THE DEVELOPMENT AND TESTING OF A METHOD FOR EARLY IDENTIFICATION OF NONPERSISTING BEGINNING STUDENTS IN THE SCHOOL OF TECHNOLOGY AT OKLAHOMA STATE UNIVERSITY

By

RUSSELL LEE HEISERMAN II

Technician's Certificate
Oklahoma State University
Stillwater, Oklahoma
1954

Bachelor of Science
Oklahoma State University
Stillwater, Oklahoma
1960

Masters of Science
Oklahoma State University
Stillwater, Oklahoma
1962

Submitted to the Faculty of the Graduate College
of the Oklahoma State University
in partial fulfillment of the requirements
for the Degree of
DOCTOR OF EDUCATION
May, 1978

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Thesis Approved:

D S Phillips
Thesis Adviser

Lloyd D Briggs

Eric W. Dreger

Lloyd Wiggins

D. L. Rutledge

Norman N Durham
Dean of the Graduate College

ACKNOWLEDGMENTS

The author expresses his sincere appreciation to all the people who have helped him achieve this personal goal. It is impossible to list them all and to cite the help and encouragement that each has extended, but to each the author is forever grateful.

Dr. Donald S. Phillips, Chairman of the Advisory Committee, has guided the author through this study and has offered invaluable counsel and encouragement at times when they were most needed.

The members of the Advisory Committee have been extremely helpful: Dr. Lloyd Wiggins for a suggestion at the first committee meeting that directed the study toward a more purposeful goal; Dr. Lloyd Briggs and Dr. Cecil Dugger who offered encouragement and direction at every opportunity; and Dr. Delbert Rutledge for giving the author the supportive feeling that he has been in his corner for a goodly number of years, this quiet feeling of support has been a source of strength along the way.

The author is indebted to the School of Technology for the support and opportunities it has granted over the years. The author is especially grateful for having the opportunity to have worked with outstanding educators in Technology, like Paul McCollum (my first teacher), Aaron J. Miller, Richard W. Tinnell, R. B. Faber, and Perry R. McNeill. Their influence over the years has been of immeasurable value.

The author also wishes to thank Craig Robison for collecting the data in GENT 1031, Carolyn Hanes for checking student records, Iris McPherson for data processing, and Deborah Zellmer for an excellent job of preparing the manuscript.

Lastly the author wishes to thank his family. With their understanding and support the author was able to achieve this goal.

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CHAPTER I

INTRODUCTION

During the spring semester many college and university administrators review student attrition figures for the preceeding fall semester. Most administrators are concerned with what they find.

The Administration of the School of Technology at Oklahoma State University is one that is concerned. In the February 12, 1975, Technology Council Meeting Minutes (27), it was reported that the School of Technology had lost approximately 150 students (13 percent of the student body) during the 1974 fall semester. It was felt that most of these students were freshmen enrolled in a post-high school program for the first time. This situation, while not unique to the School of Technology, has persisted at the School of Technology for several years.

The School's administration was concerned enough about this problem to allocate additional resources to improve counseling. It was felt that more emphasis on student counseling could reduce the number of beginning students who leave the School early. It was also felt that these resources and counseling efforts could be best used if directed most intently toward those students with a high expectancy for being early-leavers or nonpersistors.

Statement of the Problem

The problem was that the School of Technology was losing too many beginning students too quickly; there was a general lack of information readily available dealing with early identification of nonpersistors

Need for the Study

It was felt to be important for both students and the School of Technology that the number of nonpersistors be reduced. It was felt to be important to the student that leaves early, since he has dissipated time, money, and effort. It was felt to be important to the School of Technology since the School commits its educational resources on the assumption that students will continue. Reduced numbers of students increase the cost of operation through reduced effective use of resources.

Purpose of the Study

The purpose of this study was to develop and test a method of early identification of beginning students with a high expectancy for leaving the School of Technology during their first academic year.

A questionnaire was developed as the instrument for this identification. This study covers the construction of the questionnaire, how and when it was administered, and interpretation of student responses. A model was formulated based on responses to selected

questions on the questionnaire. This model was then used to identify nonpersistors in a second group of beginning students as a test of the model's effectiveness.

CHAPTER II

REVIEW OF LITERATURE

Representative literature judged to be relevant to the study at hand is reviewed in this chapter. Much of the literature reviewed is concerned with dropouts instead of nonpersistors. Dropping out connotes leaving school while nonpersisting may include transferring to another school or area of study. Characteristics or processes involved for the two groups are similar.

This chapter is organized into five areas of focus and a brief summary that is pertinent to this study. The areas are: (1) A Brief Review of Selected Research that Has Been Done on School of Technology Students, (2) Review of Studies Similar to the One at Hand, (3) Review of Additional Pertinent Studies or Reports on Dropouts, (4) A Summary of Characteristics of Dropouts and Nonpersistors, (5) A Summary of the Dropout Process.

A Brief Review of Selected Research that Has Been Done on School of Technology Students

Miller (22) conducted a study on freshmen in the Oklahoma State University Technical Institute (now the School of Technology) and College of Engineering. He compared dropouts of these programs to see if there were any differences. He found engineering students

to be more theoretically orientated than technical institute students. He also found that the dropout group had a greater need for nurture and had greater general social needs than the non-dropout.

Anderson (2) tried to determine the general characteristics of students served by technical education at several institutions. He concluded that there appeared to be no sweeping generalizations that could be made about the characteristics of students at the institutions he studied.

Faber (11) studied the effect of two algebra courses on achievement in selected courses making up the technical component of a technology curriculum. He found no significant correlation between the algebra course taken and achievement in the selected technical courses.

McNeill (20) compared academic success of native and transfer students in the School of Technology. He found no significant difference in the academic success of those students that persisted for a full four semesters. He did observe an overall student attrition rate of 41.7 percent; 47.5 percent for native students and 31.9 percent for transfer students.

Burson (5) examined the effects of various personal factors on grade-point average of students in an unconventional 2 + 2 program in the School of Technology. Of the six factors studied, only marital status correlated with the student's grade-point average. Married students had a significantly higher grade-point average than single students.

In general, the research that has been conducted on students in the School of Technology has been concerned with characteristics or factors that are associated with academic success in technical programs. These studies have a commonality of objective in trying to identify observable characteristics or factors that could be used in predicting student success. The cited research highlights the long-term interest at Oklahoma State University in trying to establish predictors of success for students in the School of Technology.

Review of Studies Similar to the One at Hand

Foster (12) reports on the third part of a three-part study concerning differences between persistors and nonpersistors in engineering programs. The objective of the study was to relate perceptions of engineering students while still in engineering to their subsequent academic status. The four categories of academic status studied were: (1) remained in engineering, (2) transferred into another major, (3) voluntarily withdrew, and (4) involuntarily withdrew.

Foster's method employed an 88 item questionnaire administered in the spring semester of 1973 to 2,600 freshmen at 39 schools. Responses to the questionnaire were statistically treated using the t-test and Discriminate Function Analysis.

Foster's results indicate that students who transfer have similar characteristics to those who voluntarily withdraw. He also found that 12 items of the questionnaire were the best discriminators among the categories of academic status. His

findings were that motivation, commitment to engineering, and strong high school records are indices of persistors in engineering. The self-image of persistors is stronger than those who leave, and they view their academic environment in a more positive way. Differences in college entrance examination scores were not significant among categories.

Another comprehensive study was the three-year NORCAL study reported by McMillian (18), Phase I, McMillian (19), Phase II, and Dallas (8), Phase III. In Phase I a 112 item questionnaire was administered to 28,000 freshmen entering 27 junior colleges in Northern California. These freshmen were followed through the fall and winter terms. Of the original 28,000 students, 1,436 were identified as dropouts. These 1,436 dropouts were statistically compared to 1,436 randomly selected persistors. Statistical analysis indicated that 9 percent of the questionnaire items accounted for the attrition--persistance of students in college. These items dealt with sex, race, dad's job, major, parental encouragement, importance of college to self, parent's education, keeping a job, need for financial aid, sources of advice, anxiety, and self-concept.

McMillian (18) reported that using the results of the study allowed the development of a hypothetical profile of a dropout. McMillian (19) further reports that out of the study a model was developed and validated which made it possible to identify, individually, students with high potential to withdraw.

However, in Phase III Dallas (8) evaluated the predictors mentioned earlier: "Empirical validity of these as predictors of attrition-prone students proved to be 0.60 only (p. 11)."

