IN SPECIFIED CATEGORIES

<table>
<thead>
<tr>
<th>Categories</th>
<th>df</th>
<th>Chi-Square</th>
<th>Level of Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mid-Management</td>
<td>1</td>
<td>0.50672</td>
<td>0.4766</td>
</tr>
<tr>
<td>Office Careers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drafting</td>
<td>1</td>
<td>5.18176</td>
<td>0.0228*</td>
</tr>
<tr>
<td>Electronics</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Welding</td>
<td>1</td>
<td>0.20380</td>
<td>0.6517</td>
</tr>
<tr>
<td>Machine Tool</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Significant at the .05 level.

The data shown in Table XVII is consistent with that in Table XV, which shows that approximately 13 per cent of the Drafting students had completed six or fewer hours of general education while approximately 35 per cent of the Electronics students had completed six or fewer hours of general education. Significant variance with regard to level of enrollment in general education is not indicated between programs in Categories A and C.

Research Question 8

Research Question 8 was concerned with whether there is a positive correlation between GPA and the amount of general education course work completed. The Pearson Product Moment test was employed to obtain correlation coefficients for each program and for the total group. The results are presented in Table XVIII.
TABLE XVIII

COEFFICIENTS OF CORRELATION BETWEEN STUDENT GPA AND SEMESTER HOURS OF GENERAL EDUCATION COMPLETED

<table>
<thead>
<tr>
<th>Program</th>
<th>N</th>
<th>r</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mid-Management</td>
<td>71</td>
<td>-0.0118</td>
<td>0.461</td>
</tr>
<tr>
<td>Office Careers</td>
<td>51</td>
<td>-0.0643</td>
<td>0.327</td>
</tr>
<tr>
<td>Drafting</td>
<td>32</td>
<td>-0.0670</td>
<td>0.358*</td>
</tr>
<tr>
<td>Electronics</td>
<td>149</td>
<td>-0.2128</td>
<td>0.005*</td>
</tr>
<tr>
<td>Machine Tool</td>
<td>15</td>
<td>-0.1334</td>
<td>0.318</td>
</tr>
<tr>
<td>Welding</td>
<td>10</td>
<td>0.0232</td>
<td>0.475</td>
</tr>
<tr>
<td>Total</td>
<td>328</td>
<td>-0.0979</td>
<td>0.038*</td>
</tr>
</tbody>
</table>

*Significant at the .05 level.

Treatment of the data did not yield a positive correlation between GPA and the amount of general education course work completed. Instead, for the current student population there is a slight negative correlation between GPA and the amount of general education course work completed, and it is significant at the .05 level. Electronics is the only program of the six with a correlation significant at the .05 level; this correlation is negative.

Research Question 9

Research Question 9 was concerned with whether successful completion of a required English or communications course during the first half of the program is related to a higher overall grade point average (GPA) for the technical-occupational graduate. The data are presented in Table XIX.
<table>
<thead>
<tr>
<th>Program</th>
<th>N</th>
<th>% Completed</th>
<th>Mean GPA</th>
<th>Completed First Thirty-Two Hours</th>
<th>N</th>
<th>% Completed</th>
<th>Mean GPA</th>
<th>Not Completed First Thirty-Two Hours</th>
<th>N</th>
<th>% Completed</th>
<th>Mean GPA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mid-Management</td>
<td>63</td>
<td>22.18</td>
<td>3.29</td>
<td>36</td>
<td>36</td>
<td>22.18</td>
<td>3.29</td>
<td>8</td>
<td>8</td>
<td>22.18</td>
<td>3.29</td>
</tr>
<tr>
<td>Office Careers</td>
<td>39</td>
<td>13.73</td>
<td>3.11</td>
<td>11</td>
<td>11</td>
<td>3.11</td>
<td>3.11</td>
<td>9</td>
<td>9</td>
<td>3.11</td>
<td>3.11</td>
</tr>
<tr>
<td>Drafting</td>
<td>15</td>
<td>5.28</td>
<td>3.14</td>
<td>7</td>
<td>7</td>
<td>3.14</td>
<td>3.14</td>
<td>5</td>
<td>5</td>
<td>3.14</td>
<td>3.14</td>
</tr>
<tr>
<td>Electronics</td>
<td>44</td>
<td>15.49</td>
<td>3.23</td>
<td>20</td>
<td>20</td>
<td>3.23</td>
<td>3.23</td>
<td>15</td>
<td>15</td>
<td>3.23</td>
<td>3.23</td>
</tr>
<tr>
<td>Machine Tool</td>
<td>3</td>
<td>1.06</td>
<td>3.29</td>
<td>5</td>
<td>5</td>
<td>3.29</td>
<td>3.29</td>
<td>1</td>
<td>1</td>
<td>3.29</td>
<td>3.29</td>
</tr>
<tr>
<td>Welding</td>
<td>1</td>
<td>0.35</td>
<td>3.43</td>
<td>1</td>
<td>1</td>
<td>3.43</td>
<td>3.43</td>
<td>0</td>
<td>0</td>
<td>3.43</td>
<td>3.43</td>
</tr>
</tbody>
</table>

Total [N=284]          165 | 58.10 | 3.22 | 77 | 27.11 | 3.15 | 42 | 14.79 | 3.32

*Transfers are shown only for the purpose of accounting for all the population.
Graduates who successfully completed a required English or communications course during the first thirty-two hours of course work had a slightly higher GPA (3.22) than graduates who took the first English or communications course after thirty-two hours of course work (3.15). The t-test was applied, but the difference in GPAs was not found to be significant at the .05 level. The data show the following:

