

AN EXPERIMENT TO DETERMINE THE EFFECTS OF THE
LENGTH OF HOMEWORK PROBLEMS ON THE
ACHIEVEMENT AND ATTITUDES OF
COLLEGE ACCOUNTING STUDENTS

By

JACK FRED AMYX

Bachelor of Science
Oklahoma State University
Stillwater, Oklahoma
1959

Master of Science
Oklahoma State University
Stillwater, Oklahoma
1963

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
July, 1972

AUG 10 1973

AN EXPERIMENT TO DETERMINE THE EFFECTS OF THE
LENGTH OF HOMEWORK PROBLEMS ON THE
ACHIEVEMENT AND ATTITUDES OF
COLLEGE ACCOUNTING STUDENTS

Thesis Approved:

Harold A. Conrad

Thesis Adviser

Julian H. Bradsher

Arnold C. Cunniff

Robert A. Lowry

M. Durham

Dean of the Graduate College

PREFACE

In spite of the contributions by research in the area of bookkeeping and accounting, most writers in the field indicate that the failure rate in this area of study seems to be too high. Since other writers indicate that homework plays an important role in the understanding of bookkeeping and accounting, the purpose of this study was to contribute some experimental evidence to show the effects of assigning short homework problems as opposed to assigning long homework problems on the accounting achievement and the attitudes toward accounting of three scholastic ability levels of college accounting students.

My sincere appreciation is extended to Dr. Harold A. Coonrad, who served as my graduate committee chairman. His interest, encouragement, and prompt and knowledgeable guidance were very helpful to me. My thanks and appreciation also go to Dr. Lloyd L. Garrison, who served as my major advisor during the initial phase of my graduate program.

Gratitude is also extended to my graduate committee: Dr. Robert A. Lowry, Dr. Arnola Ownby, and Dr. Julian H. Bradsher. I am also greatly appreciative of the time that Dr. Lowry took from his busy schedule to give me council and act as a "sounding board" during the time that I was attempting to isolate a problem. I also wish to thank Dr. Herbert Jelley for his cooperation during the final phase of this experiment.

Dr. Roger Egerton, Dr. Elsie Null, Dr. Olin Walcher, Professor Carlos Johnson, and Professor Dale Cosgrove were of great assistance in

validating the homework problems used in the experiment and in giving other assistance in developing the study.

This experiment was made possible by the cooperation of Dr. Arthur A. Farrar, Chairman of the Business Department at Cameron College, in scheduling classes and by the other members of the Department in developing materials for the experiment, helping teach the classes, and giving recommendations. I especially appreciate Miss Blanche Beavers, who has always encouraged me in my educational endeavors, and who has taken time to assist in the initial reading of portions of material in this study.

I am indebted to Dr. Harry Wagner, Mr. Jim Phillips, and Mr. R. A. Woodworth for their aid and advice in the statistical analysis of this study.

I sincerely appreciate the assistance, encouragement, and understanding which was always given me during my years of formal education by my mother, Mrs. Vivian Amyx, and my deceased father, Mr. Fred Amyx, and I will always be grateful for their guidance.

I am aware of the sacrifices made by my two sons, Duane and Douglas, when they sometimes had to forgo the companionship of their dad so that he could "work on his doctors," and I appreciate the sacrifice they had to make.

I am particularly grateful to my wife, Joyce, for her encouragement, assistance, and sacrifice during all my years of graduate study. Joyce was of particular assistance during the writing stage of my program by suggesting constructive changes, typing most of the material, and assisting in much of the proofreading.

TABLE OF CONTENTS

Chapter	Page
I. INTRODUCTION	1
Specific Statement of the Problem	1
Null Hypotheses	4
Background and Need for the Study	6
Terminology	8
Research Design	11
Data Collection	11
Statistical Analysis	12
Scope and Limitations	13
Assumptions	14
II. A REVIEW OF SELECTED RELATED RESEARCH AND LITERATURE	15
Homework Implications	15
Development of Supplementary Bookkeeping and Accounting Materials	17
Material Development	18
Application of Material Developed	22
Long Versus Short Problems	25
Student Attitudes Toward Bookkeeping and Accounting	32
Summary	40
III. EXPERIMENTAL DESIGN AND METHODOLOGY	42
Development and Selection of Homework Problems	43
Criteria for Homework Problems	43
Jury Selection and Responsibility	44
Final Validation of Homework Problems	45
Accounting Achievement Test	46
The Bi-Polar Method of Attitude Measurement	48
The Accounting Bi-Polar Attitude Test	52
Selection of the Concepts for Testing	53
Construction of the Bi-Polar Scales	53
Validity	55
Reliability	57
Pilot Study Use of Problems and Attitude Test	59
Experimental Design	61
Control of Variables	62
Design of the Experiment	63

Chapter	Page
Teaching and Testing Procedures	68
Conducting the Class	70
Summary	71
IV. FINDINGS	75
Findings Related to Accounting Achievement	76
Variance Homogeneity	76
Enumeration of Findings	78
Findings Related to Attitude Responses	82
Variance Homogeneity	82
Enumeration of Findings	83
V. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS	93
Summary	93
Conclusions	95
Accounting Achievement Conclusions	95
Conclusions About Student Attitudes	97
General Conclusions	100
Recommendations	100
A. SELECTED BIBLIOGRAPHY	102
APPENDIX A - ACCOUNTING ACHIEVEMENT TEST	109
APPENDIX B - ATTITUDE TEST	111
APPENDIX C - TABLES	118
APPENDIX D - LETTERS TO JURY MEMBERS	137
APPENDIX E - EXPLANATION OF STATISTICS	142
APPENDIX F - EXAMPLE OF CHAPTER OUTLINE AND PROBLEM ANALYSIS	146
APPENDIX G - EXAMPLE OF SHORT HOMEWORK PROBLEMS	149
APPENDIX H - EXAMPLE OF LONG HOMEWORK PROBLEMS	155

LIST OF TABLES

Table	Page
I. Variance Homogeneity Results for the Accounting Achievement Scores of 84 Students Classified According to ACT Level and Length of Homework Problems Assigned	77
II. Accounting Achievement Scores: Total Group Scores of 84 Students Classified by ACT Level and Length of Homework Assigned	78
III. Analysis of Variance of the Achievement of 84 Students on the Accounting Test, Classified by ACT Score and Length of Homework Problems Assigned	79
IV. Duncan's Multiple-Range Test to Analyze for Significant Differences in Accounting Achievement Among the Three ACT Level Groups	81
V. Variance Homogeneity Results for the Attitude Scores of 84 Students on Three Accounting Concepts Classified According to ACT Level and Length of Homework Problems Assigned	83
VI. Per Cent of Students Giving Favorable Responses on the Pre-Test and Post-Test Attitude Scales	85
VII. Change in Attitude Scores: Total Group Scores of 84 Students on the Concept "Accounting Homework" Classified According to ACT Score and Length of Homework Problems Assigned	85
VIII. Change in Attitude Scores: Total Group Scores of 84 Students on the Concept "The Study of Accounting" Classified According to ACT Score and Length of Homework Problems Assigned	86
IX. Change in Attitude Scores: Total Group Scores of 84 Students on the Concept "Accounting as a Vocation" Classified According to ACT Score and Length of Homework Problems Assigned	87

Table	Page
X. Analysis of Variance of the Attitude Change on the Concept "Accounting Homework" of 84 Students, Classified by ACT Score and Length of Homework Problems Assigned	88
XI. Analysis of Variance of the Attitude Change on the Concept "The Study of Accounting" of 84 Students, Classified by ACT Score and Length of Homework Problems Assigned	88
XII. Analysis of Variance of the Attitude Change on the Concept "Accounting as a Vocation" of 84 Students, Classified by ACT Score and Length of Homework Problems Assigned	89
XIII. Duncan's Multiple-Range Test to Analyze for Significant Differences in Attitude on the Concept "Accounting as a Vocation" Among the Three ACT Level Groups	91
XIV. Data for Achievement in Accounting Attained by the Experimental Group	120
XV. Data for Achievement in Accounting Attained by the Control Group	121
XVI. Data for Attitude of the Experimental Group on the Concept "Accounting Homework"	122
XVII. Data for Attitude of the Control Group on the Concept "Accounting Homework"	123
XVIII. Data for Attitude of the Experimental Group on the Concept "The Study of Accounting"	124
XIX. Data for Attitude of the Control Group on the Concept "The Study of Accounting"	125
XX. Data for Attitude of the Experimental Group on the Concept "Accounting as a Vocation"	126
XXI. Data for Attitude of the Control Group on the Concept "Accounting as a Vocation"	127
XXII. Accounting Achievement Test Scores: Scores of 84 Students Classified According to American College Test Score and Length of Homework Problems Assigned . .	128
XXIII. Change in Attitude Scores on the Concept "Accounting Homework." Scores of 84 Students Classified According to ACT Score and Length of Homework Problems Assigned	129

Table	Page
XXIV. Change in Attitude Scores on the Concept "The Study of Accounting." Scores of 84 Students Classified According to ACT Score and Length of Homework Problems Assigned	130
XXV. Change in Attitude Scores on the Concept "Accounting as a Vocation." Scores of 84 Students Classified According to ACT Score and Length of Homework Problems Assigned	131
XXVI. Attitude Scores Registered on the Concept "Accounting Homework," and Other Information Necessary for the Calculation of the Correlation of Two Separate Sets of Scores on the Same Attitude Test	132
XXVII. Attitude Scores Registered on the Concept "The Study of Accounting," and Other Information Necessary for the Calculation of the Correlation of Two Separate Sets of Scores on the Same Attitude Test	133
XXVIII. Attitude Scores Registered on the Concept "Accounting as a Vocation," and Other Information Necessary for the Calculation of the Correlation of Two Separate Sets of Scores on the Same Attitude Test	134
XXIX. Total Attitude Scores Registered on all Three Concepts and Other Information Necessary for the Calculation of the Correlation of Two Separate Sets of Scores on the Same Attitude Test	135
XXX. Reliability Scores for Each of Three Accounting Concepts and for the Combined Score of All Three Concepts . . .	136
XXXI. An Identification of the Chapter Concepts Contained in Each of the Short and Long Homework Problems for Chapter Three	148

CHAPTER I

INTRODUCTION

The purpose of the study was to provide experimental evidence to either support or deny the hypothesis that the working of short accounting homework problems results in greater achievement and a different attitude toward accounting than the working of long accounting homework problems. This experiment will aid instructors in determining whether accounting homework assignments should consist of a series of short segmented problems each containing a limited number of concepts, or whether accounting homework assignments should consist of the traditional longer problems which are found in the textbooks and which usually contain numerous concepts.

Specific Statement of the Problem

In general, the problem was to determine if there are significant differences in achievement and significant changes in attitude between Principles of Accounting I students of three distinct levels of intelligence who work a series of short accounting homework problems with a similar group of students who work a series of long accounting homework problems.

Specifically, the problem was to procure answers to the following questions:

- (1) Is there a significant difference in accounting achievement between all students in the experimental group (students who are assigned short problems) and all students in the control group (students who are assigned long problems)?
- (2) Is there a significant difference in accounting achievement among the three ACT score groups of all students combined (both experimental and control)?
- (3) Is there significant interaction of accounting achievement between student membership in both independent variable groups? (Basically, interaction tests whether one method of problem assignment is uniformly superior or inferior regardless of which ACT level of students are assigned the problems. A further discussion of interaction is given in Appendix E.)
- (4) Is there a significant difference in accounting achievement between the low ACT score experimental group and the low ACT score control group?
- (5) Is there a significant difference in accounting achievement between the average ACT score experimental group and the average ACT score control group?
- (6) Is there a significant difference in accounting achievement between the high ACT score experimental group and the high ACT score control group?
- (7) Is there a significant difference in attitude change for any of the three accounting concepts (accounting homework, the study of accounting, and accounting as a vocation) between all students in the experimental group and all students in the

control group?

