MONTANA STATE UNIVERSITY

Predicting freshmen dropouts at Montana State University using selected institutional data
by Dennis Joseph Dulniak

A thesis submitted in partial fulfillment of the requirements for the degree of DOCTOR OF EDUCATION
Montana State University

Abstract:
The purpose of this study was to establish the current freshman dropout rate at Montana State University (MSU), obtain information to better understand the dropout phenomenon, and develop equations that efficiently predict freshmen dropouts.

Data from the sample of 1,159 first-time freshmen who matriculated at MSU during the 1977, 1978 and 1979 Autumn Quarters were obtained primarily from institutional information gathered through the admissions process and others maintained in Registrar files. The independent variables were: sex, freshman age, Montana high school class division, high school grade point average, rank and class size, residency classification, orientation attendance, race, university computed high school grade point average, verbal and quantitative aptitude stanines, MSU predicted grade point average, general studies enrollment, scholarship or athletic fee waiver, scholastic probation, honorable dismissal, cumulative credits passed, and autumn, winter, spring and last quarter grade point average. Students were tracked for their first academic year.

The freshman dropout rate of 31.4 percent was made up of academic dropouts, voluntary dropouts and transfers. The 68.6 percent nondropout rate was determined by persisters and stopouts. The results found that males had a higher academic dropout rate and females a higher persistence rate. Students with low aptitude stanines had a higher proportion of dropouts. Undecided students had a higher dropout rate than students registered in a specific curriculum.

The phenomenological research approach involved interviewing freshmen dropouts to aid in the understanding of attrition. A lower sense of commitment to college was universal among the dropouts. Dropouts expressed a high degree of confidence in their decision and had no regrets.

Factor analysis resulted in interaction of twenty variables among five cluster groupings. Stepwise multiple regression established significant prediction equations for the dependent variables, dropout/ non-dropout and academic/voluntary dropout. Of the pre-matriculation variables, high school grades and scholastic aptitude were the most significant predictors of attrition. When using all selected variables, quarterly GPAs and credits earned were the strongest predictors of attrition. Double cross-validation found that the full set of characteristics (as compared to pre-matriculation and factor clusters) represented the most efficient prediction models.

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USING SELECTED INSTITUTIONAL DATA

by

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of the requirements for the degree

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DOCTOR OF EDUCATION

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MONTANA STATE UNIVERSITY
Bozeman, Montana

August, 1981

ACKNOWLEDGEMENTS

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ABSTRACT

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Chapter 1

INTRODUCTION

The college dropout continues to be an increasing cause of concern throughout higher education. Attrition, resulting from the number of college dropouts, has been called one of the great contemporary issues with serious national implications (Brawer, 1973). Dropouts may suffer personal setbacks in career development and a futile expenditure of time and effort. The dropouts cause institutional administrations to face misallocation of limited educational resources and the nation to obtain a less than optimal use of talent and financial resources. Summerskill, in summarizing thirty-five studies conducted over forty years, reported that about half of all entering freshmen left before completing a baccalaureate degree (1962). Additionally, forecasts of declining postsecondary enrollments are further magnified by the U.S. Census Bureau's report that the percentage of 18-year-olds declined 3.4 percent in the two years after 1979 (Magarrell, 1981a), and that a prospective decline of 23.3 percent of the 18 to 24 year age group is forecast between 1979 and 1997 (Carnegie Council, 1980). This loss of enrolled students and the projected decline in entering freshmen classes have become key sources for an expanding interest in attrition rates and retention programs.

The projection for the State of Montana by the Office of Public

X Instruction indicates a 20 percent reduction from 1979 to 1985 in the number of high school graduates. This fact combined with the historical base provided by Montana State University's (MSU) Office of the Registrar that nearly 88 percent of first-time freshmen have come from Montana high schools, the not too distant future portends a sizeable reduction in enrollments for MSU. In light of this, local retention efforts take on an even greater importance.

Astin has stated that the ability to estimate any given student's chances of dropping out was of interest to students, institutional administrators and educational policy makers (1975). Astin (1971, 1975) and numerous authors in local and national studies have established that predictive capabilities do exist in varying degrees of effectiveness. Although college dropouts are not a homogeneous group and no single set of characteristics is known to confidently predict who will dropout, results from institutional studies examining the attrition phenomenon have actuated the development and implementation of retention programs.

Generally, attrition has been found to be the highest during the first year or prior to the start of the second year of college (Albers, 1965; Astin, 1971; Brawer, 1973; Brigman and Stager, 1980; Eckland, 1964; Fetters, 1977, Iffert, 1957; Newlon and Gaither, 1980; Pantages and Creedon, 1978; Stork and Berger, 1978; Summerskill, 1962; and Terenzini and Pascarella, 1978). These studies suggested a retention

program that identified potential dropouts as early as possible. Early

identification of the potential dropouts may then lead to more clearly   X

defined goals and a more efficient use of resources by all parties

involved.

Statement of the Problem

The problem of this study was threefold:

1. to establish a current freshman dropout rate for Montana

State University,

2. to obtain an understanding of the attrition phenomenon

through interviews with freshmen dropouts, and

3. to determine if efficient equations could be obtained from

selected institutional data in predicting freshmen dropouts.