- approximately 58 per cent of the graduates chose to complete a required English or communications course during their first thirty-two hours of enrollment
- approximately 27 per cent took their first English or communications course after thirty-two hours of enrollment
- approximately 15 per cent transferred the required English or communications course from another institution

Research Question 10

Research Question 10 was concerned with whether successful completion of a required mathematics course during the first half of the program is related to a higher overall grade point average (GPA) for the technical occupational graduate. The data are presented in Table XX.
### TABLE XX

Completion of Required Mathematics Course During First Thirty-Two Hours of Enrollment with Mean GPA by Program

<table>
<thead>
<tr>
<th>Program</th>
<th>Completion of Mathematics Course During First Thirty-Two Hours</th>
<th>Transfers*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Completed</td>
<td>Not Completed</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>Mid-ManAGEMENT [N=110]</td>
<td>64</td>
<td>22.54</td>
</tr>
<tr>
<td>Office Careers [N=55]</td>
<td>38</td>
<td>13.38</td>
</tr>
<tr>
<td>Drafting [N=27]</td>
<td>20</td>
<td>7.04</td>
</tr>
<tr>
<td>Electronics [N=79]</td>
<td>55</td>
<td>19.37</td>
</tr>
<tr>
<td>Machine Tool [N=8]</td>
<td>5</td>
<td>1.76</td>
</tr>
<tr>
<td>Welding [N=4]</td>
<td>3</td>
<td>1.06</td>
</tr>
<tr>
<td><strong>Total [N=284]</strong></td>
<td><strong>185</strong></td>
<td><strong>65.14</strong></td>
</tr>
</tbody>
</table>

*Transfers are shown only for the purpose of accounting for all the population.
Graduates who successfully completed a required mathematics course during the first thirty-two hours of course work had a higher GPA (3.30) than graduates who took the first required mathematics course after thirty-two hours of course work (3.03). The t-test was applied, and the difference in GPAs was found to be significant at the .05 level. Examination of the data shows the following:

- approximately 65 per cent of the graduates chose to complete a required mathematics course during their first thirty-two hours of enrollment
- approximately 29 per cent took their first mathematics course after thirty-two hours of course work
- approximately 7 per cent transferred the required mathematics course from another institution

Research Question 11

Research Question 11 was concerned with the basic characteristics (age, sex, high school graduate, GPA) of the graduate who has a higher GPA in the technical-occupational course work versus the graduate who has a higher GPA in the required general education course work. The data are presented in Table XXI.
TABLE XXI

COMPARISON OF CHARACTERISTICS OF GRADUATES ACCORDING TO GPA IN GENERAL EDUCATION VERSUS GPA IN TECHNICAL COURSES BY PROGRAM

<table>
<thead>
<tr>
<th>Program</th>
<th>Sex</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>Mean GPA</td>
<td>Mean AGE</td>
<td>Males</td>
<td>Females</td>
<td>High School Graduates</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N</td>
<td>N</td>
<td>Yes</td>
</tr>
<tr>
<td>Mid-Management</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GE &gt; TEC</td>
<td>9</td>
<td>8.18</td>
<td>3.46</td>
<td>43.00</td>
<td>6</td>
<td>5.45</td>
<td>8</td>
</tr>
<tr>
<td>TEC &gt; GE</td>
<td>101</td>
<td>91.82</td>
<td>3.23</td>
<td>33.89</td>
<td>58</td>
<td>52.73</td>
<td>43</td>
</tr>
<tr>
<td></td>
<td>110</td>
<td>100.00</td>
<td>3.25</td>
<td>36.47</td>
<td>64</td>
<td>58.18</td>
<td>46</td>
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<tr>
<td></td>
<td></td>
<td></td>
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<td>0</td>
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<tr>
<td>Office Careers</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GE &gt; TEC</td>
<td>14</td>
<td>25.00</td>
<td>3.06</td>
<td>28.57</td>
<td>0</td>
<td>0.00</td>
<td>14</td>
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<tr>
<td>TEC &gt; GE</td>
<td>56</td>
<td>75.00</td>
<td>3.21</td>
<td>32.98</td>
<td>0</td>
<td>0.00</td>
<td>42</td>
</tr>
<tr>
<td></td>
<td>70</td>
<td>100.00</td>
<td>3.14</td>
<td>29.50</td>
<td>16</td>
<td>55.55</td>
<td>20</td>
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<tr>
<td>Drafting</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GE &gt; TEC</td>
<td>9</td>
<td>9.09</td>
<td>3.25</td>
<td>31.56</td>
<td>4</td>
<td>14.81</td>
<td>9</td>
</tr>
<tr>
<td>TEC &gt; GE</td>
<td>18</td>
<td>66.67</td>
<td>3.09</td>
<td>28.17</td>
<td>12</td>
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<td>100.00</td>
<td>3.14</td>
<td>29.50</td>
<td>16</td>
<td>55.55</td>
<td>20</td>
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<tr>
<td>Electronics</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GE &gt; TEC</td>
<td>20</td>
<td>26.19</td>
<td>3.15</td>
<td>31.05</td>
<td>19</td>
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<tr>
<td>TEC &gt; GE</td>
<td>59</td>
<td>73.81</td>
<td>3.23</td>
<td>30.95</td>
<td>52</td>
<td>65.82</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>79</td>
<td>100.00</td>
<td>3.21</td>
<td>30.71</td>
<td>71</td>
<td>69.87</td>
<td>88</td>
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<tr>
<td>Machine Tool</td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>GE &gt; TEC</td>
<td>3</td>
<td>33.33</td>
<td>3.54</td>
<td>41.67</td>
<td>1</td>
<td>12.50</td>
<td>3</td>
</tr>
<tr>
<td>TEC &gt; GE</td>
<td>5</td>
<td>66.67</td>
<td>3.05</td>
<td>37.40</td>
<td>5</td>
<td>62.86</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>100.00</td>
<td>3.23</td>
<td>39.00</td>
<td>6</td>
<td>75.00</td>
<td>2</td>
</tr>
<tr>
<td>Welding</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GE &gt; TEC</td>
<td>0</td>
<td>0.00</td>
<td>---</td>
<td>------</td>
<td>0</td>
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<tr>
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<td>3.51</td>
<td>33.00</td>
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<td>100.00</td>
<td>3.51</td>
<td>33.00</td>
<td>4</td>
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<tr>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>GE &gt; TEC</td>
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<td>19.37</td>
<td>3.22</td>
<td>33.04</td>
<td>30</td>
<td>10.56</td>
<td>25</td>
</tr>
<tr>
<td>TEC &gt; GE</td>
<td>229</td>
<td>80.63</td>
<td>3.22</td>
<td>33.37</td>
<td>131</td>
<td>46.13</td>
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<tr>
<td></td>
<td>284</td>
<td>100.00</td>
<td>3.22</td>
<td>33.37</td>
<td>161</td>
<td>56.69</td>
<td>123</td>
</tr>
<tr>
<td>Grand Total</td>
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<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>284</td>
<td>100.00</td>
<td>3.22</td>
<td>33.37</td>
<td>161</td>
<td>56.69</td>
<td>123</td>
</tr>
</tbody>
</table>