- (8) Is there a significant difference in attitude change for any of the three accounting concepts among the three ACT score groups of all students combined (both experimental and control)?
- (9) Is there significant interaction for any of the three accounting concepts between student membership in both independent variable groups? (Basically, interaction tests whether one method of problem assignment results in uniformly positive or negative changes in student attitudes regardless of which ACT level of students are assigned the problems. A further discussion of interaction is given in Appendix E.)
- (10) Is there a significant difference in attitude change for any of the three accounting concepts between the low ACT score experimental group and the low ACT score control group?
- (11) Is there a significant difference in attitude change for any of the three accounting concepts between the average ACT score experimental group and the average ACT score control group?
- (12) Is there a significant difference in attitude change for any of the three accounting concepts between the high ACT score experimental group and the high ACT score control group?

Achievement in accounting was defined as the difference between pre-test and post-test scores as measured by the United States Armed Forces Institute Level I Accounting Test. Changes in attitude toward the three accounting concepts were defined as the differences between pre-test and post-test scores as measured by a bi-polar

semantic-differential scale devised by this investigator.

The independent variables were the length of the accounting homework problems assigned for the particular class and the ACT scores of the students.

The dependent variables were the levels of achievement attained by the students and the attitudes reflected by the students.

Some possible intervening variables included: (1) ability and attitude of the teachers; (2) time of day the classes met; (3) prior bookkeeping and accounting experience of the students; (4) time available for students to study; and (5) motivation.

Null Hypotheses

- (1) There will be no significant difference in accounting achievement between all the students in the experimental group (students who are assigned short problems) and all the students in the control group (students who are assigned long problems).
- (2) There will be no significant difference in accounting achievement among the three ACT score groups (high versus average versus low) of all students combined (both experimental and control).
- (3) There will be no significant interaction between student membership in both independent variable groups and their accounting achievement scores. (Basically, interaction tests whether one method of problem assignment is uniformly superior or inferior regardless of which ACT level of students are assigned the problems. A further discussion of interaction

is given in Appendix E.)

- (4) There will be no significant difference in accounting achievement between the students in the low ACT score experimental group and the students in the low ACT score control group.
- (5) There will be no significant difference in accounting achievement between the students in the average ACT score experimental group and the students in the average ACT score control group.
- (6) There will be no significant difference in accounting achievement between the students in the high ACT score experimental group and the students in the high ACT score control group.
- (7) There will be no significant difference in attitude change on any of the three accounting concepts (accounting homework, the study of accounting, and accounting as a vocation) between all the students in the experimental group and all the students in the control group.
- (8) There will be no significant difference in attitude change on any of the three accounting concepts among the three ACT groups (high versus average versus low) of all students combined (both experimental and control).
- (9) There will be no significant interaction between student membership in both independent variable groups and their attitude change on any of the three accounting concepts. (Basically, interaction tests whether one method of problem assignment results in uniformly positive or negative changes in student attitudes regardless of which ACT level of students are assigned the problems. A further discussion of

interaction is given in Appendix E.)

- (10) There will be no significant difference in attitude change on any of the three accounting concepts between the students in the low ACT score experimental group and the students in the low ACT score control group.
- (11) There will be no significant difference in attitude change on any of the three accounting concepts between the students in the average ACT score experimental group and the students in the average ACT score control group.
- (12) There will be no significant difference in attitude change on any of the three accounting concepts between the students in the high ACT score experimental group and the students in the high ACT score control group.

Background and Need for the Study

Several individuals, including House (1961), cite the need for more research on methods to improve student achievement in bookkeeping and accounting. Working homework problems is one factor in the learning process which exerts an influence on student achievement, according to House (1961).

As much practice as time will allow should be given to problem solving. Many facts and processes are not thoroughly learned until the student has had time to develop a great deal of ability in applying them to appropriate problems and drills.

Certainly, factors other than homework affect the achievement of bookkeeping and accounting students. For example, few, if any, educators will take issue with the idea that the student's scholastic ability has an effect on learning. Also, Tonne, Popham, and Freeman (1965)

believe that students' attitudes affect their achievement.

Even more important than competencies are our attitudes and ideals. If we could get students to have proper attitudes toward work in particular, and life in general, no other teaching would be necessary. When students have correct attitudes, they learn by themselves the competencies they need.

A review of the literature revealed that factors other than homework, abilities, and attitudes affect student learning. Schultheis (1971) reiterates that low-aptitude individuals learn more slowly than persons of average intelligence, and suggests (1968) that material taught in small short units is more beneficial to this group of learners. Slow learners also have a short attention span, according to Tonne, Popham, and Freeman (1965), which could result in their inability to complete longer problem assignments, and could lead to frustration and anxiety. Several writers feel that if the homework assignments are organized into relatively short conceptual units which the students are more likely to complete, they will experience a sense of accomplishment rather than a sense of frustration and anxiety. Herein lies the advantage of frequent feedback referred to by Smith and Moore (1962), who state that "receiving frequent 'knowledge of results' keeps students working at the assigned task."

Since working homework problems is deemed to be one important learning factor, a logical conclusion seems to be that a more effective type of homework problem might lead to greater student achievement and better student attitudes toward accounting. Specifically, a group of short segmented problems, each containing a minimum number of concepts, would provide for more frequent feedback of results, would allow for more rapid completion of each problem, and would provide students with a sense of accomplishment. Therefore, shorter problems would seem to

reduce the amount of anxiety and frustration experienced by students, especially those with lower academic ability. Reduced anxiety and frustration could result in better student attitudes, especially for students of lower ability, and could also have an effect on their accounting achievement.

Terminology

ACT Score: the composite score earned by entering freshmen on the American College Testing Program battery of tests. Students transferring to Cameron College from other institutions and some older students did not have these scores on file at Cameron College.

Achievement: the gain in accounting knowledge in the Principles of Accounting I class which was defined as the difference between the pre-test and the post-test scores as measured by the United States Armed Forces Institute Level I Accounting test.

Attitude: a mental state or mood as reflected by an emotion or feeling. This feeling toward accounting concepts is measured by the intensity and direction indicated on several bi-polar scales.

Average ACT Score Group: the students whose composite ACT scores are rated between 17 and 21, inclusively.

Bi-Polar Scale: a horizontal line divided into several sections. At each end of the line is listed an evaluative adjective, with the two evaluative adjectives having an opposite meaning in relation to the concept being considered. The line, therefore, can be used to reflect the direction and the degree of feeling toward the concept for the pair of opposite evaluative adjectives being considered on that particular line.

Change in Attitude: the difference between the scores registered on a bi-polar semantic-differential attitude test administered to the accounting students at the beginning of the semester, and the scores registered by the same students on the same attitude test at the end of the semester.

Check Figure: in reference to an accounting problem, it is one of the key figures from the problem, usually from near the end of the problem. If this key figure is correct in the problem being worked, then it can usually be assumed that the rest of the completed accounting problem is correct.

Concept: in relation to the semantic-differential attitude test, it refers to the "stimulus" to which the student reacts by placing a mark on a seven-step adjectival scale. An example of a concept in this sense would be the term "accounting homework." In relation to the study of accounting, a concept refers to a main idea or area of study in the textbook used by the students of the accounting classes in this study.

Control Group: the Principles of Accounting I classes which were assigned the long or traditional accounting problems for homework.

Evaluative: an adjective which can be used to describe the worth of a concept under consideration.

Experimental Group: the Principles of Accounting I classes which were assigned the short or segmented accounting problems for homework assignments.

High ACT Score Group: the students whose composite ACT scores are rated as 22 or higher.

Long Accounting Problem: the traditional or standard accounting

problems such as those found in the accounting book by Pyle and White (1967), the textbook used in the study. Problems have characteristics of containing several concepts within one problem and require continuity of understanding by the student for successful completion of the problem.

Low ACT Score Group: the students whose composite ACT scores are rated as 16 or below.

Principles of Accounting I: defined by the Cameron College Catalog, 1971-1972, on page 112 as "Basic principles of accounting, including use of journals, ledgers, controlling accounts, work sheets, and financial statements." Specifically, this is the first of two basic courses of accounting required in the business department.

Semantic Differential: a combination of controlled association and scaling procedures. A subject is provided with a concept to be differentiated and a set of bi-polar adjectival scales against which to do it, his only task being to indicate, for each item (pairing of a concept with a scale), the direction of his association and its intensity on a seven-step scale.

Short Accounting Problems: those problems that may be dichotomized from standard accounting problems in that they are more limited in the number of concepts involved and the amount of continuity required for their completion. Specifically, they might be considered as segmented problems which could be synthesized into a longer standard problem. As an example, a standard accounting problem might consist of finding account balances, completing a work sheet, preparing an income statement and a balance sheet, journalizing adjusting and closing entries, and taking a post-closing trial balance. However, the same concepts

could be incorporated by utilizing several segmented or short problems, each requiring the completion of only one of the steps, or even only a portion of a step.

Research Design

The investigator utilized four Principles of Accounting I classes at Cameron College, Lawton, Oklahoma. The students were free to enroll in any of the four classes, unaware that they were to be involved in an experimental study. The four classes were taught by two accounting instructors on the staff at Cameron College. Each instructor taught one class arbitrarily designated as an experimental class and one class designated as a control class. The two experimental classes were given a series of short homework problems for their assignments during the entire semester while the two control classes were given the usual problems in their text (Pyle and White, 1967) for their assignments during the same time period. Each instructor discussed and explained the short and long problems assigned in the experimental and control classes respectively; otherwise, each instructor conducted his two classes in a similar manner.

Data Collection

All of the accounting students in both the experimental and control groups were administered a pre-test on the first day of the semester. The pre-test is the achievement test administered by the United States Armed Forces Institute in their Level I Principles of Accounting course. It consists of 127 multiple-choice questions and has been produced and standardized by Kansas State Teachers College. The same test was given

to the students in the experimental and control groups at the end of the semester as a post-test. The difference in scores for each student between his pre- and post-test was considered to be the gain in achievement in accounting which resulted from his semester's study.

An attitude test was also administered as a pre-test to all accounting students during the first meeting of each class. The attitude test (Appendix B) elicited feelings toward the three accounting concepts; accounting homework, the study of accounting, and accounting as a vocation. The test was constructed by the investigator and consisted of fifteen scales for each of the three concepts. Each scale was in the form of a pair of bi-polar adjectives similar to those described by Osgood (1957). The students were asked to complete the same attitude test at the end of the semester as a post-test on attitudes. The difference in scores for each student between the pre- and post-test was considered to be his change in attitude toward the three concepts as a result of his semester's study in accounting.

Statistical Analysis

For purposes of analysis, both the control and experimental groups were further divided into three sub-groups based on the American College Test composite scores. The multiple-classification analysis of variance statistic was applied to determine if there was a significant difference in achievement among the several classifications of students. Popham (1967) describes the statistic when he says:

In this model, known as multiple-classification analysis of variance, the relationship between one dependent variable and two or more independent variables can be tested. Further, one can test for relationships between the dependent variable and various interactions of the independent variables.

If significant differences were found where three or more groups had been compared through the use of the multiple-classification analysis of variance, Duncan's new multiple-range test was applied to determine which of the groups differed significantly.

The dependent variable in this instance was student achievement as measured by the United States Armed Forces Institute Accounting test. The two independent variables were: (1) the length of the accounting homework problems assigned and (2) the student's ability level as measured by the American College Test.

