A COMPARISON OF PROFILES OF SUCCESS
IN TWO INSTRUCTIONAL METHODS

DISSERTATION

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By

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The problem of this study was to isolate predictors of academic success in both self-paced classes and lecture classes in Introductory Accounting. The purposes of the study were to determine if learning style, locus of control, reading ability, age, sex, accounting work experience, and prior accounting academic experience are predictors of success in Introductory Accounting classes taught using self-paced methods of instruction and lecture methods of instruction. Another purpose was to determine if there is a difference in the set of predictors of success in the two instructional methods and to provide some direction as to determinants of success which may be addressed by counselors in advising students.

The data were collected from 463 students at a suburban community college in the Southwest. Each of the variables was analyzed by a stepwise multiple regression analysis and a backward elimination regression for students grouped according to instructional method. A two-way multivariate analysis of variance was used to examine whether the distribution of scores on the potential predictor variables
were equivalent for students in the two teaching methods and for successful completers of the course and noncompleters.

Consideration of the data findings of this study permitted the following conclusions:

1. Age and reading ability have a positive relationship to academic success in an Introductory Accounting course taught in a lecture format.

2. Concrete learning style, as measured by the Learning Style Inventory, age, reading ability, and accounting work experience have a positive relationship to success in an Introductory Accounting course taught in a self-paced format.

3. Age, reading ability, accounting work experience, and a concrete learning style have a positive relationship to academic success in Accounting courses taught using either method.

4. There is a difference in the set of predictors of success for Accounting classes taught using the two instructional methods.

5. There are differences between completers and noncompleters of courses regardless of instructional method.
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CHAPTER I

INTRODUCTION

Predicting academic achievement has been the focus of numerous studies by educational researchers for many years. Research findings consistently show that intellectual factors such as intelligence, aptitude, reading ability, and previous grades are the best predictors of academic performance (Blustein, 1986; Dettloff, 1982; Hazard, 1974). However, there exists little evidence in educational research to indicate that a single variable relating to intellectual skills only is a good predictor of academic performance (Jones & Smolen, 1979). Binder, Jones, and Strowig (1970), in a review of studies predicting academic success using intellectual factors, found that the multiple correlation coefficients of these studies clustered in the .50 range.

Because of this large percentage of variance which remains unexplained when using only intellectual factors as predictors, researchers have also examined a myriad of noncognitive factors. Variables such as age, gender, self-concept, locus of control, motivation, personality variables, and anxiety have all shown some correlation to
academic performance (Bentley, 1982; Bers, 1986; Capoor, 1982; Griffore & Samuels, 1978; Pridmore & Halyard, 1980; Reyes, 1979). Multivariate studies utilizing various combinations of intellectual and non-intellectual factors indicate that these non-intellectual factors do reduce the unexplained variance in predicting academic performance, but do not eliminate it (Fishay & Misanchuk, 1981).

Another body of research has emerged which indicates a need to examine the interaction of intellectual factors, non-intellectual factors, learning style, and instructional method (Hunter, 1979). The identification of the predictive value of intellectual factors, non-intellectual factors, and learning style as they relate to success in different instructional delivery modes could facilitate students' academic success (Carr & Echord, 1981). Hunter (1979) suggested that when a student's learning style is compatible with the teaching style being utilized, learning is more likely to occur. Other researchers have also noted the need for further research in the matching of student learning style to specific instructional strategies in order to determine if this enhances academic performance (Hunter & Lingle, 1976; Keyser, 1980).

The significance of this study is to assist students, and counselors who advise students, in the proper identification of factors that contribute to academic success
and to enable students to make better choices of instructional delivery modes that would enhance the student's chances for academic success.

Statement of Problem

The problem of this study was to isolate predictors of academic success in both individualized self-paced classes and traditional lecture classes in Introductory Accounting.

Purpose of the Study

The purposes of the study were:

1. to determine if learning style, locus of control, reading ability, age, sex, accounting work experience, and prior accounting academic experience are better than chance predictors of success in Introductory Accounting classes taught using individualized self-paced methods of instruction;

2. to determine if learning style, locus of control, reading ability, age, sex, accounting work experience, and prior accounting academic experience are better than chance predictors of success in Introductory Accounting classes taught using traditional lecture methods of instruction;

3. to determine if there is a difference in the predictors of success in Introductory Accounting classes taught using individualized self-paced methods of instruction and traditional methods of instruction; and
4. to provide some direction as to the possible determinants of success which may be addressed in counseling students as to which instructional methods may best enhance their chances for success in Introductory Accounting.

Definition of Terms

For the purpose of this study the following terms were defined and are listed below.

**Individualized Self-paced Instruction**

Individualized self-paced instruction is a method of teaching in which the students do not attend regularly scheduled classes and meet as a group with an instructor. Instead the students are given a textbook and a study guide at the beginning of the semester. They receive instruction in a laboratory setting under the guidance of an accounting instructor and supporting learning associates. The laboratory setting allows students to vary their attendance patterns as needed and to learn at their own rates.

**Traditional Instruction**

Traditional instruction is a method of teaching in which the students attend regularly scheduled classes and the instructor lectures and explains assigned accounting material at a pace determined by the instructor.
Learning Style

Learning style is the way in which one processes information. Everyone has a unique learning style, and it is partly because of these cognitive differences that people learn at varying speeds and degrees of effectiveness. No single style is considered superior; each style, with its own strengths and weaknesses, enables the individual to perform better in some educational settings than in others (Niles & Mustachio, 1978).

For purposes of this study, learning style was operationally defined as an individual's score on the two separate scales on the Learning Style Inventory (Kolb, 1976). One scale is the Abstract/Concrete (AC-EC) scale. The other scale is the Active/Reflective (AE-RO) scale.

Locus of Control

Locus of control has its theoretical background in social learning theory. Social learning theory (Rotter, 1966, 1973) provides the general theoretical background for the conception of the nature and effects of reinforcement. In social learning theory, a reinforcement acts to strengthen an expectancy that a particular behavior or event will be followed by that reinforcement in the future. Once an expectancy for such a behavior reinforcement sequence is built up, the failure of the reinforcement to
occur will reduce or extinguish the expectancy. It follows as a general hypothesis that when the reinforcement is seen as not contingent upon the subject's own behavior that its occurrence will not increase an expectancy as much as when it is seen as contingent. Depending upon the individual's history of reinforcement, individuals would differ in the degree to which they attributed reinforcements to their own actions. This difference is defined as an individual's locus of control.

For purposes of this study, locus of control was defined as an individual's score on the Rotter Internal-External Locus of Control Scale.

**External Control**

External control of reinforcement or external locus of control is reinforcement perceived by the subject as following some action of his/her own but not being entirely contingent upon his/her action. In our culture, it is typically perceived as the result of luck, chance, fate, or as under the control of powerful others (Rotter, 1973).

In this study the external locus of control was measured by the Rotter Internal-External Locus of Control Scale.

**Internal Control**

Internal control of reinforcement or internal locus of control is reinforcement perceived by the subject as
contingent upon his/her own behavior or his/her own relatively permanent characteristics (Rotter, 1973). In this study, internal locus of control was measured by the Rotter Internal-External Locus of Control Scale.

**Reading Ability**

Reading ability is based on the quantitative score obtained by the Reading Comprehension Test of the Descriptive Tests of Language Skills (College Entrance Examination Board, 1985).

**Personal Data**

Personal data includes age, sex, semester hours completed, accounting work experience, and accounting academic experience.

**Accounting Academic Success**

Accounting academic success is defined as a passing grade in Introductory Accounting which would allow the student to progress to the next level of accounting coursework. In the case of this study it is operationally defined as a final grade average of 70 percent to 100 percent.

**Predictors of Success**

Predictors of success is defined as any of the aforementioned factors (learning style, locus of control, reading
ability, age, sex, accounting work experiences, prior accounting academic experience) which individually or in combination show a statistically significant relationship to accounting academic success.

Synthesis of Related Literature

Predicting academic performance has been the subject of numerous studies. Because such an enormous volume of literature exists, this review will focus on studies which dealt primarily with the factors of instructional method and learning style as they relate to academic performance.

White (1970) utilized a pretest-posttest format to determine if nursing students achieved better in an individualized instructional mode as opposed to a traditional lecture format. Although achievement in the individualized method was not significantly higher than the lecture method, it was as good as the traditional approach.

Raines (1974) also found no significant difference in the performance levels or dropout rate of two groups of students in a basic mathematics course taught by traditional lecture format or individualized programmed format. The individualized programmed method was found to be an equally effective instructional technique.