II7
Approximately 81 per cent of the graduates attained a higher GPA in technical-occupational courses than in general education courses. The graduate who had a higher GPA in technical-occupational course work than in general education course work had a mean overall GPA of 3.22 and a mean age of 33.37; was likely to be male (57.21%); and was likely to be a high school graduate (85.59%). The graduate who had a higher GPA in general education course work than in technical-occupational course work had a mean overall GPA of 3.22 and a mean age of 33.04; was likely to be male (54.55%); and was likely to be a high school graduate (83.64%).

It is notable that both groups had the same mean overall GPA. The group with higher GPAs in general education course work had a large percentage of females (45.45%) and a smaller percentage of high school graduates (83.64%) than the group with higher GPAs in technical-occupational course work, which had 42.79 per cent females and 85.59 per cent high school graduates.

Summary

The academic records of 328 current students and 284 graduates of six different technical-occupational programs offered at Tarrant County Junior College, Fort Worth, Texas were used for this study. Eleven research questions were posed to guide the study. Eight research questions were addressed with current student records, and three research questions were addressed with graduate records.

Current students were required to meet the following criteria to be eligible for inclusion in the student population: (a) enrollment in
the Spring semester 1985-86; (b) enrollment in at least one of the identified courses (Appendix A) between Fall 1984 and Spring 1986; (c) completion of at least 15 semester hours of course work at Tarrant County Junior College; and (d) completion of a minimum of four courses or 12 semester hours in the major field being studied. Due to the large numbers enrolled in courses selected for Mid-Management and Office Occupations, it was deemed appropriate to use a sample from each of these programs. In the other four groups the population represented all students who met the criteria. Graduates of the six identified programs during the semesters from Fall 1984 through Spring 1986 constituted the graduate population.

The mean age of the current student population was 30.47 while that of the graduate population was 33.30. The mean GPA of the current student population was 3.05 while that of the graduate population was 3.22. The breakdown by sex of the current student population was approximately 68 per cent males and 32 per cent female. For the graduate population, the breakdown by sex was approximately 57 per cent male and 43 per cent female. It is notable that 84 per cent of the current student population and 85 per cent of the graduate population were high school graduates.

A large percentage (52.44) of the current student population had completed more than 45 semester hours of total course work. Fifty-seven percent of the current student population had completed hours in general education proportional to their total program enrollment. Also, 59.45 per cent of the current student population completed seven or more hours of course work in required general education.
The analyses of data related to each of the eleven stated research questions reveal the following major findings:

1. More than 57 per cent of the current students completed the general education course requirements at a level proportional to their total program enrollment. The number of general education hours required by program ranges from 21 semesters hours in Mid-Management to 13 in Welding. There seems to be no relationship between the number of general education hours required in the program and the percentage of students who have completed them. The Electronics program requires 18 semester hours of general education course work, and this program had the largest percentage (69.13) of students who had completed the prescribed level of course work in general education. Welding was lowest with 30 per cent.

2. Approximately 53 per cent of the current students had completed a required English or communications course. Students who had not completed English or communications had a slightly higher overall GPA (3.08) than those who had completed English or communications (3.03). Likewise, students who had not completed English or communications had a slightly higher GPA (3.28) in technical course work than those who had completed English or communications (3.24). Neither of these differences in mean GPAs was significant at the .05 level. Approximately 78 per cent of students with 30 or fewer hours had not taken a required English or communications course; approximately 28 per cent of those with more than 45 hours had not taken a required English or communications course.

3. Approximately 28 per cent of the current students successfully completed a required English during the first fifteen hours of enroll-
ment, and these students had a lower overall GPA (2.49) than students who took English after the first fifteen hours of enrollment (GPA = 3.05). The t-test was applied, and this difference was found to be significant. Students who had not completed English or communications during the first fifteen hours of enrollment had a slightly higher GPA (3.28) in technical course work than those who had completed English or communications (3.19). The t-test was applied, but the difference was not found to be significant at the .05 level.