The same statistic was used to determine if there was a significant difference in attitude change among the accounting students. The dependent variable in this instance was the amount of change in attitude. The two independent variables were: (1) the length of the accounting homework problems assigned and (2) the student's ability level as measured by the American College Test.

Scope and Limitations

All of the Accounting I classes taught at Cameron College, Lawton, Oklahoma during the fall semester of 1971 were included in the study. Two instructors taught all of the accounting classes, each teaching one experimental and one control class. A total of 153 students in the four classes initially began participation in the study, and data for 84 students were used in the final analysis. Data for the 69 students not utilized in the final analysis were excluded because the students withdrew from the course, because there was no American College Test score available for the students, or because some of the sub-groups were of unequal size and students were excluded to bring the sub-groups

to an equal size.

The United States Armed Forces Institute Level I Accounting Test was selected as the pre- and post-test instrument to determine student achievement, and student attitudes toward three concepts dealing with accounting were each tested by fifteen scales consisting of bi-polar adjectives which were also given as pre- and post-tests to the students.

Assumptions

The study includes the following basic assumptions:

(1) The findings of a similar study including a larger sample will yield results similar to the findings of this study.

(2) The students enrolled in Principles of Accounting I classes at Cameron College during this study represent similar-type students in future Principles of Accounting I classes at Cameron College.

(3) The scores attained by the students on the American College Test reflect the level of ability of the students for the purposes of this study.

(4) Any changes in accounting achievement or changes in student attitudes toward accounting are the result of experiences received from the particular accounting class in which they were enrolled.

(5) The scales of the semantic-differential attitude test are linear between polar opposites and pass through the origin. Furthermore, it is assumed that intervals within a single scale and between different scales are equal.

(6) The scales of the semantic-differential attitude test are bi-polar and the bi-polar adjectives are evaluative.

CHAPTER II

A REVIEW OF SELECTED RELATED RESEARCH AND LITERATURE

The related research and literature were surveyed with four purposes in mind: (1) to review information concerning the implications of bookkeeping and accounting homework; (2) to review information concerning the development of bookkeeping and accounting problems for use in classes; (3) to review findings and thinking concerning the use of long versus short problems in bookkeeping and accounting classes; and (4) to review information concerning student attitudes or opinions about various aspects of bookkeeping or accounting classes. The research and literature surveyed were classified according to these purposes, with some of the studies encompassing more than one classification.

The literature reviewed is limited to that concerned with bookkeeping and accounting, either from the different aspects of homework or from the point of view of eliciting student attitude or opinion.

Homework Implications

In the information surveyed, there were seemingly divergent opinions and findings concerning the effect of and necessity of homework in bookkeeping and accounting classes. Kahn (1962) states that "assignments are important in the teaching of bookkeeping. The

assignments must be clear, and not too long, and not too difficult." In a similar vein, Rainey (1958) specifies that daily assignments in bookkeeping are important, not as busy work, but as useful learning devices. Likewise, the American Accounting Association (1968) on page 75 states its views on the objective of accounting problems. It states that "The textbook explains and illustrates accounting theory and practice. Problems serve to test a student's understanding of the procedures." Reynolds (1953) studied the effect of homework assignments upon achievement in first-semester bookkeeping. One group of fifty bookkeeping students were equated on the basis of their intelligence quotient and their grade-point average with a second group of fifty-four bookkeeping students. The first group was given outside assignments while the second group was not. By using both publisher-provided and teacher-made tests, the findings showed that the group which was assigned homework problems had greater achievement on all tests than did students who had no homework assignments. Thus, even though students spent an average of only fifteen minutes per assignment, the conclusion was that outside bookkeeping assignments had a positive effect on achievement in first-semester bookkeeping.

An early study by Tupper (1930) considered several factors which influence achievement in bookkeeping. One particular finding revealed that the intelligence quotient was a significant factor in achievement, but that the amount of homework performed by each student was not a determining factor in the pupils' success. Furthermore, there was no significant relationship between the amount of time spent in home study and the test scores secured. A later study by House (1951) also found that there was no significant relationship between the amount of

time spent in home study and the test scores secured in bookkeeping. Twenty-two students were interviewed in depth and were asked to keep daily records of the time spent to satisfactorily complete the homework assignments. The achievement of the students was ranked by percentile ranges and the amount of time spent completing the homework was determined to be as follows: 75 to 100 percentile range, 47 minutes; 50 to 75 percentile range, 43 minutes; 25 to 50 percentile range, 48 minutes; and 1 to 25 percentile range, 56 minutes. The poorer students spent more time successfully completing the homework assignments than did the better students. In a later article, House (1966) concluded from these and other related findings that "the time required for the satisfactory completion of assignments affects to a great extent your students' achievement in bookkeeping."

In summary, the findings and conclusions indicate that there are mixed results concerning the working of homework problems by bookkeeping students of varying intellectual ability. Yet, findings by one writer did indicate that the achievement of students who were assigned homework problems was better than the achievement of students who were not assigned homework problems. Likewise, the literature indicates the desirability of planning homework for bookkeeping and accounting.

Development of Supplementary Bookkeeping and Accounting Materials

In the studies reported in this section, bookkeeping and accounting problems or problem-related materials were developed as part or all of the purposes of the studies undertaken by the investigators. Some studies consisted of developing problem-related materials, while others

entailed developing the materials and testing their effectiveness in the classroom, either by personal analysis or by statistical interpretation of test results.

Some of the materials developed by investigators for use in their bookkeeping and accounting classes included: study guides, complete-cycle units and problems, discussion problems, learning units, practice sets, courses of study, units of study, reading exercises, and problems and exercises.

The studies related to the development of supplementary bookkeeping and accounting materials were divided into two groups, those in which the primary purpose was the development of the material and those in which the primary effects of the materials were determined, as described through an analysis of student achievement.

Material Development

An early study to develop supplementary materials for bookkeeping and accounting was Asperger's (1932) preparation of study guide sheets for each unit of the bookkeeping textbook. The study guides were developed by determining the essential ideas presented in the textbook which were then listed as incomplete statements on the study guides. The students were expected to complete the statements from their reading of the textbook. Although a controlled experiment was not conducted, the writer indicated that students who had used the study guide scored higher on tests than other students previously taught without the use of the study guides.

Marsolek (1954) developed a unit of study for a bookkeeping class for the teaching of farm record keeping. Bookkeeping textbooks and

farm record sets were reviewed as background information. Interviews were conducted with county agents and instructors of adult training programs for information and data. From this background information, four units were developed in the teaching of farm record keeping. Rosenberg (1957) developed eight learning units as a result of reviewing the literature to determine different approaches to teaching bookkeeping. The learning units presented the complete bookkeeping cycle several times; however, the problems were short in order to allow the students ample time to complete more problems.

Jones (1953) developed a course of study in high school bookkeeping by reviewing textbooks on curriculum building and courses of study, educational bulletins, and periodicals. The initial course of study was developed and tested in a bookkeeping class, and modifications were made as a result of student comments. The final course of study for the high school beginning bookkeeping course consisted of five units. Kindle (1955) also developed a course of study for high school elementary bookkeeping. Bookkeeping textbooks, monographs, and periodical articles were analyzed and used in conjunction with information from a methods-of-teaching-bookkeeping course to provide information for developing the course of study. The findings of the study consisted of the development of a twelve-unit course of study for high school elementary bookkeeping.

A practice set emphasizing payroll accounting constituted the findings of a study by Hendrick (1954), with laws, rules, and regulations governing payroll accounting being reviewed for background information. Accounting textbooks and government publications together with the investigator's experience in teaching bookkeeping and income tax

constituted the sources of information for the construction of the practice set. A practice set in machine bookkeeping which included assignments for five posting cycles and which was developed with an introduction to machine bookkeeping via accounts receivable was the result of Yourd's (1955) study.

A ten-month teaching procedure for an average class in beginning bookkeeping was the study completed by Knost (1946). The teaching procedure was based upon a series of twenty-four related, complete-cycle bookkeeping problems, which comprised two years in the business life of a hypothetical businessman. The problems were sectioned into two parts with part I introducing the theory of bookkeeping and accounting as applied to the records of a service business and part II expanding the scope of the problem to involve the theory of carrying on a merchandizing type of business. The content and sequence of the material in the twenty-four problems were based upon the subject matter of textbooks, notes, readings from courses in bookkeeping and accounting, and personal experiences. Another group of complete-cycle problems and units for a beginning bookkeeping class was completed in the study by Pearson (1959). The literature, periodicals, monographs, research papers, and textbooks were read and reviewed, and from these resources and the experiences of the investigator, basic concepts concerning the presentation of bookkeeping were formed. These concepts were then incorporated in the various complete-cycle problems and units prepared for use in the bookkeeping course.

McKinley (1952) developed a series of problems and exercises to supplement the textbooks used in second-year bookkeeping classes. The scope was determined by consulting several second-year bookkeeping

teachers and by analyzing textbooks and courses of study. A periodical article, research theses, and several bookkeeping and accounting textbooks were reviewed; and, from analyzing the textbooks, sections needing additional problem material became evident. The problems for the various sections were developed and placed in order from the simple to the complex. McKinley followed certain principles in the development of the problems. The first problem in each unit contained very simple exercises, while other problems were followed by theory questions. The problems for slow learners contained a minimum amount of arithmetical computations, with the emphasis being placed on bookkeeping theory, while more complex problems emphasized a greater degree of mathematics. The problems for the slow learners contained more complete and detailed instructions and more information was given for solving the problems.

Another study which developed supplementary problems for use with a bookkeeping course was one made by Corcoran (1953). The findings of this study consisted of reading exercises constructed to improve the students' reading in bookkeeping. From reviewing the literature, the essentials of good reading were determined and summarized into seven general ideas. Bookkeeping textbooks were analyzed to determine the difficult terms and skills, and the difficult words and phrases were prepared and given as a pre-test to determine those that needed particular emphasis. The areas of interest and banking and of depreciation were determined to be the two most difficult units; thus, reading exercises were developed for these units, according to the seven reading essentials earlier identified.

Kaeding's (1957) study dealt with another type of supplementary material for use in high school beginning bookkeeping. Kaeding used

his own experience with an actual set of bookkeeping records and interviews with various businessmen relative to their practices, problems, and difficulties in record keeping as sources of information. This information was used as a basis for the development of thirty-one discussion problems, with each problem correlated to a division of subject matter in beginning bookkeeping. Six bookkeeping teachers each tried out five or six of the discussion problems in the classes they were teaching and used an evaluation sheet to evaluate the problems. As a result of this evaluation, one problem was eliminated and others were changed. Thirty discussion problems for high school beginning bookkeeping, which appeared to be more realistic and interesting to students than traditional textbook problems, resulted from the study.

Application of Material Developed

The study by Accola and Brechlin (1967) contrasted the results obtained when two groups of students were taught beginning bookkeeping principles by utilizing two different approaches to the concepts covered. One class studied those principles determined to be most essential for adjustment to adult life as determined through the use of a questionnaire. These principles were summarized as consisting of personal-use knowledge, a knowledge of debit and credit, and understanding terminology. The experimental course emphasized the findings from the teacher-made questionnaire and contrasted the results in achievement to a control class using the usual textbook material. At the end of a semester, both a publisher-prepared test based on the regular material and a teacher-made test based on the syllabus of the experimental class were given to both groups of students. The results

of the test scores indicated that there was no significant difference in scores between the two groups of students on either set of tests.