In a study with students in a variety of courses using both lecture and individualized instructional techniques,
Worley (1975) found no significant difference in student learning in the two instructional methods. Educational level was found to be an important factor to success in individualized classes. Freshmen did not do as well in this format as upper-classmen.

In a study of chemistry students in lecture and programmed individualized instruction, Cheek (1976) found no significant difference in achievement between the two methods of instruction, but did find that sixty percent of the students preferred individualized instruction.

Two instructional treatments, individualized and traditional, were used by Elliot and Tuckman (1976) in a study of two groups of students classified as concrete or abstract in learning style. No significant differences were found in terms of student preference or performance as a function of student learning type or mode of instruction.

In a study done by the Dallas County Community College District (1977) involving students taking an introductory business course, overall achievement was comparable for students who took the class on campus and students who took the open-circuit television version of the course. The study did find that females and students above age 28 achieved better in both settings.
Des Lauriers (1979) conducted a study to assess the impact of self-paced instruction on community college students enrolled in an introductory psychology course. Students were randomly assigned to three sections of psychology being taught utilizing three types of instruction: traditional, modified self-paced, and self-paced. All students were administered a series of personality, intelligence quotient, and attitudinal tests. In addition, they completed pre- and posttest cognitive examinations on course content. Results indicated that while community college students have the cognitive ability to meet the demands of various instructional strategies, they showed a definite preference for a traditional instructional format when compared to the other two approaches.

Also in 1979, Mayo conducted a literature review at Chabot College in California to determine alternative course instructional methods that may better serve those constituencies who were not completing traditional lecture courses. The literature review demonstrated the desirability of breaking the traditional educational practices which do not recognize the differing learning styles of students. The literature further indicated that all students could earn A's in a well-designed, individualized course, but a certain type of learner was consistently more successful
in this instructional method. Further research in this area was recommended.

When selected sections of courses using individualized, self-paced instruction were reviewed in a study by Clagett (1980), it was found that they had lower completion rates than sections of the same courses taught in the traditional lecture format. However, it was also found that these sections had higher proportions of students receiving an "A."

Ramsden (1980), in a similar study using students enrolled in technical composition classes, found that students in the traditional lecture section of the course were more likely to complete the course, but also had a higher failure rate. The students in the individualized, self-paced section had a higher withdrawal rate, but the students who completed this section had higher grades.

A study involving developmental math students was conducted by Frerichs and Eldersweld (1981) to determine the correlation between student success and nine independent variables. The variables were: (1) instructional method such as traditional or self-paced; (2) cognitive style; (3) numerical skills; (4) age; (5) sex; (6) students' assessment of their math knowledge; (7) student attitudes toward math; (8) students' assessment of their math ability; and (9) their reasons for taking developmental courses.
The study results identified five significant variables, indicating that the successful student was more likely to have higher numerical skills, be in a traditionally taught course, be older, have higher perceptions of his/her math abilities, and have more positive attitudes toward math. Cognitive style was not found to be significant at the .10 level.

Gifford and Vicks (1982) compared conventional biology instruction to self-paced instruction and investigated the relationship between achievement in these two instructional methods and selected variables such as age, sex, family size, income, grade point average, motivational factors, and achievement test scores. Results indicated that the self-paced method of instruction was effective in increasing biology achievement for older female students with higher motivational scores.

Also in 1982, Sitton and Haney examined course completion rates and grades of accounting students who had enrolled in traditional lecture sections and self-paced sections during the previous academic year. They found that only 1.2% of the students enrolled in self-paced sections received grades of "C" or "D" compared to 31% who earned grades of "C" or "D" in traditional lecture sections during the same period. The number of students
earning a failing grade was 50% less in the self-paced sections than in the traditional lecture sections.

Lundgren (1985) also found significant differences in achievement of English students in courses taught using a traditional lecture method and an individualized, self-paced method. Of the students successfully completing the course, those in the individualized, self-paced section achieved significantly higher grades than those in the lecture section. However, there was a higher withdrawal rate in the self-paced section than the lecture section.

The previous research cited indicates that an individualized, self-paced method of instruction is as effective as a teaching method as the traditional lecture method of instruction. There seems to be a particular type of student who excels in the self-paced method of instruction, but there is also a higher withdrawal rate in these types of classes. Research indicates a need to examine the interaction of intellectual factors, non-intellectual factors, learning style, and instructional methods (Cross, 1976). Hunter and Lingle (1976) indicated a need for educators to respond to student learning styles by adding flexible variable-paced and competency-based educational designs. Carr and Echord (1981) suggested that further studies are needed to determine predictors of success for students in
either traditional or self-paced classes. The following research investigates the variable of learning style as a predictor of academic success in different instructional methods.

Raines (1976) measured mathematics students' learning styles and instructors' teaching styles. He found that students with higher grades had learning styles more closely related to instructor teaching styles than students with lower grades.

A cognitive-style mapping program was utilized by Niles and Mustachio (1978) in an attempt to enhance students' academic self-concept. Counselors interpreted each student's cognitive style as to its strengths and weaknesses. The counselors then suggested instructional methods and study techniques to students based on their cognitive style. For those students who utilized these suggestions in selecting instructional method, a direct correlation was found between compatibility of learning style and instructional style, and grade achievement in the courses attempted.

A similar study was conducted by Scerba (1979) in which the matching of learning styles of community college students to similar teaching strategies in English and mathematics courses was investigated as to how this
matching of learning and teaching styles related to success in these courses. Although no significant first order effects between the matching of learning and teaching styles and the final course grade were found, significant second order interaction was found.

Keyser (1980) used cognitive mapping in a college orientation course to teach students strategies for college survival as it pertained to their own learning style. The rates of retention of students who completed the orientation were compared to those who did not take the course. A higher retention rate was found for students who took the orientation course.

A program was developed by Villa and Lukes (1980) to diagnose preferred learning styles for students at a Florida community college and to make recommendations as to which instructional strategies were best suited to particular learning style. After three years of tracking students who received this information, it was found that students who enrolled in courses taught with an instructional method that matched their learning style were more successful in completing their courses than students who did not follow the recommendations.

A study by Ritchey and LaShier (1981) was conducted to determine if cognitive style can predict student
performance in science classes taught in a lecture style and a self-paced style. No significant relationship was found between cognitive style and student performance in either instructional method.

In 1983, Fourier conducted research in which cognitive style map information was revealed to an experimental group of students, but not to a control group. A statistically positive effect on grades was demonstrated. However, a follow-up study by Fourier (1984) found that disclosure of cognitive style map information to adult learners had no significant positive effect on academic achievement. In neither study did Fourier attempt to match student cognitive styles with instructional techniques.

Although research results are mixed as to the role learning style plays in student academic success, most researchers indicate a need for further study of this variable. Specifically more research is needed in the matching of student learning style to specific instructional strategies to enhance academic performance. In a report on Student Diagnosis by Hendrick (1980), a diagnostic program in a California community college is described. The paper reviews recent literature supporting this program and underscores the need for a diagnostic process to help students assess their potential for academic success.
Hendrick further recommends that this diagnostic process include assessment of preferred learning styles. It is suggested that counselors and academic advisors be utilized in explaining these diagnostic results to students and included in the explanation should be recommendations as to teaching strategies that are most compatible with student learning styles.

**Summary**

In this chapter, various studies regarding intellectual and non-intellectual factors of college academic performance were reviewed. In addition, studies examining individual learning styles and instructional methods as they relate to academic performance were also presented. The research indicates that intellectual factors are the best predictors of academic performance. However, there is a large percentage of the variance which remains unexplained when using only intellectual factors as predictors. Age, gender, self-concept, locus of control, motivation, personality variables, and anxiety have all shown some correlation to college academic performance. Matching of individual learning styles to instructional methods also has some relationship to success. The extent of this relationship remains inconclusive. Multivariate studies utilizing various combinations of intellectual and non-intellectual
factors continue to reinforce previous findings that intellectual factors are the best predictors of college academic performance. These studies also indicate that non-intellectual factors do reduce the unexplained variance.

The need to combine knowledge of intellectual and non-intellectual variables which contribute to academic performance with emerging knowledge of individual learning styles as they relate to instructional methods is clearly indicated throughout the literature.
CHAPTER REFERENCES


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CHAPTER II

PROCEDURES

This chapter describes the procedures used in this study. Research questions, methodology, procedures for the collection and analysis of data, and limitations of the study are discussed.

Statement of Problem

The problem of this study was to isolate predictors of academic success in both individualized self-paced classes and traditional lecture classes in Introductory Accounting.

Research Questions

Based on the problem and purpose, the following research questions were devised for this study.

