A STUDY OF MALE STUDENTS WHO ENTERED THE COLLEGIATE DIVISIONS OF FERRIS INSTITUTE FOLLOWING GRADUATION FROM HIGH SCHOOL WITH SCHOLASTIC AVERAGES OF LESS THAN "C"

Thesis for the Degree of Ed. D.

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Harold Edward Wisner

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AN ABSTRACT

Submitted to the School for Advanced Graduate Studies of
Michigan State University of Agriculture and
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DOCTOR OF EDUCATION

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Harold Edward Wisner Abstract

The general purpose of this study was to help to answer the question"Who should go to college?" The specific purpose was to evaluate critically the progress at Ferris Institute made by male students who entered the college as a result of its liberal admissions policy--a policy so liberal that no student is denied admission because of his previous academic record.

The group studied consisted of 370 students who entered Ferris during the period from September, 1954 through March, 1957, following graduation from high school with scholastic averages of less than "C".

On the basis of cumulative honor point averages for the first three quarters of continuous attendance or the only completed portion thereof, 35 percent of the students attained at least "C" averages at Ferris. The success status of a given student was not necessarily the same for each quarter of attendance.

Of 24 factors tested for their relationship to success at the college, 11 were found to be significantly related to success and 13 were not. When the factors significantly related to success were examined for interrelationships, only ability, high school achievement and age were found to be independently related to success.

The findings of this study with respect to the factors

which were measured for their relationship to success, were in substantial agreement with the findings of other investigators regardless of whether the findings of other studies were based on general college student populations or whether the groups studied were similar to that of the present study.

Only a few of the students could have been denied admission to the college without, in the process, denying admission to some who succeeded, but combinations of ability, high school achievement and age could have been used to deny admission to some groups of students without having barred from college an appreciable number of students who succeeded.

The data of the study supplied information that is useful for establishing procedures for probation and dismissal of students whose progress is unsatisfactory.

It seems reasonable to conclude that the present challenge to higher education will be met most effectively by retaining liberal admissions policies in the American system of higher education and by carrying out realistic probation and dismissal procedures for those students who do not succeed in college.

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CHAPTER I

INTRODUCTION

I. The Problem

Higher education in the United States has evolved from a state in which college training was intended primarily for the socially elite and for the more gifted students to a position in which more and more students are being given an opportunity to go to college. College enrollments during this century have increased steadily, progressing from 238,210 in 1900 to 531,339 in 1920 to 1,499,109 in 1940 to 2,439,910 in 1950, according to Thompson, Crane and Bean (98). Johnson and Fenton (56) reported that the enrollment for the fall of 1957 was 3,068,000.

We are on the threshold of the greatest challenge ever faced by educational leaders. Estimates published in 1954 by Thompson, Crane and Bean (98) indicate that the demand for college training in the next few years may far surpass any estimates that had been made earlier. Their data showed that if the percentage of high school students going on to college continues to increase as it has in the past the college enrollment in 1970 will be more than double the enrollment of 1950. This estimate does not appear to be unrealistic, for in the fall of 1957 college enrollments

exceeded by 2 percent the estimate of these authors for that year. Compared to the number of students who will be clamoring for entrance into college during the years ahead, the large increase in enrollment following World War II pales into insignificance.

If the problem before us were limited to finding a reasonable method for meeting popular demand for education, the task would be considerable, but trial and error methods could be used to meet the challenge without ensuing mistakes having a disastrous effect on our national well-being. The problem is not limited to increases in enrollment. Recent scientific developments indicate that our citizens must enter training programs or employment which will enable them to make their maximum contribution to our society if our culture is to survive either as a political entity or as a way of life. Therefore, we must provide college training for those who have academic potentialities, and we must make provision for other types of training for those for whom college training is not appropriate.

It is from this broader setting that the problem of this study emerges. The general area of the problem is college admissions.

Colleges and universities differ widely in their requirements for admission. Many colleges select their students on the assumption that they will admit only those who, on the basis of evidence at hand, are reasonably certain of success; others will admit all students who apply,

while the remaining colleges and universities have admissions procedures that fall between these two extremes. This is not necessarily unfortunate. As White (110), Vaughn (106) and Nelson (73) point out, not every college should seek the same type of student; neither should all colleges use the same techniques in admitting students. The policy making body of each institution should consider all of the possible reasons which bring students to its school and should attempt to clarify the objectives so that the college program may be adapted to the needs and interests of the students who are admitted. No single plan for admissions can be adequate. As Cosand (25) said:

> If the colleges are to serve society as true educational leaders, and thus meet the demands society places upon them, we must be certain that there is a belief in flexibility, and a mature consideration of the individual differences of those students desiring admission.

The question of who should be permitted to go to college has been of constant interest to the American people. At different periods in our history the answer to the question has carried different implications. Although the trend has been clearly in the direction of providing higher education for more and more people, there have always been some educators who believed we were moving too far in this direction. In the past decade the issue was drawn rather sharply and discussed widely as the result of reports by the Association of American Universities Commission on Financing Higher Education and the President's Commission on Higher Education. The former Commission

upheld the older point of view in its report (4):

> American society requires two interrelated but fundamentally different kinds of education. One is common schooling. Its goal is the steady improvement in the literacy and social competence of the individual. The public primary and secondary school is the chief instrument of this purpose although it has always been accompanied and sometimes stimulated by the private school. The other educational goal is the development of the intellectual capacities of those possessing unusual talent. This is the special province of higher education...

The latter Commission reflected the present trend in its report (105):

> American colleges and universities must envision a much larger role for higher education in the national life. They can no longer consider themselves merely the instrument for producing an intellectual elite. They must become the means by which every citizen, youth and adult, is enabled and encouraged to carry his education, formal and informal, as far as his native capacities permit.

Although each of these quotations states a somewhat more extreme position than the reports as a whole present, they do reflect the spirit of the two documents.

The issue is now far more important than ever before. We are concerned not only with the question of who should go to college, nor are we concerned only with financing expanded college facilities and staffs. We are faced with a challenge to the survival of our culture and we must proceed with this challenge clearly in mind. College training must be provided for those who need it in order to make their maximum contribution toward the survival of our culture.

If determination of who would succeed in college could be made in advance the problem would be simplified.

Unfortunately, no practical procedures or techniques that can be used by most colleges have been found that even approach infallibility. Numerous studies of the efficiency of various methods of predicting college performance have been made and findings are reported in Chapter II. Of these studies, Pothoff (81) wrote in 1931:

> Prediction studies during the past 20 years have shown that it is impossible to forecast accurately the scholastic success or failure of all the members of a given group of students, and particularly that many cases of failure cannot be discovered until the students have actually tried their hands at doing college work.

Three years later Segel (90) stated:

> Youth always demands another chance. Insofar as any system of college entrance we now have is concerned, there is some truth to youth's insistence that he may succeed if given a chance in any particular institution of learning. No subjective or objective method of estimating success has yet been inaugurated which is perfect. It is true that the most valid method for finding out whether or not a student can achieve a certain scholastic standing or be successful in an occupation is for him to try it.

And more than a decade later Borow (16) pointed out:

> Despite each new advancement in the methodology of academic prognosis, one fact remains crystal clear. No forecasting measure nor any combination of such devices has as yet approached infallibility...Surveys of numerous studies in which intelligence test scores were used have shown that the average intelligence test possesses a correlation...(that) is only about 11 percent better than the accuracy resulting from sheer guesswork! The average content examination produces predictive effectiveness which is approximately 13 percent better than guesswork. The high school graduation rank predicts...16 percent better than chance. The most efficacious combination of intelligence test, content examination and high school record rarely produces a multiple correlation exceeding .75...which is less than 34 percent in excess of guesswork.

Information found in literature published since 1946 does not

contradict these statements.

It seems evident that when students are denied admission because of poor academic records or low test scores, some who could have succeeded in college are denied college entrance. Trebilcock (103) wrote:

> Colleges which take students without regard to their high school ranks are performing a real educational service in many cases, inasmuch as they open the door or opportunity to many who otherwise would find themselves cut off from a college career. While it is wasteful and otherwise undesirable to have the unfit in college, it is also wasteful and undesirable to keep the fit out of college. For many students there is no adequate test of fitness except the actual attempt to carry college work.

As Tollefson (104) said:

> Who knows the contributions that could have been made by potential geniuses who have gone unrecognized or who have been thwarted educationally?

The late United States Senator Woodbridge Nathan Ferris, who founded Ferris Institute in 1884, was fully aware of the implications of selective admissions policies and he was unalterably opposed to them in principle. His successors as Presidents of Ferris Institute have followed his lead and when Ferris became a State-owned-and-operated institution in 1950, the enabling act passed by the legislature of the State of Michigan (68) specified that the traditional policies of the institution should be retained. Accordingly, since its founding Ferris Institute has followed a liberal admissions policy. It is the philosophy of this college that a student is entitled to the opportunity to demonstrate his ability to perform college level work in a satisfactory manner, even if he failed to earn good grades

in high school or at other colleges; no student is turned away because of his previous scholastic performance. Though only about one-fourth of the students entering the collegiate divisions of Ferris received poor grades at other schools attended, to these students Ferris is the "school of the second chance."

Little research has been completed at Ferris to determine the effectiveness of the liberal admissions policy in terms of the success of students who were admitted on this basis. It is known by random observation that many students who entered Ferris after failing to earn good grades in their previous schooling have received at least average grades at Ferris. However, no extensive, critical study has been made to determine how many of these students have been successful or to learn what differences exist between those whose progress has been satisfactory and those whose progress has been unsatisfactory. The only organized information of this type is a pilot study completed by the writer (113), which included 66 students with less than "C" averages for their previous schooling who entered the collegiate divisions of Ferris during the 1952-1953 school year. The findings of this study are reported in Chapter II.

The general purpose of the present study was to help to answer the question "Who should go to college?" The specific purpose of the study was to evaluate critically the progress at Ferris of students with below-average high school grades in relation to these questions:

1. What proportion of students with below-average high school grades earned at least average grades at the college?

2. What factors seemed to differentiate between those students who earned at least average grades at the college and those who did not?

3. How do these factors compare with factors that have been found to predict college performance effectively with general college populations?[1]

4. How might the information obtained from the study be used to improve institutional procedures?

II. Importance of the Problem

The personnel of a college should evaluate critically the various aspects of the program of the institution. As indicated earlier, such an evaluation has not been made at Ferris Institute in the area of the present study. It is unlikely that the findings of this study will cause renunciation of the present liberal admissions policy at Ferris because the college is firmly committed to this philosophy by tradition and by law. However, information obtained from this study may be used to improve college procedures, to meet better the needs of the students, the college and

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[1] A survey of professional literature failed to locate many prediction studies based on college performance of high school graduates with below-average high school grades. Most studies reported were based on general college populations.

society.

During the period covered by this study no organized procedures were followed at Ferris for limiting the period of attendance of an unsuccessful student. From time to time individual students were denied the right to continue their programs of study because of unsatisfactory progress. Information obtained from this study may indicate reasonable limits of time within which an individual should be expected to prove his ability or be denied further enrollment in the same curriculum. If procedures limiting the number of terms of unsatisfactory progress were adopted, facilities would be made available for others.

At present it is difficult for counselors to indicate to students with below-average high school grades their chances of success at Ferris in terms of performance at Ferris by students with similar backgrounds. They can be told "Some have been successful; you may try." Information from this study may make available specific data which can be brought to the attention of prospective students to help them reach decisions as to whether to enter college. Such information may cause some students to abandon plans for college and it may encourage others to attend.

The findings of this study should have value for the personnel of other colleges and universities, and for high school counselors because there is a dearth of research information in professional literature.

A number of state-owned and municipally-owned colleges

and universities are required by law to admit any graduate of high schools within specified geographical limits. Some colleges and universities that are not publicly-owned also have liberal admissions policies. Since little information concerning the college performance of below-average high school students was found, personnel of several colleges and universities known to have liberal admissions policies were contacted. In not one instance was information similar to that sought in this study found to be available.

Apparently, many colleges which admit students with poor high school records tend to "fly blind" as far as treatment of these students as a group is concerned. Little attention seems to have been given to studying their progress to determine whether the same factors for which much information is available concerning general college populations are applicable to these students.

The findings of this study may contribute to the solution of the two-fold problem facing higher education in the United States today--providing for the masses of students who wish to enter college in the near future and helping each citizen to make maximum use of his capabilities. Should the study reveal that only a small percentage of these students succeeded in college, perhaps colleges could deny admission to students with below-average high school records without significant loss to society. If, on the other hand, a considerable proportion of these students succeeded, liberal admissions policies would seem to be

justified as a means of helping each citizen to make his maximum contribution to our society.

If the study shows that factors which differentiate between successful and unsuccessful students are sharply defined, admission to college might be limited to those students who are more favorably endowed. If, on the other hand, many of these students succeeded without possessing the characteristics found to be most frequently associated with success, limitation of admissions might not be wise.

If the study indicates that students who did not succeed during the first quarter or two were not likely to succeed later, limitations on the period of enrollment permitted could be made without harm to society. Otherwise, the wisdom of limiting the period of attendance by such students might be questionable.

Either restricted admissions policies or limited periods of enrollment for unsuccessful students would make room in college for additional students who wished to enter. Keeping successful students in college and assisting unsuccessful students into training or employment in keeping with their potentialities would help society to gain the maximum contribution from each citizen.

The findings of this study, then, should prove helpful to educators by providing information that will make possible more effective counseling and training for students whose high school performance was below average. Furthermore, the findings of this study should be of value to the general

public, for, in the final analysis, society must decide whether enough students such as these are successful in college to justify the retention of liberal admissions policies.

III. Definitions of Terms

Ferris Institute is a State-owned-and-operated educational institution which is located in Big Rapids, Michigan. Three basically different types of curriculums are offered--collegiate, high school, and non-collegiate training in trade and industrial curriculums and in other specialized education curriculums. Ferris grants the bachelor of science degree in pharmacy, commerce, and teacher-training. Some of the terminal curriculums lead to the associate in arts degree or the associate in applied science degree, while graduates of other terminal courses receive certificates only. The present study is concerned with the collegiate offerings of the institution only.

The college will refer to two collegiate divisions of Ferris--the Commerce Division and the General Education and Pre-professional Division. There are two other collegiate divisions--the Pharmacy Division and the Collegiate Technical Terminal Division--but students entering these divisions are excluded from the study. A "C" average is required for entering the Pharmacy Division; the only students (three in number) with below-average high school grades who entered the Collegiate Technical Terminal Division

were in commercial art, a curriculum that is different from most of the collegiate offerings in that much of it is of "workshop" nature.

Below average and unsuccessful refer to attainment of honor point averages less than 2.0 ("C").

Success and successful refer to attainment of honor point averages of at least 2.0 ("C").