Mixed results were found by Douglas (1936) between the experimental group and the control group concerning the teaching of general business knowledge in a regular bookkeeping class. To develop instructional material for the teaching of nonvocational general business objectives in a bookkeeping course, Douglas first drew up a brief outline of the proposed course, omitting many purely vocational phases and including several bookkeeping principles associated with general business knowledge. Next, 200 specific general business objectives appropriate for the bookkeeping context were outlined and classified. Each objective was combined in the course outline at an appropriate point and actual instructional material was drafted from the chart. Study guides and discussion questions were prepared, with written exercises or problems reduced to a minimum. Douglas used the material in his own bookkeeping class and determined the material to be practicable, but made revisions in light of his own classroom experiences. Six bookkeeping teachers assisted in the actual study, each teaching one class with the experimental instructional material and each teaching one class in accordance with the textbook procedures. A general business knowledge test of one-hundred questions was prepared and administered to all students as both a pre-test and an achievement test. Additionally, an objective "debit-credit" test of fifty transactions was given to all students to determine whether there was any appreciable loss in the vocational knowledge of the student due to the use of the experimental material.

Findings by Douglas indicated that for students whose scores lay between the fifth and eightieth percentiles there was a significant

gain in general business knowledge for the experimental group over the traditional group, while there was no difference in general business knowledge between the groups for the top five per cent of the students. A further finding was that there was a wide variation in both general business knowledge achievement and bookkeeping knowledge achievement between the groups taught by different teachers.

Satlow (1942) also prepared supplementary materials for instructional purposes in a beginning bookkeeping class, and his findings indicated significant differences in achievement for the students working with the material which he developed in his study. The purpose of the study was to provide the following: (1) supplementary materials to serve for drill or remedial instruction purposes; (2) materials broken down into individual lessons, each aimed at developing only one thing at a time; (3) materials arranged in order of graded difficulty; (4) materials compiled to present bookkeeping difficulties, not aggravated by arithmetic difficulties; and (5) materials which would follow the sequence of the New York City syllabus in beginning bookkeeping.

Satlow prepared a list of criteria, had them checked and evaluated by other teachers and supervisors, and then developed classroom and homework assignments based on the criteria. Next, the syllabus in beginning bookkeeping used in New York City was broken down into units, each designed to center around one major activity of a sole proprietorship. The specific objectives of each activity were listed in terms of student learning. Each unit was then broken down into a series of lessons, each primarily concerned with one specific objective of the unit. Several high school bookkeeping textbooks were analyzed for the purpose of outlining the subject matter to be assigned to the various

units. The actual problem materials for each unit were composed to conform with the objectives of each lesson. Two textbooks were analyzed and all the new problem materials were classified according to the lesson to which they were related in order to disclose the need for new problem material. New materials were composed and used in one class. Revisions to the materials were made in view of the classroom experiences and the materials were tried again on another class. Two groups were then utilized to test the materials again. One group of students used the experimental material while the other group used the textbook materials. The achievement of the two groups was tested and compared, and the experimental problem materials were given a final revision.

The final syllabus of problem material was compiled by Satlow and this was used by a group of students in the New York City schools. The Bookkeeping Two Years' Regents Examination was given in June, 1942. The results of this examination indicated that students who had used the problem materials in their study did somewhat better than the students who used the regular textbook.

Long Versus Short Problems

The studies reported in the section comparing the lengths of problems point to the fact that there is no single description to define a "short" problem. In fact, very few of the researchers actually use the terms "long" or "short" to describe the types of problems utilized in their studies. However, in all cases of the theses described in this section, one group of problems can definitely be described as being short in relation to the other problem material involved.

The "short" versus "long" idea for problem material has taken several distinct forms. One approach was to contrast the contract plan of working material to a differing daily type of problem work. A second approach was to compare the achievement of students who worked practice sets to the achievement of students who worked a series of shorter problems. Comparisons were also made concerning different knowledge and feedback patterns in the working of practice sets. Still another approach to the "long" versus "short" idea of problem material was to contrast the results of studying programmed information versus studying regular textbook and problem-type material.

The results of the studies varied, with several indicating almost no difference between groups using different types of materials, while others indicated a very significant difference between the students.

When measured by an objective method, a controlled classroom experiment by Wagner (1934) indicated that neither the contract method nor the daily assignment method of teaching produced better student achievement. One class studied from a book designed for the contract method and another class studied from another textbook by the daily assignment method. At the end of the first semester, the groups were given an identical achievement test that had originally been taken as a pre-test. During the second semester, the method of study was reversed, again with an objective test given as a pre-test and as a final achievement test. The same experiment was repeated the following school year with two additional groups of students. The students were matched on the basis of their pre-test scores, grades given by previous teachers, chronological age, and mental age. However, when final results were analyzed, the findings indicated no significant difference as measured

by an objective test, in the results achieved by using the two different methods of teaching bookkeeping.

U'Ren (1931) studied the differences in achievement between students who studied by working practice sets and students who worked short exercises. The two groups were equated on the basis of their scores on an intelligence test and a bookkeeping test. One group followed the regular material in the textbook, including the practice set, while the other group worked the regular material but did the supplementary exercises instead of the practice set. No significant difference was found between the two groups, although the group who worked the practice set had slightly greater gains in scores.

Cockshoot (1935) reported similar results in his study when one group of forty students used practice set material to develop bookkeeping ability while another group of forty students completed problems assigned by the instructor. The groups were equated on the basis of data from their school records; however, neither method proved to give superior results in achievement.

In a larger study, Reynard (1936) also compared the results of using practice sets versus using shorter problems. Students worked practice sets in the experimental group while students in the control classes worked exercises involving only part of a complete bookkeeping cycle. Six bookkeeping teachers were involved in conducting the experiment, with each teacher in charge of one control group and one experimental group. The students in the two groups were matched on the basis of chronological age, grade in school, sex, and intelligence quotients. The basis for determining achievement was the students' scores on a series of ten objective-type tests furnished by the

textbook publisher. However, there was no significant difference in the achievement of the two groups as revealed by scores on any one test or by the composite of the tests.

In a later experiment, Johns (1955) compared the achievement of a group of fifteen beginning bookkeeping students who were taught by the textbook workbook method with the achievement of a similar group of students who were taught by the expanded practice set method. The groups were equated on the basis of their intelligence quotient. The achievement of the groups was determined by the scores made on five teacher-constructed achievement tests. The mean score for the group using the practice sets was slightly higher; however, the difference was so slight that neither teaching method could be labelled as being superior to the other.

Donahue (1966) describes his experiment as being one which tested for significant differences in achievement by using different methods of working practice sets in a high school bookkeeping class. In one class which used immediate feedback of results, the practice set was worked on a step-by-step basis with each transaction discussed together in class. Another class worked the practice set on an individual basis resulting in a delayed feedback to the students concerning the correctness of their practice set. However, the results of an achievement test covering both general bookkeeping concepts and the practice set indicated no significant difference between the scores of the groups.

A similar study in bookkeeping was conducted by Fairchild (1970) when he compared achievement by using three different approaches to the teaching of practice sets; step-by-step, team, and individual work. Additionally, a fourth group of students did no work on practice sets,

but worked only selected problems. None of the four methods of working assigned material proved to be more effective in producing higher achievement scores on theory and problem-solving tests.

An extensive experiment by Dow (1936) was undertaken to determine the relative effectiveness of a college-level course in elementary accounting which includes the use of practice sets as compared to one involving only theory and problem solving. The subjects for the study were 473 students enrolled in twenty-four elementary accounting classes in twenty colleges. A different instructor taught each class which was divided into two groups. The experimental group worked only short problems, while the control group worked practice sets. Short problems were defined as those regular and alternate problems appearing at the end of each chapter in the adopted textbook. The study was divided into two experiments with twelve classes in each experiment. The first experiment compared the results obtained from working one practice set to those obtained from working one assigned unit of short problems. The second experiment compared the results obtained from working two practice sets with those obtained from working two units of short problems. The problem units and the practice sets required approximately the same amount of time for completion.

Raw scores made at the end of the year on the Level I-A Achievement Test of the American Institute of Certified Public Accountants College Testing Program determined student achievement. Dow used the analysis of variance formula to compare and analyze the groups' scores and to test for significant differences in the results.

The findings of the study showed that in the first experiment the students who worked the practice set scored higher than the students

who worked only short problems. However, the scores for the second experiment showed that the students who worked two units of short problems scored higher than did students who worked two practice sets. When the analysis of variance formula was applied, however, the F ratios obtained indicated no statistically different results between the first experiment and the second experiment, between the groups who worked short problems and the groups who worked practice sets, or in the relationship between the experiments and the teaching procedures used.

Halverson (1963) evaluated results obtained in a high school bookkeeping class by using programmed instruction material as opposed to using material contained in the textbook. Halverson developed the programmed material as part of his study. The students in the study were matched according to sex, intelligence quotient, previous scholastic achievement, social science, and composite standard scores on the Iowa Test of Educational Development. Achievement was defined as the difference in score between the objective pre-test and the same instrument given as a post-test. When achievement was compared, the results of t-tests indicated that by using the programmed material, males achieved significantly better results at the .10 level of significance; females achieved significantly better results at the .02 level of confidence; and both achieved significantly better results at the .01 level of significance.

Bedke (1969) also developed and evaluated a unit of programmed instructional material for high school bookkeeping. The unit of study developed was a study of the purchases journal and contained 109 frames. Two classes of students were evaluated on their achievement prior to

the experiment and showed no significant difference. One class studied by using the programmed material and the other class used the regular material. Performance tests administered after studying the purchases journal by the two methods indicated no significant difference in achievement between the two groups.

The results of a study by Glover (1970) concerning programmed instruction in an elementary college accounting course indicated varied results. The achievement tests were administered to 125 students in the study. The tests were given at the end of three weeks, at the end of six weeks, and at the end of the quarter. The analysis of covariance was used to compare achievement on the tests. The students who had studied the programmed material scored higher, but not significantly so, on the first test, while students who had studied the regular material performed significantly better on the post-test problem.

Daily (1969) evaluated differences of achievement between beginning accounting students who were taught by the traditional text-lecture method and those students who were taught by the "scrambled" programmed text-lecture method. Seventy students from three college accounting classes in Kansas used the traditional textbook and eighty-seven students from three college accounting classes in Massachusetts used the programmed textbook. Findings indicated that no significant relationship existed between achievement in accounting as measured by the American Institute of Certified Public Accountants Achievement Test and the method of instruction.

Student Attitudes Toward Bookkeeping and Accounting

A review of the literature reveals the importance that is attributed to student attitude, as borne out by the fact that several researchers have attempted, in one fashion or another, to elicit student opinion regarding particular aspects of bookkeeping or accounting.

The attempt on the part of researchers to derive student attitude has taken several forms. Some attempts have simply been interpretations of the feelings of the students toward certain parts of the experiment. Other writers have asked for student preference between two methods of teaching. Some researchers have asked students to answer questionnaires about particular aspects of the experiment in bookkeeping or accounting, while other writers have tried to obtain general feelings from students concerning these courses.

Most of the opinions and attitudes of bookkeeping and accounting students have been reported as general conclusions on the part of the researcher based on the answers given by the students. However, a few of the researchers have, in one way or another, statistically analyzed the attitudes of the students.

The findings of attitude studies reveal that most students have a favorable attitude toward accounting, although this attitude diminishes somewhat during the course of the semester. There is also strong feeling among students that the homework is too long and that assignments are difficult to complete. Several studies involving practice sets as part of the experiment indicated student approval in the use of the practice sets.