1. Is some combination of the variables of learning style, locus of control, reading ability, age, sex, accounting work experience, and prior accounting academic experience significantly related to successful completion of Introductory Accounting taught using the individualized self-paced method of instruction?

2. Is some combination of these same variables significantly related to successful completion of
Introductory Accounting taught using the traditional lecture method of instruction?

3. Is there a significant difference between the set of variables predicting success in individualized self-paced instruction and the set of variables predicting success in the traditional lecture method of instruction?

Selection of Sample

Permission to conduct the study was obtained from appropriate officials of the college. Subjects for this study were students who registered for Introductory Accounting classes in the Fall semester of 1985 at Brookhaven College of the Dallas County Community College District. Brookhaven College has a student population of approximately 7,000.

Students were selected utilizing a cluster-sampling technique. All sections of Introductory Accounting were utilized in order to include both day and night sections as well as lecture and individualized self-paced sections.

Two hundred and thirty volunteer subjects were enrolled in lecture courses, while 233 were taking the individualized self-paced courses. The students were asked to volunteer by their instructors who distributed and read to the students an explanation of the testing procedures and what would be required of the student
in the study. An explanation of the potential benefits to the student and the college was included. The aforementioned explanation was prepared by the researcher (see Appendix A).

The age of the subjects ranged from 17 to 55 years with a mean age of 26.92, with a standard deviation of 7.88. Of the total sample, 65% were female. Accounting work experience ranged from 0 to 15 years. Prior accounting academic experience ranged from no previous courses to four previous courses completed. The mean for accounting work experience was 1.6 years with a standard deviation of 2.95, while the mean for prior accounting courses was .49, with a standard deviation of .83.

Of the 230 students enrolled in Accounting lecture courses who volunteered for this study, 124 students successfully completed the course. Of the 233 students enrolled in Accounting self-paced courses who volunteered for this study, 104 students successfully completed the course. The 463 students who participated in the study represent 88% of the total population of 524 students enrolled in Introductory Accounting.

Correlational Research and Prediction

The basic design in correlational research is very simple, involving nothing more than collecting data on
two or more variables on the same group of subjects and computing a correlation coefficient. Many valuable studies in education have done little more than follow this simple design (Borg & Gall, 1983).

However, correlation coefficients cannot be used to determine cause-and-effect relationships, although they may be used to explore or predict relationships between two variables. Correlation coefficients are best used to measure the degree of relationship between two variables and to explore the possible causal factors that can later be tested in an experimental design (Borg & Gall, 1983).

Prediction research is a type of correlational research. In this type of research, it is possible to predict without being able to understand, and we can understand without being able to predict. According to Kaplan (1964), if we can predict successfully on the basis of certain explanations, we have good reason, and perhaps the best sort of reason, for accepting the explanation.

Nunnally (1978) says that in predictive research, the goal is to optimize prediction of criteria such as academic achievement. Consequently, the choice of variables in research of this kind is primarily determined by their contribution to the prediction of the criterion. If the correlation is high, no other standards are necessary.
Cook and Campbell (1979) agree that for purely forecasting purposes, it does not matter whether a predictor works because it is a symptom or a cause.

Prediction research has made a major contribution to education. Many prediction studies have been aimed at short-term prediction of student's performance in a specific course of study, and others have been aimed at long-term prediction of general academic success. The findings of these studies have greatly aided school personnel in choosing students most likely to succeed in a particular academic environment or course of study. Also, prediction studies provide the scientific basis for the counselor's efforts to help students plan their academic future (Borg & Gall, 1983).

Instruments

The Learning Style Inventory (LSI), which was developed by Kolb (1976), was created to measure the individual learning styles derived from experiential learning theory. Experiential learning theory conceptualizes the learning process in such a way that differences in individual learning styles and corresponding learning environments can be identified.

The theory is called "experiential learning" because it emphasizes the important role that experience plays
in the learning process. If the learning environment is compatible with the individual’s learning style, enhancement of the learning process is accomplished (Kolb, 1976).

The Learning Style Inventory is a simple self-description inventory designed to measure an individual’s strengths and weaknesses as a learner. Four statistically prevalent types of learning styles are derived from Learning Style Inventory scoring; these are labeled the Converger, the Diverger, the Assimilator, and the Accommodator (Kobb, 1976).

The Learning Style Inventory (LSI) is a nine-item self-description questionnaire. Each item asks the respondent to rank order four words in a way that best describes his or her learning style. One word in each item corresponds to one of the four learning modes: Concrete Experience, Reflective Observation, Abstract Conceptualization, and Active Experimentation. The LSI measures an individual’s relative emphasis on these modes as well as two combination scores that indicate the extent to which an individual emphasizes abstractness over concreteness and the extent to which an individual emphasizes action over reflection. The learning styles labeled above are derived from a compilation of these scores (Kolb, 1978).

The LSI scores of undergraduate students have corresponded to the learning styles which characterize
their academic specializations (Kolb & Plovnick, 1976). This is congruent with the experiential learning theory and would indicate that the Learning Style Inventory scores would be a useful starting point for a discussion with an individual about his learning style and academic choices. The patterns taken collectively across seventeen groups, which included five undergraduate studies, suggest that LSI scores show sufficient variability across different populations to be useful in assessing the learning styles that characterize occupations (Kolb, 1973, 1978).

The Learning Style Inventory shows split-half reliability coefficients on a par with most psychological self-report instruments (Kolb, 1976). Coefficients of about .80 were obtained by applying the Spearman-Brown prophecy formula to obtain correlations between halves for five different testing groups.

Four test-retest studies were conducted with four samples over different periods of time ranging from three to seven months. The four samples showed a fairly wide range of discontinuity depending on length of time between testing periods. The longest time interval of seven months showed the highest discontinuity between testing scores. The shortest time interval of three months had the lowest discontinuity of scores. The test-retest correlations
for the combination scores of AC-CE and AE-RO ranged from .30 and .43, respectively, in the seven month retest interval, to .61 and .71, respectively, in the three month retest interval.

In validity studies, the Learning Style Inventory has shown correlations between certain learning styles and Jungian psychological types assessed by the Myers-Briggs Type Indicator (MBTI). The strongest and most consistent relationship appears to be between the concrete/abstract dimension of the LSI and the feeling/thinking dimension of the MBTI. The correlations range from .39 to .30, respectively. A relationship also appears to exist between the active/reflective scale of the LSI and the extrovert/introvert scale of the MBTI, with correlations ranging from -.27 to .36, respectively (Kolb, 1976).

The data tend to support the hypotheses by Kolb (1976) that people who score high on Concrete Experience should use sensation as a mode of perceiving and feeling as a mode of judging. Abstract Conceptualizers should use intuition as a perceiving mode and thinking as a judging mode. Active Experimenters should be extroverts who use the sensation perceiving mode, while Reflective Observers should be introverts who use the intuitive perceiving mode.
The Descriptive Tests of Language Skills (DTLS) is prepared and produced by the Educational Testing Service (ETS) which develops and administers them for the College Board. The DTLS are used to assist college teachers or guidance personnel in placement of entering students in appropriate English classes, in identifying students who may need special assistance before undertaking undergraduate course work, and in planning instruction for classes or groups of students. In a broader usage, they may also be used as aids in placement of a student in a particular instructional sequence or in assignment to a distinct course or to courses in which similar subjects are taught by different methods. The tests may also be used to evaluate student progress or to assess the effectiveness of a particular instructional strategy (Educational Testing Service, 1985).

The Descriptive Tests of Language Skills are comprised of five tests, namely: Reading Comprehension, Logical Relationships, Vocabulary, Usage, and Sentence Structure. These tests can be used separately or together as per the individual purposes of the users. Each test is timed and has a varying number of items (Educational Testing Service, 1985).

The Reading Comprehension Test of the DTLS is a forty-five item, multiple choice test. It is thirty minutes long
and deals with three major aspects of reading, namely, the ability to recognize main ideas, the ability to understand direct statements, and the ability to draw inferences (Educational Testing Service, 1985). The typical instructional format of the self-paced undergraduate classes at Brookhaven College expects the student to independently read a significant volume of material without the benefit of consistent lecture reinforcement or restatement of the printed information. Success, as measured by assigned grades, would, to some extent, be dependent on reading comprehension. Administration of the Reading Comprehension Test of the Descriptive Tests of Language Skills provides a general assessment of this ability.

Reliability coefficients for the Reading Comprehension Test of the Descriptive Tests of Language Skills cluster around .89 using the Kuder-Richardson Formula 20.

In validity studies correlations of the Reading Comprehension Test of the Descriptive Tests of Language Skills to grades in regular writing courses cluster around .57. For purposes of comparison, the median correlation of SAT-verbal scores with first-year grade point average in college, based on hundreds of studies, is about .40.