Need for the Study

It is naive to assume that an institution could eliminate

attrition. Open-door admissions institutions have come to accept

attrition as an inevitable outcome of their entrance policy. Although

the attrition rate can be reduced through selective admission policies

(Iffert, 1956), it is not feasible for open-door admissions institutions

operating under law to enact such change. It is, however, within

reason for institutions to reduce student attrition by six to eight

percent (Middleton, 1978). To achieve such a decrease, there is a

need for institutions to realistically study themselves and establish

a current attrition rate, obtain a better understanding of the students

who do dropout, and construct appropriate strategies for reducing their

number of dropouts. Brigman and Stager (1980) have suggested that

institutions need to understand the local nature of attrition to

effectively confront the problem. Research findings by Stork and

Berger (1978) have also established and recommended that prediction

equations be formulated by specific institutions, so that appropriate

resources may be allocated to students who may need them the most.

The problem of attrition is unique for each institution. Pre-

vious research cannot necessarily be applied with confidence at the

local level, for it is not known which comparisons may be applicable

or misleading for the specific institution. It had become apparent

from research and various meetings, including a Retention Task Force,

that Montana State University knew very little about the current

attrition rate of its freshmen students. Also, there was no organized

retention effort, although it had been expressed that various retention

devices were in place and operating independently. Presently, Montana

State University collects and maintains numerous data elements

obtained through the Admissions process, supplemented by statistical

functions from the Testing Office, and stored, along with additional

academic and student related information, in Registrar files.

Existing literature suggested that portions of these data have been

significant in predicting potential dropouts at specific institutions
and in more widespread national studies. This study included variables
which have been shown to be effective predictors of attrition, along
with new variables that were unique to MSU. Variables that had not
been previously tested in a prediction model were Montana High School
Class Division, University Computed High School Grade Point Average
and Predicted MSU Grade Point Average. This study also had the unique-
ness of predicting dropouts by exclusively utilizing selected data
files maintained by an institution of higher education. There was
no attempt to obtain additional predictive information.

Too often, inadequate attention has been afforded to the defini-
tion of a dropout. Researchers have suggested that attrition studies
should separate the categories of dropouts into subgroups of finer
distinction. This study distinguished among the various categories
of dropouts and non-dropouts as follows: academic dropouts, voluntary
dropouts, transfers, persisters and stopouts, as defined in Chapter
3. Currently, little is known about the number of students who
transfer from MSU or the institutions in which they enroll. There
has also been a lack of knowledge about students who stopout, re-enroll
at MSU but miss one or more quarters, excluding summer.

The study employed a phenomenological research approach that
involved interviewing freshmen dropouts to aid in the understanding
of students who leave MSU. Phenomenological research allowed a

comparison of the findings with those of literature, was a source of additional retention ideas, and attempted to establish attrition theory.

The study also yielded efficient models for predicting potential freshmen dropouts as an early warning device. The findings of this study also present suggestions to reduce the number of dropouts at MSU.

General Questions to be Answered

Analysis of data obtained in this study answered the following questions:

1. What percentage of the first-time freshmen are: academic dropouts, voluntary dropouts, transfers, persisters, and stopouts?

2. What is the dropout rate of first-time freshmen at Montana State University?

3. Are there any universals about freshmen dropouts which can be obtained through a phenomenological approach and lead to the formulation of substantive theory?

4. Which significant pre-matriculation characteristics can best predict dropouts?

5. Which of the full set of significant characteristics can best predict dropouts?

6. Which significant pre-matriculation characteristics can best predict academic dropouts?

7. Which of the full set of significant characteristics can best predict academic dropouts?

8. What is the efficiency of the significant pre-matriculation characteristics in predicting dropouts?

9. What is the efficiency of the full set of significant characteristics in predicting dropouts?

10. What is the efficiency of the significant pre-matriculation characteristics in predicting academic dropouts?

11. What is the efficiency of the full set of significant characteristics in predicting academic dropouts?

General Procedures of the Study

The procedures followed in this study were:

1. A thorough review of literature and related research was conducted.

2. A random sample of first-time freshmen at Montana State University over a three year period was selected.

3. Mailings to verify transfer students were sent to respective Registrars.

4. Data were tabulated, coded, checked and corrected in

preparation for statistical analyses.

5. Statistical procedures were employed to answer the general
questions and test the hypotheses.

6. Interviews with dropouts were scheduled, taped and analyzed.

7. Conclusions and recommendations were drawn.

Limitations and Delimitations

1. The sample was taken from the population of first-time
freshmen matriculating at Montana State University during the 1977,
1978, and 1979 Autumn Quarters.

2. Only students with a complete data set were used in the
analysis.

3. The study was limited to the first academic year on each of
the three selected classes.

4. Data collected and utilized in the study were limited to the
independent variables chosen by the researcher.

5. Institutional information on dropouts was limited to the
data in the computer and permanent files maintained by the Office of
the Registrar.

6. The categories of academic dropout, voluntary dropout,
stopout, transfer and persister have been adopted and defined specif-
ically for this study.

7. Transfer students were verified to have enrolled in another higher educational institution within a year of the start of the second academic year.

Definition of Terms

The following terms were defined to insure clarity of their use in this study:

Academic Year -- Referred to the instructional quarters of Autumn, Winter, Spring and Summer. One complete academic year was from Autumn to Autumn.