Preference for the method of instruction formed the basis of other student opinionnaires and Wagner (1934) found that by overwhelming vote, the students believed that they could get better grades by the contract method as opposed to the daily assignment plan. However, the students also thought that they learned more by the daily assignment method, and they preferred the daily assignment method of teaching. Asperger (1932) also used the method of the student vote whereby he determined that the large majority liked the study guides which were prepared for his study. Duarte (1967), who used practice sets in his control group, concluded on page fifty-seven that "Most of the students in the control group regarded the practice set as a valuable learning experience." He continued by saying that there was general agreement that the students gained an awareness of the importance and use of business papers in bookkeeping. Dow (1963) also found that there was a favorable attitude toward practice sets on the part of the majority of students who had worked the sets. In fact, over 86 per cent of the students felt that an elementary accounting course should include at least one practice set, and they regarded the practice set as being beneficial to them. In the different methods of working practice sets, Fairchild (1970) determined that students preferred the individual method to either a step-by-step or a team method. As part of his study, deReyna (1959) used a questionnaire from a previously published study in determining that students felt they learned less from classes taught by television than from conventional classes.

House (1951), as part of his study of factors that affect student achievement in bookkeeping classes, administered a questionnaire to 357 beginning bookkeeping students and personally interviewed thirty-eight

of them. The results of the questionnaire indicated that about one-half of the students spent more time on bookkeeping assignments than on assignments in other courses, and these people were primarily in the lower percentile achievement range. About one-fourth of the students reported that the amount of time they spent per day on assignments was unreasonable. However, nearly two-thirds of the students did not spend more time on assignments than what they thought was reasonable. Over two-thirds of the students did not find the assignments difficult, while about one-fourth thought the assignments were difficult; the latter group was concentrated heavily in the lower achievement range. It was enlightening to learn that almost 86 per cent of the students thought bookkeeping was interesting. From these findings, House (1951) concludes on page 272 that "There is a highly significant relationship between achievement and interest in beginning bookkeeping."

Although it was a secondary purpose of the study, Dow (1963) determined the nature and trends of attitudes of accounting students who worked only short problems as compared to those who worked practice sets. Short problems in her study consisted of those regular and supplementary problems found in the textbook. A twenty-item opinionnaire administered at the beginning of the course ascertained attitudes toward accounting. Changes in attitudes were determined by administering the same opinionnaire at the end of the course and identifying changes in responses from the initial opinionnaire. The Chi-square test compared changes in responses between the group who had worked practice sets and the group who had worked only short problems. The final opinionnaire had an added section to obtain responses concerning the values derived from practice sets. The following twenty items

constituted the questions on the opinionnaire:

1. I enjoy working with figures.
2. I would not take accounting if it were not required for my major.
3. Accounting is one of my favorite courses.
4. I do not mind working accounting problems because I feel that I am really learning something.
5. I feel that I shall never have the confidence necessary to attempt the responsibility of keeping a set of books by myself.
6. I think that accounting is too repetitious.
7. I plan to take as much accounting as I can fit into my total educational program.
8. Accounting is one of the most interesting courses that I have ever taken.
9. I believe that accounting will prove to be one of the most valuable of my college courses.
10. I regret having enrolled in accounting.
11. The working of accounting problems takes longer for me than it does for most other students in the class.
12. I believe that a knowledge of accounting will prove to be valuable for my personal use even though I may never use it for vocational purpose.
13. Mastering an accounting problem gives one a sense of accomplishment.
14. I find that accounting is not a difficult subject if one keeps up to date with the problems assigned.
15. I believe that accounting requires a certain aptitude which I do not have.
16. Even before I enrolled in the accounting course, I felt that I would probably fail it.
17. I had thought that I would enjoy accounting more than I do.
18. I think that accountancy would be an interesting profession.
19. I believe that accounting should be a required course for a major in business administration.

20. I now feel that if I should so desire, I could eventually become a successful accountant or a competent teacher of accounting.

From the results of the opinionnaire, Dow concluded that student attitude toward accounting was predominantly positive for students who worked both practice sets and short problems. However, within both groups, there was a general diminishing of favorable attitude between the beginning and the completion of the course. Moreover, the working of practice sets seemingly had no effect on this trend.

The major aim of a study by Mullen (1957) was an attempt to assess attitudes of students toward the required courses in college accounting through the use of a fourteen-item questionnaire. The questionnaire was developed and scaled along a system suggested by Thurstone and allowed the students to react to each of the fourteen questions by answering whether they agreed, disagreed, or had no opinion. Each of the 374 students in the third-semester college course of accounting was asked to respond to the following fourteen comments:

1. Accounting is an interesting subject.
2. Accounting adds little to my business education.
3. Accounting is a boring subject.
4. I enjoy solving an accounting problem as much as solving any puzzle.
5. Accounting is a worthwhile addition to my education.
6. I think my time spent on accounting courses has been wasted.
7. Accounting has made me curious about many new ideas.
8. Accounting knowledge will be of some help in my future employment.
9. Most of my work in accounting courses is done to get a good grade rather than learn the material.

10. Mathematical ability is the only thing tested by accounting courses.
11. Accounting inspires me to independent effort.
12. I neither like nor dislike accounting.
13. I have learned less in accounting than in any other course.
14. Accounting gives me insight into the business world.

In addition, two open-end questions were asked. They were: (1) What do you like most about accounting?, and (2) What do you dislike most about accounting?

From the results of the questionnaire, Mullen compared the attitudes of the 211 non-accounting majors with the attitudes of the 130 accounting majors. There were also thirty-three individuals in the study who had not decided on a major. The findings of the study indicated that for the nonaccounting majors, 16 per cent had attitudes which were highly favorable, 32 per cent were favorable, and 21 per cent were slightly favorable. For the accounting majors, 46 per cent had attitudes which were highly favorable, 41 per cent were favorable, and 8 per cent were slightly favorable. More than 75 per cent of the nonaccounting majors agreed with statements five and eight, while more than 75 per cent of the accounting majors agreed with statements one, five, eight, and fourteen. More than 75 per cent of the nonaccounting majors disagreed with statements two, six, ten, and thirteen, while more than 75 per cent of the accounting majors disagreed with statements two, three, six, nine, ten, twelve, and thirteen. Mullen indicates that while both groups seem to have favorable attitudes toward accounting, there is a statistically significant difference in the ratio of responses to all questions except for questions two, six, ten, and thirteen.

The open-end questions seemed to reveal that students liked the general business information, the satisfaction of completing problems, and the general problem work. The students disliked the time required in study, the routine of the work, and the mechanics involved.

A recent study by Stearns (1969) also secured student responses through the use of an opinionnaire. The primary purpose of his study was to compare achievement in college accounting classes when class size was the independent variable involved. Therefore, many of the questions on the opinionnaire referred to student attitudes in the context of class size. Also, since attitude study was ancillary to the main research topic, the results were conveyed by means of a percentage rating.

Stearns stated on page thirty-six that he was aware that "the consideration of academic achievement is only one of a number of factors that constitutes the students' total educational experiences." With this consideration in mind, he attempted to obtain information relative to the students' opinions on variables other than academic achievement by having each student answer the following questions:

1. Approximately how many large classes have you attended in college?
2. Approximately how many small classes have you attended in college?
3. How secure did you feel in this class? (Did you feel any degree of uneasiness because of being in a class of this size?)
4. How many distractions were there in your class?
5. How difficult was it to concentrate in your class?
6. Did you feel that you had adequate personal contact with your instructor?

7. How highly motivated were you to prepare the outside assignments for this course?
8. How important (as an individual) did you feel in this class?
9. Did you feel that you were able to interrupt your instructor in order to ask questions as often as you liked?
10. Approximately how many personal consultations (office visits for help with course work,--not merely to inquire about marks) did you have with your instructor?
11. How frequently did you find yourself daydreaming in class?
12. How effective do you think the instruction was in this course?
13. How formal was the instructor in presenting the lectures?
14. How good was the instructor in dealing with students?
15. If you had the opportunity to move to another section of this course early in the semester, how would you have felt about moving?
16. How well did you like this class?
17. If you take the second course in Principles of Accounting, in what size class would you prefer to enroll?
18. In what size class do you feel you can earn the highest possible grade?
19. How valuable were the lectures by the instructor?
20. How valuable was the question-and-answer method used during selected periods?

Even though most of the questions dealt primarily with large versus small accounting classes, some of the results may have larger application. Considering that the responses to the seventh question, which dealt with the preparation of outside assignments, were similar, it appears that class size did not affect the students' motivation to prepare homework. Also, the response to question fifteen indicated that students were happy with the class size in which they were enrolled, since most of them would not have changed sections. In answering questions number sixteen, the responses were slightly more

favorable in the small classes than in the large classes; however, students in both groups indicated a favorable attitude toward the class in which they were enrolled.

Summary

A thorough review of the research and literature indicated varying degrees of agreement within the four areas of bookkeeping and accounting surveyed.

The findings of researchers and the conclusions of writers indicate that there are seemingly mixed results concerning the working of homework problems by bookkeeping and accounting students. Researchers have found that the amount of time spent working homework problems has little, if any, direct correlation to achievement. Yet, other research has indicated that assigning homework problems in bookkeeping results in better achievement than when homework problems are not assigned. Also, writers overwhelmingly feel that homework is important in bookkeeping and accounting.

Problem-related materials developed as a part of research studies include study guides, units of study, problems, practice sets, and exercises. Most researchers relied on reviewing pertinent textbooks or articles and used the concepts in the literature as the basis on which to develop the materials. The results of using materials in experimental studies, however, have given varying results. Some studies report significantly different results when experimental material was used, while other findings indicated no difference in student achievement between different groups.

Although very few researchers actually described their study as

contrasting long versus short problems in bookkeeping and accounting, several studies have compared the achievement of students when two distinct problem-type situations were studied. The comparison of achievement of students under both the contract plan versus the daily assignment plan, and the working of practice sets versus the working of a series of shorter problems indicates that there has been little, if any, statistically significant difference. However, a few researchers have reported significant differences in achievement when programmed material was compared to conventional textbook material.

A few studies pertaining to bookkeeping and accounting have attempted to determine the students' attitudes. Most of these studies had the determination of opinion and attitude as a secondary purpose. Therefore, most researchers' questions were designed primarily to give results which could be analyzed in conjunction with the main purposes of the study. Thus, the questions asked and the opinions received were quite different in most of the studies. However, all of the reported findings indicated a favorable attitude toward bookkeeping and accounting as a general theme.

CHAPTER III

EXPERIMENTAL DESIGN AND METHODOLOGY

Writers and teachers in the area of bookkeeping and accounting believe that too many students do not successfully complete the courses. Excessive failures in these subjects have been, and continue to be, a persistent problem.

Teachers of accounting are especially aware of the significant factors related to the successful working of homework problems. Factors such as the frustration of the student, the reinforcement or feedback which the student receives, the attention span of the student, and the continuity of the information involved cannot be lightly regarded. Likewise, the student's attitude plays an important role in the successful study of bookkeeping and accounting, with those students having the proper attitude being well on their way to learning accounting.

The purpose of this study was to contrast the results of working a series of short homework problems with working a series of long homework problems to determine if there was a difference in the achievement and attitude change of the groups of students in Principles of Accounting I. The difference in the length of the homework problems assigned allowed for differences in frustration, understandings, feedback, continuity, and attention span to affect the students involved, the difference, hopefully, being reflected in their achievement and attitude scores. However, the effect could have greater impact on students

at certain ability levels as measured by the ACT score.

Development and Selection of Homework Problems

Criteria for Homework Problems

Developing a series of short homework problems for the first semester accounting class constituted the initial phase of the material preparation. The long homework problems had previously been defined as consisting of a portion of those regularly published problems appearing at the end of each chapter in the textbook by Pyle and White (1967). In order to equate the short homework problems with the long homework problems, this investigator decided that both sets of problems should contain synonymous concepts within each chapter; therefore, each chapter was outlined to determine the concepts for discussion during the semester. The problems in the textbook which exemplified synonymous concepts were noted and tentatively designated as the set of long homework problems (Appendix H). Particular care was exercised to insure that the problems designated as long problems covered several concepts within one complete problem.