The Rotter Internal-External Locus of Control, (I-E), was constructed within the framework of social learning theory. Social learning theory maintains that an
individual's perception of a causal relationship between his own behavior and the reward is the determinant of the effect of reinforcement (Rotter, 1966). Internal control refers to the individual's perception of an event as contingent upon his own behavior or his own relatively permanent characteristics. External control refers to the individual's perception of an event as not being contingent upon his own behavior, but the result of chance, fate, or luck, or it may be perceived as under the control of powerful others.

The I-E scale is a 29-item forced choice, self-report inventory. The score is the total number of external choices. Scores range from 0 to 23, with higher scores indicating greater externality.

Split-halves and Kuder-Richardson reliabilities for the I-E scale are .70. Test-retest reliabilities after intervals of one to two months will vary somewhat with the length of the interval, but are also around the .70 level.

Rotter (1966) reported good discriminant validity for the I-E scale indicated by low correlations with such variables as intelligence, social desirability, and political affiliation. He further stated that sex differences on the I-E scale among college students appear to be minimal. Later studies by Feather (1968) showed that females earned significantly higher external scores than males.
Joe (1971) summarizes several studies which are concerned with the relation of internal-external scores to personality characteristics. These studies, all showing varying degrees of statistically significant correlations, depict externals, in contrast to internals, as being relatively anxious, aggressive, dogmatic, less trustful of others, lacking in self-confidence and insight, and having low needs for social approval. Research evidence further indicates that internals tend to manifest greater interest and effort in achievement-related activities than do externals (Joe, 1971).

Procedures for Collection of Data

The testing for this research was completed during the first two weeks of the Fall semester of 1985. Testing was administered in the Brookhaven College Testing Center by the Testing Center personnel. Upon entering the Testing Center, the students received a demographic data sheet (see Appendix B), the Learning Style Inventory (LSI), the Rotter Internal-External Locus of Control (I-E scale), an instruction sheet for completing all instruments, and an Informed Consent Form (see Appendix A). The students were allowed as much time as needed to complete all of the instruments. All students completed the instruments within
an hour. The instruments and Informed Consent Forms were collected as the students left the Testing Center. All instruments were collected and scored by the researcher.

The Descriptive Tests of Language Skills (DTLS) was administered to most students upon entrance to Brookhaven College. The Testing Center administered, scored, and recorded grades on the test. The scores on the test for each of the 463 subjects were obtained through the Testing Center and recorded in a master file by the students' social security number.

At the conclusion of the semester, the Accounting grades of the subjects who participated in the study were obtained from the instructors' final grade sheets and were recorded along with other test scores and demographic information by the students' social security number.

Procedures for Data Analysis

Stepwise Multiple Regression Analysis was used separately on the two sub-groups of individualized self-paced students and traditional students to determine the predictive value of the characteristic variables to success in Introductory Accounting as taught through the two instructional modes and to determine the most efficient predictive profile possible using these variables.

Method of instruction was then added as a variable and a Backwards Elimination Regression was used on the
combination of both sub-groups to determine if there was significant interaction between the two groups.

A two-way multivariate analysis of variance (MANOVA) was used to examine whether the distribution of scores on the potential predictor variables were equivalent for students in the two teaching methods and for successful completers of the course and non-completers of the course.

Limitations

1. This study was limited to community college students who were enrolled in an Introductory Accounting course. All of the subjects were voluntarily participating.

2. Measurement of learning style, locus of control, and reading ability was limited to the sophistication of the instruments being used.

3. This study was limited to the relationship of learning style, locus of control, reading ability, and selected personal data to grades in two instructional modes of Introductory Accounting.
CHAPTER REFERENCES


CHAPTER III

FINDINGS AND DISCUSSION

This chapter discusses the findings, conclusions, and recommendations of the study. The findings section is divided into:

1. a section discussing significant predictor variables related to success in the lecture courses;

2. a section discussing significant predictor variables related to success in individualized self-paced courses;

3. a section discussing significant predictor variables related to success in all courses regardless of teaching method; and

4. a section discussing the difference in significant predictor variables between successful completors and unsuccessful non-completers in the two teaching methods.

The study investigates the relationship of learning style, locus of control, reading ability, age, sex, accounting work experience, and prior accounting academic experience to success in Introductory Accounting classes taught in a traditional lecture style or in an individualized self-paced style. The three research questions were as follows:
1. Are learning style, locus of control, reading ability, age, sex, accounting work experience, and prior accounting academic experience significant variables in predicting success in Introductory Accounting taught using the traditional lecture method of instruction?

2. Are learning style, locus of control, reading ability, age, sex, accounting work experience, and prior accounting academic experience significant variables in predicting success in Introductory Accounting taught using the individualized self-paced method of instruction?

3. Is there a difference in the predictors of success in Introductory Accounting classes taught using the traditional lecture method of instruction and the predictors of success in Introductory Accounting classes taught using the individualized self-paced method of instruction?

The primary purpose of the present investigation was to analyze and evaluate potential predictors of success in an accounting course. Major comparisons were made between two teaching methods utilized in the course: a traditional lecture format and a self-paced style. For students completing the course, success was measured by course grade. Summary statistics for the major variables examined are shown in Table I. A total of 463 students was studied. Students enrolled in the lecture course
TABLE I

SUMMARY STATISTICS FOR PREDICTOR VARIABLES
IN TOTAL SAMPLE (n = 463)*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>(S.D.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abstract/Concrete</td>
<td>0.81</td>
<td>5.26</td>
</tr>
<tr>
<td>Active/Reflective</td>
<td>0.80</td>
<td>5.56</td>
</tr>
<tr>
<td>Locus of Control</td>
<td>9.35</td>
<td>3.89</td>
</tr>
<tr>
<td>Age</td>
<td>26.92</td>
<td>7.88</td>
</tr>
<tr>
<td># Prior Courses</td>
<td>0.49</td>
<td>0.83</td>
</tr>
<tr>
<td># Years Experience</td>
<td>1.60</td>
<td>2.95</td>
</tr>
<tr>
<td>Reading Score</td>
<td>34.27</td>
<td>5.83</td>
</tr>
</tbody>
</table>

*Sex (% Female) = 65%.

numbered 230, while 233 students were taking the self-paced course. Of the 230 lecture students, 29% (N=67) were at or above the mean age of 27 and 71% (N=163) were below the mean age of 27. The students at or above age 27 will be referred to as older students in this study. Fifty-seven percent of the older students who took the lecture course successfully completed the course. Forty-nine percent of the older students who took the self-paced course successfully completed the course. This is compared to 53% of the younger students who successfully completed the lecture course and 40% who successfully completed the self-paced course.
Since only students completing the courses could be analyzed with respect to potential predictors of success, a secondary analysis compared the major predictor variables for students completing the course with those for students who did not complete. A two-way multivariate analysis of variance and corresponding univariate analysis of variance were used to examine main effects of groups (completers vs noncompleters) and teaching method (lecture vs self-paced), and the interaction between groups and teaching method.

Variables hypothesized to be of potential predictive value in identifying successful students were analyzed with stepwise linear regression. Based on the hypothesis that a certain type of student may do better taking one of the two methods of teaching, while others may do better taking the second method, regression models using the significant predictor variables were developed both separately and together for the two teaching methods. Potential predictor variables were: abstract/concrete subscale of the learning style inventory, active/reflective subscale of the learning style inventory, locus of control, age, sex, number of previous accounting courses taken, number of years of accounting work experience, and reading score. The outcome variable of success was operationally defined as final numeric grade for the course.
According to Pedhazur (1982), when variables are selected from an available pool of variables, the purpose is to find the minimum number of variables necessary to account for the most variance. This is accomplished through the use of regression analysis. In the stepwise linear regression, correlations of all independent variables with the dependent variable are calculated. Variables are then combined one "step" at a time to determine how each variable contributes to the total correlation of all variables with the dependent variable. Tests are performed at each step to determine the contribution of each predictor already in the equation if it were to enter last. Thus the end result is the most efficient predictor set that shows how much each variable contributes to the total set, how much each variable contributes to the total variance, and eliminates variables that do not significantly contribute.