Honor Point Averages (HPA's) are determined by dividing the total number of "honor points" earned by a student by the total number of credit hours of instruction completed. In computing college HPA's, honor points were given for each hour of credit completed. Four honor points were given for an "A", 3 for a "B", 2 for a "C", and 1 for a "D"; no honor points were given for an "F". When computing high school HPA's, honor points were given for each Carnegie Unit of credit completed. The same number of points was assigned to each grade as when computing college HPA's.

Student, unless otherwise specified, refers to a male student who entered the college following graduation from high school with a scholastic average of less than "C".

V. Limitations of the Study

The following limitations of the study are recognized:

1. The results of the study will be limited to students who enrolled at Ferris, though it may be assumed that certain similarities would probably exist with such students who enter other colleges.

2. The study does not test for motivation or

perseverance.

3. The study does not include those students who attended the college after being unsuccessful at other institutions of higher learning.

4. The findings of the study will not necessarily be applicable to women students who attend the college.

5. It is assumed that the information in student records used in gathering data for the study is accurate and that these data were used accurately in the study.

VI. The Plan of the Thesis

In the first chapter the problem of the study has been stated, the importance of the study has been discussed, terms have been defined and certain limitations of the study have been recognized.

Additional chapters will review the literature in the field of prediction studies, describe procedures used to select, organize and analyze the data of the present study, set forth the findings of the present study, provide a summary of the study and indicate conclusions of the study and suggestions for further research.

CHAPTER II

REVIEW OF LITERATURE

Before proceeding to further consideration of this study, additional phases of the literature which pertain to the problem of the study will be reviewed. Some references to literature in the field have been made in Chapter I and other references will be made in later chapters, as appropriate. Most of the literature reviewed, however, is reported in this chapter, to provide a background of understanding based on studies that have been reported previously which should facilitate viewing the findings of this study in perspective.

The first section of this chapter presents the findings of studies which had as their major purpose analysis of the progress of students whose high school honor point averages (HPA's) were low. Few studies of this type were located.

The second section of this chapter is devoted to studies that sought to determine factors that are predictive of performance in college. Because the number of studies of this type is so large and so many of them are similar in nature, conclusions reported in summaries of such studies were used liberally in presenting the information.

The third section of this chapter summarizes the findings reported and states implications for the present study.

For the most part, this review has been limited to literature which considered matters similar to those used in this study and the presentation of information is organized in a matter similar to the presentation of the findings of this study. The information presented will later serve as a basis for comparing the experience of the students in this study with the experience of students in other college populations.

I. Studies Describing the Progress of Groups of Students Whose High School Academic Records were Below-average

Trebilcock (103) reported in 1938 the results of a follow-up study of the graduates of Calumet (Michigan) High School. He found that from the lower third of the group studied 28 percent earned approximately average grades, 44 percent earned average grades and 27 percent earned below-average grades, the last figure including 10 percent who failed.

Tuttle (104) reported that, on the basis of first semester grades, only 13 percent of the students entering the University of Illinois from the lowest quarter of their high school classes received college degrees, whereas 50 percent of those entering from the highest quarter did.

In 1944 Berg, Larson, and Gilbert (10) compared the progress of 79 students at the University of Illinois who had graduated from the lowest quarter of their high school classes with 461 students not in the lowest quarter of their

classes. They found that only 15 percent of the lowest quarter group earned grades above those of the average freshman, whereas 61 percent of the other group did. By inspection of test data, the writers fixed a critical score consisting of a raw score of 90 on the American Council on Education Psychological Examination (ACEPE) and 395 on a composite of all the tests. Twenty-two students scored below these; 25 had one score above and the other below. The authors stated:

> If the college counselors could have used the critical scores with the group, they could have justifiably prepared the 22 for failure and discussed non-college training or vocations with them. This would have prepared the students for the difficulties they encountered later.

In 1951 Sanders, Osborne and Greene (89) reported that a reliably higher percentage of students making better than "C" averages than of students making less than "C" averages had come from the upper third of their high school classes. The opposite was true for students from the lower third of their high school classes, but the latter was not statistically reliable.

Farwell (41) compared a group of 228 students who enrolled at Michigan State University in the fall term, 1952, on the basis of testing and counseling procedures (because their high school HPA's were below the level required for ordinary admission) with a group of 228 students admitted by other admissions procedures to ascertain differences and similarities in respect to their academic accomplishment for one academic year of three terms. He found that the similarities between the two groups overshadowed the

differences; high school quarter rank proved to be as good a predictive index as were orientation test scores; the correlation between test scores and HPA's were found to be similar to those found by most investigators; the value of the recommendations of high school principals were open to question; and the most significant relationship for the borderline sample was the relationship between the university counselor's recommendation and subsequent success in the first quarter of college.

Jackson (54) in 1955 described an experiment at Michigan State University in which a group of 123 students who failed entrance examinations were not informed of their failure and were permitted to enroll as if they had passed the tests. Their progress was compared with the progress of 209 students who were admitted by passing the tests and 40 students who were admitted as the result of their performance during a summer school trial period. The following findings were reported:

1. Average grades or better were earned by 56.6, 13 and 50 percent of the passing, failing and summer entrant groups, respectively.

2. Below-average but passing grades were received by 28.7, 46.4 and 30 percent of the passing, failing, and summer entrant groups, respectively.

3. Failing grades were received by 14.8, 40.6 and 20 percent of the passing, failing and summer entrant groups, respectively.

The writer (113), in 1955, studied a group of 66 students who entered the collegiate divisions of Ferris Institute after receiving less than "C" averages for schooling

completed previously. Forty-five of these students had entered the college without having first attended another college; 21 students had attended another college first and were selected on the basis of having failed to maintain a "C" average at the college attended previously. No attempt was made to compare the groups for homogeneity of background other than the failure to obtain "C" averages. The following conclusions were drawn:

1. One-half the group was either still attending college in the spring quarter, 1955--at Ferris or elsewhere--or had successfully completed programs of study.

2. On the basis of the cumulative HPA's for all quarters attended at Ferris, one-third of the students entering from high school and 57 percent of the students who transferred from other colleges were successful.

3. About 18 percent of the students entering from high school and about 23 percent of those entering from other colleges approached success, with HPA's from .76 to .99. (An HPA of 1.0 represented "C" at that time).

4. Students with high school HPA's that approached a "C" average were no more likely to succeed than were students whose averages were lower.

5. Students whose HPA's at other colleges approached a "C" average were more likely to succeed than were those whose averages were lower.

II. Studies Concerning the Relationship Between College Performance and Various Factors

Studies relating college performance to ability. In 1931 Douglass (32) summarized studies of prediction of college success that had been made prior to that time. He

reported a wide range among 160 coefficients of correlation (r), with a median r of .45 between college grades and intelligence test scores. Studies since then have, for the most part, yielded similar results. Segel's (90) review of the literature in 1934 reported a median r of .44 for the 100 studies he reviewed. In 1940 Harris (51), reviewing the literature from 1930 to 1939, found the pattern to be similar. Crawford and Burnham (28), writing in 1946, reported the r's to be typically between .40 and .50 and Borow (16) in the same year reported .45. Garrett (46) in 1949 reported an average r of .47 and Johnson (58), in 1950, found median r's of approximately .44 to .45. During the period since 1950, Posz (89) in 1952, found a median r of .45 for the studies he reported and Cosand (25), a year later, reported a median r of .45. Farwell (41), in summarizing his review of the literature in 1954, concluded:

> The correlations reported in the various studies and summaries appear to be in agreement, since the median correlation ranges from .40 to .50.

The literature reviewed suggests that the ACEPE has predictive efficiency equal to or better than the average of all types of ability tests reported above. Peiser (77) in 1937, found an r of .435, while Freelich (44) reported in 1941 an r of .55 between the ACEPE and freshman HPA. Kirkpatrick (60) found r's of .52 and .57 for the 1937 and 1938 editions of the ACEPE, respectively. Grater and Thalman (49) in 1955, studying students who received bachelor's degrees, found r's of .68, .42 and .58 for the Q-score, L-score and T-score, respectively. Reviews by Segel (90),

Dressel and Schmid (34), Wagner (107), Super (96), Posz (79), Williamson and Berdin (112), and Roznik (85) reported results similar to the range of .40 to .50, hovering near .45 as the median r. Bertrand (11) reported in 1950 that at Texas A & M, an institution to which high school graduation is the only admission requirement, the ACEPE is more predictive of the potentially scholastically deficient student than are high school grades. It is generally felt by those who have studied the ACEPE that the Total Score (T-score) is somewhat more predictive of general college performance than either the Quantitative Score (Q-score) or the Linguistic Score (L-score). This conclusion was reached by Bolton (15), Berdie, Dressel and Kelso (9), Osborne, Sanders and Greene (74) and Wallace (108).

Studies relating college performance to previous academic progress. The best single predictor of college grades after a student has completed at least one enrollment period of college work has been found to be the college grades earned. Studies which support this finding were completed by Potthof (81) in 1931, Byrns (19) in 1932, Rogers (84) in 1937, Read (82) in 1938, Feder (42) and Harris (51) in 1940, Smith (92) in 1945, Bolton (15) in 1952 and Sanders and others (88) in 1955. No studies were found that reported contrary findings. Correlations were commonly as high as .80.

A few studies considered the relationship between the time on which HPA's were based and the relationship of those HPA's to subsequent college performance. In 1931 Pothoff (81)

found an r of .81 between first term grades and the scholastic record for the first two years; in 1940 Feder (42) found an r of .30 between the HPA's for the first year of college attendance and the HPA's for the second year of attendance; Lehman (64) reported in 1943 that HPA's for the freshman year were superior to HPA's for the first term only as predictors of subsequent college performance and that they were almost as effective as were HPA's for the sophomore year; in 1952 Bolton (15) found that HPA's for the freshman year predicted scholarship in later years better than did HPA's for any one term of attendance; and Jackson (54) found in 1955 that students who entered Michigan State University during a summer session on a trial basis and who were permitted to reenroll for the fall term indicated in that first regular term whether they were able to do college work.

Academic progress in high school usually has been found to be the best single predictor of the first college grades. The degree of relationship has varied from study to study and there is a difference of opinion as to whether the cumulative HPA for all high school courses completed is more predictive than is the percentile rank in the high school graduating class. Rank in class is generally regarded as being somewhat the better predictor, but both reflect the quality of work performed in high school. Douglass (32) in 1931 reported an average r of .54 between high school average and college achievement; Segel (90) in 1934 found an average r of .55; Harris (51) in 1940 reported somewhat

higher r's, most of them falling between .60 and .70; Durflinger (35) in 1943 and Borow (16) in 1946 reported a median r of about .55; while Garrett (46) in 1949 reported average r's of approximately .59. Posz (79) in 1952, reported a median r of .55 for the studies he reviewed; Cosand (25) in 1953 found most r's falling between .50 and .60, with a median of .52; Farwell (41) in 1954 reported variations from .45 to .65, without establishing a median r. Carey (20) in 1955, found in his study an r of .69 between high school HPA and university cumulative HPA.

Studies relating college performance to specific subjects completed in high school. For many years educators believed that completion of the "college preparatory" and "mind training" subjects prepared students for college more effectively than did courses of other types. Studies have usually shown, however, that college performance is not closely related to specific subjects taken in high school. Harris (50) in his 1931 summary of prediction studies found this to be true and in his 1940 review (51) he stated that the evidence was even less in favor of the "mind training" subjects. The question has not been debated much since the findings of the Eight Year Study of the Progressive Education Association were published in 1942. Aiken (1), in summarizing the results of this study, demonstrated that students admitted to college from the experimental schools without regard to the pattern of subjects taken in high school achieved as well and in some cases slightly higher than their

counterparts in the controlled study, whose preparation was in the old program. Travers (102) stated in 1949:

> The practice of college admissions officers of requiring certain high school courses or certain prescribed sequences lacks support of any kind from systematic investigation.

Studies relating college performance to various other factors concerning the high school backgrounds of students. Evidence pertaining to the relationship between the size of the high school attended and college performance is conflicting. Harris (51) and Dwyer (36) reported that studies made prior to 1938 were conflicting or showed little relationship. Studies during the decade following continued to show conflicting results. Feder (42) in 1940 and Saupe (89) in 1941 found no significant difference in performance, and studies since 1950 by Bertrand (11) and Dowd (33) found no significant relationship; Bledsoe (13) and Lins (65) in 1954, however, reported that students of large graduating classes were found to make significantly higher average marks during the first year of college than students who attended small and middle-sized high schools. Usually, when scholastic aptitude has been taken into consideration, size of high school does not seem to be related to college achievement.

Graduates of public high schools usually have been found to perform better in college than have graduates of non-public high schools. Studies supporting this point of view were completed by Potter (80) in 1913, Beatley (8) in

1922, Koos (61) in 1931, Chamberlain (23) in 1933, Feder (42) in 1940, and Seltzer (91) in 1948. Contrary findings were reported by Blakeslee (12) in 1929 and by Blum (14) in 1936.

Studies of the relationship between college performance and the recommendation of the high school principal are conflicting. Brown and Nemzek (17) reported in 1944 a study of freshman grades of 342 students from one Detroit high school who entered Michigan colleges from 1930 to 1939. No significant differences were found between the recommended and the non-recommended groups in terms of achieving a "C" average, but there was a significant difference in the overall HPA of the two groups, the recommended group being the better achievers. Sullivan (94) found the principals' estimates of scholastic promise to be very effective in differentiating between the broad groupings of successful and unsuccessful students and in identifying the high achieving students. On the other hand, Farwell (41) in 1954 found the correlation between high school recommendations and college HPA at Michigan State University to be so small that he questioned the value of the recommendations, especially with those students who were of "borderline" ability.

Studies relating college performance to differences in socio-economic status. Although different factors may be involved in determining the "socio-economic" status of students, most studies have used the occupation of the father as the criterion of such status. Neff (72) expressed the

opinion in 1938, after presenting an extensive discussion of socio-economic status and intelligence:

> ...an occupational hierarchy, of the type suggested by the U. S. Census Classification, would afford the most objective means of indicating social level... the danger of the sources of error involved in all rating methods would be avoided if occupation were taken as the sole criterion.

Some of the earlier studies of the relationship between college performance and the occupation of the father seemed to suggest that there might be some significant differences. These included studies by Bear (7) in 1928, Crawford (27) in 1929, Cuff (29) in 1933, and Robinson (83) in 1940. The preponderance of evidence, however, seems to agree with Mueller and Mueller (70) who summarized their study in 1953:

> Insofar as these data are reliable, it would seem that the fact of socio-economic status exerts a very limited direct influence on grades, since students with high scores receive high grades, irrespective of social status.