Woolsey (35) reports on a study to test the possibility of predicting student withdrawal at North Central Technical Institute before it occurs. Woolsey proposed a hypothetical attrition model with three dimensions. The working dimensions were: (1) predicted ability, including I.Q. and aptitude test scores, (2) demonstrated ability, including high school grade-point average and rank in class, (3) attitudes, measured along semantic differential judgments of school in general and North Central Technical Institute in particular. Information from the first two areas were gathered from student folders and statistically analyzed. The attitude data was gathered in group meetings of freshmen and in individual interviews with the student's major advisor during September of the freshman year.

Woolsey (35) reports that since different majors took different aptitude tests, no correlation was obtained and this dimension of the model was dropped. Woolsey found that at the beginning of the semester all students liked North Central Technical Institute better than school in general, but that dropout attitude toward North Central Technical Institute dropped more than for continuing students. Woolsey also found that the I.Q. of dropouts was significantly higher than the I.Q. of continuing students. Of particular interest was the combination of high I.Q. and relative low high school achievement of dropouts.

Righthand (25) reports on research to identify technical institute dropouts. He administered a series of standardized tests to 263 freshmen in October, 1962, then separated the students into survival and attrition groups in June the following year, with 95 in the survival group and 168 in the attrition group. Discriminate function analysis was used to determine significant differences in the means scored on the tests by the two groups.

Righthand found the characteristics which differentiate the technical institute dropout from the persisting student is the combination pattern of the mathematics portions of the Engineering Science Aptitude Test (EPSAT-M) and the score on the Survey of Study Habits and Attitudes (SSHA). He concluded that this study also substantiated the importance of the role of mathematics in technical education.

Blanchfield (4) used multiple discriminate analysis in an attempt to emphasize predicting potentially successful or dropout students in college. He took the input data from student records for the study.

Blanchfield found that the social consciousness score proved significant in his study. He reports that one can identify by this single variable a dropout or successful student. He found that the successful student has greater concern for social issues. He also found that the percentage of college costs financed by grants was significant, but high school grade point average was not significant. Also that first semester college grades were significant, while all other variables used did not prove significant.

He concluded that the entire area of currently used indicators of student success in college should be re-evaluated. He also concluded that multiple discriminate analysis proved successful (69 to 87 percent) in identifying dropouts.

Review of Additional Pertinent Studies or Reports on Dropouts

Roesler (26) reports on a study to: (1) determine factors contributing to student withdrawal, (2) create a profile of conditions concerning students who withdraw, and (3) ascertain what students did during the first quarter after withdrawing from school. He sent one hundred questionnaires to students, representing 19 percent of the attrition population, that had been enrolled for 12 or more credit hours in degree or diploma programs. Ninety-two forms were returned and formed the information base for his report.

Roesler's (26) results showed that: (1) 37 percent of those that withdrew found employment or entered the military, 17 percent were attending other schools, and 46 percent reported no marketable skills; (2) many reasons were given for withdrawing, but family or personal reasons were cited as the most important reason, with employment and dissatisfaction following in frequency; and (3) median beginning weekly salaries for attrition students were $10 lower than those for alumni.

Astin (3) reports on a study of national scope involving two-year colleges and four-year colleges and universities. Data

were collected through the Cooperative Institutional Research Program of the American Council on Education and involved a four-year followup of the class of 1970.

Astin (3) reports the principle findings as follows: (1) The national dropout rate for four-year colleges and universities was 40 percent with nearly half of those students that left their original institutions having requested that transcripts be sent to another institution. (2) Dropout rates for two-year colleges are higher than those at four-year colleges and universities. Astin felt that these higher rates are attributable to the lower level of motivation and poorer academic preparation of students entering these colleges. (3) The principal predictors of persistence are the students grades in high school and his scores on tests of academic ability. Other predictors include being a man and a nonsmoker; having high degree aspirations at the time of college entrance; financing one's college education chiefly through aid from parents, scholarship, or personal savings; and not being employed during the school year. Astin feels that using these predictors of the student's persistence in a multiple regression equation makes it possible to compute an "expected" persistence rate for individual colleges. He does not attempt to identify individual nonpersistors at a particular institution.

Terry (31) in a study of dropouts in the College of Vocational Education at Louisiana Tech University used personal interviews, letters and long distance calls to collect data from 180 dropouts. Seventy-nine persons who had graduated were randomly selected to form a comparison group. Terry reports that the study shows that

significant predictors may be: (1) high school average, (2) college average, (3) size of hish school, (4) occupation of father and source of financing. He also reports that ACT scores are not reliable predictors of success in college for gifted students and that marriage contributes significantly to the rate of attrition.

Ciampa (7) used an 81 item questionnaire and used a cause appraisal technique to find how Nasson College, Maine could modify its operation and perhaps reduce attrition. The findings of the task force were: (1) the attrition rate of the college was higher than similar schools included in a national sample, (2) attrition tends to be concentrated among the strongest and weakest students. The task force made several recommendations for making minor changes in school operation to reduce attrition. These changes included making sure that school publications presented an accurate view of the college to potential students, that goals of the college were known to potential students, and that faculty and staff work toward actually being the small, personalized, college that students sought. They also recommended change in the curriculum to allow more elective course work.

Summary of Characteristics of Dropouts or Nonpersistors

The NORCAL study, McMillian (18), purposed the following hypothetical profile of a dropout:

1) The potential dropout is likeliest to be Negro, least likely to be Oriental.

2) The potential dropout is likely to be married, or divorced, or separated.

3) The potential dropout is likely to be employed part-time in a job that is not related to the college major program for which he is enrolled.

4) The potential dropout is likely to come from a family that is less affluent, and is likelier to express greater concern over matters of finance and employment.

5) The potential dropout is likely to be both physically and/or psychologically distant from his parent's home: he is less likely to turn to his parents for advice, and is less likely to be living under the same roof.

6) The potential dropout is likely to have less perceived parental encouragement for his college plans.

7) The potential dropout is likely to characterize both parents as less loving, kind, or understanding than his persisting counterpart.

8) The potential dropout shows a lower sense of importance of college.

9) The potential dropout is likely to have lower educational aspirations than the persistors (p. 43).

In phase III of the NORCAL study, Dallas (3) reports that predictors subsequently used were:

1) Male
2) Low importance of college to self
3) Advice sought outside
4) Mother working
5) Unidentified obstacles to continuing college
6) Planning for a higher degree
7) Indefinite about attendance plans
8) High anxiety level
9) Low social maturity level (p. 11).

While McMillian (18) was the only researcher to specify race as a characteristic of dropouts, many of the cited NORCAL characteristics and predictors are supported by other research. Foster (12) in discussing predictors for persistors in engineering cited:

(1) early commitment to engineering, (2) strong vocational goals, parental moral support, (3) strong academic credentials, and (4) perseverance.

Roesler (26) agrees that personal or family reasons are important reasons cited for withdrawal from school. In addition the Subcommittee on Retention (29) at Oklahoma State University strongly supports the importance of the family's influence in persisting or dropping out.

Mehra (21) observed that men and women drop out for different reasons: men mostly due to financial and academic difficulties and women for marriage and loss of study motivation. Klein (16) noted that female students were over-represented in the achiever group and male students were over-represented in the under-achiever group. She further noted that the achiever group indicated a slightly higher educational expectation.

Blanchfield (4) felt that social maturity and consciousness was significant in identifying persistors and dropouts.

Hanna (13) found that dropouts discuss their plans and seek advice outside the college, usually with friends and/or parents. Faculty and other college personnel, when they are consulted, are consulted late in the decision making process.

Van Dyke and Hoyt (33) in a study of secondary school dropouts identified many of the same predisposing factors for dropping out as is cited in the NORCAL study. They found six factors: (1) school too difficult, (2) lack of acceptance, (3) disrespective home situation, (4) financial need, (5) school program inadequate, and

(6) engagement or marriage. Terry (31) agrees that marriage and its subsequent responsibilities contribute significantly to the attrition rate.

In summarizing the findings in the literature regarding characteristics of dropouts and predictors used in identification of dropouts, it appears that an instrument should seek information in a number of areas: (1) family encouragement, (2) importance of college to self, (3) concern about finances, (4) sources of advice, (5) anxiety, (6) self concept, and (7) educational expectations. In addition the instrument should give some attention to high school grades or achievement and how the student perceives the institution he is attending.