The first research question involved the significance of certain variables in predicting successful completion of Introductory Accounting taught in the lecture method of instruction. The correlation matrix among variables for students completing the lecture course (n=124) is shown in Table II. Due to the large sample size, several statistically significant, although relatively low, positive correlations were found. A significant and moderately high positive correlation was found between number of accounting
<table>
<thead>
<tr>
<th>Variable</th>
<th>Abstract/Concrete</th>
<th>Active/Reflective</th>
<th>Locus of Control</th>
<th>Age</th>
<th>Sex</th>
<th># Prior Courses</th>
<th># Years Experience</th>
<th>Reading Score</th>
<th>Course Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abstract/Concrete</td>
<td>1.00</td>
<td>. .</td>
<td>. .</td>
<td>. .</td>
<td>. .</td>
<td>. .</td>
<td>. .</td>
<td>. .</td>
<td>. .</td>
</tr>
<tr>
<td>Active/Reflective</td>
<td>.19*</td>
<td>1.00</td>
<td>. .</td>
<td>. .</td>
<td>. .</td>
<td>. .</td>
<td>. .</td>
<td>. .</td>
<td>. .</td>
</tr>
<tr>
<td>Locus of Control</td>
<td>-.09</td>
<td>.12</td>
<td>1.00</td>
<td>. .</td>
<td>. .</td>
<td>. .</td>
<td>. .</td>
<td>. .</td>
<td>. .</td>
</tr>
<tr>
<td>Age</td>
<td>-.08</td>
<td>&lt;.01</td>
<td>-.18*</td>
<td>1.00</td>
<td>. .</td>
<td>. .</td>
<td>. .</td>
<td>. .</td>
<td>. .</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>. .</td>
<td>. .</td>
</tr>
<tr>
<td>(1=f;0=m)</td>
<td>-.22*</td>
<td>-.10</td>
<td>&lt;.01</td>
<td>.19*</td>
<td>1.00</td>
<td>. .</td>
<td>. .</td>
<td>. .</td>
<td>. .</td>
</tr>
<tr>
<td># Prior Courses</td>
<td>.09</td>
<td>.18*</td>
<td>.12</td>
<td>-.07</td>
<td>.14</td>
<td>1.00</td>
<td>. .</td>
<td>. .</td>
<td>. .</td>
</tr>
<tr>
<td># Years Experience</td>
<td>.09</td>
<td>.16</td>
<td>.02</td>
<td>.15</td>
<td>.19*</td>
<td>.36**</td>
<td>1.00</td>
<td>. .</td>
<td>. .</td>
</tr>
<tr>
<td>Reading Score</td>
<td>-.07</td>
<td>-.10</td>
<td>-.11</td>
<td>.12</td>
<td>.22*</td>
<td>-.07</td>
<td>.08</td>
<td>1.00</td>
<td>. .</td>
</tr>
<tr>
<td>Course Grade</td>
<td>.08</td>
<td>.02</td>
<td>-.08</td>
<td>.44*</td>
<td>.21</td>
<td>&lt;.01</td>
<td>.20*</td>
<td>.24*</td>
<td>1.00</td>
</tr>
</tbody>
</table>

*p<.05; **p<.01.
courses taken and number of years of prior accounting work experience.

A summary of the stepwise regression analysis on these students is shown in Table III. The final regression equation was \( Y = (0.36)X_1 + (0.25)X_2 + 68.78 \), where \( Y \) = course grade, \( X_1 \) = age, and \( X_2 \) = reading score. The standardized beta coefficients indicate that age has over three times the weight, or influence, in predicting final course grade than reading score. At step one, age entered the regression model, which accounted for 20% of the variance in the outcome measure of course grade. The addition of reading score into the model at step two increased the variance accounted for to 23%. No other variables added significantly to the prediction of success in the lecture course.

### Table III

RESULTS OF STEPWISE REGRESSION ANALYSIS TO PREDICT COURSE GRADE IN THE LECTURE CLASS

<table>
<thead>
<tr>
<th>Variable</th>
<th>Step Entered</th>
<th>Beta</th>
<th>( R^2 )</th>
<th>( t )</th>
<th>( P )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>1</td>
<td>.13</td>
<td>.20</td>
<td>5.23</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Reading</td>
<td>2</td>
<td>.04</td>
<td>.23</td>
<td>2.36</td>
<td>.02</td>
</tr>
</tbody>
</table>
The findings positively relating age to academic success are consistent with the findings of Caglano (1978), Anolik (1980), and Billingham and Travaglino (1981).

The positive relationship of reading ability to academic success is supported by the findings of Gerow and Murphy (1980), Bertalan (1977), and Carney and Geis (1981).

The second research question involved the significance of certain variables in predicting successful completion of Introductory Accounting taught using the individualized self-paced method of instruction.

Table IV shows the correlation matrix of variables for students completing the self-paced course (n=104). As was found with the students completing the lecture course, several correlations between variables were statistically significant, but low in value. For the present group, a moderate, significant positive correlation was found between age and sex, indicating that females in this group tended to be older than the males.

Results of the stepwise regression analysis for this group of completers is summarized in Table V. The final regression equation was \( Y = (-.48)X_1 + (.45)X_2 + (.41)X_3 + (.16)X_4 + 67.04 \), where \( Y = \) course grade, \( X_1 = \) abstract/concrete learning style, \( X_2 = \) reading score, \( X_3 = \) work experience, and \( X_4 = \) age. As indicated by the beta
### Table IV: Correlations Among Predictor Variables for Students Completing the Self-Paced Course

<table>
<thead>
<tr>
<th>Variable</th>
<th>Abstract/Concrete</th>
<th>Active/Reflective</th>
<th>Locus of Control</th>
<th>Age</th>
<th>Sex (1=f;0=m)</th>
<th># Prior Experience</th>
<th># Years Experience</th>
<th>Reading Score</th>
<th>Course Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abstract/Concrete</td>
<td>1.00</td>
<td>-0.21*</td>
<td>-0.01</td>
<td>-0.05</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>-0.02</td>
<td>-0.04</td>
</tr>
<tr>
<td>Active/Reflective</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Locus of Control</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sex (1=f;0=m)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td># Prior Experience</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td># Years Experience</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reading Score</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Course Grade</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* *p<.05; **p<.01
coefficients, the most influential variable in predicting outcome was abstract/concrete learning style, with concrete style being associated with higher final grades. Next in importance, with respect to predicting course grade, was age, with older students having higher scores. Age had approximately half the predictive power of learning style, with a beta coefficient of .16. Reading score had half the predictive power of age, while work experience was lowest in predictive contribution. Higher reading scores and more work experience were indicative of a higher final course grade.

TABLE V

RESULTS OF STEPWISE REGRESSION ANALYSIS TO PREDICT COURSE GRADE IN THE SELF-PACED COURSE

<table>
<thead>
<tr>
<th>Variable</th>
<th>Step Entered</th>
<th>Beta</th>
<th>R2</th>
<th>t</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abstract/Concrete</td>
<td>1</td>
<td>-.33</td>
<td>.13</td>
<td>-3.74</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Reading Score</td>
<td>2</td>
<td>-.09</td>
<td>.19</td>
<td>2.55</td>
<td>.01</td>
</tr>
<tr>
<td># Years Experience</td>
<td>3</td>
<td>-.06</td>
<td>.23</td>
<td>2.00</td>
<td>.05</td>
</tr>
<tr>
<td>Age</td>
<td>4</td>
<td>.16</td>
<td>.25</td>
<td>1.78</td>
<td>.08</td>
</tr>
</tbody>
</table>
The relationship of learning style to academic success is supported in studies by Kolb (1976), Hunter (1979), Niles and Mustachio (1978), Cross (1976), Carr and Echord (1981), and Raines (1976). These studies were reviewed earlier in this study.

The correlation matrix among variables for all students completing both methods of the course is shown in Table VI. Significant and moderately high correlations were found between age and sex, indicating that, in general, females were older than males. Age also correlated with teaching method, with more older students taking the self-paced method. In addition, age correlated positively with course grade indicating that older students tended to be more successful in completing courses.

Sex also correlated with the number of years of work experience and course grade indicating that females had more accounting work experience and made higher grades in accounting overall.