Short homework problems were composed by this investigator (Appendix G), and covered identical concepts designated in the chapter outline; but each problem was constructed to include a minimum number of concepts. In fact, the limited material contained in each problem lends credence to the description of short problems as being segmented, and not displaying a long, continuous series of interrelated material. The fact that fewer concepts were contained in each short problem dictated the necessity of having a larger number of short problems,

although this investigator felt that the two sets of problems were equated in total working time required. More important, however, than total working time involved was equating the concepts covered within the chapters. The method employed to verify the equality of the two sets of problems was to establish a panel of knowledgeable accounting instructors who were asked to judge the equality of the two sets of problems.

Jury Selection and Responsibility

A jury of college-level accounting instructors was established to validate the problems which this investigator had tentatively designated as appropriate for homework problems. Individuals meeting certain preestablished criteria were selected to serve as members of the panel. These criteria specified that jury members should be from different institutions of higher education, should be currently connected with the teaching of accounting at the college level, should have a knowledge of the content of a college level principles of accounting class, and should be willing to serve as a member of the validating panel.

The five individuals selected to serve on the panel had either recently taught a beginning college accounting course or were actually teaching a course at the time. Four of the members were from four-year state colleges and one was from a two-year state college. Three of the panel members have doctorate degrees in business education, with all three having at least a concentration in accounting. One member is a Certified Public Accountant, and the fifth individual has a masters degree in accounting.

After gaining the consent of these individuals to serve in the

capacity of a validating jury, the investigator sent each member a packet of material; a set of the proposed short homework problems (Appendix G); a set of the proposed long homework problems (Appendix H); the investigator's outline of the chapters of the textbook included in the study (Appendix F); the set of tables showing the concepts contained in each of the tentative homework problems (Appendix F); and a copy of the textbook used in the experiment. A letter of transmittal outlined the prerequisite definition for short homework problems whereby a problem qualified as "short" for the study, and included brief instructions for examining the material. Each jury member was asked to respond to three items which the researcher had established as criteria. These criteria were: (1) Had the concepts of the chapters been adequately outlined by the investigator? (2) Did each set of problems adequately cover the concepts? (3) Were the problems sufficiently different to designate one set as long problems and the other set as short problems? Each member was asked to note deficiencies and make helpful comments for the investigator's consideration.

Final Validation of Homework Problems

Upon receipt of the replies from the panel members, the investigator evaluated the homework problems in terms of the comments elicited from the five-member panel. Considering the small number of panel members, the investigator had predetermined that one or more adverse comments on a particular problem constituted sufficient evidence for eliminating or revising the problem.

All the panel members concluded that each chapter had been acceptably outlined according to concepts contained in the textbook.

The panel members also unanimously agreed that insufficient instructions had been given for working one of the short problems. Other flaws and deficiencies were noted, but none were cited by more than one particular juror.

The remainder of the panel's comments were quite divergent. Two members believed that the problems were acceptable as written. A third member pointed out a need for "editorial changes" to maintain consistency of wording in the problems; otherwise, the problems were acceptable as written. A fourth panel member suggested that throughout the fourteen chapters, a total of fifteen concepts were not covered consistently in the two sets of problems. The fifth member cited three instances of the need for adding problems or parts of problems to encompass the concepts.

Since the jury expressed no adverse comments on the outlines of chapter concepts, the investigator regarded the basic structure of the problems as meeting the acceptability requirements set forth in his letter of transmittal and completed the problem changes and additions to comply with the jury's suggestions.

Accounting Achievement Test

The difference between the pre-test and post-test scores attained on the USAFI Level I Accounting Achievement Test determined the achievement scores of the students in this study.

The Level I Accounting Test, which was prepared under contract by Kansas State Teachers College, covers the material included in a collegiate level accounting I class. The Level I Test includes three pages of accounting forms for use in computing the answers, a

machine-scored answer sheet, and a "test booklet" with the introductory instructions, examples of how to mark the test, and 127 multiple-choice questions.

According to the USAFI Information Bulletin (1971), "A primary use of the Subject Standardized Test is to measure learning acquired through the study of a USAFI high school or college level course." Furthermore, the Subject Standardized Test derives its objectives from the textbooks most commonly used in the subject area, of which five books were surveyed. The textbook by Pyle and White (1967) used in this study was one of the books surveyed for this achievement test.

The procedures followed for achievement test construction resemble those of Nolan, Hayden, and Malsbary (1967) who suggest the criteria for achievement tests as being those which "have as their purpose measuring the student's knowledge in or understanding of a given body of subject matter or measuring the student's proficiency in certain skills." USAFI Subject Standardized Tests are constructed through contract with institutions approved by the American Council on Education and meet the following requirements:

The contractor shall be an accredited institution of higher learning, having a department of examiners, or a non-profit testing agency with experience in the construction of subject examinations at the high school and college levels, and in the standardization of such examinations with high school and college students nationally.

The Level I Principles of Accounting Test specifications conform to standards developed in coordination with the American Council on Education. The proposed test items are subjected to an item analysis and the items are selected and revised for a test manuscript. The test is administered to a sample of at least 1,000 students in approximately forty civilian colleges. The scores achieved by civilian students

become the norms for measuring successful achievement by all examinees.

Likewise, the procedure followed for standardizing the USAFI test coincides with the norms set forth by Nolan, Hayden, and Malsbary (1967), who state:

A standardized test is one that has been constructed in accordance with accepted standards for tests of the kind in question and that in consequence is accepted for use by a large group of teachers or of schools. It further carries with it the idea that it will be uniformly administered and scored and that norms have been established.

The USAFI Level I Accounting Test is a controlled item and cannot be reproduced as a part of this document. Individuals having further interest in the test may refer to Appendix A for a notation of the test number and address of USAFI.

The Bi-Polar Method of Attitude Measurement

Since attitude determination was another important consideration in the study, an instrument was needed to measure student attitude toward accounting within the framework of the purposes of this study. After reviewing several possible approaches to measuring attitudes, the semantic-differential method was chosen.

The semantic-differential technique of attitude measurement was originally developed by Osgood, Suci, and Tannenbaum (1957) as part of their study of meaning. Osgood and his associates believed that through the bi-polar semantic differential, a quantitative value could be ascribed to the meaning of a word or concept. Osgood, Suci and Tannenbaum (1957) describe the instrument in the following manner:

The semantic differential is essentially a combination of controlled association and scaling procedures. We provide the subject with a concept to be differentiated and a set of bi-polar adjectival scales against which to do it,

his only task being to indicate, for each item (pairing of a concept with a scale), the direction of his association and its intensity on a seven-step scale.

In constructing the theoretical model, Osgood formulated a multi-dimensional semantic space, and the semantic differential was the device for scaling with which to locate a point in space representing the meaning of a word or concept. The bi-polar semantic differential is composed of a series of scales, and the person being tested rates the concept or term on each of the scales. Each scale is composed of a pair of opposite meaning (polar) adjectives which are placed on the opposite ends of a straight line continuum. The continuum is segmented into seven parts, each segment representing a rating intensity whereby the individual reacts to the concept being considered in relation to the alternative polar terms. Therefore, the responder assumes a neutral stance by checking the mid point of the segmented line; or, he indicates his preference for one of the other six points in the semantic space. If the response lies closer to the favorable pole, the attitude is considered favorable, and vice versa with "intensity" measured according to the extent that the selection lies from neutrality. The scales used in the semantic differential are further described by Osgood, Suci, and Tannenbaum (1957):

Each semantic scale, defined by a pair of polar (opposite-in-meaning) adjectives, is assumed to represent a straight line function that passes through the origin of this space, and a sample of such scales then represents a multidimensional space.

One method for defining a concept with a space is shown by an example from Osgood, Suci, and Tannenbaum (1957):

FATHER

Happy ___ : ___ : ___ : X : ___ : ___ : ___ Sad
 Hard ___ : X : ___ : ___ : ___ : ___ : ___ Soft
 Slow ___ : ___ : ___ : ___ : X : ___ : ___ Fast, etc.

Two distinct properties for the concept "father" are signified by the indicated scale ratings: (1) direction from the origin, and (2) distance from the origin, with direction depending upon the polar term chosen and distance indicated by the extremeness of the point checked.

A quantitative measure for a word or concept is achieved by assigning a numerical value to each of the seven points on the linear continuum. An example of this numbering technique is shown on page 28 by Osgood, Suci, and Tannenbaum (1957), in the following manner:

(concept)

Polar term X $\frac{\quad}{(1)}$: $\frac{\quad}{(2)}$: $\frac{\quad}{(3)}$: $\frac{\quad}{(4)}$: $\frac{\quad}{(5)}$: $\frac{\quad}{(6)}$: $\frac{\quad}{(7)}$ Polar term Y

The segment of the continuum numbered (4) signifies a neutral response toward the concept, the part numbered (1) represents an extreme feeling toward polar term X, and the section numbered (7) represents an extreme feeling toward polar term Y. Thus, several different numerical ratings are obtained by including a series of bi-polar adjective scales under each concept.

Oppenheim (1966) reports on page 204 that after each scale is numerically rated, "It is possible to submit sets of such ratings to factor-analysis, in search for the basic dimensions of meaning."

According to Shaw and Wright (1967), Osgood originally used factor analysis to uncover several dimensions within the semantic space. They report that Osgood and his associates, "using factor-analytic procedures, established three general factors of meaning measured by the semantic differential technique; an evaluative factor, a potency factor, and an activity factor."

Osgood, Suci, and Tannenbaum (1957), describe on page 36, their findings in the following manner:

The first factor is clearly identifiable as evaluative by listing scales which have high loadings on it: good-bad, beautiful-ugly, sweet-sour, clean-dirty, tasty-distasteful, valuable-worthless, kind-cruel, pleasant-unpleasant, sweet-bitter, happy-sad, sacred-profane, nice-awful, fragrant-foul, honest-dishonest, and fair-unfair.

The second factor identifies itself fairly well as a potency variable: large-small, strong-weak, heavy-light, and thick-thin serve to identify its general nature, these scales having the highest and most restricted loadings.

The third factor appears to be mainly an activity variable in judgments, with some relation to physical sharpness or abruptness as well. The most distinctively loaded scales are fast-slow, active-passive and hot-cold.

The writers further state that a fourth factor revealed by factor analysis accounted for less than 2 per cent of the total variance. Further, an analysis of the three primary factors reveals that the evaluative factor accounted for almost 70 per cent of the common variance, the potency factor accounted for 15 per cent of the variance, and the activity factor accounted for 13 per cent of the variance. Therefore, the evaluative factor plays the most dominant role in the meaningful judgments of concepts (Osgood, Suci, and Tannenbaum, 1957).

Osgood, Suci, and Tannenbaum (1957), believe that "the evaluative factor of the semantic differential is an index of attitude. It is, moreover, a method of attitude assessment that is relatively easy to

administer and easy to score." Edwards (1957) defines an attitude as "the degree of positive or negative affect associated with some symbol, phrase, slogan, person, institution, ideal, or idea toward which people can differ with respect to positive or negative affect." Osgood, Suci, and Tannenbaum (1957) offer arguments of page 189 that attitude is very evaluative in nature and the evaluative factor, therefore, is a measure of an individual's attitude. They determine attitude by using sets of scales which possess high loadings on the evaluative factor. Further, for scoring purposes, the unfavorable poles of the bi-polar scales are assigned the score "1" while the favorable poles are assigned the score "7". When this method of scoring is used, the sum of all evaluative ratings for all the sets of scales for any one concept comprises the attitude score.