Summary of the Dropping Out Process

Hannah (13) points out that while many studies have compared "leavers" and "stayers", few have analyzed the process of leaving, the thoughts and attitudes of students, and those other persons involved while the decision is debated. Hannah asks the questions:

1) When do first thoughts of withdrawal occur?
2) With whom are significant discussions held?
3) What issues are discussed?
4) What attitudes about self and about the college are held as the decisions are made (p. 397)?

Hannah's research attempted to answer these questions. The results of his study indicate that first thoughts of leaving school actually occurred before initial enrollment for 20 percent of those who withdrew during the first and second years of college. He also found that 77 percent indicated that the final decision was made during vacation or periods when college was not in session.

He found that initial discussion concerning withdrawal was with friends of the same sex, parents next, then a friend of the opposite sex. Faculty and other college personnel, when consulted, entered the process later.

Hannah found that attitudes toward self and the college were not strong or clear-cut. Only 10 percent claimed strong feelings of disillusionment with college. About one-third felt relieved or happy about leaving, while 40 percent felt strong anxiety about leaving.

Hannah established that dropping out is a process. It appears to be a process in which college personnel are little involved or are involved late in the decision making process.

Van Dyke and Hoyt (33) established that dropping out of a secondary school is a true process and not a simple event. As a process, dropping out was seen as involving the interaction of predisposing, precipitating and counteracting forces in the student's environment with similar forces existing within the general personality makeup of the student. The author felt that if potential dropouts were identified early, attempts could be made on the part of the school personnel to avoid contributing to a student's withdrawal from school.

The report from the Subcommittee on Retention (29) referred to comments by R. L. Muth in a conference on college attrition. Muth noted that most students program themselves for persistence or withdrawal during the first eight weeks of college.

Most of the researchers agreed that dropping out was a true process that begins early in the student's career and reaches the final stages of decision making prior to the eighth week of school. It also seemed to be a process that involved few members of the college staff.

Summary

It appeared reasonable in the search for predictors of nonpersistors to lump dropouts and transfer students in a group having similar characteristics, Foster (12). It also appeared more fruitful to consider the characteristics and factors affecting attrition as a multifaceted problem rather than trying to detect a single factor for predicting persisting or nonpersisting.

The questionnaire seemed to be a tool that could be used to investigate how the student perceived many aspects of his involvement with education. It also seemed probable that a questionnaire could be constructed that would aid in the early identification of groups of students with a high expectancy for withdrawing.

The literature also suggests that early identification activities must be started quickly during the first semester and that identification activities be completed prior to the eighth week of school. Woolsey (35) implies that it would be beneficial to measure student perceptions in certain areas at more than one time during the critical period. He observed a greater decline in the dropouts' feeling toward the school they were attending than observed for persistors.

CHAPTER III

METHODOLOGY

The objective of this study was to develop and test a method of early identification of beginning students with a high expectancy for leaving the School of Technology during their first academic year. The initial problems were to identify the students to be studied and construct the instrument for the study. Next a delivery technique had to be established to insure a high return rate. The responses had to be statistically analyzed and a model developed to identify beginning students with a high expectancy for leaving. This model was then validated using a second class. These activities are discussed in this chapter.

Definition of Terms

The following definitions were developed to help clarify how these terms were used in this report and throughout the study. They admittedly may differ from more strict definitions of these terms when used in a broader sense.

Beginning Students--Those Freshmen students enrolled in the School of Technology taking the orientation course, 1031, whose records indicate that this was their first post-high school enrollment.

Best Model--The derived formula using the Stepwise Discriminate Analysis Program that was most accurate in identifying nonpersistors. If more than one formula is so identified, the one requiring the least amount of data gathering would be selected as "best".

Dropouts--Students who leave school to engage in an activity other than organized education.

Instrument--The questionnaire developed for the purposes of this study.

Items--The individual questions that make up the questionnaire used in this study.

Matched Pairs--When a student responds to the questionnaire both times that it is administered and the student is determined to be a beginning student, then a matched pair of usable questionnaires exist for study.

Nonpersistors--Those beginning students that leave the School of Technology during the first two semesters of school. They may be dropouts or transfer to another school or college on or off campus.

Persistors--A beginning student that remains in the School of Technology for the first two semesters.

Response--The beginning student's answer to an individual item on the questionnaire.

Response Change--A change in the beginning student's response to a particular item on the questionnaire for the two times the instrument was administered.

Assumptions

The following assumptions were made for the purposes of this study. These assumptions are necessary to aid in developing limitations that this study may have.

1. The students studied in this research were representative of previous and future beginning students in the School of Technology
2. The first few weeks of the first semester of school are the most critical for purposes of identifying nonpersisting beginning students.
3. Students will respond honestly each time to the items making up the questionnaire.

Hypotheses

The following hypotheses were tested for each item on the questionnaire to determine those items most effective in identifying nonpersistors.

1. There will be no significant difference in the way persistors and nonpersistors respond to the individual items on the instrument the first time it is administered.
2. There will be no significant difference in the way persistors and nonpersistors respond to the individual items on the instrument the second time it is administered.
3. There will be no significant difference in the response change of persistors and nonpersistors for the individual items on the instrument between the first and second time the instrument is administered.

Selection of the Subjects

The subjects selected for this study were students enrolled in the School of Technology. They were enrolled in the required General Technology (GENT) Freshman Orientation course, GENT 1031. Those students so enrolled and whose records indicated that this was their first enrollment in a post-high school program were the subjects selected for this study.

Development of the Instrument

The questionnaire was developed to seek student responses in the areas identified in Chapter II. These areas were: (1) family encouragement, (2) importance of college to self, (3) concern about finances, (4) sources of advice, (5) anxiety, (6) self concept, (7) educational expectations, (8) high school performance, and (9) perception of the institute being attended.

Questions were developed or rewritten using guidance from Foster's study (12) and NORCAL study (18) (19) (8). Attention was given to the construction of the questionnaire using the advice gleaned from a monograph on developing a questionnaire (9), a book on asking questions by Payne (23) and a book on response scale selection by Edwards (10). A draft questionnaire was completed in June 1975, and reviewed by four fellow staff members. They offered recommendations on the organization of the questionnaire, wording of selected items, and word choice used in some items.

The questionnaire was revised in July, 1975, and pretested using three students attending summer school in the School of Technology

and two high school students. They were asked to comment on the clarity of each question, reading level and overall organization of the questionnaire. Only minor adjustments in language seemed necessary based on this pretest and student review.

Considerations used in developing the questionnaire were:

1. The student was quickly appraised of the fact that the questionnaire was confidential. Edwards (10) points out that this is necessary when seeking opinions as the respondants may be reluctant to make public their feelings or attitudes on controversial issues and may respond with what they feel is socially acceptable.
2. Subject identification was pursued by asking for the student's name (printed), social security number and date of birth.
3. The student was asked to sign a statement to allow the researcher access to their academic records. (See Appendix A).
4. Detailed instructions were given the student as recommended in the monograph on developing a questionnaire (9).
5. The first two questions were used to further familiarize the student with what was expected and how the response scale could be interpreted.
6. The Likert response scale was used for most of the questions. This response scale was highly recommended by Edwards (10) who cited research that claimed a correlation of 0.99 with more complicated response scales.

7. The semantic differential scale was used to develop a self-image profile on the final fourteen questions.
8. Throughout the development of the questionnaire the author used a response space that could be checked if the student or reviewer felt the question was unclear. This feature was left in the final form of the questionnaire to detect any poor questions that might have slipped through the development phase. No questions were found to be not understood by students using the final questionnaire.
9. About half the questions were asked in positive form and half in negative form on a random basis so that the respondent would not take a response set. This strategy was recommended by both Edwards (10) and in the monograph on developing a questionnaire (9).
10. The questionnaire was made lengthy to counter remembering responses.

The final instrument was prepared in August 1975, and class quantities made available to the instructor of GENT 1031. The final instrument is displayed in Appendix A. Table I below is a summary of which questions are associated with which areas of inquiry.

TABLE I

QUESTIONS ASSOCIATED WITH PARTICULAR AREAS OF INQUIRY

Area of Inquiry	Questions
1. Family Encouragement	3, 13, 21, 23, 25, 30, 40, 46, 51
2. Importance of College to Self	4, 10, 14, 22, 24, 32, 35
3. Concern About Finances	5, 16, 26, 37, 38, 49
4. Sources of Advice	6, 17, 27, 34, 39, 48
5. Anxiety	8, 18, 31, 42
6. Self Concept	12, 29, 45, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65
7. Educational Expectations	9, 11, 15, 19, 20, 33, 44
8. High School Performance	1, 43
9. Perception of Institute Being Attended	2, 7, 28, 36, 41, 47, 50

Collection of the Data

The questionnaire was administered during the second class meeting of GENT 1031 and during the fifth class meeting in the fall of 1975. Since GENT 1031 met once a week this allowed the administration of the instrument during the identified critical period. The second class meeting was chosen because the first period usually has high absenteeism. The class meeting during the fifth week was selected because students would be under stress as the

first examination period would be in progress in most of their courses. The School of Technology operates on a 16 week semester basis, so first testing usually occurs in the fourth and fifth weeks of school.