4. Approximately 63 per cent of the current students had completed a required mathematics course. Students who had completed mathematics had a higher GPA (3.10) than those who had not completed a required mathematics (2.93). The t-test was applied, and the difference in mean GPAs was found to be significant at the .05 level. Students who had successfully completed a required mathematics course had a higher GPA (3.30) in technical course work than students who had not completed a required mathematics course (3.19). However, when the t-test was applied the difference was not found to be significant at the .05 level. Sixty-one per cent of the students with 30 or fewer hours had not taken mathematics; yet only 22 per cent of those with more than 45 hours had not taken mathematics.

5. Approximately 34 per cent of the current students successfully completed a required mathematics course during the first fifteen hours of enrollment, and these students had a higher GPA (3.12) than those students who took mathematics after the first fifteen hours of enrollment (GPA = 3.01). The t-test was applied; the difference in mean GPAs was not found to be significant at the .05 level. Students who completed
a required mathematics course early in the program had a slightly higher GPA (3.27) in technical course work than students who did not complete a required mathematics course early in the program (3.24). The \( t \)-test was applied; the difference in mean GPAs was not found to be significant at the .05 level.

6. In four of the six programs, students who had taken six or fewer semester hours of general education course work were older than students who had taken more; in one program, Welding, no students had taken more than six hours. A larger percentage (41.71) of the male population had taken six or less hours in general education than the female population (38.10). A larger percentage of the high school graduates (41.09) had taken six or less hours in general education than the non-high-school graduates (37.74). Students with six or less hours in general education had a higher GPA (3.12) than students with seven or more hours (3.00).

7. Of the three categories, only the Drafting - Electronics category yielded a significant level of variance with regard to general education hours completed by students in the two programs.

8. Two negative correlations, statistically significant at the .05 level, were indicated between hours completed in general education and overall GPA. These correlations were for the students in the Electronics program (-0.2128) and the total student population (-0.0979).

9. Approximately 58 percent of the graduates successfully completed a required English or communications course during the first thirty-two hours of enrollment. Graduates who completed English early in their enrollment had a higher GPA (3.22) than graduates who com-
completed English later (3.15); the difference in mean GPAs was not significant.

10. Approximately 65 per cent of the graduates successfully completed a required mathematics course during the first thirty-two hours of enrollment. Graduates who completed mathematics early in their enrollment had a higher GPA (3.30) than graduates who completed mathematics later (3.03); the difference in mean GPAs was found to be significant.

11. Graduates having a higher GPA in technical course work outnumbered those with a higher GPA in general education course work by 4 to 1. It is notable that the overall mean GPAs for the two groups were identical (3.22).

The graduates who had higher GPAs in technical course work than in general education course work can be profiled as follows:

- mean age of 33.37 years
- mean overall GPA of 3.22
- males (57.21%) and females (42.79%)
- high school graduates (85.59%) and non-high-school graduates (14.41%)

The graduates who had higher GPAs in general education course work than in technical course work can be profiled as follows:

- mean age of 33.04 years
- mean overall GPA of 3.22
- males (54.54%) and females (45.45%)
- high school graduate (83.64%) and non-high-school graduates (16.36%)
CHAPTER BIBLIOGRAPHY


CHAPTER V

SUMMARY, CONCLUSIONS, INTERPRETATIONS, AND RECOMMENDATIONS

Introduction

The purpose of this chapter is to summarize the purposes, methods and procedures, analysis of the data, and the findings of this study. Conclusions and recommendations based on the findings are presented.

Summary

This study was concerned with the enrollment patterns in required general education courses of technical-occupational students in a multi-campus urban community college. The purposes of the study were as follows: (1) to examine the general education course enrollment patterns of technical-occupational students in specific programs at intervals of course work; (2) to determine whether successful completion (grade of C or better) of certain required general education courses is related to overall grade point average (GPA) or grade point average in technical-occupational course work for the technical-occupational student; (3) to profile the basic characteristics of the technical-occupational student who enrolls to a greater extent in general education courses than the student who enrolls to a lesser extent; and (4) to profile the basic characteristics of the graduates who have a higher
grade point average in technical-occupational courses and those who have a higher grade point average in general education courses.

The academic records of 328 current students and 284 graduates of six technical-occupational programs at Tarrant County Junior College, Fort Worth, Texas, were used for this study. The following criteria were used for current students to be eligible for inclusion in the student population: (a) enrollment in the Spring semester 1985-86; (b) enrollment in at least one of the identified courses (Appendix A) between Fall 1984 and Spring 1986; (c) completion of at least 15 semester hours of course work at Tarrant County Junior College; and (d) completion of a minimum of four courses or 12 semester hours in the major field being studied.

Eleven research questions were posed to guide the study. The first eight research questions were answered with current student data and the last three with graduate data. Data were processed using the Statistical Package for the Social Sciences. Statistical tests used were the t-test for independent samples, the chi-square test of independence, and the Pearson Product Moment test for correlations. The .05 level of significance was established as acceptable.

Summary of Major Findings

Results obtained from the data are summarized in the order of the posed questions:

1. "Do technical-occupational students enroll in required general education courses at a semester-hour level proportional to their enrollment in technical-occupational courses?" According to the results of this study, the answer is yes, not a totally resounding yes but a
solid yes. Over 57 per cent of the current students completed general education course requirements at a level proportional to their program enrollment. This is an encouraging percentage when compared to the finding of Stegall (1985); she found that 20 per cent of technical-occupational students completed general education requirements at a level prescribed by their degree plan.

The number of general education hours required by program ranged from 21 semester hours in Mid-Management to 12 in Machine Tool. There seemed to be no relationship between the number of general education hours required in the program and the percentage of students who completed them. The Electronics program, with 18 semester hours of required general education course work, had the highest percentage (69.13) of students who had completed the prescribed level of course work in general education; Welding had the lowest percentage (30).