Dropout -- A student who did not enroll at Montana State University for the start of his/her second academic year.

Dropout rate -- The percentage of first-time freshmen students at Montana State University matriculating in Autumn Quarter which did not enroll for the start of the second academic year at MSU.

Montana High School Class Division -- An established classification of Montana high schools based on district enrollment. The divisions used were first, second, and third class, and private. First class high schools were in districts with a population of 8,000 persons or more. Second class high schools represented districts having a population of 1,000 - 7,999 persons and third class schools had district populations of less than 1,000 (Hamilton, 1962). Generally, first class schools were the largest with third class

representing the smallest public high school in Montana.

Montana State University -- (MSU) comprehensive land-grant

institution renamed from Montana State College (MSC) July 1, 1965.

Non-dropout -- A student who enrolled at MSU for the start of

his/her second academic year.

Predicted MSU Grade Point Average - A statistically derived

number obtained through a regression equation based on academic

achievement variables as follows:

PREDGPA = .1109 + .6639 (UCHSGPA) + .06982 (VSTAN)

   where:

UCHSGPA = University Computed High School Grade Point Average

  VSTAN = conversion of raw national test score to local MSU

       verbal stanine score (Suvak, 1968).

University Computed High School Grade Point Average -- A

statistically derived number computed by averaging the grades in the

following high school subjects: junior and senior year English

courses, junior and senior social studies, chemistry, physics,

commercial courses, vocational courses, language, algebra, solid

geometry, trigonometry, and advanced math courses (Suvak, 1966).

Additional terms and variables as they pertain to this study

will be defined in later sections.

Summary

College attrition has attracted the attention of numerous segments of our society. Institutions look to retention as a way of combating projected enrollment declines. Students view higher education as a means to an end that should not be a waste of their time, energy and X money. Outsiders view attrition as a waste of expensive resources and loss of talent. A certain level of attrition should be expected at the institutional level, but through studying the attrition phenomenon and enacting a retention program, some attrition can be avoided.

The problem of this study was to investigate the freshman drop-out rate, gain a better understanding of students who dropped out, and establish efficient prediction models to identify potential dropouts. The information obtained was then useful in suggesting specific concepts to increase retention.

Chapter 2

REVIEW OF LITERATURE

The study of college dropouts is not a new phenomenon. As early
as 1872, the problem was discussed at the annual convention of the
National Education Association. Attrition rates have received
increased attention due to the projected decline in the general
population of the 18-24 year-olds, the traditional age group attending
institutions of higher education. Attrition research has led them to
the development of retention programs.

The problem of this study was to investigate the freshman dropout
rate, gain a better understanding of students who dropped out, and
establish efficient prediction models to identify potential dropouts
to reduce attrition. This chapter will review selected literature
findings with regard to attrition. It will be presented as follows:

1. Dropout Rates and Categories of Dropouts

2. Predictability of Dropouts

3. Pre-matriculation Characteristics

4. Post-matriculation Characteristics

5. Summary

Dropout Rates and Categories of Dropouts

Summerskill, in reviewing thirty-five attrition studies performed

over a period of forty years, found no appreciable change in the drop-
out rate (1962). The median dropout rate was 50 percent during the

X four years of college. He also found that the percentage of students

lost at a given institution had stayed constant. Summerskill con-

cluded that attrition is the result of multicausal factors.

Literature findings have been difficult to interpret and general-

ize from due to the variability in the definition of dropouts. National

studies have been useful in providing a broader, more general survey

on college attrition. A national study by the U.S. Department of

Health, Education and Welfare surveyed 12,667 students at 149 colleges

and universities (Iffert, 1957). Iffert noted that of the students

who withdrew, approximately one-half did so before the student's

second year. Freshmen dropouts in higher education were figured at

X 27.6 percent in Iffert's study. But the rates of attrition have

varied by type of institution. Fetters (1977), in the National

Longitudinal Study of the High School Class of 1972, cited a 16.63

percent freshman withdrawal rate in four-year colleges of 5,001 -

10,000 students. Both Iffert and Fetters did not include students

who transferred, since by their definition, transfers were still

pursuing their education at some institutions. Also, selective

private colleges and universities were found to have lower dropout

rates than public institutions and community colleges.

Cope and Hannah (1975) found a 33 percent freshmen dropout rate, X

which included transfers, at four-year public institutions from 1975

to 1977. Specifically, Haviland (1979) found a 32.9 percent attrition

at the University of Northern Colorado, and Newlon and Gaither (1978),

32 percent at California State University, Northridge.

Presently, Montana State University has little current knowledge

about the attrition rate of its students. Studies in the early 1960's

placed MSU's (then Montana State College) freshman dropout rate at

20 percent (Boyd, 1969; Correll, 1968; and Hamilton, 1962). This 20

percent dropout rate, which included transfers, was remarkably lower

than the 32 - 33 percent national figure. An MSU Retention Task Force,

established in 1978, found a lack of attrition data to support the

formulation of a coordinated retention program. The Task Force

failed to maintain its momentum and few results were achieved.