The stepwise regression analysis yielded a model incorporating the predictor variables of age, reading score, previous accounting work experience, and abstract/concrete dimension of learning style. Table VII presents a summary of the stepwise regression analysis. The regression equation was: \( Y = (.25)X_1 + (.31)X_2 + (.50)X_3 - (.14)X_4 \), where \( Y \) = course grade, \( X_1 \) = age, \( X_2 \) = reading score,
TABLE VI

CORRELATION MATRIX AMONG VARIABLES FOR ALL STUDENTS COMPLETING THE COURSE

<table>
<thead>
<tr>
<th>Variable</th>
<th>Abstract/Concrete</th>
<th>Active/Reflective</th>
<th>Locus of Control</th>
<th>Age</th>
<th>Sex</th>
<th># Prior Courses</th>
<th># Years Experience</th>
<th>Reading Score</th>
<th>Course Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abstract/Concrete</td>
<td>1.00</td>
<td>. . .</td>
<td>. . .</td>
<td>.</td>
<td>.</td>
<td>. . .</td>
<td>. . .</td>
<td>. . .</td>
<td>. . .</td>
</tr>
<tr>
<td>Active/Reflective</td>
<td>.02</td>
<td>1.00</td>
<td>. . .</td>
<td>.</td>
<td>.</td>
<td>. . .</td>
<td>. . .</td>
<td>. . .</td>
<td>. . .</td>
</tr>
<tr>
<td>Locus of Control</td>
<td>-.05</td>
<td>.06</td>
<td>1.00</td>
<td>.</td>
<td>.</td>
<td>. . .</td>
<td>. . .</td>
<td>. . .</td>
<td>. . .</td>
</tr>
<tr>
<td>Age</td>
<td>&lt;.01</td>
<td>-.06</td>
<td>-.11</td>
<td>1.00</td>
<td>.</td>
<td>. . .</td>
<td>. . .</td>
<td>. . .</td>
<td>. . .</td>
</tr>
<tr>
<td>Sex (1=m; 0=f)</td>
<td>-.14*</td>
<td>&lt;.01</td>
<td>.08</td>
<td>.30**</td>
<td>1.00</td>
<td>. . .</td>
<td>. . .</td>
<td>. . .</td>
<td>. . .</td>
</tr>
<tr>
<td># Prior Courses</td>
<td>.08</td>
<td>.19*</td>
<td>-.01</td>
<td>-.05</td>
<td>.13*</td>
<td>1.00</td>
<td>. . .</td>
<td>. . .</td>
<td>. . .</td>
</tr>
<tr>
<td># Years Experience</td>
<td>-.04</td>
<td>.19*</td>
<td>-.02</td>
<td>.18*</td>
<td>.23**</td>
<td>.17*</td>
<td>1.00</td>
<td>. . .</td>
<td>. . .</td>
</tr>
<tr>
<td>Reading Score</td>
<td>-.04</td>
<td>-.13*</td>
<td>.11</td>
<td>.17*</td>
<td>-.09</td>
<td>.10</td>
<td>.10</td>
<td>.10</td>
<td>1.00</td>
</tr>
<tr>
<td>Course Grade</td>
<td>-.15*</td>
<td>&lt;.01</td>
<td>.02</td>
<td>.22**</td>
<td>.23**</td>
<td>.04</td>
<td>.24**</td>
<td>.11</td>
<td>1.00</td>
</tr>
<tr>
<td>Teaching Method</td>
<td>-.11</td>
<td>-.01</td>
<td>-.05</td>
<td>.33**</td>
<td>.15*</td>
<td>-.04</td>
<td>.26**</td>
<td>.25**</td>
<td>.09</td>
</tr>
</tbody>
</table>

*p<.05; **p<.01.
X3 = prior work experience, and X4 = abstract/concrete learning style. Thus, older students having higher reading scores, more work experience, and a more concrete learning style earned higher grades. When scores were standardized to yield beta coefficients, concrete learning style was found to be the most influential variable in the model, with a beta coefficient of .27. Age had a beta coefficient of .10, whereas work experience and reading score had lower beta levels of .02 and .002, respectively. The regression model accounted for 19.7% of the variation in course grades.

TABLE VII
RESULTS OF STEPWISE REGRESSION ANALYSIS TO PREDICT COURSE GRADE FOR STUDENTS IN BOTH COURSES

<table>
<thead>
<tr>
<th>Variable</th>
<th>Step Entered</th>
<th>Beta</th>
<th>R2</th>
<th>t</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>1</td>
<td>.10</td>
<td>.11</td>
<td>4.49</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Reading Score</td>
<td>2</td>
<td>&lt;.01</td>
<td>.15</td>
<td>3.23</td>
<td>.001</td>
</tr>
<tr>
<td># Years Experience</td>
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<td>.02</td>
<td>.19</td>
<td>3.01</td>
<td>.003</td>
</tr>
<tr>
<td>Abstract/Concrete</td>
<td>4</td>
<td>.27</td>
<td>.20</td>
<td>-1.69</td>
<td>.09</td>
</tr>
</tbody>
</table>
Stepwise linear regression was explained earlier in this chapter. Backward elimination differs from stepwise linear regression in that it starts out with the squared multiple correlation of all independent variables with the dependent variable. The independent variables are deleted for the regression equation one at a time, and the loss to R² due to the deletion of the variable is studied (Pedhazur, 1982). It is thus possible to observe which variable adds the least when entered last.

When variables were analyzed with a backward elimination procedure, results were consistent with the results of the stepwise regression analyses. Table VIII summarizes the results of the regression with backward elimination for variables in the group of students taking the lecture course. At the final step of the regression, the two variables remaining in the model were age and reading score. The regression equation was identical to that derived with the stepwise procedure.

Results of the backward elimination procedure for students in the self-paced course are shown in Table IX. Variables remaining in the final regression model included abstract/concrete learning style, work experience, age, and reading score. Again, the final regression equation was the same as that resulting from the stepwise procedure.

As shown in Table X, the backward elimination procedure for all completing students yielded a model
equivalent to the model derived from the stepwise procedure. Variables remaining in the model were: abstract/concrete learning style, age, prior work experience, and reading score. The regression equation was the same as the equation derived by the stepwise procedure.

TABLE VIII
RESULTS OF BACKWARD REGRESSION ANALYSIS TO PREDICT COURSE GRADE IN THE LECTURE COURSE

<table>
<thead>
<tr>
<th>Variable</th>
<th>Step Removed</th>
<th>Partial R2</th>
<th>Model R2</th>
<th>F</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active/Reflective</td>
<td>1</td>
<td>.0001</td>
<td>.271</td>
<td>.022</td>
<td>.88</td>
</tr>
<tr>
<td>Locus of Control</td>
<td>2</td>
<td>.0005</td>
<td>.270</td>
<td>.085</td>
<td>.77</td>
</tr>
<tr>
<td># Prior courses</td>
<td>3</td>
<td>.0006</td>
<td>.270</td>
<td>.089</td>
<td>.77</td>
</tr>
<tr>
<td># Years Experience</td>
<td>4</td>
<td>.0071</td>
<td>.263</td>
<td>1.140</td>
<td>.29</td>
</tr>
<tr>
<td>Sex</td>
<td>5</td>
<td>.0140</td>
<td>.249</td>
<td>2.260</td>
<td>.14</td>
</tr>
<tr>
<td>Abstract/Concrete</td>
<td>6</td>
<td>.0166</td>
<td>.232</td>
<td>2.660</td>
<td>.11</td>
</tr>
</tbody>
</table>

The third research question examined the difference, if any, between the predictors of success for each of the two instructional methods. A two-way multivariate analysis
### TABLE IX

RESULTS OF BACKWARD REGRESSION ANALYSIS TO PREDICT COURSE GRADE IN THE SELF-PACED COURSE

<table>
<thead>
<tr>
<th>Variable</th>
<th>Step Removed</th>
<th>Partial R2</th>
<th>Model R2</th>
<th>F</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td># Prior Courses</td>
<td>1</td>
<td>.0008</td>
<td>.276</td>
<td>.099</td>
<td>.75</td>
</tr>
<tr>
<td>Locus of Control</td>
<td>2</td>
<td>.0008</td>
<td>.275</td>
<td>.103</td>
<td>.75</td>
</tr>
<tr>
<td>Active/Reflective</td>
<td>3</td>
<td>.0046</td>
<td>.270</td>
<td>.622</td>
<td>.43</td>
</tr>
<tr>
<td>Sex</td>
<td>4</td>
<td>.0167</td>
<td>.254</td>
<td>2.240</td>
<td>.14</td>
</tr>
</tbody>
</table>

### TABLE X

RESULTS OF BACKWARD REGRESSION ANALYSIS TO PREDICT COURSE GRADE IN BOTH COURSES

<table>
<thead>
<tr>
<th>Variable</th>
<th>Step Removed</th>
<th>Partial R2</th>
<th>Model R2</th>
<th>F</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active/Reflective</td>
<td>1</td>
<td>.0001</td>
<td>.1999</td>
<td>.015</td>
<td>.90</td>
</tr>
<tr>
<td>Sex</td>
<td>2</td>
<td>.0003</td>
<td>.199</td>
<td>.073</td>
<td>.79</td>
</tr>
<tr>
<td>Teaching Method</td>
<td>3</td>
<td>.0004</td>
<td>.199</td>
<td>.102</td>
<td>.75</td>
</tr>
<tr>
<td># Prior Courses</td>
<td>4</td>
<td>.0010</td>
<td>.197</td>
<td>.276</td>
<td>.60</td>
</tr>
</tbody>
</table>
of variance (MANOVA) was used to examine whether the distributions of scores on the potential predictor variables were equivalent for students in the two teaching methods and for completers and noncompleters. Two-way multivariate analysis of variance (MANOVA) is a statistical technique for determining whether several groups differ on more than one dependent variable (Borg & Gall, 1983). The analysis revealed significant main and interaction effects. The main effect for teaching method implied that the predictor variables differed when scores on these variables for students in the lecture course were compared to scores for students in the self-paced course, $F(8,452) = 5.44, p<.001$. The significant main effect for completion status indicated that completers and noncompleters differed on the predictor variables, $F(8,452), p<0.0001$. Furthermore, when both teaching method and completion status were considered, the relationship between the predictors and the main effects were not constant, as indicated by the significant interaction effect, $F(8,452) = 2.82, p<.001$.