The questionnaire was to be voluntary for the students. Therefore the questionnaire was passed out to the students late during the second class period with instructions to complete them outside of class and bring them to class next time. This procedure led to a low yield of returns, only 47 questionnaires returned out of a potential for 208 returns, this being the number of students carried on the class role.

The second time the questionnaire was administered, during the fifth week of school, time was made available for the student to complete the questionnaire in class and turn it in. This technique yielded 109 responses. It was decided that this technique would be used for all future study. Only 30 matched sets of the questionnaire were obtained from this class.

During the fall of 1976 the questionnaire was again administered during the second and fifth weeks of school. Both times the student completed and turned in the questionnaire before leaving class. This collection technique led to 125 matched sets of usable questionnaires from this class out of a potential of 201.

Analysis of the Data

The questionnaires were organized into matched pairs for each class. In June 1976, student records were reviewed for those

students having responded to the instrument during the fall of 1975, students were verified to be beginning students and classified as persistors or nonpersistors.

This same technique was followed in June 1977, for the students having responded to the questionnaire in the fall of 1976. This led to 30 usable matched sets from the class studied in 1975 and 125 usable matched sets from the class studied in 1976.

In reviewing the study with Professors Warde (34) and Halbert (14) of the O.S.U. Statistics Department as to best statistical strategies to use for this study, worthwhile recommendations emerged. These recommendations included:

1. Use of the larger sample obtained in 1976 for testing the hypotheses and developing a model for identifying nonpersistors.
2. Use the smaller sample obtained in 1975 to validate the model.
3. Verification of the author's intent of using the t-test for testing the hypotheses.
4. Use Stepwise Discriminate Analysis to determine the model for classifying beginning students as persistors or nonpersistors.

Both the t-test and Stepwise Discriminate Analysis programs are canned programs available at the Computer Center as part of the Statistical Analysis System (SAS).

The 1976 student responses were then coded. The coded information was transferred to punched cards for computer use in the t-test.

The t-test identified those items on the questionnaire for which the hypotheses were rejected at the .05 level of significance. The critical items were then used in the Step Wise Discriminate Analysis Program to determine the best model or formula for catagorizing beginning students as persistors or nonpersistors.

The model was applied to the data of the key items of the class of 1975. The computer was not told which catagory these students were in, but was instructed to classify them as persistors or nonpersistors using the model and the input data. The computer classification was compared, manually, to the actual classification of these students to validate the model's ability to accurately identify nonpersistors for an independent sample.

Limitations

The instrument developed for this study was to deal with beginning students in the School of Technology only. If this technique were to be tried with other groups, the questionnaire should be modified, a new model developed and verification of the new model's effectiveness should be completed prior to instituting the use of this technique.

CHAPTER IV

RESULTS

The results of the study are presented in this chapter. The chapter is divided into four sections: (1) Background, which covers return rates and the number of usable pairs of questionnaires obtained for use in the study; (2) Analysis and Model Development, which covers the testing of each hypothesis using the t-test and the use of Stepwise Discriminate Analysis to produce models for identifying beginning students with a high expectancy for nonpersisting; (3) Model Selection, which covers a comparison of the models developed and the selection of the "best" model for identifying beginning students with a high expectancy for nonpersisting; and (4) Validation, which covers the results of applying the "best" model to a separate class and comparing model prediction to the actual.

Background

The questionnaire was administered to students enrolled in GENT 1031 during the second and fifth weeks of school in the fall of 1975. Table II indicates the return rate of the questionnaires by indicated major.

The return rate was better during the fifth week when the collection procedure was modified. There were a total of 208 students

carried on the class role, but only 197 eligible for the study. The returns for the class responding in 1975 resulted in 30 matched pairs of questionnaires usable for this study.

TABLE II

RETURN RATE OF THE INSTRUMENT BY INDICATED MAJOR FOR STUDENTS ENROLLED IN GENT 1031 IN THE FALL OF 1975

Major	Number of Returns (Second Week of School)	Number of Returns (Fifth Week of School)
Aeronautical Technology	6	11
Construction Management	10	12
Electrical Power Technology	1	6
Electronics Technology	4	21
Fire Protection and Safety	6	9
General Technology	1	0
Mechanical Design	3	10
Petroleum Technology	4	4
Radiation Nuclear Technology	6	13
Mechanical Power Technology	3	11
Other	0	4
No Response	3	8
TOTAL	47	109

The questionnaire was again administered to students enrolled in GENT 1031 during the second and fifth weeks of school in the fall of 1976. Table III indicates the return rate of the questionnaire by indicated major.

The return rates were better in 1976 due to using the improved collection technique developed in the fifth week of 1975. There were 209 students carried on the class role with 201 eligible for the study in 1976. The returns for the class responding in 1976 resulted in 125 matched pairs of questionnaires usable for the study.

It was decided that the larger sample obtained in 1976 would be used for analysis and model development. After the models were developed, they were compared and a "best" model selected for the validation study. The appropriate data from the 1975 sample would be used in the "best" model for validation.

Analysis and Model Development

The data for the 125 matched pairs of questionnaires were fed to the computer with information as to the persistor-non-persistor classification of each respondent. There were 27 identified nonpersistors, for this group, determined by reviewing student records. The t-test program analyzed the response means of each item on the questionnaire for the first time it was administered to test Hypothesis 1. The t-test then analyzed the response means of each question on the questionnaire for the second time it was administered to test Hypothesis 2. The t-test program then computed

TABLE III

RETURN RATE OF THE INSTRUMENT BY INDICATED MAJOR FOR STUDENTS ENROLLED IN GENT 1031 IN THE FALL OF 1976

Major	Number of Returns (Second Week of School)	Number of Returns (Fifth Week of School)
Aeronautical Technology	18	15
Construction Management	16	17
Electrical Power Technology	10	6
Electronics Technology	43	30
Fire Protection and Safety	28	22
General Technology	7	3
Mechanical Design	16	14
Petroleum Technology	18	18
Radiation Nuclear Technology	3	3
Mechanical Power Technology	14	8
Other	5	1
No Response	2	7
TOTAL	180	144

the difference in response to each question on the questionnaire (first response - second response) and analyzed the means of each difference in response to each question to test Hypothesis 3.

The t-test program first tested the variances of the two groups (persistors and nonpersistors) using the F-test. The program then used the proper model of the t-test equation, separate variance t-model or pooled variance t-model as recommended by Popham (24) to compute the t-value. The program also determined the degrees of freedom to use in the selected t-model, computed the t-value and the level of significance. The researcher rejected the hypotheses for items on the questionnaire at the .05 level.

The items identified as those where the hypotheses were rejected were thought by the author to be the items most sensitive to differences between persistors and nonpersistors. These items were used to develop models to catagorize beginning students as persistors or nonpersistors.

Table IV is a summary of the t-test output for those questions where Hypothesis 1 was rejected. The table includes the question, identification of the two groups (1 = persistor, 0 = nonpersistor), the number of respondents to the question (N), the mean value of the group's response to the question (MEAN), and the computed level of significance (PROB>ITI).

Table V is a summary of the t-test output for those questions where Hypothesis 2 was rejected. The table includes the question, identification of the two groups, the numbers of respondents to

TABLE IV

A SUMMARY OF THE t-TEST OUTPUT FOR THOSE ITEMS WHERE HYPOTHESIS 1 WAS REJECTED

	Question	Group	N	Mean	PROB>ITI
(3)	My family is happy about my going on to school.	0*	27	1.11111111	
		1**	97	1.46391753	0.0001
(8)	I worry about my poor study habits.	0	27	2.37037037	
		1	97	3.17525773	0.0030
(13)	My family is helping me go to school.	0	27	1.66666667	
		1	97	2.24742268	0.0090
(24)	A college education is important to me because of its economic value.	0	27	1.51851852	
		1	97	2.02061856	0.0276
(31)	I worry about my future.	0	27	2.00000000	
		1	97	2.63541667	0.0204
(44)	A college education is not really important anymore.	0	27	4.44444444	
		1	96	3.98958333	0.0302
(46)	I can count on my family if a money problem comes up.	0	26	1.65384615	
		1	96	2.26041667	0.0185
(50)	The campus is big, but everyone has been helpful.	0	27	1.70370370	
		1	98	2.07142857	0.0454

*Group 0 = nonpersistors
**Group 1 = persistors

the question, the mean value of the group's response to the question and the computed level of significance.