The Accounting Bi-Polar Attitude Test

The semantic differential encompasses a generalized approach to attitude determination as opposed to being a particular attitude test. Osgood, Suci, and Tannenbaum (1957) state on page 76 the idea of the semantic differential in the following manner:

Although we often refer to the semantic differential as if it were some kind of "test," having some definite set of items and a specific score, this is not the case. To the contrary, it is a very general way of getting at a certain type of information, a highly generalizable technique of measurement which must be adapted to the requirement of each research problem to which it is applied. There are no standard concepts and no standard scales; rather, the concepts and scales used in a particular study depend upon the purposes of the research.

Since the entire basis of the semantic differential depends upon the particular concepts and scales used, the researcher undertook the

process of the identification and selection of these items to reflect the purposes of the study.

Selection of the Concepts for Testing

The general purpose of this study was to determine if there were any differences in achievement and attitude change between Principles of Accounting I students who were assigned short homework problems and a similar group of students who were assigned long homework problems. A brief description of the study along with its general purpose was presented to the four accounting instructors at Cameron College, Lawton, Oklahoma, together with a request that each instructor give to the investigator a few very general concepts about accounting to which students could respond. The ideas contributed by the accounting faculty were analyzed by the investigator and grouped under three very general ideas: the working of homework, accounting as a class, and the accounting profession itself. The three concepts "accounting homework," "the study of accounting," and "accounting as a job" were suggested to the Cameron accounting faculty as the prospective general concepts from which to elicit the students' reactions. Replies from the accounting instructors indicated that they concurred with the suggested concepts with the exception that "accounting as a job" was suggested to be changed to "accounting as a vocation." The suggested change of wording was adopted, and the three concepts were finalized.

Construction of the Bi-Polar Scales

After the three concepts for accounting attitude were determined, this investigator began the process of devising the scales for each of

the concepts. All of the accounting instructors at Cameron were consulted and were asked to present to their accounting classes a list of the three concepts. The students were asked to react as beginning accounting students and were further asked to submit in writing during the class period evaluative adjectives for each of the concepts. Approximately 150 adjectives resulted from this survey of the students and these were subsequently synthesized into fifty evaluative adjectives.

At that point, listings on page 53 of adjectives and bi-polar opposites were noted from the lists of evaluative scales devised by Osgood, Suci and Tannenbaum (1957). By using these lists as a basic reference, the investigator tentatively selected a bi-polar adjective for each of the fifty evaluative adjectives under consideration. This investigator subsequently presented these tentative scales to the four accounting instructors at Cameron together with the following criteria: (1) the adjectives selected must be evaluative in nature; (2) the adjectives in the scales must be bi-polar; (3) the adjectives must seem to be appropriate and valid for the accounting concept being judged. By using these criteria, the four accounting instructors deleted the overlapping and least-appropriate bi-polar opposites. A list of fifteen bi-polar evaluative scales for each concept was recommended as the final attitude test.

Each of the adjectives for the scales selected was classified as eliciting either a positive or a negative feeling toward the concept being considered. These evaluative adjectives were submitted once again to the Cameron accounting instructors for their comments, their criticisms, or their confirmation of the correct labeling of positive

or negative attitude classification. The adjectives were returned to the investigator with the comment that all of the evaluative terms were correctly labeled.

With the concepts and scales finalized, the investigator listed suitable instructions to accompany the attitude test. The instructions followed the exact form suggested on page 83 by Osgood, Suci, and Tannenbaum (1957) and comprised the cover sheet of the test (Appendix B). These instructions, together with the concepts and bi-polar adjective scales constituted the final form of the accounting attitude test.

Validity

Effective measurement of attitudes requires that the scales be valid. Osgood, Suci, and Tannenbaum (1957) state on page 140 that an instrument is said to be valid when "it measures what it is supposed to measure." Further, Thorndike and Hagen (1955) state on page 171 that a test is not generally valid, but is valid for "a particular curriculum or a particular job."

In determining the validity of the accounting attitude scales, content and face validity were the primary factors considered. The appearance of reasonableness in what the test intends to measure is sometimes referred to as "face validity." (Thorndike and Hagen, 1955) Osgood, Suci, and Tannenbaum (1957) point out on page 193 that the evaluative dimension of the technique of measurement known as the semantic differential "displays reasonable face-validity as a measure of attitude." This statement is made in view of the fact that several studies have shown sound ability to differentiate between definitely

known groups of individuals by using the semantic differential technique of attitude measurement.

Shaw and Wright (1967) on page 18 indicate that content validity is evaluated by "determining the degree to which the items of the scale sample the content of the attitude domain, i.e. the degree to which the content of the attitude scale corresponds to the content of the attitude system." The content validity of the semantic differential is supported by studies which compare these measurements with attitude measurements on more traditional scales.

Summers (1970) reports on page 230 that the results of a comparison between the semantic differential and Thurstone scales on the concepts "The Negro," "The Church," and "Capital Punishment" reflected, in each case, a significance greater than chance ($p < .01$). A further statement reiterates the close correlation between the two scales: "It is apparent, that, whatever the Thurstone scales measure, the evaluative factor of the semantic differential measures just about as well."

Osgood, Suci, and Tannenbaum (1957) report on page 194 that similar results are found in a comparison between the semantic differential and the Guttman scale when attitudes of farmers toward the practice of crop rotation were assessed. The correlation between the results of these two instruments was highly significant ($p < .01$), and the authors drew the conclusion that they were measuring the same thing to a considerable degree.

Summers (1970) on page 236 summarizes the total findings of all studies when he says, "The results in these, and many other studies, support the validity of the semantic differential as a technique for attitude measurement."

Shaw and Wright (1967) indicate on page 562 that another method to help insure content validity is to have items "selected on the basis of agreement among judges regarding their content validity."

The validity of the attitude scales developed for this study was established by comparing the scales selected to known scales of attitude measurement and by having a panel judge the scales on their validity. Scales which were devised and confirmed by Osgood, Suci, and Tannenbaum (1957) as having a definite evaluative factor were used as one basis for selecting the scales to be used with the three concepts of the accounting attitude test. The final confirmation of the validity was elicited when proposed bi-polar adjectives were submitted to a group of four accounting instructors at Cameron College, Lawton, Oklahoma. The instructors agreed on the seeming validity through a process described in the preceding section.

Reliability

The usefulness of an attitude scale depends upon its properties, one of which is its reliability. The concept of reliability is complex, but one of the simplest definitions states that "it is the degree to which a scale yields consistent scores when the attitude is measured a number of times" (Shaw and Wright, 1967). Osgood, Suci, and Tannenbaum (1957) say on page 126 that the basic "score" obtained from the semantic differential is the digit value (1 through 7) corresponding to a person's check-mark with which he indicates his judgment of a particular concept against a particular scale.

Several methods of estimating the reliability of an attitude scale are feasible but Shaw and Wright (1967) suggest on page 16 that the

test-retest method corresponds most closely to the conceptual idea of reliability and is a relatively simple procedure to administer.

The attitude scale is administered to the same group of persons at two different times, and the correlation between the two sets of scores is computed. This coefficient, usually the Pearson r , is the reliability estimate.

Additionally, the test-retest method for determining reliability has the advantage of holding constant the items used, eliminating unreliability due to differences between items, which would occur if equivalent-forms were used.

Test-retest data have been obtained by several researchers for the semantic-differential type of attitude scale. Summers (1970) on page 229 reports that the test-retest coefficients for one study of 135 subjects ranged from .87 to .93, with a mean r of .91. Osgood, Suci and Tannenbaum (1957) report on page 194 the results of another study which relates the test-retest reliability coefficients for the semantic differential. The scores on this study ranged from .83 to .91. Still another correlation reported on page 127 by Osgood, Suci, and Tannenbaum (1957) indicates a resulting coefficient of .85.

The validity of the accounting attitude scales (Appendix B) was determined by the test-retest method in a pilot study group of twenty-one students during the summer of 1971. Osgood, Suci, and Tannenbaum (1957) note a basic problem on page 133 in estimating the reliability of any psychological instrument, such as the semantic differential. The problem is in determining the extent that the measured unreliability of an instrument is really an index of its sensitivity in recording real changes in the thing being measured. The longer the time interval between the initial test and the retest, the greater the real change

may be.

The pilot study was conducted in the very compressed time interval of three weeks. Therefore, any lengthy delays between the test and retest of the attitude scales could easily result in actual changes of attitude on the part of the students being measured instead of reflecting the unreliability of the instrument. To offset this possibility, the retest of the attitude scales was given one day after the initial test had been administered.

The correlation coefficient was determined through the application of the Pearson r to the test-retest scores of the twenty-one students in the pilot study group. A reliability score was obtained for each of the three concepts individually, and a reliability score was also derived from the combined scores on the three concepts. The correlation coefficients ranged from .75 to .81, (Appendix C, Tables XXVI to XXX).

Pilot Study Use of Problems and Attitude Test

During the summer of 1971, this investigator taught two separate Principles of Accounting I classes. The classes were conducted through Cameron College, were special compressed sessions completed within a three-week period, and consisted of approximately twenty students each. The investigator took the opportunity to utilize these two classes in a short pilot study to evaluate the materials which would be used in this experiment during the fall semester of 1971.

The first three-week class was conducted during June of 1971. This class had regular homework assignments from the problems which appear in the textbook by Pyle and White (1967). An example of the problems is shown in Appendix H. These are the same problems which a

panel of accounting instructors from colleges across the state verified as being adequate problems to represent the concepts of the textbook. Additionally, these same problems were the ones assigned to the control group of students during the experimental study.

The second accounting class was taught during a three-week period in July and August of 1971, and was assigned the series of short homework problems developed by the investigator (Appendix G) and verified by the panel of accounting instructors. This was the same series of short problems assigned to the experimental group of students during the experimental study.

The primary purpose of the pilot study was to use the experimental problems in an actual classroom situation to determine if their use was actually feasible. Other secondary purposes were to determine if the check figures for the experimental problems were realistic, to gather information concerning the reliability of the accounting attitude scales, and to make notations of any particular problem areas connected with the use of the short problems.

Since the second group of students worked the short problems, the investigator used that class to collect information for the other experimental material. During the first meeting of the class, the students were asked to respond to the attitude test (Appendix B). The reason given the students for the purpose of the test was that it would give the individuals within the department some idea of what their feelings were on certain subjects. On the second class meeting, the students were retested on the same attitude test. The students were simply told that the instructor needed to know what their responses were for the questions asked. The two scores obtained from the students

on the attitude scales became the basis for the computation of the Pearson r for the reliability coefficient (Appendix C, Tables XXVI through XXX).

As the class progressed, the investigator noted that the check figures seemed to be adequate and that there were no unusual problems connected with the use of the short problems.

Since the primary purpose of the pilot study was to discover and eliminate any difficulties connected with the experimental short problems, information for a statistical analysis was not desired. Also, the investigator was already familiar with the accounting achievement test since his students had been one of the several groups of students selected to establish the norms when the test was initially composed. Therefore, the achievement test used in the actual experiment was not given to any of the students in the pilot study. Although the pilot study was not designed to yield any statistical information on achievement and operated within a very compressed time schedule, it served its purpose of verifying that the experimental material was ready to be utilized in an actual classroom situation.

Experimental Design

Upon completing the pilot study and thereby confirming the materials for the experiment, the investigator finalized the design of the study. The experiment was designed to control those variables considered by many writers to have a possible intervening effect on experimental studies.