Studies which substantiated this point of view were completed by Harris (50) in 1931, Miller (70) in 1936, Arnold (3) in 1941, Hoskins (53) in 1950 and Osgood (75) in 1955.

Studies relating college performance to the age of the student. In his review of 5 studies in 1931, Harris (50) reported that it was found rather consistently that younger students did better work than older students but superior intelligence was felt to be the main causal factor; the results of his own study indicated that age had no appreciable or consistent bearing on college performance when intelligence

was held constant. In his review of 9 studies in 1940 (51) the same author reported that findings were overwhelmingly to the effect that the younger students got the better grades. In most cases either no account was taken of intelligence or, where it was mentioned, the younger students had the advantage. In 3 of the studies no relationship was found between age and grade; in another study, in which groups were equated for Regents' averages, both the underage and the overage students did better than the middle group. In 1930 Dwyer (37) reviewed 29 studies completed from 1912 to 1935, which indicated that the younger students usually did better work than the older students. There was a significant tendency, however, for grades to decrease until the age of 21 or 22 and to increase thereafter. Dwyer referred to the "now familiar pattern" of low averages for those aged 19 to 21, while those aged 17 and 22 had higher averages; the results of his own study conformed to the pattern. In summary, he wrote:

> There is a negative trend from ages 16 to 21 and a positive trend from age 22 up...In no case is the absolute value of the coefficient large enough so it can be used for individual prediction, but it is frequently large enough to predict by age groups.

In studying 600 students at Michigan State University in 1948, Pierson (78) concluded that the age of a student upon entering the university had little significance as far as his academic success was concerned.

Studies relating college performance to veteran status. A total of 19 studies (5, 6, 24, 26, 30, 31, 39, 40, 43, 45,

48, 62, 74, 76, 87, 97, 99, 100, 109) concerning the progress of veterans was reviewed. Veterans were usually found to have a slight HPA superiority over non-veterans. Only two studies reported findings to the contrary. Grant (48) found that veterans attained essentially the same level of success as average college students and Sanders, Osborne and Greene (87) found no significant differences between veterans and non-veterans when they were equated as to scholastic aptitude.

There was a strong suggestion that age, rather than experiences peculiar to veterans, may have been the underlying cause of the superior performance by veterans. Tepping (97) found in his study at the University of Colorado Extension Center that non-veterans had a median average .41 credit point higher than veterans at both the graduate and undergraduate levels of instruction; non-veterans at the center were older than veterans. Owens and Owens (76) found that the age of a veteran was almost as good a predictor of scholastic success as was the scholastic aptitude test score. Frederiksen and Schrader (43) found that veterans did better work relative to their ability than did non-veterans, but that a group of older veterans was the important element in raising the average for the veteran group. When they were removed from the groups, the difference in grades between veterans and non-veterans became insignificant.

Studies relating college performance to determination of a vocational goal. Studies of the relationship between college performance and certainty of vocational choice are

not in agreement. In 1931 Harris (51) reported that the findings of two studies indicated a relationship while the findings of two studies did not; in his own study he found no appreciable relationship when intelligence was held constant. A similar pattern was reported in the 1940 review of the literature by Harris (51). In 1943 Marshall and Simpson (66) found that students with tentative vocational choices performed better than either those with definite choices or those who were undecided about their vocational choice. Carter and McGinnis (21) in 1952 found that definiteness of vocational choice was significantly related to HPA's. The situation was well-stated by Borow (16) in 1946:

> Despite the reasonableness of the belief that definiteness of occupational choice should be related to college achievement, research has failed to furnish clear-cut evidence to support it.

Studies relating college performance to the specific curriculum entered. Little information was found in the literature concerning the relationship between college performance and the curriculum entered. Harris (50) reported in 1931 that the findings of 5 studies reviewed indicated that results vary markedly in different institutions. The only item that was found repeatedly was the poor showing of business students. In 1940 he reviewed 5 studies (51) that had been completed in the interim and concluded that they shed no particular light on the subject, either; there was no recurrence of the poor showing by the business students, however.

Studies relating college performance to changes in curriculum. Again, the findings were meagre. After comparing the mean HPA for the first two years of students who changed their major during that period with those who remained in the same major (including students who entered college with no stated major), Matteson (67) concluded that indecision does not affect grades adversely, when scholastic aptitude is controlled. Williamson (111) also found that certainty of choice does not appear to be diagnostic of seriousness of educational purpose.

Studies relating college performance to the credit-hour load of studies. Lehman and Stoke (63) reported in 1930 that students who increased their credit-hour load of studies did better than formerly, while those whose loads remained the same improved more often than those who lightened their loads. Holtz and Trice (52) found in 1934 that students who increased or decreased their loads did better than those who made no change. Neel and Matthews (71) reported in 1935 that "achievers" (students with HPA percentiles in excess of their intelligence percentiles) carried fewer courses than did non-achievers. Both Glatfelter (47) and Karraker (59), in 1936 found no relationship between these two factors. Berg, Larson and Gilbert (10) found in 1944 that students who had been in the lowest quarter of their high school classes earned lower grades than other students, even though they carried fewer hours of work. Jackson (55) reported in 1955 that at Michigan State University the mean HPA increased

regularly with an increased credit load, concluding that students taking heavier credit loads are generally more able students and continue to perform at the expected higher level despite the heavier load. Andrew (2) in 1956, reported findings of a study involving a group of students who were expected to have difficulty with college work; their predicted HPA was 1.75. The results tended to show that both the greater the number of semester hours of credit carried and the greater the number of hours spent in class each week, the greater the HPA. The differences were not of statistical significance, however.

Care must be taken to prevent concluding that carrying a heavier load of studies is a major causal factor in getting good grades; such reasoning could soon reach a point of absurdity. The evidence available, however, seems to support the point of view that lightening a student's load does not necessarily cause him to obtain better grades.

III. Summary and Implications for the Present Study

Few studies were found which had as their major purpose analysis of the progress of students whose previous scholastic averages were low. Available evidence suggests that as many as one-third of those students who could not have been admitted to college on the basis of their previous grades under the provisions of selective admissions policies have succeeded in college.

Studies of college populations, which measured the

relationship of various factors to academic progress, seem to have established rather clear relationships between college performance and both ability and the quality of previous academic performance. Four other factors were generally found to be related to college performance--the type of high school attended, veteran status, the length of college training completed, and the credit-load of studies carried. Graduates of public high schools seem to have an advantage over graduates of non-public high schools; veterans showed a superiority in performance over non-veterans (but the evidence suggests that the age of veterans may have been the major factor); college HPA's based on more than one enrollment period predicted subsequent college performance more effectively than did HPA's based on one enrollment period only; and students carrying heavier loads of credit tended to receive higher grades than students carrying lighter loads of credit.

Usually the younger and the older students were found to do better in college than do students between 18 and 21 years of age, but there was indication that superior intelligence may be the primary reason for the better progress of the younger students. Students who are 21 years of age or older seem to have an advantage over younger students of similar intelligence.

The evidence suggests that there is little or no relationship between college performance and the specific subjects completed in high school, socio-economic status, the college curriculum entered and the changing of curriculums.

Evidence is inconclusive or conflicting concerning the relationship between college performance and the recommendations of the high school principals, the size of the high school attended and certainty of a vocational goal.

The review of literature concerning prediction studies proved helpful in establishing the pattern of previous experience. Of special significance to this study is the fact that little has been published that bears directly on the type of student population that is used in the present study.

CHAPTER III

PROCEDURES USED TO SELECT, ORGANIZE AND ANALYZE THE DATA

The problem of the present study has been defined and literature pertaining to the problem has been reviewed. This chapter will describe the procedures that were used to select the population to be studied and to select, organize and analyze the data of the study.

I. Selecting the Population to be Studied

Identifying the students. The first procedure was to determine which students would be used in this study. A study of those students who entered the college recently seemed desirable, yet it was necessary to have enough cases to make the study worthwhile; furthermore, the population should consist of a group of students for whom a maximum amount of information could be obtained.

A testing program was inaugurated at the college in the fall of 1954 which made available for the first time scholastic aptitude test scores (scores on the ACEPE) for most of the entering students; this seemed to be a logical starting point for the study. Since only preliminary work on the study was to be completed prior to the fall of 1957, the progress of the group could be observed through the

summer session which ended in August, 1957.[2] Since a period of more than one quarter seemed desirable for observing the progress of the students[3], the last entrance date for students included in the study was March, 1957.

Two classifications of students with below-average grades for previous schooling--women students and students who transferred to Ferris from other colleges--were excluded from the study. Women students would most appropriately be studied as a separate population because other studies (9, 18, 22, 35, 50, 51, 74, 86, 93, 95) indicated significant differences in the academic performance of men and women students. Students who transferred to Ferris from other colleges would most appropriately be studied as a separate population because the pilot study completed by the writer (113) indicated marked differences in performance by students who had attended another college before entering Ferris and those who had not. The relatively small number of both women students and transfer students indicated that excluding them from the present study altogether was more advisable than

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[2]The regular academic year at Ferris is divided into three quarters of approximately 12 weeks each. During the summer two five-week sessions are offered, which together provide instructional time equivalent to a 12-week quarter. In those few instances in which a student attended only one 5-week session, this period was not used in computations.

[3]The findings of other studies seemed to suggest that HPA's based on a period of time in excess of one enrollment period predicted later progress better than did HPA's for one enrollment period only.

including them in this study as separate populations.

The population of this study, then, was to consist of all unsuccessful male high school graduates who entered the college without first attending another college during the period September, 1954 through March, 1957. The records completed by the students from September, 1954 through August, 1957 were to be used in the analysis.

The records of all male students who entered the college following graduation from high school during the period covered by the study, without first attending another college, were examined to determine which of them had been unsuccessful in high school. Grades for all high school credit courses were used to make this determination. The 393 students thus identified became the initial population of the study. Subsequent investigation showed that 23 students failed to complete a full quarter of study before leaving the college. Since no college grades were available for these students, their records were excluded from further consideration. College grades for at least one quarter of attendance were available for 370 students; this group became the working population of the study.

Determining whether the students could be treated as a single group. These 370 students graduated from many different high schools in different years and they entered the college during three different academic years. In order to justify treating them as one group it was necessary to establish that they were alike in basic characteristics.

That this were true would seem reasonable if it could be demonstrated that there were no significant differences among them in academic ability and in academic performance. The chi square (X^2) test was used to determine whether the groups could be considered to have come from a single distribution with respect to ability and performance or whether differences existed among the groups that were great enough to be of statistical significance.

The students were divided into three groups, based on the academic year during which they entered the college. A statistical table was prepared comparing the three year-groups in relation to the ACEPE raw T-score as the measure of ability; separate tables were prepared comparing the three year-groups with respect to each of three measures of performance--HPA's for all high school subjects, HPA's for courses completed during the first quarter of attendance at the college, and cumulative HPA's for courses completed at the college during the first three quarters of continuous attendance or the only completed portion thereof. X^2's were computed for each of the four tables.

The "Distribution of X^2" table from Johnson (57) was used to determine whether the X^2's were large enough to indicate that statistically significant differences existed among the groups. X^2's found to be at or beyond the .05 level of confidence were accepted as being significant.

Table 1 reports the results of the X^2 computations.[4]

TABLE 1.--Relationship between year of entering the college and selected factors based on academic ability and academic performance

Factors	X^2	Significant at the .05 level of confidence?	Table Number in Appendix
Raw T-scores on the ACEPE	1.05	No	A1
High School HPA's	1.97	No	A2
College HPA's, first quarter only	10.36	No	A3
College HPA's cumulative for the first three quarters of continuous attendance or the only completed portion thereof	9.62	No	A4

No significant relationship was found between the year of entering the college and any of the four criteria. This means that differences that may have existed among the three year-groups of students in ability or in academic performance were not significantly greater than those which would have been expected as the result of chance. Thus it would appear that the three groups tended to be alike in academic ability and in academic performance and could, therefore, be treated as a single group for the purposes of this study.

[4]The basic tables are in the Appendix. This procedure of reporting the statistical results in summary tables and placing the basic tables in the Appendix will be used in Chapter IV, also.

II. Selecting, Organizing and Analyzing the Data

Determining the progress of the students at the college. HPA's earned at the college were computed to obtain information needed to describe the academic progress of the students. Six different bases of computation were used--the academic record for each of the first three quarters of attendance and the cumulative records for two quarters, three quarters, and all quarters attended. The results of the computations are presented in Chapter IV.

Selecting the factors to be investigated for their relationship to success at the college. Professional literature was reviewed to learn what factors have been studied to determine their relationship to college performance. One of the functions of the present study was to compare factors found to be predictive of college success for the students in this study with factors found by other investigators to be effective predictors of achievement for typical college populations. Factors included in other studies were included in this study if the needed information was available for a major part of the students of the study. A review of student records showed that sufficient data were available for studying the following variables: ability (as measured by the T-score, the L-score and the Q-score of the ACEPE); high school HPA's based on all subjects taken, on "college preparatory" subjects alone (English, foreign language, science and social studies); on commercial subjects alone

(typing, shorthand, bookkeeping, business training, cooperative training, etc.), and on vocational subjects other than commercial subjects (shop, agriculture, drawing, etc.); the rank of the student in his high school graduating class; the type of recommendation given the student by the high school principal; the size of the high school attended; the socio-economic status of the student as indicated by the occupation of the father; certainty of vocational choice, age and veteran status at the time of entering the college; the type of curriculum entered at the college; whether a change in curricular goal was made after completing one quarter or more at the college; the number of quarters of training completed at the college, with the number of hours of credit completed and the grades earned for each quarter.

Data were also available for some variables concerning which no studies were found in professional literature. Many educators have felt that students are handicapped when they move from school to school. Since evidence was at hand to indicate the number of high schools attended, this variable was included in the study to determine whether it affected performance at the college.

The percentage of married students attending college has increased steadily since the close of World War II, but no studies of the relationship between marital status and college performance were found. Consequently, this seemed to be a worthwhile variable for study.

A complete file of actions taken by the college

Committee on Discipline was available in the office of the Dean of Students. This made possible comparison of the academic progress of students against whom action had been taken by the disciplinary committee with the progress of students against whom no action had been taken. No studies involving the relationship of this factor to college performance were found. The characteristics that cause a student to receive formal disciplinary action might affect his academic performance, as well as his personal behavior. This factor seemed to be worthy of investigation.

The nature of most of the variables selected for this study is probably clear, but a few explanatory remarks are required. Recommendations of high school principals were classified in one of three categories--"Recommended", "Not recommended", and "Recommended with qualifications".[5]

Type of high school attended pertained to public or non-public schools.