TABLE V

A SUMMARY OF THE t-TEST OUTPUT FOR THOSE QUESTIONS WHERE HYPOTHESIS 2 WAS REJECTED

	Question	Group	N	Mean	PROB>ITI
(8)	I worry about my poor study habits.	0*	27	2.40740741	
		1**	97	2.92783505	0.0324
(12)	I ask a lot of questions in class.	0	27	3.74074074	
		1	96	3.14583333	0.0051
(39)	Friends and other students are my main source of advice about school.	0	27	2.81481481	
		1	97	2.38144330	0.0213

*Group 0 = nonpersistors
**Group 1 = persistors

Table VI is a summary of the t-test output for those questions where Hypothesis 3 was rejected. The table is organized in the same way as Tables IV and V. A complete summary of the t-test output for all questions is included as Appendix D.

Data for the items where a hypothesis was rejected was programmed into the computer. The computer used Stepwise Discriminate Analysis

to produce models for catagorizing beginning students as persistors or nonpersistors. The computer developed three models and compared its prediction based on a particular model to the actual classification of the students. It then summarized the succes of that particular model.

TABLE VI

A SUMMARY OF THE t-TEST OUTPUT FOR THOSE QUESTIONS WHERE HYPOTHESIS 3 WAS REJECTED

	Question	Group	N	Mean	PROB>ITI
(12)	I ask a lot of questions in class.	0*	27	-0.29629630	
		1**	95	0.21052632	0.0215
(26)	I have money problems, but no one seems interested in helping.	0	27	0.59259259	
		1	95	0.18947368	0.0228
(39)	Friends and other students are my main source of advice about school.	0	27	-0.40740741	
		1	95	0.28421053	0.0050
(64)	Talkative ----- Quiet	0	27	0.33333333	
		1	97	-0.10309278	0.0375

*Group 0 = nonpersistors
**Group 1 = persistors

Each model produced by the computer was of the form:

$$Y = K1(R1) + K2(R2) = \ldots\ldots KN(RN) + C,$$

where the K's are called coefficients for cononical variables, the

R's are the students coded responses to identified sensitive items on the questionnaire. The responses were coded as follows:

1 = Strongly Agree

2 = Agree

3 = Can't Say

4 = Disagree

5 = Strongly Disagree

6 = Don't Understand.

The C's are constants used in the models and the Y's are numbers that are computed and then compared to a threshold number. If Y is greater than the threshold number, then the subject is classified as a nonpersistor. If Y is less than or equal to the threshold number, then the subject is classified as a persistor. The three models developed using Stepwise Discriminate Analysis are presented along with a summary table of how well each model was able to predict.

Model A was based on the eight identified items on the questionnaire for the first time the questionnaire was administered during the fall of 1976. The model was:

$$Y = (-0.72016)(R3) + (-0.42400)(R8) + (-0.06214)(R13) + (-0.12796)(R24) + (-0.34638)(R31) + (0.40854)(R44) + (-0.19534)(R46) = (-0.18469)(R50) = 2.62261.$$

Again, the R's are the coded student responses to questions 3, 8, 13, 24, 31, 44, 46 and 50 identified in Table IV as those questions where Hypothesis 1 was rejected.

Using this model, the computer printed out a histogram of the actual student classification indicated by the letter A or B

but showing where the students would have been placed using the model. The computer also computed the threshold number for Model A to be: 0.36685. Figure 1 is the histogram of the computer prediction based on Model A, with the mean of each group identified and the threshold number identified.

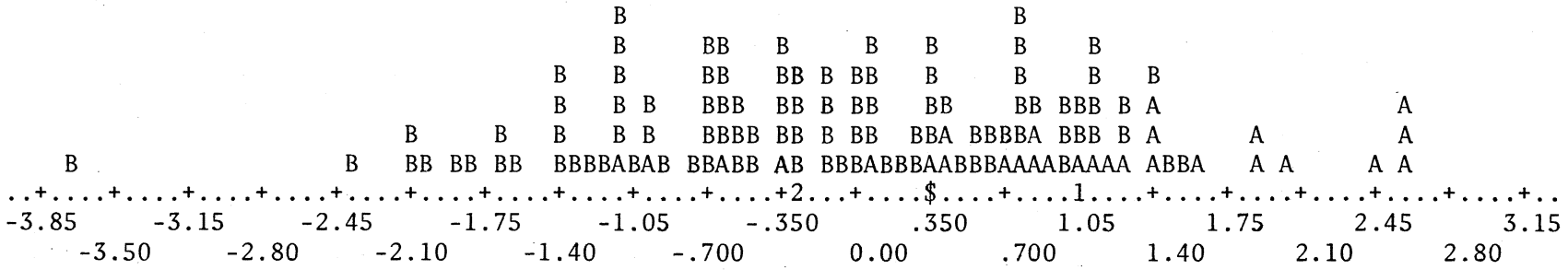
Table VII is a summary table of how well Model A performed when comparing the model's predictions to the actual classification of the students. It can be seen that the model classified 47 students in GROUP 0 and was in error 26 times when compared to the student's actual classification. However, the sample that the model classified as GROUP 0 actually contained 21 out of the 27 identified actual nonpersistors. This model identified a sample of students that contained 77.8 percent of the actual nonpersistors.

Model B was based on the three identified items on the questionnaire for the second time the questionnaire was administered during the fall of 1976 where Hypothesis 2 was rejected. The model was:

$$Y = (-0.36574)(R8) = (0.67430)(R12) + (0.54166)(R39) - 2.48882.$$

Again, the R's are the coded student responses to questions 8, 12, and 39 identified in Table V as those questions where Hypothesis 2 was rejected.

Using this model, the computer printed out a histogram of the actual student classification indicated by the letter A or B, but showing where the student would have been placed using the model. The computer also computed the threshold number for Model B to be: 0.24455. Figure 2 is the histogram of the



On the axis $ indicated dividing point and numbers the group means

LEGEND: A = Group 0
B = Group 1
1 on Axis is $\overline{X}$ for Group 0
2 on Axis is $\overline{X}$ for Group 1
$ on Axis is Threshold

$\overline{X}$ for Group 0 = 1.01670
$\overline{X}$ for Group 1 = 0.28300

$$\text{Threshold} = \frac{1.01670 - 0.28300}{2}$$

$$= 0.36685$$

Figure 1. Histogram of Model A

computer predictions based on Model B, with the mean of each group identified and the threshold number identified.

TABLE VII

CLASSIFICATION MATRIX USING MODEL A

Actual	Number of Cases Classified into: Group 0	Group 1
Group 0*	21	6
Group 1**	26	71
Total	47	77

Sample classified as nonpersistors contained 21 of the 27 actual nonpersistors for an effectiveness of: $\frac{21}{27} \times 100 = 77.8$ percent

*Group 0 = nonpersistors
**Group 1 = persistors

Table VIII is a summary table of how well Model B performed when comparing the model's predictions to the actual classification of the students.

It can be seen that Model B classified 49 students in GROUP 0 and was in error 34 times when compared to the student's actual classification. However, the sample classified as GROUP 0 by the model contained 15 of the 27 actual nonpersistors for an effectiveness of 55.8 percent.

```
                                       B
                                       B
                                       B   B
                                       B   B
                            B          B   B
                            B     B    B   B
                  B         B     B    B   B       B       B     B  B
                  B         BB    B    B   A    B  B B  B  B     B  B
                  B    B    BB  B B    B   A  B B  B BB B  B     B  B
                  B BB B    AB  B B  B B B A BB B BB AB A  B     A  A
BB       B BBB B  B BB A  B AA BBBBABB ABBAABABBABBBBAB AA A  B  A  A     A  A           A     A
...+...+....+....+....+....+....+....+.2..+...$+...+1...+....+....+....+....+....+....+....+....+....+....+....+.
 -2.4     -1.8      -1.2      -.60       0.0      .60       1.2       1.8       2.4       3.0       3.6
      -2.1      -1.5      -.90      -.30       .30      .90       1.5       2.1       2.7       3.3
```

On the axis $ indicates dividing point and numbers the group means.