2. "Is successful completion of a required English or communications course related to overall grade point average (GPA) or grade point average in technical-occupational course work for the technical-occupational student?" According to the results of this study, the answer seems to be no. While no positive relation was determined, the negative relation indicated by GPAs was not found to be significant. Approximately 53 per cent of the current students had completed a required English or communications course. Students who had completed a required English or communications course had a lower overall GPA (3.03 vs. 3.08) when compared to students who had not completed a required English or communications course. The same was true with regard
to GPA in technical-occupational course work; students who had not completed a required English or communications course had a lower GPA (3.24 vs. 3.28) when compared to students who had not completed a required English or communications course. However, neither difference in GPAs was significant ($p > .05$).

3. "Is successful completion of a required English or communications course early in the program related to overall grade point average (GPA) or grade point average in technical-occupational course work for the technical-occupational student?" According to the results of this study the answer seems to be no. Approximately 28 per cent of the current students successfully completed a required English or communications course during the first fifteen hours of enrollment. Students who had completed a required English or communications course during the first fifteen hours of enrollment had a lower overall GPA (2.49 vs. 3.05) when compared to students who had not completed a required English or communications course during the first fifteen hours of enrollment. This difference in GPAs was significant ($p < .05$). The same was true with regard to GPA in technical-occupational course work; students who had not completed a required English or communications course during the first fifteen hours of enrollment had a lower GPA in technical-occupational course work (3.19 vs. 3.28) when compared to students who had not completed a required English or communications course during the first fifteen hours of enrollment. However, this difference was not significant ($p > .05$).

4. "Is successful completion of a required mathematics course related to overall grade point average (GPA) or grade point average
in technical-occupational course work for the technical-occupational student?" According to the results of this study, there is a positive relationship between successful completion of a required mathematics course and overall GPA for the technical-occupational student. Approximately 63 per cent of the current students had completed a required mathematics course. Students who had completed a required mathematics course had a higher overall GPA (3.10 vs. 2.93) when compared to students who had not completed a required mathematics course. This difference in GPAs was significant ($p < .05$).

Students who had completed a required mathematics course also had a higher GPA in technical-occupational course work (3.30 vs. 3.19) when compared to students who had not completed a required mathematics course. However, this difference in GPAs was not found to be significant ($p > .05$).

5. "Is successful completion of a required mathematics course early in the program related to overall grade point average (GPA) or grade point average in technical-occupational course work for the technical-occupational student?" Approximately 34 per cent of the current students successfully completed a required mathematics course during the first fifteen hours of enrollment. It was found that students who successfully completed a required mathematics course during the first fifteen hours of enrollment had a higher overall GPA (3.12 vs 3.01) and a higher GPA in technical-occupational course work (3.27 vs. 3.24) when compared to students who completed a mathematics course later in the program. However, neither of these differences in GPAs were found to be significant ($p > .05$).
6. "What are the basic characteristics (age, sex, high school graduate, GPA) of the student who has successfully completed a minimum of seven semester hours of required general education courses versus the student who has completed six semester hours or less?" According to the results of this study, the student who has completed a minimum of seven semester hours of required general education is younger (30.03 years of age vs. 31.11), is less likely to be male (66.67% vs. 69.92%), is slightly less likely to be a high school graduate (83.08% vs. 84.96%), and has a lower GPA (3.00 vs. 3.12) than the student who has taken six or less hours of required general education.

7. "Is there significant variance among the groups with regard to the number of general education hours completed by students in the two programs when technical-occupational programs are grouped according to the following: (A) Mid-Management and Office Careers; (B) Electronics Technology and Drafting and Design Technology; and (C) Welding and Machine Tool Technology?" Of the three categories, only one, (B) Electronics Technology and Drafting and Design Technology, yielded a significant level of variance with regard to general education hours completed by students in the two programs.

8. "Is there a positive correlation between GPA and the amount of general education course work completed?" According to the results of this study there is not a positive correlation between GPA and the amount of general education course work completed; instead, a negative correlation exists between GPA and the amount of general education course work completed. This correlation was found to be significant ($p < .05$). Also, for one of the six programs, Electronics, a negative
correlation, significant at the .05 level, exists between GPA and the amount of general education course work completed.

9. "Is successful completion of a required English or communications course during the first half of the program related to a higher overall grade point average (GPA) for the technical-occupational graduate?" Approximately 58 per cent of the graduates successfully completed a required English or communications course during the first thirty-two hours of enrollment. Graduates who completed English early in their enrollment had a higher GPA (3.22 vs. 3.15) when compared to graduates who completed English later. However, this difference was not found to be significant (p > .05).

10. "Is successful completion of a required mathematics course during the first half of the program related to a higher overall grade point average (GPA) for the technical-occupational graduate?" According to the results of this study, the answer is yes. Approximately 65 per cent of the graduates completed a required mathematics course during their first thirty-two hours of enrollment. Graduates who completed a required mathematics course early in their enrollment had a higher GPA (3.30 vs. 3.03) when compared to graduates who completed mathematics later. This difference was found to be significant (p < .05).

11. "What are the basic characteristics (age, sex, high school graduate, GPA) of the graduate who has a higher GPA in the technical-occupational course work versus the graduate who has a higher GPA in the required general education course work?" Over 81 per cent of the graduates had a higher GPA in technical-occupational course work than in general education course work. Yet, the characteristics of the two
groups of graduates differed only slightly. The graduate who had a higher GPA in technical-occupational course work had the following characteristics when compared to the graduate who had a higher GPA in general education course work:

- was older (33.37 years of age vs. 33.04)
- was more likely to be male (57% vs. 55%)
- was more likely to be a high school graduate (86% vs. 84%)
- had the same overall GPA (3.22 vs. 3.22)

Discussion of the Findings

This study addressed the questions studied by Stegall in 1985 and went beyond those questions to seek additional insights. Contrasting results were obtained with regard to the completion of general education courses at a level proportional to enrollment in the technical-occupational program; Stegall found 20 per cent, and this study yielded 57 per cent. While 57 per cent is not an overwhelming positive result, it is certainly an encouraging one when compared to that of Stegall.