Students who transferred between institutions also represented

an identifiable category of dropouts. The classification of transfer

students, however, present a dilemma in interpreting attrition

research. The point of view taken by institutions was that transfers

represented students who dropped out from that school. From the

wider view of higher education, transfers represented students who

continued their education at another college or university. Iffert

and Clarke (1965) found that transfers made up about 25 percent of

an institution's dropouts. Stefanich (1971), in a study at the

University of Montana, found that the freshmen transfer rate ranged

between 13 and 21 percent for 1968 and 1969. He established that 87

percent of the transfers enrolled in another Montana institution, of

which 55 percent transferred to MSU. Boyd (1969) found 22.6 percent

of the freshmen dropouts from the class of 1963 transferred from

Montana State College.

A further distinction was made between academic and voluntary

dropouts. Although there has been variability among institutions, it

has been generally established that academic dropouts, students who

withdrew for academic reasons or had a grade point average below

2.0 on a 4.0 scale, accounted for approximately one-third of all

dropouts (Brigman and Stager, 1980; Fetters, 1977; Iffert, 1965;

MacMillan, 1969; Newlon and Gaither, 1980; and Summerskill, 1962).

Thus, the majority of dropouts were not students who failed to perform

academically. Literature reviews have also concluded that men tended

to cite academic reasons for dropping out, while women were frequently

considered voluntary dropouts for personal reasons (Astin, 1972;

Cope and Hannah, 1975; Pantages and Creedon, 1978; and Tinto, 1975).

Predictability of Dropouts

Attrition has been established as a multicausal phenomenon, the

result of extremely intricate interplay among a multitude of variables.

No single factor has been isolated as the major cause of attrition.

Some institutions take such a long time to discover who the dropouts

are, that the current practices are ineffective in predicting dropouts
and reducing attrition. There have been, however, studies that
identified predictive characteristics of potential dropouts.

The most comprehensive notable research on predicting college
dropouts was a national longitudinal study performed by Astin (1975).
This study initially included 243,156 entering freshmen in the fall
of 1968 at 358 two- and four-year colleges and universities. Freshmen
and follow-up questionnaires were received from 41,356 four-year
college and university students selected from the sample, in addition
to student scores on the Scholastic Aptitude Test and American College
Test provided by the institution. From this study, Astin developed
regression weights to calculate a student's "dropout-proneness".
Fifty-two student variables, including aptitude, family background,
educational aspirations, study habits, college expectations, and
twelve additional variables on financial aid, work status and residence
were offered as a method of computing a student's chances of dropping
out (pp. 182-94). Astin stated that the multiple correlations
obtained from the analysis accounted for 14.5 percent of the variabil-
ity in predicting potential dropouts.

Other studies have also examined prediction models to predict
college dropouts. Pre-college and college academic variables have
been most useful in distinguishing between dropouts and non-dropouts.
Terenzini and Pascarella (1978) found in a study conducted at

Syracuse University that pre-matriculation characteristics were weak

predictors of attrition. They determined that what happened after

enrolling was more important to subsequent attrition decisions than

the attributes that the student brought to college. Measures of abil-

ity and achievement have been primarily useful in identifying students

who are most likely to dropout for academic reasons. Voluntary

dropouts have been found to be relatively unpredictable, since they

cannot be easily identified prior to departure (Eichworth, 1971).

Sexton, in reviewing twenty-five years of attrition research, claimed

that freshmen dropouts were largely due to poor academic performance

(1965). She suggested that academic dropouts may be subject to a

higher degree of predictiveness than those who voluntarily dropout.

Stork and Berger (1978) called for an earlier identification of

potential dropouts. In light of the claim that each institution is

unique and so may be the factors for dropping out (Kowalski, 1977),

retention efforts need to focus on institutional and student char-

acteristics. Additional research is needed to examine characteristics

found to have predictive capabilities and other factors that researchers

may intuitively include as potential predictors.

The next two sections discuss the predictiveness of selected

pre-matriculation and post-matriculation characteristics.

Pre-matriculation Characteristics

Past research has found that pre-matriculation information collected through the admissions process, high school record and scholastic aptitude (entrance) examinations have predictive capabilities.

High School Record

In much of the early research regarding student attrition, there was a positive relationship between high school grades and rates of persistence. Pantages and Creedon's review of studies on attrition found that high school grade point average and rank in class were the strongest single-variable predictors available for persistence and attrition (1978). This was confirmed by Haviland (1979) in a study of freshmen at the University of Northern Colorado. Astin's nationwide study indicated that the students' chances of dropping out of college increased consistently as their high school grades decreased, and that high school grades were the most consistently "potent" predictors of college attrition (1975). High school grades have been found to be powerful predictors by numerous researchers besides Astin (Belk, 1966; Eckland, 1964; Fetters, 1977; Harman, 1969; Haviland, 1979; Howell, 1979; Stork and Berger, 1978; Terenzini and Pascarella, 1978; and Waller, 1962).

Class rank in high school has also been found significant in predicting dropouts and non-dropouts (Astin, 1971 and 1975; Baier, 1974; Belk, 1966; Blanchfield, 1971; Brigman and Stager, 1980; Eckland, 1964; Fetters, 1977; Harman, 1969; Haviland, 1979; Howell, 1979; Storks and Berger, 1978; Terenzini and Pascarella, 1978; and Waller, 1962). Iffert (1956) had found that students from the top one-fifth of their high school class tended to survive in college twice as long as those from the bottom fifth. In 1960, Montana State College students from the lower third of the high school class had a dropout rate nearly three times higher than those from the upper third (Hamilton, 1962). Hamilton noted that the 1960 class had 48.6 percent of the students in the upper third and 13.8 percent in the lower third of their high school graduating class.