The occupation of the father was used as the criterion of socio-economic status. Occupations were classified in accordance with the system prepared by Edwards (38) for the United States Bureau of the Census. Six categories were established--professional; proprietors, managers, and officials; clerks and kindred workers; skilled workers and

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[5]Qualifications included such statements as "with testing"; "might not make it, but should have a chance"; "is older now; may succeed"; "not much of a student, but a fine person", etc.

foremen; semiskilled workers; and unskilled workers.

Certainty of vocational choice was based on the presence or absence of a specific vocational choice in a student's application for admission to the college.

For most of the factors the records of the entire 370 students could be used. For other factors, however, this was not possible. ACEPE scores were available for about 90 percent of the students; grades in commerce subjects were available for about 85 percent of the students; fathers' occupations were indicated by about 80 percent of the students; grades for vocational subjects other than commerce subjects were available for about 75 percent of the students; and high school principal recommendations were given for about 58 percent of the students.

Classifying students as "successful" or "unsuccessful." In order to determine which factors seemed to differentiate between those students who were successful at the college and those who were not, each student was classified as "successful" or "unsuccessful." The criterion of success was indicated earlier to be a 2.0 ("C") average, but the basis to use for classifying each student remained to be determined. As indicated earlier, the literature suggests that HPA's based on records for longer periods of time may be better predictors of later college performance than are HPA's based on one enrollment period only. Since 255 of the 370 students completed at least three consecutive quarters of training at the college but only 82 students completed more

than three quarters of continuous training,[6] three quarters seemed to be a reasonable maximum period of attendance to use. Cumulative HPA's for three quarters of attendance, therefore, were used to classify 255 of the students. For the remaining 115 students, the longest enrollment period they completed was used; this was one quarter for 74 students and two quarters for 41 students. Table 2 presents the results of this classification of students, showing that 131

Table 2.--Classification of students as to success in college*

Period of training completed	Successful students		Unsuccessful students		Total	
	No.	%	No.	%	No.	%
One quarter only	20	27	54	73	74	100
Two quarters only	13	32	28	68	41	100
Three or more quarters	98	38	157	62	255	100
Total	131	35	239	65	370	100

*The criterion of success was an HPA of at least 2.0 ("C"), based on cumulative HPA's for the enrollment period indicated.

students were successful and 239 students were unsuccessful. On this basis, exactly one-third of the original group of 393 students were successful at the college and 35 percent of

[6]Many of the students in this study entered the college for the primary purpose of proving their ability so they could transfer to other colleges. This accounts in part for the small number of students who remained after three quarters.

those students who completed at least one quarter were successful.

Testing the relationship between success and the selected factors. The relationship between success and each of the selected factors was tested by X^2. Statistical tables were prepared and X^2 was computed for each table. X^2's that were found to be at or beyond the .05 level of confidence were accepted as evidence that a statistically significant relationship existed between the factors tested.

Literature reviewed in Chapter II suggests that some variables appear to be independently related to success and that the relationship to success of other variables appears to be influenced strongly by the independent variables.[7] The factors found in this study to be significantly related to success were examined further, therefore, to determine which of them seemed to be independently related to success. The following procedures were used:

1. These factors were analyzed in pairs to determine what interrelationships existed among them. X^2 was again used as the test of the statistical significance of relationships.

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[7] Other investigators have suggested that age, rather than experiences peculiar to veterans may account for the superiority in performance of veterans over non-veterans and that ability may account primarily for the superiority in performance of students carrying heavier loads of credit over students carrying lighter loads.

2. If two of these factors were not significantly related to each other, this was accepted as evidence that they were independent of each other in their relationship to success.

3. If two of these factors were significantly related to each other, the relationship of each to success was measured, with the other factor held constant.

4. If one factor was no longer significantly related to success when a second factor was held constant, this was accepted as evidence that the factor held constant was a major cause of the other factor's relationship to success.

5. If, with one factor held constant, a second factor still bore a significant relationship to success, this was accepted as evidence that each factor was independent of the other in its relationship to success.

Comparing the findings concerning the relationship between success and the selected factors with the findings of other investigators. The findings of this study concerning the relationship between success at the college and the selected factors were compared with the findings of other investigators, reported in Chapter II, who have studied the relationship between selected factors and college achievement.

Examining the data for information that might be used to improve institutional procedures. Finally, the data were examined for information that might be used to improve procedures of the college in admitting students such as those

used in this study and for meeting better their needs and the needs of the college and of society, once the students are admitted.

III. Summary

All unsuccessful male high school graduates who entered the college, without first attending another college, during the period from September, 1954 through March, 1957 were selected as the population of this study. Records made by them from September, 1954 through August, 1957 were used in the analysis. Students were classified according to the school year during which they entered the college. To determine whether the three groups thus formed could be treated as one population for the purposes of the study, they were compared on the basis of academic ability and academic achievement; the X^2 test was used to determine whether statistically significant differences among the groups existed. Since no significant differences in either academic ability or academic performance were found, it seemed reasonable to combine the students into one group for this study.

To describe the progress of the students at the college, separate HPA's were computed on the basis of the performance of the students during each of the first three quarters and cumulative HPA's were computed on the basis of two quarters, three quarters, and all quarters of continuous attendance.

Twenty-four factors were chosen to be measured for

their relationship to success at the college. Students were classified as successful or unsuccessful on the basis of their cumulative HPA's for the first three quarters of continuous attendance at the college or the only completed portion thereof; the criterion of success was an HPA of at least 2.0 ("C").

The relationship between success and each of the 24 selected factors and interrelationships between these variables significantly related to success will be discussed in the next chapter. Information that might be used to improve institutional procedures will be indicated, also.

CHAPTER IV

THE FINDINGS OF THE STUDY

This chapter will present the findings of the study. The progress of the students at the college will be described; the results of the investigation to determine the relationship to success of the selected factors discussed in Chapter III will be reported; the relationships found in this study between success and the selected variables will be compared with the findings of other investigators; and the data of the study will be examined for information that might be used to improve the procedures of the college in caring for students such as those constituting the population of the study.

I. The Academic Achievement of the Students

To describe the academic achievement of these students at the college, HPA's were computed on six different bases--separate HPA's for each of the first three quarters of attendance and cumulative HPA's for two quarters, three quarters and all quarters of continuous attendance. All students who completed the period of training in each instance were included in the statistics in Table 3, which summarizes the achievement of the students.

The percentage of students who made 2.0 averages or better ranged from a minimum of 37 percent (on the basis of

TABLE 3.--Academic achievement of the students

Basis of Computation	Honor Point Averages								Total	
	0.0-1.49		1.5-1.74		1.75-1.99		2.0			
	No.	%	No.	%	No.	%	No.	%	No.	%
First quarter grades	146	39	40	11	46	12	138	37	370	99
Second quarter grades	99	33	30	10	44	15	123	42	296	100
Third quarter grades	73	29	35	14	31	12	116	45	255	100
Cumulative grades, first two quarters	98	33	43	15	44	15	111	37	296	100
Cumulative grades, first three quarters	66	26	49	19	42	16	98	38	255	99
Cumulative grades, all quarters	20	24	18	22	14	17	30	37	82	100

first quarter grades and cumulative grades for two quarters and for all quarters of attendance) to a maximum of 45 percent (based on third quarter grades). In addition, from 12 percent (first and third quarter computations) to 17 percent of the students (computation based on all quarters of attendance) approached success, as they earned HPA's between 1.75 and 1.99. Thus from 49 percent (first quarter computation) to 57 percent of the students (second quarter and third quarter computations) were either successful or approached success.

As indicated in Chapter III, when each student was classified as successful or unsuccessful on the basis of cumulative HPA's for the first three quarters of continuous attendance or the only completed portion thereof, 131 (35 percent) of the students who completed at least one quarter were successful. An additional 44 (12 percent) of the 370 students approached success with HPA's between 1.75 and 1.99. Examination of the records of the students who were classified as unsuccessful showed that 79 (33 percent) of them were successful in at least one quarter of attendance. Therefore, 210 (57 percent) of the 370 students who completed one or more quarters at the college were successful at least one quarter.

Obviously, students were not in the same success status each quarter. In fact, further inspection of the records revealed that 6 (20 percent) of the students classified as successful for the purposes of the study who remained

at the college for more than 3 quarters became unsuccessful on the basis of their cumulative averages for their full period of attendance. Also, 6 (11 percent) of the students classified as unsuccessful became successful on the basis of their full period of attendance at the college.

The review of literature indicated that few studies were found with which to compare these findings. The results are about the same as those reported by the writer (113) in a study of a similar group of students who entered Ferris during the 1952-1953 school year, one-third of whom were successful and about 18 percent of whom approached success. The results are not as favorable as those reported by Trebilcock (103) in his study of students from the lowest third of the graduating classes of one high school, 44 percent of whom were successful in college and 28 percent of whom approached success.[8]

II. The Relationship Between Success and the Selected Factors

Determining the relationship to success of each selected factor. The results of the statistical computations made to determine which of the 24 selected factors were

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[8] About 60 percent of all college students who entered Ferris for the first time in the fall quarter, 1954, were successful on the basis of first quarter grades, according to a study completed at the Counseling Center of the college. A similar finding was reported for students who entered in the fall quarter, 1956, 59 percent of whom were successful.

significantly related to success at the college are presented in Table 4. Significant relationships were found between success and 11 of the factors--ACEPE T-scores, L-scores, and Q-scores; high school HPA's based on all subjects, on college preparatory subjects, and on commercial subjects; the recommendation of the high school principal; age and veteran status at the time of entering the college; and the hours of credit completed during the second and third quarters of attendance. No significant relationship was found to exist between success and the remaining 13 factors--high school HPA's based on vocational subjects other than commercial subjects; rank in the high school graduating class; the size and the type of the high school attended; the number of high schools attended; the socio-economic status of the student; certainty of vocational choice, marital status at the time of entering the college; the type of curriculum entered at the college; change of curricular goal while at the college; the number of quarters of training completed; the hours of credit completed during the first quarter of attendance; and disciplinary action taken by the college.

The 13 factors that were not significantly related to success at the college would appear to have little value as predictors of achievement by students such as those used in this study.

Interrelationships among the significant factors. The next step was to investigate further the factors which were found to be significantly related to success at the college

TABLE 4.--Relationship between success and selected factors

Factor with which success was compared	X^2	Degrees of freedom	Significant at the .05 level of confidence?	Table Number in Appendix
Ability				
T-score	30.88	3	Yes	A5
L-score	23.24	4	Yes	A6
Q-score	20.92	4	Yes	A7
High school achievement				
HPA's all subjects	18.13	2	Yes	A8
HPA's, college preparatory subjects	22.2	3	Yes	A9
HPA's, commercial subjects	9.02	2	Yes	A10
HPA's, vocational subjects	2.24	2	No	A11
Rank in graduating class	4.95	3	No	A12
Other high school information				
Recommendation by the principal	9.37	2	Yes	A13
Size of high school	2.96	3	No	A14
Type of high school (public or non-public)	.99	1	No	A15
Number of high schools attended	.45	1	No	A16
Other information from application for admission				
Socio-economic status (Father's occupation)	4.5	5	No	A17
Certainty of vocational choice	.25	1	No	A18
Age at entry	28.49	5	Yes	A19
Marital status at entry	3.26	1	No	A20
Veteran status at entry	21.84	1	Yes	A21
College information				
Type of curriculum entered	1.11	2	No	A22
Change of curriculum	1.53	1	No	A23
Number of quarters completed	4.07	3	No	A24

TABLE 4.--Continued

Factor with which success was compared	X^2	Degrees of Freedom	Significant at the .05 level of confidence?	Table Number in Appendix
College information				
Hrs. credit, first quarter	0.0	2	No	A25
Hrs. credit, second quarter	20.42	2	Yes	A26
Hrs. credit, third quarter	21.42	2	Yes	A27
Disciplinary action taken	.24	1	No	A28

in an effort to determine which of them seemed to be independently related to success and which of them may have been related to success primarily because of the influence of the independently-related factors. These 11 significant factors embraced 6 different types of information--ability, high school achievement, opinions of high school principals, age, veteran status, and the load of studies completed. Use of all of the measures of ability and all of the measures of high school achievement for the purpose of cross-analysis seemed to be unnecessary. The ACEPE T-score was selected as the most appropriate single measure of ability because it has generally been found to relate more closely to college performance than have the L-score and the Q-score. The HPA's for all high school subjects was selected as the most appropriate single measure of high school achievement because it was more generally applicable to all students than were HPA's based on only certain portions of the high school work completed.

Factors to be cross-analyzed, then, were ability (as represented by the ACEPE T-score), high school achievement (as represented by HPA's for all high school subjects), age, recommendation of the high school principal, veteran status, hours of credit completed the second quarter and hours of credit completed the third quarter.

Among those variables that were usually found by other investigators to be independently related to college performance were ability, high school achievement, and age. Therefore, the cross analysis was begun by comparing each of these factors with all of the others.

Table 5 reports the statistical results of the

TABLE 5.--Relationship between ability (ACEPE T-score) and selected factors

Factor with which ability is compared	X^2	Degrees of freedom	Significant at the .05 level of confidence?	Table Number in Appendix
High school HPA's, for all subjects	7.97	4	No	A29
Recommendation by the high school principal	10.67	6	No	A30
Age at entry	11.95	4	Yes	A31
Veteran status at entry	.996	2	No	A32
Hours of credit completed second quarter	14.69	4	Yes	A33
Hours of credit completed third quarter	13.69	4	Yes	A34

comparison of ability with each of the other factors found to be related significantly to success at the college. No relationship of statistical importance was found to exist between ability and high school achievement, recommendation of the high school principal, or veteran status; therefore, ability appears to have been related to success independently of each of these factors. A significant relationship, inverse in nature, was found between ability and age. Table A31 shows that the youngest students (17-year-olds) possessed the most ability and the oldest students (20 years of age or older) possessed the least ability. The fact has already been established that the older students were superior in performance to the younger students. Since, despite less ability, more of the older students were successful, age and ability apparently were independent of each other in their relationship to success. To determine further the accuracy of this conclusion, the relationship of each of these factors to success, with the other held constant was tested. The findings, presented in Tables 6 and 7, show

TABLE 6.--Relationship between success and age, with ability held constant

ACEPE T-scores	X^2	Degree of freedom	Significant at the .05 level of confidence?	Table Number in Appendix
100+	5.1	1	Yes	A35
80-99	10.51	1	Yes	A36
0-79	5.8	1	Yes	A37

TABLE 7.--Relationship between success and ability, with age held constant

Age Groups	X^2	Degrees of freedom	Significant at the .05 level of confidence?	Table Number in Appendix
20+	14.59	2	Yes	A38
17-19	17.66	2	Yes	A39

that the relationship of each factor to success was still statistically significant. This evidence supports the conclusion that ability and age were independent of each other in their relationship to success.