The relation of successful completion of a required English or communications course to student success, as measured by overall GPA and by GPA in technical course work, was addressed in this study. Stegall found that English non-completers had higher GPAs. The results of this study were similar; each of four measures showed English non-completers with higher GPAs than English completers. The measure with significant results was for current students who had successfully completed English during the first fifteen hours of enrollment; their mean overall GPA was 2.49, while students who took English later had a mean GPA of 3.05.
It is typically assumed that the reading and writing skills developed in the required English or communications course would benefit the student in other course work. The data do not support this. Perhaps the technical-occupational student who took English early did so because of a known weakness in the communications area. Or, the student may have chosen a career program rather than a transfer program because of a lack of success in communications subjects during high school.

These particular findings regarding the lower GPAs of English completers, particularly early completers, lends credence to the need for what is now termed "Writing Across the Curriculum" or "Writing Across the Disciplines." In a recent article, "The Challenge for Community Colleges: Writing Across the Disciplines," Marlette Rebhorn states, "One of the major challenges facing community colleges in the future will be to increase the literacy of students poorly prepared to read with adequate comprehension or to write clearly. Long sequestered in the confines of the English department, these skills must, as it were, come out of the closet to be practiced and refined throughout the curriculum" (6, p. 4).

The writing-across-the-curriculum movement began at small liberal arts colleges where faculty were committed to an excellent educational foundation for students of all majors and has grown phenomenally. According to Donald H. Cunningham, editor-in-chief of the West Texas Project in Writing across the Curriculum, the movement has traveled from liberal arts colleges to professional programs and now into vocational-technical programs (4, p. 1).
Students learn and develop basic writing skills in each English or communications class taken, but excellence in writing can be achieved to a greater extent by expanding writing into all classes. Cunningham states two main objectives on which the vitality of the writing-across-the-curriculum movement rests. One is the requirement that students be required to verbalize their observations, perceptions, and responses. By writing frequently in all classes and having their writing critiqued by professionals in their field of study, the student should improve as a writer. The second objective is to use writing as a method for gaining and retaining new information. Writing helps to clarify thinking; it adds to learning beyond just reading and studying (4, p. 1).

In William Bennett's report to President Reagan in May, 1988, he states that that fewer than one-fourth of the 17-year-olds tested in 1984 "were able to perform at an 'adequate' level on writing tasks considered essential to academic study, business, and professional work" (2, p. A31). This report, "American Education: Making It Work," indicates that writing skills have improved slightly since 1979 among high school students tested. These are generally high-performing students (2, p. A31).

Students in the technical-occupational programs of the community college represent a varied group with regard to age, ability, experience, and skills. The need for solid English and communications courses coupled with a writing-across-the-curriculum approach seems evident. The report of the Commission on the Future of Community Colleges issued in April, 1988, addresses this concept. The report, "Building Communities:
A Vision for a New Century," gives eleven curriculum recommendations. One of these stresses that all community colleges students should complete a collegiate English course emphasizing writing and also states, "Good oral and written communications should be taught in every class" (5).

This study addressed the question of successful completion of a required mathematics course in relation to success as measured by GPA. The same four measures were taken with mathematics as were taken with English. The results for mathematics were opposite to those for English. Completers of mathematics had higher mean GPAs, overall and in technical course work, than non-completers. Early completers, those who took mathematics during the first fifteen hours of enrollment, had higher mean GPAs than students who took mathematics later.

The percentage of enrollments in English and mathematics differed among technical-occupational students, with a higher percentage of current students enrolling in mathematics than in English. The data revealed the following:

- Current students who had completed a required course (mathematics - 63 per cent vs. English - 53 per cent)
- Current students who had completed a required course during the first fifteen hours of enrollment (mathematics - 34 percent vs. English - 28 per cent)
- Graduates who completed a required course during the first thirty-two hours of enrollment (mathematics - 65 per cent vs. English - 58 per cent)
This study indicates that technical-occupational students tend to avoid English to a greater degree than mathematics; thus, avoidance of required general education courses appears to vary by subject matter. One possible explanation of this particular variation could be that technical-occupational students perceive mathematics as more essential than English to their success in the career programs. This study also indicates a positive relation between successful completion of a required mathematics course and a higher overall GPA; it does not indicate the same with regard to English.

These findings may be compared with data given by Bennett in his report, "American Education: Making It Work." He noted that "only 51 per cent" of the 17-year-olds tested in the mathematics competency areas could adequately handle moderately complex procedures and reasoning (2, p. A31). While this figure does not sound promising, this 51 per cent is higher than the "fewer than one-fourth" who could perform at an adequate level on writing tasks (2, p. A31). Thus, while students are underprepared in both mathematics and English, perhaps they are slightly more prepared for the mathematics courses than for the English courses required in the technical-occupational programs. Another explanation for the findings is possible; perhaps more thorough remediation through developmental mathematics was available to or required of these community college students than was remediation in English.