Size of high school and the graduating class have favored the larger schools for persistence (Anderson, 1974; Astin, 1975; Brigman and Stager, 1980; Cope, 1972; Correll, 1968; DeVecchio, 1972; and Summerskill, 1962). Students who attended high schools with a graduating class of less than 20 did not persist as well as classes sized 20 and larger (Anderson, 1974). Tweeddale (1978) also noted that a higher percentage of graduating classes of 20 - 99 dropped out. Correll (1968) had found that smaller high schools (less than 500) had a significantly higher dropout rate at Montana State College in 1964.

Type of high school has also been studied as a factor of attrition. Students from public high schools have had a higher rate of persistence than private high schools (Sexton, 1965). Astin (1973), however, concluded the opposite and implied a need for further research in this area.

Scholastic Aptitude

Scholastic aptitude and ability measures have generally received support as contributing significantly in predicting dropouts. Astin (1975) had found that composite scores on the American College Testing Program (ACT) and Scholastic Aptitude Test (SAT) were significant, though not as high a predictor as actual high school grades.

Astin (1973) and Iffert (1957) found that scholastic aptitude was only half as stable a predictor as high school rank. Eichworth (1971) claimed that such test scores were not as beneficial as grades in predicting dropouts, due to their tendency to fluctuate.

Evidence reported by numerous studies support test scores as significant predictors of attrition (Blanchfield, 1971; Howell, 1979; Stefanich, 1971; Stork and Berger, 1978; and Summerskill, 1962). Baier (1974) and Harman (1979) cited ACT scores as significant predictors; Bean (1970), Nichols (1975), and Terenzini and Pascarella (1978) found SAT scores to be significant predictors. Newlon and Gaither (1978) found the SAT Math score to be a better predictor of

freshman persistence than the SAT Verbal score. Belk (1966) also
established that scores for the School and College Ability Test (SCAT)
and Ohio Psychological Test (OHIO) were significant variables in
predicting freshmen attrition. Students with high academic aptitude
had a higher persistence rate than those with lower aptitude (Fetters,
1977). Although measures of scholastic aptitude had high predictive
abilities, the relationship has not been effective in predicting a
sizeable amount of attrition.

Predicted Grade Point Average

Institutions have utilized regression models that key on selected
pre-matriculation variables (e.g. high school grades, rank in class
and aptitude test scores) to compute a predicted college grade point
average (GPA). Summerskill (1962) found such prediction models to be
more accurate at the lower end of the grade scale. Astin (1971)
claimed that predicted GPA's were slightly more accurate for women.
A predicted college GPA established for Montana State University,
using selected high school grades and the verbal aptitude score as
independent variables, had a correlation of .63 with the actual
freshman GPA (Suvak, 1966 and 1968).

Sex

The student's sex has been a source of much disagreement among
researchers. Studies by Alfred (1973), Astin (1971), Brigman and

Stager (1980), Newlon and Gaither (1980), and Panos and Astin (1968)
found that women had higher dropout rates than men, whereas Demos
(1968) reported men as significantly higher in a study at California
State College at Long Beach. Fetters (1977), Howell (1979), Iffert
(1957), MacMillan (1970) and Summerskill (1962) found neither sex as
having a significantly higher dropout statistic. Also, as addressed
earlier in this chapter, men tended to dropout for academic reasons
while women often gave personal reasons and were voluntary dropouts.
Pantages and Creedon (1978), in reviewing college attrition studies,
concluded that sex may be a significant predictor in specific
institutions, when taken into account with other factors.

Age

Research findings on the age of entering college students also
have opposing results. Alfred (1973), Astin (1975), Rose (1980) and
Sexton (1965) found older students having lower persistence rates,
supporting the concept of the traditionally-aged freshmen, under 21
years of age, as more likely to persist. Eckland (1964), Howell
(1979), MacMillan (1970), and Pantages and Creedon (1978) concluded
that age is not a primary factor in persistence.

Residency Classification

The student's origin of residence, in-state or out-of-state,
has received very little attention in attrition studies. Iffert's

national study found that nonresidents had lower dropout rates than
in-state residents (1957). Brigman and Stager (1980), in a study
at Indiana University at Bloomington, noted that the dropouts were
primarily residents, with a higher proportion of nonresident dropouts
categorized as voluntary.

Orientation Attendance

Orientation programs have been considered an institutional
characteristic that positively affect retention. Research on the
relationship of orientation to predicting attrition has received
little attention. Summer orientation attendees at the University of
Oregon were found to have a lower freshmen dropout rate than those who
did not attend (Carlson and Wegner, 1965). A study of the MSU fresh-
man class of 1979 found that students attending summer orientation had
a lower dropout rate than those who did not, 26.8 to 44.9 percent
(Dulniak, 1981).

Racial Background

Certain racial categories have been found to have higher dropout
rates. Blacks were found to have higher dropout rates than non-Blacks
(Greenberg, 1972; and MacMillan, 1970). Alfred (1973) found that a
greater proportion of Black and Spanish students drop out than non-
Black and non-Spanish students. Astin (1975) determined that Black,
Chicano and American Indian students had higher dropout rates than

Oriental and White students. MacMillan (1970) also found that
Oriental students had higher persistence rates than all other racial
groups. However, Fetter's national longitudinal study found no
evidence to support any racial distribution among dropouts (1977).