Hours of credit completed both the second quarter and the third quarter were significantly related to ability; Tables A33 and A34 show that the more capable students tended to complete heavier loads of study and the less capable students tended to complete lighter loads of study. Hours of credit completed the first quarter was not significantly related to success and ability was found to be independent of the other significant factors in its relationship to success. The conclusion that ability was a major cause of the significant relationship between success and load of studies completed seems reasonable. Ability, therefore, appears to have operated independently of load of studies carried in its relationship to success.[9]

[9]The relationship between ability and the hours of credit completed during the second and third quarters could have been investigated further by examining the

The evidence presented seems to indicate that ability was independently related to success.

Table 8 presents the statistical results of the comparison of high school achievement with the other factors

TABLE 8.--Relationship between high school achievement (HPA's for all subjects) and selected factors

Factors with which high school achievement was compared	X^2	Degrees of freedom	Significant at the .05 level of confidence?	Table Number in Appendix
Ability (ACEPE T-score)	7.97	4	No	A29
Recommendation of the high school principal	20.87	4	Yes	A40
Age	7.4	4	No	A41
Veteran Status	1.85	2	No	A42
Hours of credit completed second quarter	1.48	4	No	A43
Hours of credit completed third quarter	9.18	4	No	A44

that were found to be significantly related to success at the college. The only factor with which a significant relationship was found was the recommendation of the high school principal; as Table A41 demonstrates, the principals seemed more inclined to recommend students whose HPA's approached

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relationship between success and the load of studies, with ability held constant. However, the number of cases was too small to make possible a fine enough breakdown to make the conclusions valid.

2.0 than they were to recommend students with lower HPA's. The conclusion that the recommendations of the principals were affected by the high school achievement of the students is supported by the data reported in Table 9; when high school

TABLE 9.--Relationship between success and the recommendation of the high school principal, with high school achievement held constant

HPA's for all high school subjects	X^2	Degrees of freedom	Significant at the .05 level of confidence?	Table Number in Appendix
1.75-1.99	1.2	2	No	A45
1.5-1.74	.55	2	No	A46
0.0-1.49	4.05	2	No	A47

achievement was held constant, there was no significant relationship between success and the recommendation of the high school principal.[10]

The evidence seems to indicate that high school achievement was independently related to success.

The statistical results of the comparison of age with the other factors that were significantly related to success

[10]The relationship of high school achievement to success, with the recommendation of the high school principal held constant was not measured. It was most unlikely that the recommendations of the principals would have affected achievement because the recommendations were not made until all or nearly all of the high school work was completed.

are presented in Table 10. The fact has already been

TABLE 10.--Relationship between age and selected factors

Factors with which age is compared	X^2	Degrees of freedom	Significant at the .05 level of confidence?	Table Number in Appendix
Ability (ACEPE T-score)	11.95	4	Yes	A31
High school HPA's for all subjects	7.4	4	No	A41
Recommendation by the high school principal	19.38	2	Yes	A48
Veteran status	297.85	2	Yes	A49
Hours of credit completed second quarter	16.87	4	Yes	A50
Hours of credit completed third quarter	19.64	4	Yes	A51

established that age apparently was independent of ability and high school achievement in its relationship to success. A significant relationship was found to exist between age and each of the remaining factors--recommendations of the high school principal, veteran status, hours of credit completed during the second quarter and hours of credit completed the third quarter. Therefore, these relationships were examined further.

First to be investigated was the relationship between success and the recommendation of the high school principal, with age held constant.

The findings, reported in Table 11, show that there was no

TABLE 11.--Relationship between success and the recommendation of the high school principal, with age held constant

Age group	X^2	Degrees of freedom	Significant at the .05 level of confidence?	Table Number in Appendix
20+	3.45	2	No	A52
17-19	2.62	2	No	A53

significant relationship, suggesting that the recommendations of the high school principals may have been influenced strongly by the ages of the students.[11] This suggests that age was related to success independently of the recommendation of the high school principal.

When the relationship between success and veteran status was investigated with age held constant, no significant relationship was found. The results are reported in Table A54 in the Appendix; only students 20 years of age or older were used in this computation because there were only 2 veterans younger than 20.[12] The evidence suggests that the superiority of veterans over non-veterans may have been caused primarily by age, rather than other characteristics of veteran

[11]The relationship between success and age, with the recommendation of the high school principal held constant, was not measured. It is obvious that the recommendation of the principal would not have affected the age of a student.

[12]The relationship between success and age, with veteran status held constant was not measured because there were only two veterans younger than 20.

status. The conclusion that age was related to success independently of veteran status seems justified.

Finally, the relationship between age and the load of studies was considered. Tables A50 and A51 show that a greater proportion of older students than of younger students completed heavier loads of study both the second quarter and the third quarter. Hours of credit completed the first quarter was not significantly related to success, and age has been established as seeming to be independent of the other significant factors in its relationship to success. The conclusion that age may have been a major cause of the significant relationship between success and load of studies completed the second and third quarters seems to be justified. Age, therefore, appears to have been related to success independently of the load of studies completed.[13]

The evidence available suggests that age was independently related to success.

Further examination of the interrelationships of the factors significantly related to success was not necessary. Ability, high school achievement and age seem to be clearly established as being independently related to success. Each of the other significant factors appeared to be dependent upon ability, high school achievement and/or age in its

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[13] The relationship between age and the load of studies completed during the second and third quarters could have been investigated further by examining the relationship between success and the load of studies, with age held constant. However, the number of cases was too small to make as fine a breakdown as would have been needed to make the conclusions valid.

relationship to success. The recommendations of the high school principals and the load of studies completed the second and third quarters seemed to have been dependent upon age and high school achievement for relationship to success; the superiority in performance of veterans over non-veterans may be attributed primarily to the fact that the veterans were older.

Summary. Eleven of the selected factors were found to be significantly related to success at the college and 13 were not. When the factors significantly related to success were tested for interrelationships, only ability, high school achievement and age emerged as factors that seemed to be independently related to success.

III. Comparison of the Relationships Between Success and the Selected Factors with the Findings of Other Investigators

Literature in the field of prediction studies was reviewed in Chapter II, most of the studies reported having been based on general college populations. One of the purposes of this study was to determine whether measures of prediction of academic success that seem to be effective with general college populations would also be useful in predicting success for students who had below-average high school HPA's.

Factors significantly related to success. The findings of the present study concerning factors significantly related to success are in general agreement with the findings of

other investigators. The preponderance of evidence reported by other investigators found significant relationships between college performance and ability, high school HPA's, age, veteran status and load of studies. The literature concerning the recommendations of high school principals was conflicting; the present study serves to support those investigations which indicated a relationship between college performance and recommendations of high school principals. The literature reviewed suggested, as did the findings of this study, that age might be the causal factor for veterans being more successful than non-veterans and that ability may be a primary reason for students carrying heavier loads of study being more successful than students carrying lighter loads of study. No studies were found that measured the effect of high school achievement and age on the recommendations of high school principals; no were studies found that measured the effect of age on the load of studies completed.

Factors not significantly related to success. For the factors found in this study to bear no significant relationship to success, general agreement with conclusions of other studies existed with respect to socio-economic status, certainty of vocational choice, size of the high school attended, the type of curriculum entered, the number of quarters completed at the college and the effect of changes in curricular goal. No previous studies were found concerning the relationship between success and achievement in high school vocational courses only, marital status, the number of high

schools attended, or disciplinary action taken by the college.

The findings of the present study differed from the findings of other studies concerning some factors. The percentile rank in the high school graduating class was usually found by other investigators to be significantly related to college performance. In the present study the data pointed in the direction of a positive relationship between success in college and rank in class but the X^2 was not large enough to indicate the relationship was statistically significant. The most reasonable explanation for rank in class having not been found significantly related to success in this study seems to be the limited variation in rank caused by the fact that all of the students were below the 50th percentile of their classes. Rank in class appears to be a less appropriate measure of academic achievement than is the HPA for students all of whom were in the lower half of their high school graduating classes.

A second factor for which the findings of this study differed from the usual findings of other investigators was the type of high school attended. Again, the direction of the relationship between success and attendance at public or non-public high schools favored the graduates of public high schools--the usual findings of other investigators--but the relationship was not found in the present study to be statistically significant. Possibly the small number of non-public high school graduates was partly responsible for this, since only slightly more than 10 percent of the students

in this study graduated from non-public high schools.

The fact that load of studies completed during the first quarter was not significantly related to success differs from the more predominant findings of other investigators, but it is in keeping with the findings of some studies reported. The most plausible explanation for this difference in findings may be that students such as those used in this study would be less likely to be realistic about the loads of studies they undertook their first quarter than would students who had proved themselves capable of earning at least average high school grades. Although the personnel of the college now are limiting the credit hours carried by students such as these during their first quarter of attendance, during most of the period covered by this study no consistent and thoroughgoing procedure was used to control loads.

It is interesting to note that, although no significant relationship was found between success and the credit hours completed the first quarter, there was a significant relationship between these two factors during the second quarter and the third quarter. Perhaps other factors operated to make the experience of the second and third quarters less representative of the relationship between success and the credit hours completed per se. With each succeeding quarter students may have been influenced by their previous experience as they prepared their schedules; or the academic advisers may have influenced students to adjust their loads

in accordance with their experience during preceding quarters; possibly, also, teachers may have had a tendency to "peg" students grades in relation to performance during the previous quarters. The assumption that the experience of the first quarter, which included the records of all the students in the study, is more representative of the relationship between success and the credit hours completed than is the experience of the second and third quarters seems to be justified.

Summary. The findings of the present study were in general agreement with the findings of other investigators with respect to factors that were significantly related to success and with respect to most of the factors in the present study that were not significantly related to success. The findings of the present study were in disagreement with the findings of other investigators with respect to percentile rank in the high school graduating class, the type of high school attended, and the load of studies completed the first quarter. That the findings of this study are in substantial agreement with the findings of others who have investigated the relationship between college performance and selected factors seems to be a justifiable conclusion.

IV. Examination of the Data of the Study for Information that Might be Used to Improve Institutional Procedures

Admissions procedures. As indicated in Chapter I, Ferris will in all probability continue to administer a

liberal admissions policy, but if the data of this study were to indicate almost certain failure for students with specified characteristics, denying admission to some students might be justified.

Records were examined to determine how many students succeeded in spite of an unfavorable prognosis in terms of factors significantly related to success at the college. Table 12 shows the number and percent of students in the

TABLE 12.--Success status of students in the least favorable group reported for factors significantly related to success

	Successful students		Unsuccessful students		Total	
Factor	No.	%	No.	%	No.	%
Ability (ACEPE T-score of 0-69)	12	13	78	87	90	100
High school achievement (HPA's for all subjects, 0-1.49)	20	21	75	79	95	100
Recommendation of the high school principal (not recommended)	15	24	47	76	62	100
Age (19 years)	14	23	48	77	62	100
Veteran status (non-veteran)	72	28	187	72	259	100

least favorable category reported in the statistical tables for all types of factors significantly related to success except load of studies completed, which was excluded because it is inappropriate for use in determining whether to admit a

student to the college. About one-fourth of the students succeeded who were in the least favorable grouping with respect to the recommendation of the high school principal, age, and veteran status; one-fifth of the students with high school HPA's below 1.5 succeeded and about one-seventh of the students with ACEPE T-scores below 70 succeeded.

Since ability, high school achievement and age were the only factors found to be independently related to success at the college, data concerning these variables were examined further to determine whether criteria could be established which would tend to indicate almost certain failure at the college.

With age held constant, the success status of the students in relation to the combination of ability and high school achievement was reviewed. Table 13 presents the data for students 20 years of age or older; Table 14 presents the data for students under 20 years of age. The following information is pertinent when examining the data to determine whether any of the levels of ability and high school achievement--separately or in combination--seem to predict almost certain failure.

For students 20 years of age or older:

1. Of the 24 students with ACEPE T-scores below 60, two succeeded.

2. One of the 7 students with high school HPA's below 1.25 succeeded.

3. None of the 8 students with ACEPE T-scores below

TABLE 13.--Success status of students 20 years of age or older in relation to ability and high school achievement

ACEPE T-scores	HPA's for all high school subjects											
	0-99	1.0-1.24		1.25-1.49		1.5-1.74		1.75-1.99		Total		
		S*	U*	S	U	S	U	S	U	S	U	T*
120+	-	-	-	-	-	-	-	1	-	1	-	1
110-119	-	-	-	-	-	1	-	4	-	5	-	5
100-109	-	-	1	-	-	3	1	7	3	10	5	15
90-99	-	-	-	1	-	8	6	6	2	15	8	23
80-89	-	-	2	-	2	2	2	5	2	7	8	15
70-79	-	1	-	3	-	3	2	3	1	10	3	13
60-69	-	-	2	1	3	2	3	2	5	5	13	18
50-59	-	-	-	1	5	-	4	-	3	1	12	13
40-49	-	-	1	-	4	-	3	-	1	-	9	9
30-39	-	-	-	-	-	-	-	1	1	1	1	2
0-29	-	-	-	-	-	-	-	-	-	-	-	-
Total	-	1	6	6	14	19	21	29	18	55	59	114

*S-successful; U-unsuccessful; T-total.

TABLE 14.--Success status of students less than 20 years of age in relation to ability and high school achievement

ACEPE T-scores	HPA's for all high school subjects												
	0-99		1.0-1.24		1.25-1.49		1.5-1.74		1.75-1.99		Total		
	S*	U*	S	U	S	U	S	U	S	U	S	U	T*
120+	-	-	-	-	-	-	-	2	1	-	1	2	3
110-119	-	-	-	1	-	2	1	3	3	1	4	7	11
100-109	-	-	2	2	2	1	9	9	5	5	18	17	35
90-99	-	-	-	2	2	6	5	13	4	8	11	29	40
80-89	-	-	-	2	1	8	5	9	4	9	10	28	38
70-79	-	1	-	2	2	6	1	15	5	11	8	35	43
60-69	-	-	-	2	-	4	1	8	2	3	3	17	20
50-59	-	2	-	1	-	3	-	7	-	2	-	15	15
40-49	-	-	-	-	-	1	1	3	-	2	1	6	7
30-39	-	-	-	-	-	-	-	2	1	2	1	4	5
0-29	-	-	-	-	-	-	-	1	-	-	-	1	1
Total	-	3	2	12	7	31	23	72	25	43	57	161	218

*S-Successful; U-Unsuccessful; T-Total

50 and high school HPA's below 1.75 succeeded.