The characteristics of the current students who had taken seven or more semester hours of general education were similar to those found by Stegall with regard to age, sex, and GPA. Both studies found this student to be younger than one with six or less hours of general educa-
tion; however, Stegall found an age difference of three years while this study showed an age difference of slightly over one year. While the student is likely to be male in both studies, this study found the student to be less likely to be male than the counter-part student who had six or less hours in general education. The student with seven or more hours in general education had a lower GPA than the student with six or less hours in general education; this was not surprising since the data on graduates showed over 80 per cent had higher GPAs in technical course work than in general education course work. In Stegall's study only 8.4 per cent of the students who had taken seven or more hours in general education were non-high-school graduates; in this study that percentage was doubled to 16.9 per cent. Stegall found that 49.2 per cent of the students had completed seven or more hours in general education; this study revealed that over 59 per cent had completed seven or more hours in general education. This was not surprising since this study revealed that over 57 per cent, compared to 20 per cent in Stegall's study, of the students had completed general education course work proportional to their total program enrollment.

The six programs were grouped by twos to represent three types of job or career preparation. The assumption was that similar programs would not likely have much variation with regard to enrollment in general education. This was true for two groups. However, the Drafting-Electronics grouping, which represented technical-skill oriented occupations, yielded significant variance.

Upon closer inspection, it was noted that students in the Electronics program tended to take general education courses earlier in the
program than students in the Drafting program. Electronics had approximately 29 per cent of the students who had completed 15 to 48 semester hours of course work and had completed the proportional amount of general education course work; this is in contrast to approximately 11 per cent for the Drafting program. However, the data on completion of required English and mathematics, revealed that a higher percentage of students in Drafting had completed English (68.50% vs. 54.36%) and mathematics (87.50% vs. 80.54%) than students in Electronics.

The relation of early successful completion of a required English or communications course to the academic success of graduates, as measured by overall GPA and by GPA in technical course work, was addressed in this study. Whereas current students who were early completers of English had a significantly ($p < .05$) lower GPA than later completers, graduates who were early completers of English had a higher GPA. This higher GPA was not significant ($p > .05$); thus, there was essentially no difference in mean GPAs of early completers and later completers among graduates. Therefore, it can be concluded that no negative difference existed, as was the case for current students.

The same relation was investigated for mathematics. Graduates who were early completers of mathematics had a significantly higher mean GPA than graduates who completed mathematics later. These findings strengthened the findings for current students; completion of mathematics has more impact on GPA than completion of English for the technical-occupational student.

The basic characteristics of the graduate who had a higher GPA in
technical-occupational course work and the graduate who had a higher GPA in general course work were essentially the same. The proportion of males and females in each group were within 2 percentage points of one another; the same was true for high school graduates and non-high-school graduates. The mean ages were less than one-half year in difference. The mean GPAs were exactly the same. An outstanding finding was that four of five graduates made a higher GPA in technical-occupational course work than in general education course work.

Conclusions

Based on the findings of this study, the following conclusions seem to be appropriate:

1. Technical-occupational students tend to enroll in general education courses at a level reasonably proportional to their program enrollment; avoidance of general education varies with the subject matter; the tendency to avoid English is greater than the tendency to avoid mathematics.

2. Overall enrollment in required general education courses does not seem to improve the overall GPA of the technical-occupational student; the effect varies by subject matter.

3. Successful completion of a required English or communications course, early, does not appear to contribute to academic success, as measured by overall GPA or GPA in technical course work, for the technical-occupational student.

4. Successful completion of a required mathematics course does contribute to academic success, as measured by overall GPA, for the technical-occupational student.
5. The type of program in which a technical-occupational student is enrolled does not seem to have an effect on the level of enrollment in general education courses.

6. The characteristics of technical-occupational students more likely to enroll in general education courses can be identified.

7. The technical-occupational student who completes a greater amount of general education course work tends to have a lower GPA than the technical-occupational student who completes fewer hours in general education course work.

8. Graduates of technical-education programs tend to have been more successful in their technical course work than in their general education course work.

9. The characteristics of graduates more likely to achieve higher GPAs in technical-occupational course work than in general education course work are difficult to identify; the characteristics of the two groups are practically identical.

Implications

The present revival of interest in general education is accompanied by issues regarding the quality of undergraduate programs and mandates at the state level for assessment and remediation. Regional accrediting associations are putting teeth into the general education issue by requiring that a specific amount of general education course work be included in each undergraduate program. The Southern Association of Colleges and Schools (SACS) established in its 1987 Criteria for Accreditation that a minimum of fifteen semester hours of general education be included in each associate degree program; for baccalaureate
programs the minimum is thirty semester hours (3, p.45). The implication for technical-occupational programs, such as those included in this study, is that there must be at least fifteen hours of general education course work included in each program.

Another fundamental concept to improving undergraduate education is that of defining college-level work. The Southern Regional Education Board (SREB), in a 1987 paper entitled "Readiness for College: Should There Be Statewide Placement Standards?" by Abraham, addressed this issue (1). The placement practices and standards in higher education were studied. A survey was conducted; it included 489 public two-year and four-year institutions from the 15 SREB state area. Three of the states had statewide placement standards in place; two states (Arkansas and Texas) had state mandates for developing statewide standards. Of the other ten states, five had taken no action, and five were at various stages of placement consideration. Within states and within the regional area, there was a "lack of consensus on what constitutes college-level/degree-credit work" (1, p.9).

Abraham stressed the need to use the same placement instruments and standards (scores) statewide as a foundation for raising the overall quality of undergraduate education. He notes that, without such standards, student deficiencies are "masked in everyday operations" and students may receive credit for work not of degree level and may even graduate with an associate in arts or baccalaureate degree (1, p.15). These are the concerns that have led state legislatures to mandate assessment and remediation. In 1987, the 70th Texas Legislature passed House Bill 2182, known as the Texas Academic Skills Program (TASP). This pro-
gram, to be implemented in fall 1989, will include the assessment of basic academic skills of all new students entering public colleges and universities in Texas and will require skills development for students who demonstrate a need for remedial work in reading, writing, or mathematics (8, p.1).