Post-matriculation Characteristics

All, or even most, potential dropouts cannot be identified by
primarily using information available before the student enrolled
(Pantages and Creedon, 1978; and Terenzini and Pascarella, 1978).
Data available after the student enrolled have been shown to signifi-
cantly increase the predictiveness of college dropouts.

Academic Performance

In reviewing studies pertaining to the relationship between
college grades and rates of persistence, the findings were analogous
to those for high school GPA. Summerskill (1962) in reviewing
thirty-five studies found consistency in the significant relationship
between attrition and first term college grades. The fact that women
tended to get better grades than men during the freshmen year (Astin,
1971), may account for the higher rate of academic dropouts among the
men. Cumulative grade point averages have also been established as
significant predictors of persistence (Astin, 1975; Blanchfield, 1971;
Fetters, 1977; Haviland, 1979; and Terenzini and Pascarella, 1978).

Precautions are in order that while low grades were often good predictors of attrition, high grades did not guarantee persistence (Summerskill, 1962).

Scholastic Action

The decision of whether to persist or drop out was not always left up to the student. Suspension or scholastic disqualification may force academic dropouts, although it did not seemingly play a major role in attrition at California State University, Northridge (Newlon and Gaither, 1980). Suspended students and academic dropouts generally exhibited significantly lower high school grade averages than voluntary dropouts or non-dropouts.

Academic probation was also a factor imposed upon students who do not achieve the institution's standards. The effect of probation has been found to negatively affect men, thus increasing their chances of dropping out, and positively affecting women in challenging them to persist (Astin, 1975).

Financial Assistance

Economics was one of the major and most common causes of attrition. When considering the relationship of sources of financial aid and attrition, only scholarships and grants, in contrast to loans and work-study, have been found to increase chances of persistence (Haviland, 1979; and Iffert, 1957).

Curriculum Choice

The decision of what major to pursue has been a predictive characteristic of attrition. Undecided students had significantly higher dropout rates than those who declared a major (Howell, 1979; Iffert, 1957; MacMillan, 1970; Newlon and Gaither, 1980; and Rose, 1980).

Time Status

The number of credits for which a student registered has also been a predictive factor. Part-time students, who carried fewer than twelve credits per term, were found to have a higher attrition rate than full-time students (Alfred, 1973; Brawer, 1963; Cohen and Brawer, 1970; Fetters, 1977; Greenberg, 1972; and Rose, 1980).

Summary

The review of literature focused on attrition research and related findings in predicting college dropouts. Attrition has been found to be a multicausal phenomenon. Rates of attrition vary among types of institutions but remained relatively constant for given institutions. The freshman dropout rate of four-year colleges and universities has been found to be approximately 33 percent. Variability among the definition of a dropout made comparison of research findings difficult.

Dropouts were found to possess significant characteristics for prediction models. Astin developed the most comprehensive investigation of attrition in establishing a prediction model of "dropout-proneness". Other studies also found numerous pre-matriculation characteristics that were significant attrition predictors including high school grades, rank in class and scholastic aptitude tests. Other characteristics received conflicting findings among the research. But most potential dropouts were not identified from information available before the student was admitted. College grades were found to add significantly in predicting attrition. Other factors from information after the student enrolled also improved the prediction models.

Most potential dropouts have not been identified by available prediction equations. Characteristics that have been found to be significant predictors vary among the institutions. Specific institutions were urged to study the attrition at their own school and derive prediction equations appropriate to their unique setting.

Chapter 3

PROCEDURES

The problem of this study was to establish the current freshman
dropout rate at Montana State University, obtain information to better
understand the dropout phenomenon, and develop equations that predict
potential dropouts. Selected institutional data were utilized in the
statistical analysis, and interviews with freshmen dropouts were
also performed.

This chapter presents the procedures used in the study as
follows:

1. Population Description

2. Method of Data Collection

3. Categories for Investigation

4. Statistical Hypotheses

5. Analysis of Data

6. Precaution Taken for Accuracy

7. Summary

Population Description

This study was conducted at Montana State University, a compre-
hensive land-grant institution with an enrollment of approximately
10,000 students. An open-door admissions policy permits any
graduate from an accredited Montana high school to have access to

any state institution of higher education, including Montana State University. Out-of-state graduates of non-Montana high schools are admitted provided that they ranked in the upper 50 percent of their high school graduating class or on the basis of national aptitude tests, high school grades or other evidence of achievement, maturity and motivation. The student population was primarily undergraduate (90 percent), with an average entering freshman class Autumn Quarter of approximately 2,200.

The population of this cross-sectional study consisted of a random sample of first-time freshmen students who matriculated at Montana State University during the 1977, 1978 and 1979 Autumn Quarter. Only sampled students, for whom a complete data set was available, were used in the analyses. A total of 1,159 students used in the analysis were distributed by 402, 392 and 365 for 1977, 1978 and 1979 respectively. These sample sizes exceeded the appropriate number necessary to achieve 95 percent confidence that the result was not off by more than 5 percent, as determined by the Formula for Sample Size of Finite Populations (Cochran, 1977). Through such a representative sample of the population, the researcher was able to employ statistical inference procedures and offer recommendations with a level of confidence that they applied to the whole population.