4. None of the 3 students with ACEPE T-scores below 70 and high school HPA's below 1.25 succeeded.

5. One of the two students with ACEPE T-scores below 40 and high school HPA's from 1.75 to 1.99 succeeded.

For students under 20 years of age:

1. Of the 49 students with ACEPE T-scores below 70, five succeeded.

2. Two of the 17 students with high school HPA's below 1.25 succeeded.

3. None of the 13 students with ACEPE T-scores below 70 and high school HPA's below 1.5 succeeded.

4. Three of the 35 students with ACEPE T-scores below 90 and high school HPA's below 1.5 succeeded.

This examination of data suggests that no combination of ability, high school achievement and age could have been used to deny admission to very many students without having barred from college some students who succeeded. The data do suggest, however, that combinations of ability, high school achievement and age could have been used to deny admission to some groups of students without having barred from college very many students who succeeded.

Probation and dismissal procedures. The data of the study were examined, next, for information that might be helpful in establishing procedures for probation and dismissal from the college. The fact that 65 percent of the students were unsuccessful suggested that such procedures

might be advisable.

First, the records of the unsuccessful students were reviewed to determine whether performance during the first quarter or two of attendance would indicate the likelihood of a student being successful at the college. Table 15

TABLE 15.--Students who were unsuccessful the first quarter but who became successful by the end of the third quarter

First quarter HPA's	Number of Students unsuccessful, first quarter grades only	Those who became successful	
		Number	Percent
1.75-1.99	46	13	28
1.50-1.74	40	7	18
1.25-1.49	41	2	5
1.0-1.24	40	1	3
.75-.99	26	1	4
0.0-.74	39	0	0
Total	232	24	10

shows that of the students who were unsuccessful on the basis of the first quarter HPA's, 24 (about 10 percent) became successful on the basis of cumulative HPA's for the first three quarters of continuous attendance or the only completed portion thereof. Table 16 indicates that 19 students (about 11 percent) who were unsuccessful on the basis of HPA's for the second quarter only became successful, and Table 17 shows that 14 students (about 8 percent) who were unsuccessful on the basis of cumulative HPA's for the first two quarters became successful.

TABLE 16.--Students who were unsuccessful the second quarter but who became successful by the end of the third quarter

Second quarter HPA's	Number of students unsuccessful, second quarter grades only	Those who became successful	
		Number	Percent
1.75-1.99	44	14	32
1.5-1.74	30	5	17
0.0-1.49	99	0	0
Total	173	19	11

TABLE 17.--Students who were unsuccessful on the basis of cumulative HPA's for the first two quarters but who became successful by the end of the third quarter

Cumulative HPA's first two quarters	Number of unsuccessful students, cumulative HPA's, first two quarters	Those who became successful	
		Number	Percent
1.75-1.99	44	10	23
1.5-1.74	43	4	9
0.0-1.49	98	0	0
Total	185	14	8

Further examination of Table 15 reveals that only 4 students (about 1 percent of the students who completed the first quarter) with first-quarter HPA's below 1.5 became successful. Tables 16 and 17 show that no students with second-quarter HPA's below 1.5 or with cumulative HPA's for the first two quarters below 1.5 became successful. Students who did not earn an HPA greater than 1.5 during the first two

quarters were not likely to succeed at the college.

Second, since so few students who started out poorly subsequently succeeded at the college, the relationship between success and withdrawal from the college merited investigation. Table 18 summarizes the results of the

TABLE 18.--Relationship between lack of success and withdrawal from the college at the end of the period on which the HPA's were based

Basis of computation of HPA's	X^2	Degrees of freedom	Significant at the .05 level of confidence?	Table Number in Appendix
First quarter grades	4.17	1	Yes	A55
Cumulative grades, first two quarters	.68	1	No	A56
Cumulative grades, first three quarters	.17	1	No	A57

statistical computations made to determine the relationship between lack of success and withdrawal from the college. At the end of the first quarter of attendance a significantly greater proportion of unsuccessful than of successful students withdrew. No significant relationship was found between lack of success (based on cumulative HPA's) and withdrawal after completing two quarters or three quarters, however.

The records of students who did not earn HPA's above 1.5 during the first two quarters were examined to see how many of them withdrew from the college. The findings are reported in Table 19. Of 146 students who received first-

TABLE 19.--Withdrawal from the college by students with HPA's below 1.5

Basis of computation of HPA's	Number of students who withdrew at end of quarter	Number of students who did not withdraw at end of quarter	Total
First quarter grades	42	104	146
Second quarter grades	22	77	99
Cumulative grades, first two quarters	22	76	98

quarter HPA's below 1.5, 42 (29 percent) withdrew at the end of the first quarter; of 99 students who had second-quarter HPA's below 1.5, 22 (22 percent) withdrew at the end of the second quarter; of 98 students who had cumulative HPA's for the first two quarters below 1.5, 22 (22 percent) withdrew at the end of the second quarter. Table 14 shows that only 4 students with first-quarter HPA's below 1.5 became successful. Thus, although the majority of students with HPA's below 1.5 for the first and/or second quarter of attendance remained in college, very few of them improved their grades sufficiently to become successful.

The foregoing evidence suggests that the data of the study would be helpful in establishing a policy of probation and dismissal.

V. Summary

From 37 to 45 percent of the students were successful at the college, depending on the basis of the HPA

computations. On the basis of cumulative HPA's for the first three quarters of continuous attendance or the only completed portion thereof, 35 percent of the students succeeded. A student was not necessarily in the same success status during each quarter of attendance.

Of the 24 selected factors that were tested for their relationship to success at the college, 11 were found to be significantly related and 13 were not. Cross-analysis of the significant factors indicated that ability, high school achievement and age were independently related to success but that the other significant factors were not.

The findings of the study agree substantially with the findings of other investigators with respect to the factors that were significantly related to success and with respect to most of the factors not related significantly to success.

Prediction of almost certain failure for very many students would have been difficult because some students least favorably endowed with the factors significantly related to success were successful at the college. Very few students who earned HPA's below 1.5 during the first quarter or two of attendance at the college became successful but many of them remained at the college for three or more quarters.

CHAPTER V

SUMMARY, CONCLUSIONS AND IMPLICATIONS OF THE STUDY; SUGGESTIONS FOR FURTHER RESEARCH

I. Summary and Conclusions

Higher education today is faced with a dual challenge, the challenge of caring for the ever-increasing numbers of students who wish to enter college and the necessity for helping society to gain the maximum contribution from each citizen. Colleges differ in their policies for admitting students. Some colleges maintain highly selective admissions procedures, some colleges accept all students who apply, and the admissions procedures of other colleges fall between these two extremes.

Ferris Institute has traditionally maintained a liberal policy of admission; students are not denied entrance because of their previous academic performance. However, no detailed, critical investigation of the results of this policy has been completed.

A review of the literature in the field of prediction studies revealed that, although many studies have been carried on with general college populations, few studies have been made of students who entered college after receiving poor high school grades. Yet it is important to know how well such students perform in college and what factors may differentiate between those who succeed in

college and those who do not; otherwise, it is difficult to know whether retention of liberal policies of admission is justified.

A study of students who entered Ferris Institute after receiving below-average high school grades would provide educators information that would make possible more effective counseling and training for such students. Furthermore, the findings of such a study should help society decide whether the retention of liberal college admissions policies is justified.

All male high school graduates with less than "C" averages for their high school work who entered Ferris without first attending another college, during the period September, 1954 through March, 1957 were selected for the study. There were 393 students in this group. Since no significant differences in academic ability or academic achievement were found among these students when the X^2 test was used, they were treated as one group for the purposes of the study. Records made by them from September, 1954 through August, 1957, were used in the analysis. Twenty-three students were excluded from consideration because they did not complete a full quarter of work at the college and therefore, received no grades.

The general purpose of this study was to help answer the question "Who should go to college?" The specific purpose of the study was to evaluate critically the performance at Ferris of students who entered the collegiate divisions after graduating from high school with below-average grades.

Conclusions of the study will be presented as answers to four questions that were posed in Chapter I.

What proportion of students with below-average high school grades earned at least average grades at the college?

1. On the basis of cumulative HPA's for the first three quarters of continuous attendance or the only completed portion thereof, 35 percent of the students who completed at least one quarter at the college attained 2.0 ("C") averages or better;[14] 57 percent of them had 2.0 averages for at least one of the three quarters.

2. On other bases of computation, the percentage of students who made 2.0 averages or better ranged from a minimum of 37 percent (on the basis of first quarter grades, cumulative grades for two quarters and cumulative grades for all quarters attended) to a maximum of 45 percent (based on third quarter grades). The success status of a given student was not necessarily the same for each quarter of attendance.

What factors seemed to differentiate between those students who earned at least average grades at the college and those who did not?

1. Of 24 factors tested by X^2 for their relationship to success at the college, 11 were found to be significantly related to success at or beyond the .05 level of confidence. These were: ACEPE T-scores, L-scores, and Q-scores; high

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[14] Exactly one-third of the original group of 393 students were successful on this basis.

school HPA's based on all subjects, on college preparatory subjects, and on commercial subjects; the recommendation of the high school principal; age and veteran status at the time of entering the college; and the hours of credit completed during the second and third quarters of attendance.

2. The remaining 13 factors tested were not significantly related to success at the college. These were: high school HPA's based on vocational subjects other than commercial subjects; rank in the high school graduating class; the size and the type of the high school attended; the number of high schools attended; the socio-economic status of the student; certainty of vocational choice, marital status at the time of entering the college; the type of curriculum entered at the college; change of curricular goal while at the college; the number of quarters of training completed; the hours of credit completed during the first quarter of attendance; and disciplinary action taken by the college.

3. When the factors significantly related to success were examined for interrelationships, ability (as measured by the ACEPE T-score), high school achievement (as measured by HPA's for all high school subjects) and age at the time of entering the college were the only factors which were found to be independently related to success. Recommendations of high school principals seemed to have been affected by the age and the high school achievement of the students. Apparently age accounted for the superiority of veterans over non-veterans. Ability and age seemed to be largely responsible

for the relationship between success and the load of studies completed the second and third quarters.

How do these factors compare with factors that have been found to predict college performance effectively with general college populations?

1. The findings of this study were in general agreement with the findings of other investigators with respect to the factors that were significantly related to success. The preponderance of evidence reported by other investigators found significant relationships between college performance and ability, high school HPA's age, veteran status, and load of studies. Literature pertaining to recommendations of high school principals was conflicting; the findings of this study support those investigations which indicated a relationship between college performance and principals' recommendations. Other studies found, also, that age seemed to be largely responsible for the superior performance of veterans and that ability may be the primary reason for the success of students carrying relatively heavy academic loads.

2. For the factors found in this study to bear no significant relationship to success, general agreement with conclusions of other studies existed with respect to socio-economic status, certainty of vocational choice, size of the high school attended, the type of curriculum entered, the number of quarters completed at the college and the effect of changes in curricular goal.

3. The findings of this study differed with the

findings of other investigators with respect to some factors. Rank in the high school graduating class has usually been found to be significantly related to college performance; it was demonstrated to be an inappropriate measure of high school achievement for use with students such as those studied. Other studies usually have found graduates of public high schools to be more successful in college than are graduates of non-public schools; the direction of the evidence of the present study was the same but the X^2 was not great enough for the relationship to be statistically significant, perhaps because of the small percentage of students who graduated from non-public high schools. The fact that the load of studies completed during the first quarter was not significantly related to success differs from the findings of most studies, but the load of studies completed during both the second and the third quarters was significantly related to success.

4. No other studies were found which measured the relationship between success and achievement in high school vocational courses other than commercial subjects, marital status, the number of high schools attended, or disciplinary action taken by the college. Likewise, no studies were found that measured the effect of high school achievement and age on the recommendations of the high school principals; nor were other studies found that measured the effect of age on the load of studies completed.

How might the information obtained from the study be used to improve institutional procedures?

1. Examination of the data to determine whether a combination of the independent predictors of success at the college could have been used to indicate almost certain failure for some groups of students revealed that only a few students could have been denied admission to the college without denying admission to some who succeeded. Combinations of ability, high school achievement and age could have been used to deny admission to some groups of students without having barred from college an appreciable number of students who succeeded.

2. The data of the study do seem to be useful for establishing probation and dismissal procedures. No more than 11 percent of the students who were not successful the first or second quarter became successful later. Only 4 students (1 percent of the total group) became successful after having HPA's below 1.5 the first quarter and no students with HPA's below 1.5 the second quarter or on the basis of cumulative HPA's for the first two quarters became successful. Furthermore, unsuccessful students seemed to be reluctant to withdraw from the college. Only 29 percent of those who were unsuccessful the first quarter withdrew at the end of that quarter and only 22 percent of those who were unsuccessful the second quarter or who were unsuccessful on the basis of cumulative HPA's for the first two quarters withdrew at the end of the second quarter.

II. Implications of the Findings of the Study

Meeting the present challenge to higher education. If we accept the proposition that a citizen capable of succeeding in college is likely to contribute more to society with college training than without college training, the results of this study appear to support retention of liberal admissions policies. The writer regards the incidence of success among these students as being great enough to justify having given them all a chance to attend college, since it was not possible to determine in advance which of them would succeed and which of them would not succeed. The challenge of more and more people wishing college training should not be met by making admissions procedures more highly selective; to do so would rob society of the maximum contribution of many of its citizens. Rather, society should provide for the college personnel and facilities needed to meet the demand for college training, and liberal admissions policies should be retained at least until such time as more effective methods of predicting college performance are available. This does not mean that every college should adopt liberal admissions practices, nor does it mean that college admission should be denied to no one. Valid reasons exist for different colleges using different procedures, and denying admission to those who seem to have no chance of succeeding in college is justifiable. Usually, however, admission to some college should be granted to students who wish to attempt college training.

Provision for dismissal from college of students such as those in this study who do not succeed is perhaps of even greater importance than is retention of liberal admissions policies. Two-thirds of the original group of students did not succeed in college. Just as the welfare of society demands that students capable of college training should have an opportunity to go to college, so likewise does it demand that students who are not succeeding should be directed into more appropriate training programs or employment situations. Effective probation and dismissal procedures reduce the extent to which college facilities are used ineffectively; they also reduce the amount of expansion of facilities which would otherwise be necessary to care for the increased numbers of students who wish college training. Furthermore, they benefit society by helping to channel unsuccessful students into areas of training or work experience for which they are better suited. This is not to suggest that students should be treated coldly or impersonally; they should receive the best counseling that can be provided, so that any action taken is in the best interest of all concerned. The point to be made is that it is wasteful to permit students to continue long in programs in which they are not likely to succeed. Evidence from this study can be used to formulate effective procedures at Ferris for placing students on probation and for denying further attendance to the less successful students, without serious damage to society in the form of wasted talent.

The findings of this study suggest that the present challenge to higher education will be met most effectively by retaining liberal admissions policies in the American system of higher education and by carrying out effective probation and dismissal procedures for those students who do not succeed in college. Implications of the findings of the study for admission and probation procedures at Ferris will be considered next.