The TASP does not differentiate assessment based on degree sought. Technical-occupational students seeking the associate in applied science degree will be assessed and remediated in the same manner as those seeking the associate in arts or baccalaureate degree. It does, however, allow institutions to identify those courses which may be taken without passing a given portion of the TASP exam.

The findings of this study indicate that technical-occupational students are more likely to be successful in technical course work than in general education course work and that successful completion of the required English or communications course does not necessarily contribute to success as measured by GPA. The following implications exist:

1. A careful view of technical-occupational courses and programs will be needed to determine which courses should have as a prerequisite the successful completion of the TASP or parts thereof.

2. Technical-occupational programs must be reviewed course by course to determine which courses in each program are "collegiate" level.

3. Technical-occupational programs, although designed for job-entry preparation and as terminal degree programs, will likely become more comparable to the two-year associate in arts degree programs.
4. A "bottlenecking" effect will probably occur as students desiring technical-occupational courses are restricted from enrolling in those courses while necessary remediation takes place.

5. A greater demand for non-credit technical-occupational programs may develop as students seek job-entry skills without the delay required for remediation.

6. The content and effectiveness of required English courses may become of more interest as they relate to the success of technical-occupational students; the same may be true of mathematics courses.

**Recommendations**

From the findings and conclusions of this study, several recommendations can be made. Community colleges interested in the academic success of technical-occupational students should carefully design technical-occupational programs to include general education courses sufficient to provide skills for success. Each technical-occupational program should contain appropriate required courses in collegiate English; appropriate remediation should be available and required for students who are underprepared for collegiate English. The required courses in English should be supplemented and complemented throughout the curriculum, in both technical and non-technical courses, by a well-developed program such as writing-across-the-curriculum. To simply require an English course, or to simply approach the development of communications skills by an integrated effort is probably not sufficient; both are needed.

Each technical-occupational program should contain appropriate required courses in mathematics. The significant relationship between
successful completion of mathematics and the academic success of technical-occupational students strongly suggests that mathematics is a necessary component of each program. Whether success is due to the development of computational skills, reasoning power, or study skills and concentration developed in mathematics courses, the findings affirmed a strong link between success in mathematics and overall academic success. Appropriate remediation should be available to and required of students underprepared for the mathematics courses required in technical-occupational programs. The required courses in mathematics should also be reinforced throughout the curriculum in a concerted effort, perhaps termed "calculating-across-the-curriculum," involving faculty of all disciplines. The skills of estimating, calculating, reasoning, and problem-solving should be taught in every course. As with English, this reinforcement throughout the curriculum should in no way replace the required courses; instead, it should expand the required courses and add meaning to concepts learned in the required courses.

The course enrollment patterns of technical-occupational students should be reviewed through studies, such as this, to determine whether avoidance of general education courses is occurring and whether success in general education courses is contributing to academic success.

Recommendations for future research are as follows:

1. This study should be replicated in community colleges in other states to learn if the results may be further generalized.

2. A study should be conducted to include both technical-occupational students and transfer students to determine if successful com-
pletion of English and mathematics has the same relation to academic success for each of these groups of students.

3. A study should be conducted to determine whether students who take the required English early in their enrollment had a greater or lesser need for remediation before enrollment in the required course and whether remediation occurred; the same should be studied regarding mathematics.

4. A study should be conducted to determine the relation of English grade to academic success; the same should be studied regarding mathematics.

5. A comparative study should be conducted to determine whether technical-occupational students involved in a curriculum using both required English courses and a well-developed writing-across-the-curriculum program attain greater academic success than students who are only required to take English courses; the same should be studied regarding mathematics.

6. A study should be conducted to determine whether technical-occupational students who pass the TASP exam without need for remediation are more successful in technical course work than technical-occupational students who fail a portion of the exam and need remediation.
CHAPTER BIBLIOGRAPHY


APPENDIX A

COURSES USED TO IDENTIFY "MAJORS"

FOR EACH PROGRAM
COURSES USED TO IDENTIFY "MAJORS" FOR EACH PROGRAM

Mid-Management

MID 1332 Management Training II
MID 1333 Management Essentials

Office Careers

OFO 1313 Intermediate Typing
OFO 1383 Machine Transcription

Welding

WEL 1413 Structural Welding
WEL 1423 Welding Design and Layout

Machine Tool Technology

MAS 1564 Machine Shop II
MAS 1564 Milling-Advanced Turning
MAS 2554 Precision Machine Operation

Electronics

ELE 1324 Electronic Devices
ELE 1334 Digital Electronics
ELE 1404 Digital Logic Fundamentals
ELE 1414 Linear and Switching Devices

Drafting and Design Technology

DRF 1373 Electronic Drafting
DRF 2303 Machine Drawing Design
APPENDIX B

DEGREE HOUR REQUIREMENTS BY PROGRAM
### DEGREE HOUR REQUIREMENTS BY PROGRAM

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<thead>
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APPENDIX C

RATIO OF GENERAL EDUCATION HOURS TO TOTAL HOURS
# APPENDIX C

## RATIO OF GENERAL EDUCATION HOURS TO TOTAL HOURS

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### Ratio:

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\frac{\text{Hours Completed in Program}}{\text{Total Hours Required in Program}} = \frac{\text{Hours Completed In General Education}}{\text{Total Hours Required In General Education}}
\]
APPENDIX D

GENERAL EDUCATION DEGREE REQUIREMENTS

BY PROGRAM
## APPENDIX D

### GENERAL EDUCATION DEGREE REQUIREMENTS
BY PROGRAM

#### Mid-Management

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Dissertations