LEGEND: A = Group 0
B = Group 1
1 on Axis is $\overline{X}$ for Group 0
2 on Axis is $\overline{X}$ for Group 1
$ on Axis is Threshold

$\overline{X}$ for Group 0 = 0.67775
$\overline{X}$ for Group 1 = 0.18865

$$\text{Threshold} = \frac{0.67775 - 0.18865}{2}$$

$$= 0.24455$$

Figure 2. Histogram of Model B

TABLE VIII

CLASSIFICATION MATRIX USING MODEL B

Actual	Number of Cases Classified into: Group 0	Group 1
Group 0*	15	12
Group 1**	34	63
Total	49	75

Sample classified as nonpersistors contained 15 of the 27 actual nonpersistors for an effectiveness of: $\frac{15}{27} \times 100 = 55.8\%$

*Group 0 = nonpersistors
**Group 1 = persistors

Model C was based on the four identified items of the questionnaire for the differences in response for the two times the questionnaire was administered during the fall of 1976 for the questions where Hypothesis 3 was rejected. The model is"

$$Y = (-0.32153)(D12 + (0.68406)(D26) + (-0.81416)(D39 + (0.42815)(D64) - 0.05196.$$

The D's are the student difference in response for the two times the questionnaire was administered. The D's are computed by taking the student's second response to a question from his first response (First Response - Second Response). The differences were computed for questions 12, 26, 39, and 64 identified in Table VI as those questions where Hypothesis 3 was rejected.

Using this model, the computer printed out a histogram of the actual student classification indicated by the letter A or B, but showing where the student would have been placed using the model. The computer also computed the threshold number for Model C to be: 0.32684. Figure 3 is the histogram based on Model C with the mean of each group identified and the threshold number identified.

Table IX is a summary table of how well Model C performed when comparing the model's predictions to the actual classification of the students.

TABLE IX

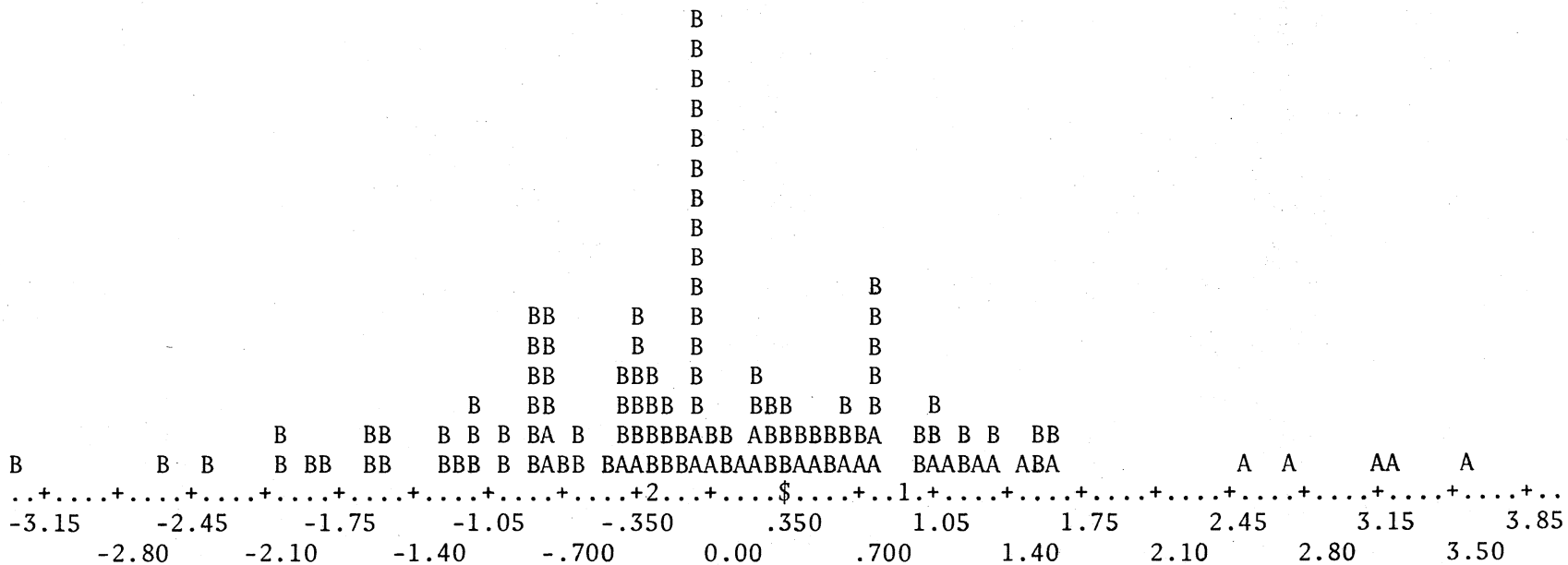
CLASSIFICATION MATRIX USING MODEL C

Actual	Number of Cases Classified into: Group 0	Group 1
Group 0*	17	10
Group 1**	25	72
Total	42	82

Sample classified as nonpersistors contained 17 of the 27 actual nonpersistors for an effectiveness of: $\frac{17}{27} \times 100 = 68.0\%$.

*Group 0 = nonpersistors
**Group 1 = persistors

It can be seen that Model C classified 42 students in GROUP 0 and was in error 25 times when compared to the student's actual



On the axis $ indicates dividing point and numbers the group means.

LEGEND: A = Group 0
B = Group 1
1 on Axis is $\overline{X}$ for Group 0
2 on Axis is $\overline{X}$ for Group 1
$ on Axis is Threshold

$\overline{X}$ for Group 0 = 0.92300
$\overline{X}$ for Group 1 = 0.25694

$$\text{Threshold} = \frac{0.92308 - 0.25694}{2}$$

$$= 0.32684$$

Figure 3. Histogram of Model C

classification. However, the sample classified as GROUP 0 by the computer contained 17 of the 27 actual nonpersistors for an effectiveness of 63.0 percent.

Model Selection

Table X summarizes the salient characteristics of the three models developed from questionnaire data.

TABLE X

SUMMARY OF MODEL CHARACTERISTICS

Model	Sample Size Catagorized as Group 0*	Number of Actual Group 0 in Sample	Total Number of Actual Group 0
Model A	47	21	27
Model B	49	15	27
Model C	42	17	27

*Group 0 = nonpersistors

As can be seen in Table X all samples catagorized as Group 0 by the various models are of comparable size. However, the sample catagorized by Model A contains the highest number of actual non-persistors. The researcher, therefore, felt that Model A was the "best" model for use in early identification of beginning students with a high expectancy for non-persisting. Model A was used for the validation study.

Validation

Since Model A required input from the first time the questionnaire was given, the 47 returned questionnaires were reviewed along with student records. It was found that 40 of the subjects were beginning students and had responded to the key questions required for the model.

The data for these 40 cases were coded and programmed into the computer which was told to use Model A to make its classification. The actual classification of the 40 students was not programmed into the computer

Table XI is a summary table of how well the model performed when comparing the model's predictions to the actual classification of the subject as indicated by their records. The sample of nonpersistors classified by the computer contained five of the eight actual nonpersistors. The validation study shows an effectiveness of 62.5 percent.

TABLE XI

CLASSIFICATION MATRIX USING MODEL A AND DATA FROM AN INDEPENDENT CLASS FOR VALIDATION

Actual	Number of Cases Classified into: Group 0	Group 1
Group 0*	5	3
Group 1**	7	25
Total	12	28

Sample classified as nonpersistors contained 5 of the 8 actual nonpersistors for an effectiveness of: $\frac{5}{8} \times 100 = 62.5\%$

*Group 0 = nonpersistors
**Group 1 = persistors

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The purpose of this study was to develop and test a method of early identification of beginning students with a high expectancy for leaving the Oklahoma State University School of Technology during their first academic year.

The objective of the study was to develop a model that could identify a group of students with a high expectancy for nonpersisting.

A questionnaire was developed and administered to students enrolled in GENT 1031, a freshman orientation class in the School of Technology, during the second and fifth weeks of the fall semesters of 1975 and 1976. The t-test was used to compare group means of the responses for each individual item on the questionnaire.