Since significant main and interaction effects were found by the multivariate analyses of variance, corresponding univariate analyses of variance for each variable were examined. Several variables showed significant differences when students in the lecture course were compared to students in the self-paced course. Table XI
presents summary statistics for the students in each teaching method class. A significant main effect for teaching method revealed differences between the two groups in terms of their learning style. Students taking the lecture course were significantly more concrete in learning style than students in the self-paced course, $F(1,459) = 10.4$, $p = .001$. The groups also differed significantly in age.

**TABLE XI**

**SUMMARY STATISTICS FOR PREDICTOR VARIABLES BY TEACHING METHOD**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Lecture Method (N = 229)</th>
<th>Self-Paced Method (N = 234)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (S.D.)</td>
<td>Mean (S.D.)</td>
</tr>
<tr>
<td>Abstract/Concrete</td>
<td>0.03 (5.03)</td>
<td>1.57 (5.40)</td>
</tr>
<tr>
<td>Active/Reflective</td>
<td>1.11 (5.39)</td>
<td>0.50 (5.73)</td>
</tr>
<tr>
<td>Locus of Control</td>
<td>9.44 (3.70)</td>
<td>9.26 (4.06)</td>
</tr>
<tr>
<td>Age</td>
<td>23.44 (7.61)</td>
<td>25.36 (7.86)</td>
</tr>
<tr>
<td># Prior Courses</td>
<td>0.48 (0.87)</td>
<td>0.51 (0.79)</td>
</tr>
<tr>
<td># Years Experience</td>
<td>1.10 (2.37)</td>
<td>2.09 (3.53)</td>
</tr>
<tr>
<td>Reading Score</td>
<td>33.96 (6.52)</td>
<td>34.57 (5.07)</td>
</tr>
<tr>
<td>Sex (% Female)</td>
<td>66%</td>
<td>64%</td>
</tr>
<tr>
<td># Completers</td>
<td>54%</td>
<td>44%</td>
</tr>
</tbody>
</table>
On the average, students in the lecture course were younger than those in the self-paced course, $F(1,459) = 19.4$, $p<.0001$. Students in the lecture course had less prior accounting work experience than those in the self-paced course, $F(1,459) = 13.34$, $p = .0003$. Reading scores for the two groups approached a significant difference, with students in the lecture course having somewhat lower scores $F(1,459) = 3.62$, $p = .058$. Groups also differed in terms of the proportion of students completing the courses, with more students completing the lecture course, Chi square, $(1) = 4.1$, $p = .045$.

Several differences were found between students completing the courses and those who did not complete. Summary statistics for the groups of completers and non-completers on the major variables are shown in Table XII.

A significant main effect of completion status was found for the active/reflective dimension of learning style, with completers being more active in style, $F(1,459) = 52.19$, $p = .004$. Completers also had significantly higher reading scores than noncompleters, $F(1,459) = 52.19$, $p<0.0001$. There was a higher proportion of females in the group of completers than in the noncompleter group, Chi square, $(1) = 38.23$, $p<0.001$. These findings dealing with the relationship of sex to successful completion of courses
TABLE XII

SUMMARY STATISTICS FOR PREDICTOR VARIABLES
BY COMPLETION STATUS

<table>
<thead>
<tr>
<th>Variable</th>
<th>Completers (N = 228)</th>
<th>Noncompleters (N = 235)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (S.D.)</td>
<td>Mean (S.D.)</td>
</tr>
<tr>
<td>Abstract/Concrete</td>
<td>0.91 (5.50)</td>
<td>0.72 (5.05)</td>
</tr>
<tr>
<td>Active/Reflective</td>
<td>1.55 (5.08)</td>
<td>0.07 (5.92)</td>
</tr>
<tr>
<td>Locus of Control</td>
<td>9.60 (3.81)</td>
<td>9.11 (3.95)</td>
</tr>
<tr>
<td>Age</td>
<td>27.27 (8.01)</td>
<td>26.58 (7.75)</td>
</tr>
<tr>
<td># Prior Courses</td>
<td>0.55 (0.92)</td>
<td>0.44 (0.73)</td>
</tr>
<tr>
<td># Years Experience</td>
<td>1.55 (2.74)</td>
<td>1.65 (3.15)</td>
</tr>
<tr>
<td>Reading Score</td>
<td>36.15 (4.71)</td>
<td>32.44 (6.23)</td>
</tr>
<tr>
<td>Sex (% Female)</td>
<td>79%</td>
<td>51%</td>
</tr>
<tr>
<td>% in Lecture Method</td>
<td>46%</td>
<td>55%</td>
</tr>
</tbody>
</table>

are consistent with studies done by McCausland and Stewart (1974), and Khan (1973). The effects of both teaching method and completion status were examined in the ANOVA interaction effect. Table XIII lists the summary statistics for major variables by teaching method for students who completed the courses.
TABLE XIII

SUMMARY STATISTICS FOR PREDICTOR VARIABLES
BY TEACHING METHOD (COMPLETERS ONLY)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Lecture Method (N = 124)</th>
<th>Self-Paced Method (N = 104)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (S.D.)</td>
<td>Mean (S.D.)</td>
</tr>
<tr>
<td>Abstract/Concrete</td>
<td>0.15 (5.52)</td>
<td>1.81 (5.36)</td>
</tr>
<tr>
<td>Active/Reflective</td>
<td>1.54 (5.32)</td>
<td>1.56 (4.80)</td>
</tr>
<tr>
<td>Locus of Control</td>
<td>9.52 (3.78)</td>
<td>9.68 (3.86)</td>
</tr>
<tr>
<td>Age</td>
<td>25.69 (8.14)</td>
<td>29.16 (7.46)</td>
</tr>
<tr>
<td># Prior Courses</td>
<td>0.52 (0.94)</td>
<td>0.60 (0.89)</td>
</tr>
<tr>
<td>Reading Score</td>
<td>35.69 (5.31)</td>
<td>36.69 (3.82)</td>
</tr>
<tr>
<td>Sex (% Female)</td>
<td>71%</td>
<td>89%</td>
</tr>
</tbody>
</table>

Analysis of variance (ANOVA) is an inferential technique with many applications. Analysis of variance results in an F value which, if statistically significant, tells the researcher that the means are likely to have been drawn from different populations. However, analysis of variance does not specify which of the three or more sample means differ significantly from one another (Borg & Gall, 1983).

Table XIV presents the corresponding data for students who did not complete the courses. The single significant interaction effect found was for sex, indicating that,
TABLE XIV
SUMMARY STATISTICS FOR PREDICTOR VARIABLES
BY TEACHING METHOD (NONCOMPLETERS ONLY)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Lecture Method (N = 105)</th>
<th>Self-Paced Method (N = 130)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>(S.D.)</td>
</tr>
<tr>
<td>Abstract/Concrete</td>
<td>-0.10</td>
<td>(4.40)</td>
</tr>
<tr>
<td>Active/Reflective</td>
<td>0.59</td>
<td>(5.44)</td>
</tr>
<tr>
<td>Locus of Control</td>
<td>9.34</td>
<td>(3.63)</td>
</tr>
<tr>
<td>Age</td>
<td>24.98</td>
<td>(6.94)</td>
</tr>
<tr>
<td># Prior Courses</td>
<td>0.44</td>
<td>(0.77)</td>
</tr>
<tr>
<td># Years Experience</td>
<td>1.29</td>
<td>(2.93)</td>
</tr>
<tr>
<td>Reading Score</td>
<td>31.90</td>
<td>(7.21)</td>
</tr>
<tr>
<td>Sex (% Female)</td>
<td>61%</td>
<td></td>
</tr>
</tbody>
</table>

compared to students completing the self-paced course, proportionately more of the students completing the lecture course were female. Conversely, for the students not completing the courses, proportionately fewer of the students who did not complete the lecture course were female.