Method of Data Collection

The data used in the study were collected through files maintained by the Office of the Registrar at Montana State University. The final Student Data Bank and New Student File, two computer files, represented the source from which the sample was randomly chosen. Much of the variable information was also obtained through accessing the appropriate computer file. Each freshman selected was tracked for one academic year to build the student data record for the study. Upon completion of the computerized collection, alphabetical lists and corresponding data cards were prepared. The lists were checked, missing data researched through permanent files, information verified or corrected, and codes not available within the computer files were inserted. The data cards were then corrected and verified. There was no attempt to contact the individual students for further data information.

Students who transferred to another postsecondary institution represented the only intended variable used in the study which was not available from institutional files. In order to collect such information, the permanent record card containing the student's academic record was checked. This was performed to determine whether any transcripts were issued for students who did not enroll at MSU each quarter through Autumn of the second year, excluding Summer. Had

the student requested transcripts to be sent to another school, a letter requesting verification of enrollment was sent to the Registrar of that institution. A copy of this letter appears in Appendix A. A prepaid addressed envelope accompanied the 134 letters that were mailed. There were also ten students who transferred and then returned to MSU, thus being coded as transfers, but not requiring written verification.

All other variables were directly available or derived through statistical methods. Two of the statistically derived variables were Quantitative and Verbal Aptitude Test Scores, converted to a local MSU stanine, a scaled score from one to nine based on a normal distribution curve (Suvak, 1968). Appendix B presents the conversion of national tests to MSU stanines in relation to the normal distribution curve. University Computed High School Grade Point Average, as calculated from the grades of selected high school courses (Suvak, 1966), and the Montana State University Predicted Grade Point Average, as determined from a multiple regression equation using the recomputed high school GPA and verbal stanine (Suvak, 1968), represented the remaining statistically derived variables.

As a means of controlling any contaminating variables, a random sample was taken for each of the three freshmen classes. From this sample, only students with a complete data set were used in the analyses.

Categories for Investigation

The random sample of first-time freshmen students who matricu-
lated at Montana State University during the 1977, 1978 and 1979
Autumn Quarter was followed for one academic year from the quarter of
initial enrollment. The information used in the study was obtained
exclusively from the institutional files in the Office of the
Registrar. There was no attempt to contact students for information
used in the statistical analyses.

Dependent Variable

Students in this study were differentiated into specific sub-
groups of dropouts and non-dropouts, under the advisement of literature
that cited weakness in past attrition research. The freshmen students
were separated into the following dropout/non-dropout categories:

1. Dropout -- a student who did not enroll for the start
of the second academic year. Dropouts were further subdivided into:

    a. Academic -- a student who had a cumulative grade point
average of less than 2.0; was on scholastic probation; or was
ineligible to return due to suspension.

    b. Voluntary -- a student who had a cumulative grade
point average of 2.0 or greater; or had officially withdrawn through
the Honorable Dismissal procedure.

    c. Transfer -- a student who transferred to another higher

educational institution within a year of the start of the second
academic year. Official verification was required for this status.

2. <u>Non-dropout</u>

a. <u>Persister</u> -- a student who maintained continuous enroll-
ment for each quarter, excluding summer.

b. <u>Stopout</u> -- a student who enrolled at the start of the
second academic year, but who had not enrolled for Winter and/or
Spring Quarter(s) during the first academic year.

Independent Variables

Following is the complete listing of the independent variables
and their respective codings, along with a brief description where
deemed appropriate:

1. Sex: dichotomous coding, 1 (male) and 2 (female)

2. Freshman Age: actual years at entry into college

3. Montana High School Class Division: dichotomous coding of
1 (No) and 2 (Yes) for each of the following class divisions: first
class, second class, third class, and private. This represented
graduating from a Montana high school which had an established
classification based on district enrollment.

4. High School Grade Point Average: student's actual grade
average coded as follows: 1 (0.00 - 0.69, F), 2 (0.7 - 1.49, D),
3 (1.50 - 2.14, C), 4 (2.15 - 2.49, C+), 5 (2.50 - 2.84, B-),

6 (2.85 - 3.14, B), 7 (3.15 - 3.49, B+), 8 (3.50 - 3.84, A-),

9 (3.85 - 4.00, A).

5. Relative High School Rank: percentile representation of the
student's high school graduating class obtained by:

$$\frac{RANK}{\text{Number of graduating seniors}} \quad X \quad 100$$

6. High School Class Size: number in graduating class. Coded
as follows: 1 (1 - 19), 2 (20 - 49), 3 (50 - 99), 4 (100 - 249),
5 (250+).

7. Residency classification: coding for purposes of fee assess-
ment, as follows: 1 (In-state resident), 2 (Out-of-state/nonresident).

8. Orientation Attendance: participation in freshmen summer
orientation. Coded as follows: 1 (No, did not attend summer
orientation), 2 (Yes, did attend a summer program).

9. Racial Background: student's ethnicity classified as either:
1 (Oriental or White), or 2 (Black, Hispanic or Native American).

10. University Computed High School Grade Point Average:
selected high school courses used in recomputing the High School Grade
Point Average. The code was the same as that used for High School
Grade Point Average.