The t-test yielded those items on the questionnaire that were significant at the 0.05 level. These identified items were used as the discriminators for catagorizing students as persistors or nonpersistors. The items identified at the 0.05 level were used in a Stepwise Discriminate Analysis program to produce models or formulas that could be used for catagorizing students as persistors or non-persistors. Three models were produced by the Stepwise Discriminate

Analysis program. These three models were compared to determine the most effective model. The most effective model was used in a validation study using appropriate data from the questionnaire returned by the 1975 class. In the validation study, the model catagorized a group of students as nonpersistors that contained 62.5 percent of those students that were actual nonpersistors as determined by reviewing student records.

Conclusions

1. A questionnaire can be designed that yields items significant at the 0.05 level. These identified items can be used to catagorize students as persistors or non-persistors.
2. Only a few items on the questionnaire were significant at the 0.05 level. This finding is in keeping with results reported in the literature. McMillian (18) reported only 9 percent of the items on a 112 item questionnaire as being significant in discriminating between persistors and nonpersistors. Foster (12) reported only 12 items on an 88 item questionnaire as being effective discriminators.
3. The three models developed using the questionnaire items significant at the 0.05 level and Stepwise Discriminate Analysis were able to identify groups of students that contained more than half of the actual nonpersistors.
4. The three models had varying degrees of effectiveness in terms of catagorizing groups of students as nonpersistors

when compared to the number of actual nonpersistors included in that group.

5. The most effective model had an effectiveness of 77.8 percent for the 1976 class for which the data was used to develop the model. This same model was 62.5 percent effective when validated using data from the 1975 class. These levels of effectiveness are comparable to those reported in the literature. Dallas (8) reported that the empirical validity of the predictors identified in the NORCAL study was 60 percent.
6. Administering the questionnaire early in the first semester is most effective. There were eight items significant at the 0.05 level identified when the questionnaire was administered during the second week of school, compared with only three items identified when the questionnaire was administered during the fifth week of school.

Recommendations

After concluding this study, the author felt that additional questions need to be studied. These recommendations are based on the findings of this study and on the author's experiences during the study.

1. This technique for early identification of nonpersistors should be implemented by the counseling services in the School of Technology. The model developed in this study is effective enough to make more selective use of counseling

resources. At the time of this writing, the author reviewed the current status of the seven individuals catagorized as nonpersistors by the model, but were found to be persistors using the definition used in the validation study. Two of these seven students have left the School of Technology. Thus, by liberalizing the definition of nonpersistors, the effectiveness of the validation study would be 70 percent instead of the 62.5 percent reported.

2. The counseling services of the School of Technology should initiate research on treatments for groups of students identified by the model as nonpersistors. This effort could identify treatments that are effective in reducing the number of actual nonpersistors in the School of Technology.
3. The same approach to early identification of nonpersistors should be studied for similar populations at other institutions. This research could determine a wider applicability of the technique.
4. The same approach to early identification of nonpersistors should be studied for other populations on the Oklahoma State University campus. This research could determine a wider applicability of the technique.
5. Additional research should be done on the instrument in an attempt to increase the number of items significant at the 0.05 level. The author feels that more significant items, used as discriminators in the model, can lead to models with higher effectiveness.

6. A study that might yield information about the characteristics separating persistors and nonpersistors would involve determining why the particular items on the questionnaire found to be significant were answered the way they were by the two groups. This kind of study by a properly trained researcher could give guidance in developing more effective questionnaires as well as more clearly defining personal characteristic differences between persistors and nonpersistors.
7. Repeat the same study reported in this paper for several years to test the assumption that the class used for developing the model is typical of future classes.

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APPENDIX A

THE INSTRUMENT

FRESHMAN

QUESTIONNAIRE

Date _____

Name (Print) _____

Social Security Number _____ - _____ - _____

Date of Birth _____

Subject being studied at O.S.U. (Major) _____

Sex: ○ male ○ female

The school official performing this research, has my permission to examine my school records with regard to my academic progress.

_____

Signature

INSTRUCTIONS

This questionnaire is treated as confidential.

Your responses will be used for computing statistical trends of freshmen. Your individual responses will be kept secret.

Please read the following instructions, then respond to the questionnaire honestly and candidly. Thank you.

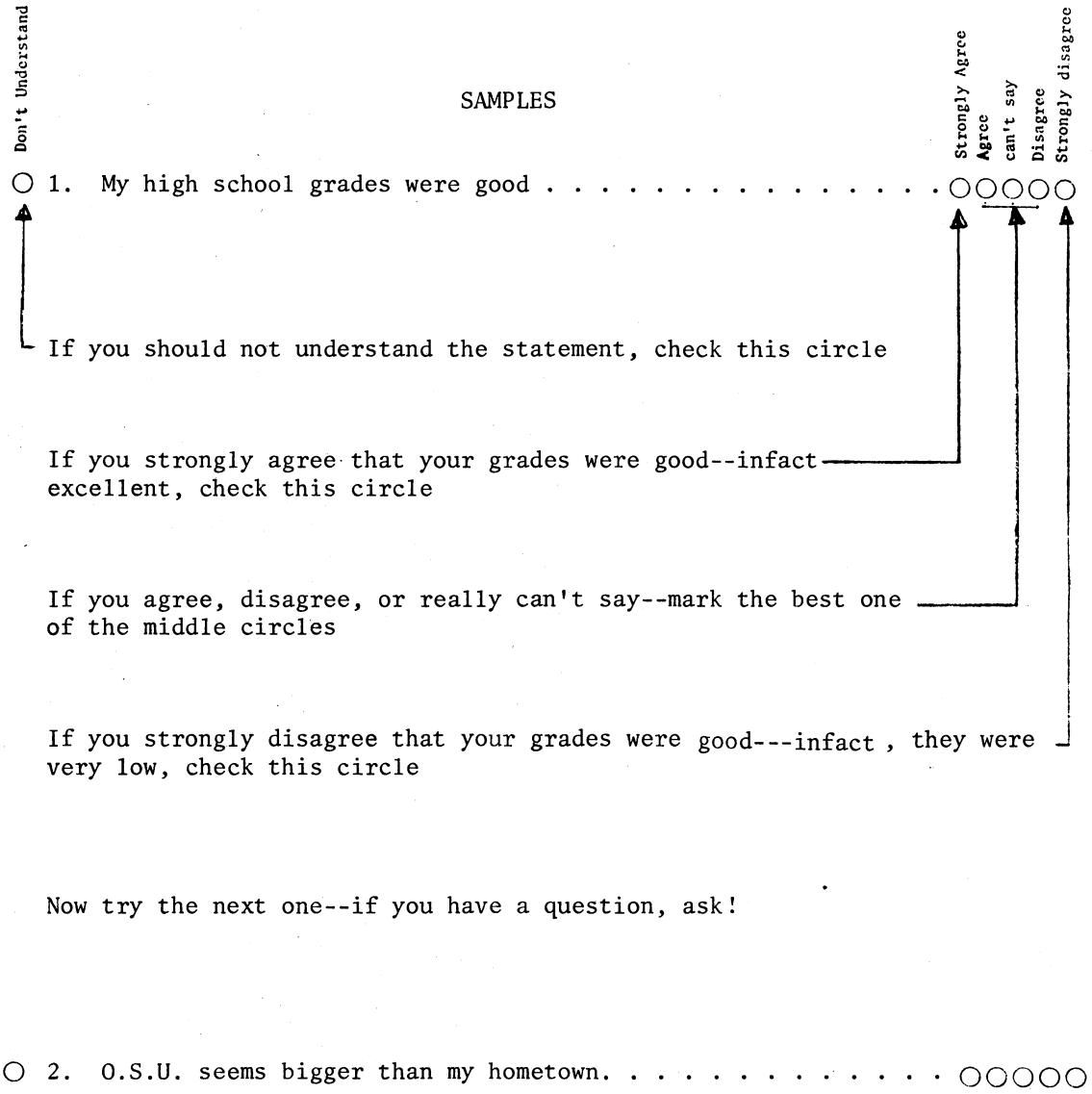
(1) Read each statement carefully.

(2) Check the circle closest to your first reaction to the statement (check only one) ⊘

(3) Keep in mind there are no "right" or "wrong" answers.

(4) If you do not understand a question or statement, check the circle by the question number.

Now turn to the next page for two samples.