Figure 1 shows the percentage of females for completers and noncompleters in the two types of courses.
Fig. 1--Percentage of Females by Teaching Method and Completion Status
Summary of Findings

A summary of the data findings is as follows:

1. In the lecture course, age accounted for 20% of the variance in the outcome measure of course grade. The addition of reading score into the model at step two increased the variance accounted for to 23%. No other variables added significantly to the prediction of success in the lecture course.

2. In the individualized self-paced course, the most influential variable in predicting outcome was abstract/concrete learning style, with concrete style being associated with higher final course grades. Next in importance, with respect to predicting course grade, was age, with older students having higher scores. Age had approximately half the predictive power of learning style. Reading score had half the predictive power of age, while work experience was lowest in predictive contribution. Higher reading scores and more work experience were indicative of a higher final course grade.

3. For all students completing both methods of the course, the stepwise regression analysis yielded a model incorporating the predictor variables of age, reading score, previous accounting work experience, and the abstract/concrete dimension of learning style. Thus, older students having higher reading scores, more work experience, and a
more concrete learning style earned higher grades. Concrete learning style was found to be the most influential variable in the model. The regression model accounted for 19.7% of the variation in course grades.

4. A two-way multivariate analysis of variance (MANOVA) was used to examine whether distributions of scores on the potential predictor variables were equivalent for students in the two teaching methods and for completers and non-completers. Several variables showed significant differences when students in the lecture course were compared to students in the self-paced course. Students taking the lecture course were significantly more concrete in learning style than students in the self-paced course. On the average, students in the lecture course were younger than those in the self-paced course. Students in the lecture course had less prior accounting work experience than those in the self-paced course. Reading scores for the two groups approached a significant difference, with students in the lecture course having somewhat lower scores. Groups also differed in terms of the proportion of students completing the courses with more students completing the lecture course.

Several differences were found between students completing the course and those who did not complete.
For the active/reflective dimension of learning style, the completers were more active in style. Completers also had significantly higher reading scores than noncompleters. There was also a higher proportion of females in the group of completers than in the noncompleters group.

Conclusions

Consideration of the data findings of this study permitted the formulation of the following conclusions:

1. It appears that age and reading ability have a positive relationship to academic success in an Introductory Accounting course taught in a lecture format. As age and reading ability increase, chance of academic success in the lecture format increases.

2. It appears that the concrete learning style, as measured by the Learning Style Inventory, has a positive relationship to academic success in an Introductory Accounting course taught in an individualized self-paced format. There also appears to be a positive relationship between age, reading ability, and accounting work experience, and success in this course. As age, reading ability, and accounting work experience increase, chance of academic success in the individualized self-paced format increases.

3. It appears that age, reading ability, accounting work experience, and a concrete learning style have a
positive relationship to academic success in Introductory Accounting courses, regardless of instructional method. As age, reading ability, and accounting work experience increase, chance of academic success in all Introductory Accounting courses increases.

4. There does appear to be a difference in the predictors of success in Introductory Accounting classes taught using the lecture method of instruction and those taught using the individualized self-paced method of instruction. While age and reading scores were significant predictors of success in classes taught using both methods of instruction, learning style was a significant predictor of success in the individualized self-paced classes only. A more concrete learning style appears to have a positive relationship to success in the individualized self-paced classes, but learning style appears to have no significant relationship to success in the lecture classes. Also work experience was a significant predictor of success in the individualized self-paced classes, but not significant as a predictor of success in the lecture classes.

5. There appear to be differences in students who successfully complete Introductory Accounting in either instructional method and students who do not complete Introductory Accounting. The students who successfully completed Introductory Accounting were more active in
their learning style, as measured by the Learning Style Inventory. These students also had significantly higher reading scores and there was a higher proportion of females in this group.

Recommendations

Although several variables were statistically significant in their relationship to academic success in both instructional methods examined, the correlations of these variables to academic success account for less than half of the total variance. Since more than half of the variance remains unexplained, the recommendations made on the basis of these statistical findings are appropriately limited.

On the basis of the findings and conclusions of this study, the following recommendations are made:

1. The variables of age, reading ability, previous work experience, and learning style should be utilized in the placement of students in Introductory Accounting classes to determine if student success is significantly increased.

2. The variables of age, reading ability, work experience, and learning style should be further researched as to their relationship with success in courses other than Introductory Accounting.
3. The Learning Style Inventory should be utilized in the placement of students in classes taught using different instructional methods to determine if this significantly increases the number of students who successfully complete these courses.

4. Other measures of learning style should be utilized in future research to determine significance in predicting academic success in various instructional methods.

5. In advising students as to which instructional method may best enhance their chances for success in Introductory Accounting, counselors should be cautious in the use of the findings of this study as further research is necessary to strengthen the results. However, counselors may wish to advise older students with more accounting work experience, higher reading ability, and a concrete learning style to strongly consider the individualized self-paced method of instruction. These four variables comprise the strongest profile of predictors of success in courses taught using the individualized self-paced method of instruction.
CHAPTER REFERENCES


Boston, MA: McBerand company.


APPENDICES
APPENDIX A

INFORMED CONSENT FORM

NAME: __________________________ SOCIAL SECURITY NO.: _______

You are being asked to participate in this research project in order to help the Accounting Faculty and the Counseling Faculty at Brookhaven College to better assist future students in selecting the best instructional method (self-paced or lecture) to match the students' individual learning style and thus enhance the students' chances for successfully completing courses. Hopefully you too will be able to benefit from both the research results and your own individual results at the conclusion of the research project. At that time, your results and the research project results will be made available to you with a thorough interpretation and explanation of these results. Your own test results will be kept strictly confidential and will not be released to anyone else.

If you agree to allow us to utilize your data sheet and test results, please sign this Consent Form. If you have questions or need further explanation of this project, please call John Williams in the Brookhaven College Counseling Center (620-4830). If you do not wish for us to
utilize your data and test results, simply do not sign the Consent Form. Refusal to release these results will not affect your grade in Accounting 201 in any way.

1. I hereby give consent to John Williams to perform or supervise the following investigational procedure or treatment:

   (a) Completion of the Learning Style Inventory
   (b) Completion of the Rotter I-E Scale
   (c) Completion of the Demographic Data Sheet
   (d) Access and use of my student records and grades in Accounting 201.

2. I have seen a clear explanation and understand the nature and purpose of the procedure or treatment, possible appropriate alternative procedures that would be advantageous to me, and the attendant discomforts or risks involved and the possibility of complications which might arise. I have seen a clear explanation and understand the benefits to be expected. I understand that the procedure or treatment to be performed is investigational and that I may withdraw my consent and my understanding of this, having received this information and satisfactory answers to the questions I have asked, I voluntarily consent to the procedure or treatment designated in Paragraph 1 above.

Date Signed

Witness
APPENDIX B

DEMOGRAPHIC DATA SHEET

NAME: ____________________________________________

SOCIAL SECURITY NUMBER: __ __ __ - __ __ __

ACCOUNTING SECTION NUMBER: ________

AGE: ________

SEX: M or F?

U.S. CITIZEN? Yes or No

MARITAL STATUS: _______________________

NUMBER OF DEPENDENTS LIVING WITH YOU: _____________

NUMBER OF COLLEGE HOURS ATTEMPTED: _____________

NUMBER OF COLLEGE HOURS COMPLETED: ________ GPA: ______

NUMBER OF SELF-PACED CLASSES ATTEMPTED: ___________

NUMBER OF SELF-PACED CLASSES COMPLETED: ___________

NUMBER OF TIMES ATTEMPTING ACCOUNTING 201 PRIOR TO THIS TIME: _______

ATTEMPTED SELF-PACED ______ or LECTURE STYLE _______

NUMBER OF HIGH SCHOOL ACCOUNTING OR BOOKKEEPING CLASSES COMPLETED: __________

NUMBER OF COLLEGE ACCOUNTING OR BOOKKEEPING CLASSES COMPLETED: __________
NUMBER OF HOURS WORKING PER WEEK: 

NUMBER OF COLLEGE HOURS ENROLLED IN THIS SEMESTER: 

ANY EXPERIENCE WORKING IN BOOKKEEPING OR ACCOUNTING: 

HOW LONG: 

COLLEGE MAJOR: 

HOW SURE ARE YOU OF YOUR MAJOR: VERY SOMEWHAT NOT SURE
REFERENCES


Reyes, A. (1979, June). *Academic success of San Jose City College students using selected student characteristics.* Unpublished research report, San Jose City College, San Jose, CA.