11. Verbal Aptitude Test Score: converted raw score from
standard national tests. Coding performed with stanine scores
established for MSU (1 through 9), see Appendix B.

12. Mathematics/Quantitative Aptitude Test Score: converted raw score from standard national tests. Coding performed with localized stanine scores, see Appendix B.

13. Montana State University Predicted Grade Point Average: regression formula utilizing the University Computed High School Grade Point Average and the Verbal Aptitude Test Score.

14. General Studies Enrollment: student's curriculum/college during the last quarter of attendance of his/her first academic year. Coded as follows: 1 (matriculated in a specific curriculum/college), 2 (undecided, enrolled in General Studies).

15. Scholarship Fee Waiver: whether or not a student received a reduction of fees for academic scholarship. Coded as: 1 (None), 2 (Yes, National Merit or Montana High School Honor Scholarship).

16. Athletic Fee Waiver: whether or not a student received a reduction of fees for athletic participation. Coded as: 1 (None), 2 (Yes, MSU athletic waiver).

17. Scholastic Probation: under University Probation for inadequate academic performance. Coded as: 1 (No), 2 (Yes, University Probation during last quarter of enrollment of the first academic year).

18. Honorable Dismissal: officially withdrew during an academic quarter. Coded as: 1 (No), 2 (Yes, official withdrawal during any quarter of the first academic year).

19. Cumulative Credits Passed: the actual number of credits earned by the end of the first academic year.

20. Quarterly Grade Point Average: the official grade point average recorded for the Autumn, Winter and Spring Quarters of the first academic year. The coded grade point averages were truncated to one decimal point.

21. Last Quarter Grade Point Average: the official grade point average recorded during the student's last quarter of enrollment of the first academic year.

22. Last Quarter Time Status: based on the number of credits for which the student was registered during his/her last quarter of the first academic year. Coded as follows: 1 (Honorable Dismissal), 2 (Part Time, less than 12 credits), and 3 (Full Time, 12 or more credits).

The pre-matriculation characteristics were the independent variables numbered 1 through 13. The full set of characteristics were represented by the entire listing of independent variables. Appendix C lists the abbreviations used for the independent variables.

Descriptive Variables

In addition to the dependent and independent variables that were necessary in the statistical analyses, descriptive variables were also utilized. The following variables were included in the study for comparison and establishment of categories within the dependent

variable.

1. Year of Entry: the specific year that the student enrolled. Coded as: 7 (1977), 8 (1978), and 9 (1979).

2. Academic Suspension: whether or not the student was suspended following his/her last quarter of enrollment of the first academic year, therefore academically ineligible to return.

3. Transferred: verification of enrollment from another accredited post-secondary institution. Students were coded as transfer students when verification was obtained that they had attended another school within a year after the beginning of their second academic year, except the 1979 class for which the allowable time frame of this study permitted only two quarters.

Statistical Hypotheses

To achieve the purpose of the study and answer some of the general questions, the following null hypotheses were tested.

1. There is no linear relationship between the set of pre-matriculation characteristics (independent variables 1 through 13) and the dependent variable, dropout/non-dropout.

2. There is no linear relationship between the full set of characteristics (independent variables 1 through 22) and the dependent variable, dropout/non-dropout.

3. There is no linear relationship between the set of pre-

matriculation characteristics (independent variables 1 through 13) and the dependent variable, academic/voluntary dropout.

4. There is no linear relationship between the full set of characteristics (independent variables 1 through 22) and the dependent variable, academic/voluntary dropout.

5. There is no linear relationship between the variables suggested by factor analysis and the dependent variable, dropout/non-dropout.

6. There is no linear relationship between the variables suggested by factor analysis and the dependent variable, academic/voluntary dropout.

Analysis of Data

The coded data was scrutinized to insure that the data set accurately reflected the needed information. The data collected in this study was then subjected to both quantitative and qualitative analyses.

Descriptive Analysis

Descriptive statistics were applied to obtain general and comparative information on the sample. The dependent variables were ordered as follows: dropout (academic dropout, voluntary dropout and transfer), non-dropout (persister and stopout), academic dropout, and voluntary dropout (voluntary dropout and

transfer). Questions 1 and 2 concerning the percentage of academic
dropouts, voluntary dropouts, persisters, transfers and stopouts and
the freshmen dropout rate were answered. Crosstabulations were
generated for comparison among the variables of the sample and against
the actual population and respective literature findings.

Analysis of Phenomenological Research

In a review of attrition literature, Tinto (1975) found that
researchers failed to move beyond the mere description of dropouts
and therefore ignored the perspective of the individual student.
Tinto also called for the development of theoretical models which
attempted to explain the processes that lead to dropping out. Socio-
logical theory has provided the following research strategies which
are:

> (1) to enable prediction and explanation of behavior; (2) to
> be useful in theoretical advance in sociology; (3) to be
> useable in practical applications -- prediction and explanation
> should be able to give the practicioner understanding and some
> control of situations; (4) to provide a perspective on behavior --
> a stance to be taken toward data; and (5) to guide and provide
> a style for research on particular areas of behavior.
>
> (Glaser and Strauss, 1967:3)

Applying sociological theory to attrition research permitted
additional understanding of the phenomenon of dropouts while providing
a basis for the development of theoretical models.

Glaser and Strauss presented a phenomenological method of