Admissions procedures at Ferris Institute. Four major implications for admissions procedures at the college are suggested by the findings of this study. Though younger students with low high school HPA's and low ACEPE T-scores are least likely to succeed at the college, the findings of this study indicate that some of them do succeed. Furthermore, so few students in this category apply for admission[15] that it might be wiser to accept them all and to dismiss from the college at the end of one or two quarters those who are not successful than to deny admission to a designated group. Enough students succeeded at the college despite deficiencies in characteristics most commonly associated with success to support the conclusion that the only effective way of learning who will succeed and who will not succeed at the college is to admit all who wish to enter.

A second implication of the findings of this study

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[15]For example, only 6 of the 370 students were under 20 years of age and had high school HPA's below 1.5 and ACEPE T-scores below 60.

is that students whose high school records were below-average should be encouraged to come to the college for pre-admissions testing and counseling.[16] The ACEPE should be given, along with other tests selected to determine the strengths and the weaknesses of the students. The results of the tests and the data of the present study could be used in counseling these students. Such counseling should help the prospective student to decide whether he should enter the college by indicating the likelihood of his being successful and by providing information as to alternative courses of action that might be appropriate for him. Those who decide to enter the college should be well-motivated as the result of the pre-admissions testing and counseling. Assuming that the decisions of those who decide not to enter the college are based on valid reasons, both the individuals and society would benefit from their seeking more appropriate training or employment, instead of attending college.

A third implication of the findings of this study is that some students should be placed on academic probation as a condition of their admission to the college. Permitting unsuccessful students to remain in college very long is

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[16] Since the admissions philosophy of the college prevents denial of admission because of previous academic records, pre-admissions counseling should not be required; it should, however, be strongly encouraged, for it is advantageous for prospective students to obtain this type of information and assistance as soon as possible. Pre-admissions testing and counseling is not needed for the purpose of providing test data for preparing class schedules for students, because tests for this purpose are given regularly as part of the orientation and registration procedures.

wasteful. Academic probation as a condition of admission to the college would serve not only to motivate students to do their best from the beginning, but would serve also to hasten the time when the unsuccessful students would seek more appropriate training or employment. Society would benefit in either case.

Appropriate personnel of the college should determine which students should be admitted in a probationary status. The writer suggests that all students with high school HPA's below 1.5 or with ACEPE T-scores below 60 should be granted probationary admission only.[17] Also, all who do not report for pre-admissions testing and counseling should be given probationary admission, because classifying them in accordance with the criteria suggested above would not be possible without the ACEPE score.

The fourth implication of the findings of this study concerns the time during the school year when students with below-average high school records should be permitted to enter the college. The fact is clearly established that the college is obligated, under present policies, to not deny admission to students because of their previous academic

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[17] Examination of Tables 13 and 14 shows that such action would have placed on probation 8 of 55 successful students 20 years of age or older and 11 of 57 successful students who were under 20 years of age. Thirty-two of 59 unsuccessful students 20 years of age or older and 65 of 161 unsuccessful students under 20 years of age would also have entered in a probationary status. No need seems to exist for using different cut-off points for the different age groups.

performance.[18] This does not necessarily require, however, that such students must be accepted for the specific enrollment period for which they apply. As long as there is room at the college for all students who wish to enter, the present procedure of accepting applications in the order in which they are received may be practical. If, however, the time comes when it is known that some students must be turned away from the college at a given enrollment period, the procedure of postponing the entrance date of some students whose high school records were below-average seems justified. In the first place, facilities for remedial and tutorial services and for extensive counseling are limited. Furthermore, the data of this study have indicated that a greater proportion of these students than of the total student body were unsuccessful at the college. With a probation and dismissal policy functioning, a greater attrition rate from quarter to quarter would be expected among these students than for the student body as a whole. Therefore, it would seem wise to adopt a policy of limiting the proportion of students with below-average high school records who would be accepted at any one enrollment period and to defer until later enrollment periods those who apply after the established

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[18]The college is not obligated, however, to permit a student to enter the specific curriculum he requests if he does not seem to be qualified for that training. In such instances, a student is given the option of taking training designed to help him develop the skills needed for the curriculum of his choice or entering a curriculum for which he seems to be qualified.

quota has been reached. Such a procedure would work no real hardship on anyone and would have the advantage of tending to keep the enrollment at the college more constant from quarter to quarter than would be true if a larger proportion of these students were admitted at any one enrollment period. A corollary of this implication is that the summer sessions might be an ideal time for the college to admit a heavy proportion of these students, since enrollments during the summer are usually considerably lower than during the regular quarters of the school year.

Probation and dismissal procedures at Ferris Institute. Two findings of the present study emphasize the need for probation and dismissal procedures--the fact that 65 percent of the students who completed at least one quarter of training at the college were unsuccessful and the fact that a majority of the unsuccessful students did not withdraw from the college voluntarily.

A realistic probation and dismissal program is in the interest of both the student and society. Probation should serve as a motivating factor for those students who need motivation and should, as a result, enhance their chances for success. Furthermore, such a program would facilitate attainment of success in an appropriate area of training or work experience for those who are not successful in college by redirecting them sooner than the findings of this study suggest they would redirect themselves. Certainly denial of admission to prospective students because of lack of room

would not be justifiable if unsuccessful students were allowed to remain at the college indefinitely; nor can indefinite attendance by unsuccessful students be justified for any other sound reason.

The probation and dismissal policy to be adopted by the college must be formulated by the use of the appropriate policy-making procedures of the institution. The writer has certain suggestions to offer, however.

In the first place, the goal of such a policy should be the salvage of the student, both for his own good and for the good of society. The probation policy, therefore, should not be regarded primarily as a device for dismissing students from the institution. Rather, the total resources of the institution should be utilized to help students to succeed. Adequate counseling should be provided and standard considerations should include remedial and tutorial instruction, repetition of some courses, lighter loads of study, and changes of curriculum. The specific problems of a given student may suggest other approaches that would be helpful for him.

Students should be dismissed from the institution after reasonable efforts to enable them to succeed in an appropriate course of study have failed. Students who are dismissed should receive counseling regarding more suitable vocational goals. In the final analysis, "salvage" of a student may be achieved by success at the college or by dismissal from college accompanied by realistic plans for other training or employment.

Secondly, within the present framework of college procedures, responsibility for marshalling institutional resources to help students to succeed rests with the academic deans. This should continue.

A third suggestion is that students in the following categories should be placed on probation:

1. As already suggested, students with high school HPA's below 1.5 or ACEPE T-scores below 60, as well as those who do not report for pre-admissions testing and counseling, should enter the college in a probationary status.

2. All students whose first quarter college HPA's fall below 1.75 should be placed on probation.

3. All students whose cumulative HPA's for two or more quarters fall below 2.0 should be placed on probation.

The fourth matter for consideration concerns the length of time during which a student can remain in attendance in the same curriculum while in a probationary status. The following suggestions are offered:

1. A student who enters the college on probation should not be permitted to reenroll in the same curriculum if he fails to earn an HPA of at least 1.75 the first quarter.

2. A student should not be allowed to reenroll in the same curriculum for more than two quarters after being placed on probation unless he attains a cumulative HPA of at least 2.0.

3. A student should be removed from probation status when he attains a cumulative HPA of at least 2.0.

Two final suggestions are offered. First, no policy should be adhered to without exception; in individual cases extenuating circumstances might alter the action taken. Second, the foregoing suggestions are intended primarily for use when the college is able to accept all, or nearly all, of its applicants for admission. Should the time come when this is no longer possible, a stricter probation policy, providing for earlier dismissal from the college would be justified. Denying admission to students who have not yet entered a college, while permitting unsuccessful students to remain long in college cannot be justified.

Other implications of the study. Three additional implications of the present study have general application. First, the findings of this study suggest that colleges that have room for additional students should consider seriously accepting students who failed to earn "C" averages in high school. If colleges are reluctant to accept all students who wish to enter, they might consider accepting at least those with higher scores on college aptitude tests and those who are older.

A second implication of the present study worthy of note arises from the fact that the findings of this study are in substantial agreement with the findings of others who have investigated the relationship between college performance and selected factors. This suggests that factors that are predictive of college performance for general student populations may also be effective predictors for

students who had below-average high school grades. This finding has value for counselors of high school and college students.

Finally, the present study included an analysis of the relationship between college performance and some factors that were not found to have been reported on by other investigators. These include high school HPA's based on vocational courses other than commercial courses, marital status, the number of high schools attended, disciplinary action taken by the college, the effect of high school achievement and age on the recommendations of high school principals, and the effect of age on the load of studies completed. The findings concerning these relationships constitute additions to the existing professional literature in the area of prediction of college performance.

III. Suggestions for Further Research

The scope of the present study has, of necessity, been limited. A number of suggestions for further research have come to mind from time to time as the present study has progressed.

Some variables that have been studied by other investigators for their relationship to college performance were not included in this study because needed information was not available. Among such factors are achievement test scores, study habits, affective factors such as interest, motivation and personality, and activities while in college such as fraternity membership, participation in athletics,

musical and forensic organizations and other special interest groups, outside employment and miscellaneous recreational activities. Study of factors such as these with student populations similar to the population of the present study might produce additional information of value in meeting the needs of students.

Three suggestions are offered with reference to the variables that were examined in the present study. First, no other studies were found that measured the relationship between marital status and college performance. Although, in the present study, the relationship was not found to be significant at the .05 level of confidence, the X^2 was large enough that the relationship approached significance. Possibly with larger samples than the sample of the present study (fewer than 10 percent of the students were married) different findings would result. The writer suspects that if a significant relationship between marital status and college performance were found, the relationship might result primarily from the effect of age, rather than from other characteristics of marital status, but in view of the lack of information in this area and since the number of married students attending college is increasing steadily, this factor warrants further investigation.

Secondly, further research concerning the effect of the load of studies on college performance is needed, but not research of the type usually reported. Sufficient attention seems to have been given to the relationship between

load of studies and performance in general, with the usual conclusion that ability and/or other factors cause students who are capable of earning good grades to carry heavier schedules than do other students. Research is needed, however, to determine whether the practice of lightening the loads of students who have encountered academic difficulty is justified in terms of better performance as a result of the lighter load. This is a common practice in colleges, but to the writer's knowledge, it has not been proved to be successful.

The third suggestion with reference to factors included in the present study is that the effect on college performance of changes in curricular goal warrants further investigation. Very little information concerning this variable was found in the literature. The present study did not provide an analysis of whether students were more successful after making changes than before making them.

Additional research might also include a study of the progress of women students who had less than "C" high school averages and a study of students who transfer from other colleges after failing to maintain at least "C" averages at the colleges previously attended.

Instructional units of colleges could profitably seek methods for improving instructional procedures for students such as those composing the population of the present study. Course placement, special courses, instructional methods and academic counseling might all be considered.

A very important study that should be carried out is an analysis of the progress of Ferris students at other colleges attended subsequent to their attendance at Ferris. An underlying assumption of the present study was that success at Ferris is synonomous with "success in college". Insufficient data were found in the literature to establish whether other colleges with liberal admissions policies have an incidence of success with students such as those used in this study that is similar to the incidence of success in the present study. Also, no follow-up studies of the experience of Ferris students at other colleges seem to have been completed. The writer contacted colleges to which transcripts of credits earned by students used in this study had been sent, in the hope that information that could be used in this study could be obtained. The information gathered seemed to be insufficient for use other than for informational purposes, however. Only 40 students (slightly more than 10 percent of the students in this study) had completed at least one enrollment period at other colleges. Furthermore, 16 different colleges were attended, including 3 Junior Colleges. Of these 40 students, 27 had been successful at Ferris and 13 had not. At the colleges attended subsequently, 15 of the students were successful and 25 were not. This suggests that these students found it more difficult to succeed at other colleges than at Ferris. However, the data are too meagre to justify any basic conclusions. A well-planned study to investigate this matter is needed.

Finally, though the findings of this study should have implications for other colleges as well as for Ferris, it would be well for other colleges with liberal admissions policies to gather similar information concerning their students, as few studies of this type are available. This action would be of value even if the findings of such studies served only to echo the findings of the present study.

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APPENDIX

TABLE A1.--Relationship between ability and year of entry

Ability as measured by ACEPE T-score	Year of Entry 1954	1955	1956	Total
100-140	17	22	32	71
80- 90	25	28	69	122
60- 79	12	35	54	101
20- 59	14	19	23	56
Total	68	104	178	350

X^2-1.05; df-6; not significant

TABLE A2.--Relationship between high school achievement and year of entry

Achievement as measured by HPA for all high school subjects	Year of Entry 1954	1955	1956	Total
1.75-1.99	36	43	56	135
1.5 -1.74	34	46	72	152
0.0 -1.49	24	29	53	106
Total	94	118	181	393

X^2-1.97; df-4; not significant

TABLE A3.--Relationship between HPA's for the first quarter of attendance at the college and year of entry

	Year of Entry			
First Quarter HPA's	1954	1955	1956	Total
2.5+	15	17	20	52
2.0-2.49	16	25	44	85
1.5-1.99	24	20	43	87
1.0-1.49	18	33	30	81
0.0- .99	14	17	34	65
Total	87	112	171	370

X^2-10.36; df-8; not significant

TABLE A4.--Relationship between cumulative HPA's for the first three quarters of continuous attendance at the college or the only completed portion thereof and year of entry

	Year of Entry			
Cumulative HPA's for first three quarters or completed portion thereof	1954	1955	1956	Total
2.5+	9	15	18	42
2.0-1.49	19	31	39	89
1.5-1.49	33	26	51	110
1.0-1.49	16	27	31	74
0.0- .99	10	13	32	55
Total	87	112	171	370

X^2-9.62; df-8; not significant

TABLE A5.--Relationship between success and ACEPE T-score

ACEPE T-scores	Number of successful students	Number of unsuccessful students	Total
110-137	11	9	20
90-109	54	59	113
70- 89	35	74	109
0- 69	12	78	90
Total	112	220	332

X^2-30.88; df-3; significant

TABLE A6.--Relationship between success and ACEPE L-score

ACEPE L-scores	Number of successful students	Number of unsuccessful students	Total
60+	29	28	57
50-59	46	60	106
40-49	22	69	91
30-39	11	41	52
0-29	4	22	26
Total	112	220	332

X^2-23.24; df-4; significant

TABLE A7.--Relationship between success and ACEPE Q-scores

ACEPE Q-scores	Number of successful students	Number of unsuccessful students	Total
50+	5	12	17
40-49	40	39	79
30-39	48	86	134
20-29	11	45	56
0-19	8	38	46
Total	112	220	332

X^2-20.92; df-4; significant

TABLE A8.--Relationship between success and HPA's for all high school subjects

HPA's for all high school subjects	Number of successful students	Number of unsuccessful students	Total
1.75-1.99	62	66	128
1.5 -1.74	49	98	147
0.0 -1.49	20	75	95
Total	131	239	370