Don't Understand
SAMPLES
Strongly Agree
Agree
can't say
Disagree
Strongly disagree
1. My high school grades were good . . . . . .
If you should not understand the statement, check this circle
If you strongly agree that your grades were good--infact excellent, check this circle
If you agree, disagree, or really can't say--mark the best one of the middle circles
If you strongly disagree that your grades were good---infact , they were very low, check this circle
Now try the next one--if you have a question, ask!
2. O.S.U. seems bigger than my hometown. . . . . .
ALL SET -- Continue

Don't Understand			Strongly Agree	Agree	can't say	Disagree	Strongly disagree
O	3.	My family is happy about my going on to school	O	O	O	O	O
O	4.	A college education is important for men	O	O	O	O	O
O	5.	I worry a lot about money for my education	O	O	O	O	O
O	6.	Teachers are my main source of advice about school	O	O	O	O	O
O	7.	It is easy to get to know other students on campus	O	O	O	O	O
O	8.	I worry about my poor study habits	O	O	O	O	O
O	9.	I plan to make good grades	O	O	O	O	O
O	10.	I don't really know why I came to school	O	O	O	O	O
O	11.	I plan to go to graduate school someday.	O	O	O	O	O
O	12.	I ask a lot of questions in class	O	O	O	O	O
O	13.	My family is helping me go to school	O	O	O	O	O
O	14.	A college education is important to me	O	O	O	O	O
O	15.	I want to be a TECHNOLOGIST	O	O	O	O	O
O	16.	O.S.U. helped me get money for my education	O	O	O	O	O
O	17.	The advice given me by the School of Technology has been helpful	O	O	O	O	O
O	18.	I worry about grades	O	O	O	O	O
O	19.	I plan to get a B.S. degree.	O	O	O	O	O
O	20.	I decided to go on to college while in high school	O	O	O	O	O
O	21.	My family is happy about the major subject I am taking	O	O	O	O	O
O	22.	A college education is important for women	O	O	O	O	O
O	23.	My family encourages me to do well	O	O	O	O	O
O	24.	A college education is important to me because of its economic value	O	O	O	O	O
O	25.	Getting an education will please my family	O	O	O	O	O

Don't Understand			Strongly Agree	Agree	can't say	Disagree	Strongly disagree
○	26.	I have money problems, but no one seems interested in helping. .	○	○	○	○	○
○	27.	Advice about school I have gotten from O.S.U. has been helpful .	○	○	○	○	○
○	28.	The campus is too big, I don't feel comfortable here	○	○	○	○	○
○	29.	My study habits are good	○	○	○	○	○
○	30.	My family isn't interested in my grades	○	○	○	○	○
○	31.	I worry about my future	○	○	○	○	○
○	32.	My decision to go on to college was made before I was in high school	○	○	○	○	○
○	33.	I am determined to finish my education	○	○	○	○	○
○	34.	My family helped me decide to go to school	○	○	○	○	○
○	35.	It is well worth the effort to graduate	○	○	○	○	○
○	36.	There are other subjects besides Technology that I am interested in	○	○	○	○	○
○	37.	If I leave school, it will be due to money problems.	○	○	○	○	○
○	38.	Going to school takes good budgeting and money management . . .	○	○	○	○	○
○	39.	Friends and other students are my main source of advice about school	○	○	○	○	○
○	40.	I will disappoint my family if I make poor grades.	○	○	○	○	○
○	41.	The campus is big, everything seems to be a hassel	○	○	○	○	○
○	42.	I don't worry about finding a job after graduation	○	○	○	○	○
○	43.	My grades show my ability	○	○	○	○	○
○	44.	A college education is not really important anymore.	○	○	○	○	○
○	45.	Completing my education will make me feel good	○	○	○	○	○
○	46.	I can count on my family if a money problem comes up	○	○	○	○	○
○	47.	The School of Technology is close-knit, it is easy to feel like a part of the school	○	○	○	○	○
○	48.	My family is my main source of advice about school	○	○	○	○	○
○	49.	Money for my education is available	○	○	○	○	○

		Don't Understand	Strongly Agree	Agree	can't say	Disagree	Strongly disagree
50.	The campus is big, but everyone has been helpful	○	○	○	○	○	○
51.	My family would help me if any kind of problem came up	○	○	○	○	○	○

The following asks you to rate yourself on a scale between two extremes. Check the circle that you feel is nearest the position you are on each scale.

I am . . . .

52.	Weak	○○○○○	Strong
53.	Passive	○○○○○	Active
54.	Beautiful	○○○○○	Ugly
55.	Unstable	○○○○○	Stable
56.	Successful	○○○○○	Failure
57.	Secure	○○○○○	Insecure
58.	Unmotivated	○○○○○	Motivated
59.	Positive	○○○○○	Negative
60.	Unfriendly	○○○○○	Friendly
61.	Intelligent	○○○○○	Dumb
62.	A winner	○○○○○	A loser
63.	Honest	○○○○○	Dishonest
64.	Talkative	○○○○○	Quiet
65.	Dirty	○○○○○	Clean

Thank You For Your Cooperation

APPENDIX B

CODING SCHEME OF STUDENT DATA

ON PUNCHED CARD FORMAT

TABLE XII

CODING SCHEME FOR STUDENT RESPONSES, DEMOGRAPHIC DATA, AND CLASSIFICATION

I. Columns 1 to 65 used for student responses to individual questionnaire items using the following code:

1 = Strongly Agree

2 = Agree

3 = Can't Say

4 = Disagree

5 = Strongly Disagree

6 = Don't Understand

7 = No Response.

II. Columns 67 to 80 used for demographic data, identification and classification using the following code:

Column 67: Sex, Male = 1, Female = 0
Columns 68 - 69: Year of Birth
Columns 71 - 72: Major Code as Follows:

01 = Aeronautical Technology

02 = Construction Technology

03 = Electrical Power Technology

04 = Electronics Technology

05 = Fire Protection and Safety

06 = General Technology

07 = Mechanical Design Technology

TABLE XII (CONTINUED)

08 = Petroleum Technology

09 = Radiation - Nuclear Technology

10 = Mechanical Power Technology

11 = Other

12 = No Response

Column 74 - 76: Individual Identification Numbers
Column 78: First Time Questionnaire = 1
Second Time Questionnaire = 2
Column 80: Classification from Student Records:
1 = persistor
0 = nonpersistor

APPENDIX C

RAW DATA FOR 1976 CLASS

80/80 LIST

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80/80 LIST

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APPENDIX D

RAW DATA USED IN VALIDATION STUDY,

1975 CLASS

TABLE XIII

RAW DATA FOR VALIDATION

Subject	Response to Questions: 3	8	13	24	31	44	46	50
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6	1	4	1	1	5	4	2	2
7	1	3	4	3	1	4	5	2
8	2	4	1	6	1	5	2	3
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13	1	2	2	1	2	5	2	2
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15	1	2	1	1	2	5	1	2
16	1	4	1	2	4	3	1	2
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37	2	4	2	4	4	5	2	2
38	1	2	2	1	2	5	2	2
39	3	1	2	2	5	2	2	2
40	1	5	5	5	1	5	1	4

VITA 2

Russell Lee Heiserman

Candidate for the Degree of

Doctor of Education

Thesis: EARLY IDENTIFICATION OF NONPERSISTING BEGINNING STUDENTS

Major Field: Vocational-Technical and Career Education

Biographical:

Personal Data: Born in Oklahoma City, Oklahoma, December 25, 1930, the son of Mr. and Mrs. Mack Russell Heiserman.

Education: Graduated from Enid High School, Enid, Oklahoma, in 1949; received the Technical Certificate in Electronics from Oklahoma State University in 1954; received the Bachelor of Science degree from Oklahoma State University with a major in Physics in 1960; received the Master of Science degree with a major in Physics in 1962 from Oklahoma State University; completed requirements for the Doctor of Education degree at Oklahoma State University in May 1978.

Professional Experience: Electronic Technician, Airpax Products Company, Baltimore, Maryland, 1954 - 1956; Electronics Technician, Labko Scientific, Stillwater, Oklahoma, 1956 - 1958; Electronics Instructor, Technical Institute, Oklahoma State University, 1958 - 1960; Physicist, Naval Ordinance Laboratory, White Oak, Maryland,1960; Assistant Professor and Head, Electronics Department, Technical Institute, Oklahoma State University, 1962 - 1966; Vice President, Development and President, School Division, Hickok Teaching Systems, Woburn, Massachusetts, 1966 - 1974; Research Associate, Electrical/Nuclear Department, School of Technology, Oklahoma State University, 1974 - 1976; Assistant Professor, Electrical/Nuclear Department, School of Technology, Oklahoma State University, 1976 - present.

Professional Organizations: American Society of Engineering Education, Oklahoma Technical Society, American Society of Certified Engineering Technicians.