X^2-18.13; df-2; significant

TABLE A9.--Relationship between success and HPA's for college preparatory subjects

HPA's for college preparatory subjects	Number of successful students	Number of unsuccessful students	Total
1.75+	24	22	46
1.5 -1.74	60	76	136
1.25-1.49	33	75	108
0.0 -1.24	14	66	80
Total	131	239	370

X^2-22.2; df-3; significant

TABLE A10.--Relationship between success and HPA's for high school commercial subjects

HPA's for commerce subjects	Number of successful students	Number of unsuccessful students	Total
2.0+	58	73	131
1.5-1.99	24	63	87
0.0-1.49	26	67	93
Total	108	203	311

X^2-9.02; df-2; significant

TABLE A11.--Relationship between success and HPA's for high school vocational subjects other than commercial

HPA's for vocational subjects other than commercial	Number of successful students	Number of unsuccessful students	Total
2.0+	57	118	175
1.5-1.99	29	40	69
0.0-1.49	12	24	36
Total	98	182	280

X^2-2.24; df;-2; not significant

TABLE A12.--Relationship between success and rank in the high school graduating class

Percentile rank in high school graduating class	Number of successful students	Number of unsuccessful students	Total
30-49	18	21	39
20-29	26	40	66
10-19	40	79	119
0- 9	30	76	106
Total	114	216	330

X^2-4.95; df-3; not significant

TABLE A13.--Relationship between success and the recommendation of the high school principal

Type of recommendation	Number of successful students	Number of unsuccessful students	Total
Recommended	26	24	50
Recommended, with qualifications	37	64	101
Not recommended	15	47	62
Total	78	135	213

X^2-9.37; df-2; significant

TABLE A14.--Relationship between success and the size of the high school attended

Size of high school	Number of successful students	Number of unsuccessful students	Total
900 students +	61	114	175
400-899 students	37	69	106
200-399 students	22	27	49
1-199 students	11	29	40
Total	131	239	370

X^2-2.96; df-3; not significant

TABLE A15.--Relationship between success and the type of high school attended

Type of high school	Number of successful students	Number of unsuccessful students	Total
Public	120	211	331
Non-public	11	28	39
Total	131	239	370

X^2-.99; df-1; not significant

TABLE A16.--Relationship between success and the number of high schools attended

Number of high schools attended	Number of successful students	Number of unsuccessful students	Total
One	125	224	349
More than one	6	15	21
Total	131	239	370

X^2-.45; df-1; not significant

TABLE A17.--Relationship between success and socio-economic status

Father's occupation	Number of successful students	Number of unsuccessful students	Total
Professional	19	36	55
Proprietors, managers ans officials	23	64	87
Clerks and kindred workers	13	24	37
Skilled workers and foremen	30	49	79
Semi-skilled workers	3	12	15
Unskilled workers	11	16	27
Total	99	201	300

X^2-4.5; df-5; not significant

TABLE A18.--Relationship between success and certainty of vocational choice

Certainty of vocational choice	Number of successful students	Number of unsuccessful students	Total
Choice indicated	91	160	251
No choice indicated	40	79	119
Total	131	239	370

X^2-.25; df-1; not significant

TABLE A19.--Relationship between success and age at entry

Age group	Number of successful students	Number of unsuccessful students	Total
24+	19	14	33
22-23	29	30	59
20-21	20	21	41
19	14	48	62
18	35	109	144
17	14	17	31
Total	131	239	370

X^2-28.49; df-5; significant

TABLE A20.--Relationship between success and marital status at entry

Marital status	Number of successful students	Number of unsuccessful students	Total
Married	16	16	32
Single	115	223	338
Total	131	239	370

X^2-3.26; df-1; not significant

TABLE A21.--Relationship between success and veteran status at entry

Veteran status	Number of successful students	Number of unsuccessful students	Total
Veteran	59	52	111
Non-veteran	72	187	259
Total	131	239	370

X^2-21.84; df-1; significant

TABLE A22.--Relationship between success and the type of curriculum entered

Curriculum entered	Number of successful students	Number of unsuccessful students	Total
Science	46	72	118
Commerce	40	84	124
Other non-science	45	83	128
Total	131	239	370

X^2-1.11; df-2; not significant

TABLE A23.--Relationship between success and change in curricular goal

Curricular goal status	Number of successful students	Number of unsuccessful students	Total
Changed goal	10	28	38
Did not change goal	121	211	332
Total	131	239	370

X^2-1.53; df-1; not significant

TABLE A24.--Relationship between success and the number of quarters completed

Number of quarters completed	Number of successful students	Number of unsuccessful students	Total
1	20	54	74
2	13	28	41
3	68	105	173
More than 3	30	52	82
Total	131	239	370

X^2-4.07; df-3; not significant

TABLE A25.--Relationship between success and the hours of credit completed during the first quarter

Hours of credit completed	Number of successful students	Number of unsuccessful students	Total
17+	3	7	10
14-17	90	148	238
Below 14	45	77	122
Total	138	232	370

X^2-0.0; df-2; not significant

TABLE A26.--Relationship between success and the hours of credit completed during the second quarter

Hours of credit completed	Number of successful students	Number of unsuccessful students	Total
17+	32	20	52
14-17	75	93	168
Below 14	17	59	76
Total	124	172	296

X^2-20.42; df-2; significant

TABLE A27.--Relationship between success and the hours of credit completed during the third quarter

Hours of credit completed	Number of successful students	Number of unsuccessful students	Total
17+	39	19	58
14-17	60	71	131
Below 14	17	49	66
Total	116	139	255

X^2-21.42; df-2; significant

TABLE A28.--Relationship between success and disciplinary action taken by the college

Disciplinary action status	Number of successful status	Number of unsuccessful students	Total
Action taken	3	11	14
No action taken	128	228	356
Total	131	239	370

X^2-1.24; df-1; not significant

TABLE A29.--Relationship between ability and HPA's for all high school subjects

HPA's for all high school subjects	ACEPE T-scores			Total
	0-69	70-89	90+	
1.75-1.99	25	39	50	114
1.5 -1.74	36	40	60	136
0.0 -1.49	29	30	23	82
Total	90	109	133	332

X^2-7.97; df-4; not significant

TABLE A30.--Relationship between ability and the recommendation of the high school principal

Type of recommendation	ACEPE T-scores 0-79	80-89	90-99	100+	Total
Recommended	9	12	12	8	41
Recommended with qualifications	44	22	11	20	97
Not recommended	20	12	11	13	56
Total	73	46	34	41	194

X^2-10.67; df-6; not significant

TABLE A31.--Relationship between ability and age at entry

Age group	ACEPE T-scores 0-69	70-89	90+	Total
20+	42	28	44	114
18-19	44	70	73	187
17	4	11	16	31
Total	90	109	133	332

X^2-11.95; df-4; significant

TABLE A32.--Relationship between ability and veteran status

	ACEPE T-scores			
Veteran status	0-79	80-99	100+	Total
Veteran	38	34	21	93
Non-veteran	111	81	47	239
Total	149	115	68	332

X^2-.996; df-2; not significant

TABLE A33.--Relationship between ability and hours of credit completed the second quarter

	ACEPE T-scores			
Hours of credit completed	0-69	70-89	90+	Total
17+	6	15	26	47
14-17	34	50	64	148
Below 14	28	25	19	72
Total	68	90	109	267

X^2-14.69; df-4; significant

TABLE A34.--Relationship between ability and hours of credit completed the third quarter

Hours of credit completed	ACEPE T-scores 0-69	70-89	90+	Total
17+	7	13	31	51
14-17	30	42	47	119
Below 14	20	25	17	62
Total	57	80	95	232

X^2-13.69; df-4; significant

TABLE A35.--Relationship between success and age, with ability held constant, ACEPE T-scores of 100+

Age group	Number of successful students	Number of unsuccessful students	Total
20+	16	5	21
17-19	23	26	49
Total	39	31	70

X^2-5.1; df-1; significant

TABLE A36.--Relationship between success and age, with ability held constant, ACEPE T-scores of 80-99

Age group	Number of successful students	Number of unsuccessful students	Total
20+	22	16	38
17-19	21	57	78
Total	43	73	116

X^2-10.51; df-1; significant

TABLE A37.--Relationship between success and age, with ability held constant, ACEPE T-scores of 0-79

Age group	Number of successful students	Number of unsuccessful students	Total
20+	17	38	55
17-19	13	78	91
Total	30	116	146

X^2-5.8; df-1; significant

TABLE A38.--Relationship between success and ability, with age held constant, age 20+

ACEPE T-score	Number of successful students	Number of unsuccessful students	Total
100+	16	5	21
80-99	22	16	38
0-79	17	38	55
Total	55	59	114

X^2-14.59; df-2; significant

TABLE A39.--Relationship between success and ability, with age held constant, age 17-19

ACEPE T-score	Number of successful students	Number of unsuccessful students	Total
100+	23	26	49
80-99	21	57	78
0-79	13	78	91
Total	57	161	218

X^2-17.66; df-2; significant

TABLE A40.--Relation between high school achievement and the recommendation of the high school principal

Type of recommendation	HPA's for all high school subjects			
	0-1.49	1.5-1.74	1.75+	Total
Recommended	8	12	30	50
Recommended, with qualifications	23	40	38	101
Not recommended	23	27	12	62
Total	54	79	80	213

X^2-20.87; df-4; significant

TABLE A41.--Relationship between high school achievement and age at entry

	HPA's for all high school subjects			
Age group	0-1.49	1.5-1.74	1.75+	Total
20+	33	45	55	133
18-19	57	85	64	206
17	5	17	9	31
Total	95	147	128	370

X^2-7.4; df-4; not significant

TABLE A42.--Relationship between high school achievement and veteran status

	HPA's for all high school subjects			
Veteran status	0-1.49	1.5-1.74	1.75+	Total
Veteran	29	39	43	111
Non-veteran	66	108	85	259
Total	95	147	128	370

X^2-1.85; df-2; not significant

TABLE A43.--Relationship between high school achievement and the hours of credit completed the second quarter

Hours of credit completed	HPA's for all high school subjects			
	0-1.49	1.5-1.74	1.75+	Total
17+	10	22	20	52
14-17	41	65	62	168
Below 14	18	33	25	76
Total	69	120	107	296

X^2-1.48; df-4; not significant

TABLE A44.--Relationship between high school achievement and the hours of credit completed the third quarter

Hours of credit completed	HPA's for all high school subjects			
	0-1.49	1.5-1.74	1.75+	Total
17+	7	24	27	58
14-17	37	50	44	131
Below 14	14	33	19	66
Total	58	107	90	255

X^2-9.18; df-4; not significant

TABLE A45.--Relationship between success and the recommendation of the high school principal with high school achievement held constant, with HPA's for all high school subjects of 1.75+

Type of recommendation	Number of successful students	Number of unsuccessful students	Total
Recommended	18	12	30
Recommended, with qualifications	21	17	38
Not recommended	5	7	12
Total	44	36	80

X^2-1.2; df-2; not significant

TABLE A46.--Relationship between success and the recommendation of the high school principal with high school achievement held constant, with HPA's for all high school subjects of 1.5-1.74

Type of recommendation	Number of successful students	Number of unsuccessful students	Total
Recommended	5	7	12
Recommended, with qualifications	13	27	40
Not recommended	8	19	27
Total	26	53	79

X^2-.55; df-2; not significant

TABLE A47.--Relationship between success and the recommendation of the high school principal with high school achievement held constant, with HPA's for all high school subjects of 0.0-1.49

Type of recommendation	Number of successful students	Number of unsuccessful students	Total
Recommended	3	5	8
Recommended, with qualifications	3	20	23
Not recommended	2	21	23
Total	8	46	54

X^2-4.05; df-2; not significant

TABLE A48.--Relationship between age and the recommendation of the high school principal

Type of recommendation	Age group 17-19	Age group 20+	Total
Recommended	22	28	50
Recommended, with qualifications	64	37	101
Not recommended	52	10	62
Total	138	75	213

X^2-19.38; df-2; significant

TABLE A49.--Relationship between age and veteran status

	Age group			
Veteran status	17-19	20-21	22+	Total
Veteran	2	20	89	111
Non-veteran	235	21	3	259
Total	237	41	92	370

X^2-297.85; df-2; significant

TABLE A50.--Relationship between age and hours of credit completed the second quarter

	Age group			
Hours of credit completed	17	18-19	20+	Total
17+	4	21	27	52
14-17	14	87	67	168
Below 14	8	54	14	76
Total	26	162	108	296

X^2-16.87; df-4; significant

TABLE A51.--Relationship between age and hours of credit completed the third quarter

Hours of credit completed	Age group 17	18-19	20+	Total
17+	7	24	27	58
14-17	13	68	50	131
Below 14	6	51	9	66
Total	26	143	86	255

X^2-19.64; df-4; significant

TABLE A52.--Relationship between success and the recommendation of the high school principal, with held constant, age 20+

Type of recommendation	Number of successful students	Number of unsuccessful students	Total
Recommended	17	11	28
Recommended, with qualifications	16	21	37
Not recommended	3	7	10
Total	36	39	75

X^2-3.45; df-2; not significant

TABLE A53.--Relationship between success and the recommendation of the high school principal, with age held constant, age 17-19

Type of recommendation	Number of successful students	Number of unsuccessful students	Total
Recommended	9	13	22
Recommended, with qualifications	21	43	64
Not recommended	12	40	52
Total	42	96	138

X^2-2.62; df-2; not significant

TABLE A54.--Relationship between success and veteran status with age held constant, age 20+

Veteran status	Number of successful students	Number of unsuccessful students	Total
Veteran	59	50	109
Non-veteran	9	15	24
Total	68	65	133

X^2-2.81; df-1; not significant

TABLE A55.--Relationship between lack of success the first quarter and withdrawal at the end of the first quarter

Withdrawal status	Number of successful students	Number of unsuccessful students	Total
Withdrew	20	54	74
Did not withdraw	118	178	296
Total	138	232	370

X^2-4.17; df-1; significant

TABLE A56.--Relationship between lack of success on the basis of cumulative HPA's for the first two quarters and withdrawal at the end of the second quarter

Withdrawal status	Number of successful students	Number of unsuccessful students	Total
Withdrew	13	28	41
Did not withdraw	98	157	255
Total	111	185	296

X^2-.68; df-1; not significant

TABLE A57.--Relationship between lack of success on the basis of cumulative HPA's for the first three quarters and withdrawal at the end of the third quarter

Withdrawal status	Number of successful students	Number of unsuccessful students	Total
Withdrew	68	105	173
Did not withdraw	30	52	82
Total	98	157	255

X^2-.17; df-1; not significant