Control of Variables

West (1967) on page 51 states that "it is extremely difficult to secure adequate control over all relevant variables," but also states on page 49 that "you must guard against 'confounding' of your variables, against 'contamination' of the experiment, and against 'bias' of one sort or another." West (1967) on page 49 indicates that differences in teaching skill is one bias which would "contaminate" the experiment; therefore, contrasting the results of one teacher instructing by one method against those of another teacher using a different method would be misleading. According to Johnson (1969) on page 57, student knowledge of their participation in an experiment endangers the reliability of the results obtained. Also, authorities agree that a prime possibility for bias is the manner in which students are selected for the experiment. However, West (1971) states on page 286 that there is a valid method for student selection.

Without denigrating matching where it is proper and useful to do so, authorities are now in agreement that random assignment of experimental participants to treatments is superior. For one thing, matching on one factor does nothing about other factors. For another thing, matching on more than one or two factors is practically impossible. With randomization, on the other hand, persons will tend to be distributed in comparable fashion with respect to all pertinent factors--increasingly so as N (the number of participants: students, teachers, classes, schools) increases. Accordingly the threat to internal validity due to selection factors is removed by randomization.

West further points out that "random assignment of treatments to classes will result in random assignment of students to treatments."

Several measures were invoked to guard against contamination and bias which might influence the results of the experiment. Students were allowed to enroll in any of the four accounting classes instead

of being assigned to a particular class. In addition, the students were never told that they were involved in an experiment. Two instructors each taught two of the accounting classes, and each instructor had one of his classes arbitrarily designated as an experimental class and the other as a control class.

There is a possibility that some variables were not controlled or allowed for in the experiment. Possible variables outside the framework of the human element include the hour the classes met and the classroom situation. However, all four classes were conducted in the same room between the hours of 8:30 and 12:30. Other uncontrolled personal variables might include the amount of study time each person had, the number of semester credit hours in which each was enrolled, their previous exposure to bookkeeping and/or accounting, their sex, and their marital status. These and other variables, however, were assumed to be controlled through the process of the random enrollment of the students in the classes and the random assignment of treatment to the classes rather than attempting to match the experimental and control students for all the variables.

Design of the Experiment

The primary purpose of this study was to determine if a significant relationship existed between the length of homework problems and student achievement in accounting. Moreover, a secondary purpose was to determine if a significant relationship existed between the length of homework problems and student attitude change toward three accounting concepts.

To establish a problem design whereby collection of information

concerning the effects of the homework on the students could be assimilated, an experimental group of accounting students was selected to comprise the classes in which the experimental short problems (Appendix G) were assigned. Furthermore, a control group of accounting students was selected to comprise the classes in which the regular long problems (Appendix H) were assigned. Since conjecture among writers in the field of education has intimated that perhaps students with different ability might achieve differently or have different attitudes when exposed to the same treatment, both the control and experimental groups were further subdivided into three groups each.

Determination of the three divisions within each group was made on the basis of the students' composite American College Test Scores, after consulting information published by the American College Testing Program (1966) on page 161. The high ACT score range was defined as all scores of 22 and above. Average ACT scores ranged between 17 and 21 inclusively, and the low ACT score range was limited to scores below 17.

With the division of students into a control and an experimental group and the consequent further subdivision within each group, an experimental design became plausible whereby it was possible to study the results in relation to one dependent variable and two independent variables for each of the two purposes in the experiment. For the purpose of comparing achievement among the accounting students, the one dependent variable was the achievement on the accounting test and the two independent variables were (1) the length of the accounting homework problems assigned and (2) the ACT score level of the students. For the purpose of comparing any differences in student attitude change, the accounting attitude test score was the one dependent variable, and

the two independent variables were (1) the length of the accounting homework problems assigned and (2) the ACT score level of the student.

The statistical test applied was the multiple-classification analysis of variance. According to Popham (1967) on page 189, by using the statistical model known as the multiple-classification analysis of variance "the relationship between one dependent variable and two or more independent variables can be tested. Further, one can test for relationships between the dependent variable and various interactions of the independent variables." A further discussion of the meaning and importance of testing for interaction is explained by Popham (1967) on page 195.

Ordinarily, one sets up subgroups representing an independent variable, so that differences between the groups will indicate the existence of such a relationship. In the case of an interaction effect, the potential relationship under analysis is between the dependent variable and the combined interacting of the two (or more) independent variables. It is possible, then, in the case of a two-way classification model to obtain non-significant F values representing both independent or main-effect variables but a highly significant F for interaction.

Popham (1957) further states on page 202 that the use of the multiple-classification analysis of variance allows the independent variables to be represented by two or more classifications of the data.

Two assumptions apply to the use of the multiple-classification analysis of variance: (1) the measures must approximate randomly drawn samples, and (2) the variances within the subgroups must be homogeneous (Popham, 1967). However Popham (1967) goes on to state:

There is increasing evidence attesting to the "robustness" of analysis of variance models, that is, their ability to withstand fairly serious departures from the above assumptions without disturbing the meaning of the final statistical analysis, namely, the F tests.

Another condition which should be adhered to when using the multiple-classification analysis of variance is the number of students in each of the groups being tested. Bruning and Kintz (1968) indicate on page 26 that there should be an equal number of students in each of the experimental groups.

The use of the multiple-classification analysis of variance allows for the determination of three F values from the application of the statistic to the data. The first F value involves the relationship of one independent variable with the dependent variable and the second F value indicates the relationship of the second independent variable with the dependent variable. The third F value, however, indicates the relationship of the interaction of the two independent variables with each other with the dependent variable.

The two independent variables for this study are (1) the length of the homework problems assigned, and (2) the ACT score of the students. When student accounting achievement was being analyzed, the one dependent variable was the achievement attained; and when student attitude was being considered, the dependent variable was the attitude score under consideration.

The experiment was organized to meet the criteria outlined for the multiple-classification analysis of variance. The criteria for the randomness of the samples was fulfilled by permitting the students to enroll in the accounting class of their choosing. After the classes were organized, they were randomly designated as experimental and control, with each of the two instructors teaching one experimental and one control class. Both the experimental and control groups were each further subdivided into three groups for statistical analysis

based on the ACT scores of the students. The resulting six groups were numerically unequal, but the scores of a sufficient number of students in the larger groups were randomly discarded until the groups met the specified criteria of numerical equality. The six groups also met the criteria of being homogeneous as shown in Chapter IV.

A total of 153 students enrolled in the four accounting classes, but scores for 69 students were discarded for the following reasons: (1) 36 students did not complete the course and had no post-test scores; (2) 18 scores were eliminated in some of the groups to equalize the size of each group; and (3) ACT scores were unavailable for 15 students, making it impossible to classify them into any particular group.

The multiple-classification analysis of variance was applied to scores obtained to determine any significant differences in (1) the accounting achievement scores, (2) the attitude scores on the concept "accounting homework," (3) the attitude scores on the concept "the study of accounting, and (4) the attitude scores on the concept "accounting as a vocation." Resulting F scores were obtained for each of the four applications of the statistic. However, any significant F scores did not indicate specifically which of the several subgroups were significantly different. The statistic chosen for further analysis of the significant F scores was Duncan's new multiple-range test.

Steel and Torrie (1960) report on page 107 that in 1951, Duncan developed "a multiple comparisons test to compare each treatment mean with every other treatment mean. A detailed explanation for applying the statistic is given; however, the usefulness of the statistic is summarized by Steel and Torrie (1960) on page 109 when they say:

The new multiple-range test is easy to apply; it takes into account the number of treatments in the experiments...; it permits decisions as to which differences are significant and which are not whereas the F test permits no such decisions when F is significant; it uses a set of significant ranges, each range depending upon the number of means in the comparison.

Duncan's new multiple-range test was applied to those scores where a significant F value was found, which allowed for an exact determination of which groups were significantly different. The complete results of the application of the statistics can be seen in Chapter IV and in Appendix C.

Teaching and Testing Procedures

The four accounting classes were randomly designated as experimental and control groups and each of the two instructors taught one experimental and one control class. On the first two regular meetings of each of the four classes, each instructor had every student complete the attitude scales (Appendix B) and the accounting achievement test (Appendix A). The results of these tests constituted the pre-test scores for the students on both the achievement and attitude tests. The students were not informed that they were participants in an experiment, but were simply told that the results of the tests would indicate to the instructor their feeling toward accounting and the extent of their prior accounting knowledge. Students were asked to complete all answers on all the tests regardless of whether or not they knew the answer, thereby equalizing the effect of guessing on the determination of the achievement scores. Late enrollees came to the instructor's office and were given two hours in which to complete the tests for pre-test score determination.

For the remainder of the semester, each instructor conducted his class in the usual manner, the exception being that each experimental class was assigned the short homework problems while each control class was assigned the normal long homework problems. Furthermore, each instructor conducted chapter explanations and discussions in a similar manner for both the control and experimental groups except for the discussion and explanation of the problems assigned. During the semester, "problem-type" tests were composed by each individual instructor and were given to the students of both classes. At the end of the semester, during the regularly scheduled final examination period, the same attitude and accounting achievement tests were again administered to the students whereby their post-test scores were ascertained. The examination periods for all accounting classes were extended beyond the regularly scheduled two hours in order to give the students an unlimited time period for completing the tests. Students completed the attitude scales first, with all students finishing within ten minutes. Although the instructors established the unlimited time period for answering the accounting achievement test, all of the students had answered all of the questions within two hours.

Scores for all of the accounting students completing the course were computed after completion of the post-test. The investigator computed the difference between the pre-test and post-test scores on the attitude scales; this difference became the student's change in attitude score. USAFI scored both the achievement pre-test and post-test with the resulting scores being transmitted to the investigator. The differences between the pre-test and post-test scores of the students were considered as their accounting achievement scores for

purposes of the study.

Conducting the Class

During the fall semester of 1971, this investigator conducted his experiment by using all of the Principles of Accounting I classes at Cameron College. Students were free to enroll in any of the four accounting courses offered, and two instructors taught the classes, each one having both one experimental and one control group. The classes were designated as control and experimental on a random basis after students had completed enrollment. During the initial class period, two separate tests were administered to the students in each of the four accounting classes. One test was the accounting attitude test devised by this investigator, as shown in Appendix B. The results of this test constituted the attitude score for the students at the beginning of his study of accounting and has been designated as his pre-test attitude score.

The other test was the accounting achievement test (Appendix A) produced and standardized under the direction of USAFI. The results of this achievement test were designated as the pre-test achievement score for each participating students.

During the fall semester, homework assignments for the two experimental classes consisted of the short homework problems devised for this study (Appendix G), while the homework assignments for the control classes consisted of the standard long problems from the textbook (Appendix H).

Summary

The purposes of this study were to determine if the length of homework problems assigned in the Principles of Accounting I course significantly affected the achievement or the attitude changes of this group of accounting students. An experimental study was devised to accomplish these purposes whereby an experimental group of students was assigned short homework problems and a control group of students was given regular or long homework problems. The experimental and control groups were further divided into subgroups based on ACT scores; and, scores of an accounting achievement test and an attitude scale were analyzed for significant differences between the groups.

The short homework problems used in the study were developed by the investigator and validated by a five-member jury of collegiate accounting instructors. The first fourteen chapters of the textbook adopted for the Principles of Accounting I course were outlined and the short homework problems were equated with a group of long homework problems on the basis of the accounting concepts contained in the textbook. An example of the chapter outline and problem analysis is shown in Appendix F.

Both an accounting achievement test and an attitude test were used in the experiment. The accounting test was developed by USAFI as the end-of-course achievement test for their Principles of Accounting I course, and it was constructed and validated in accordance with requirements set forth by USAFI. The attitude test, however, was developed by the investigator as a bi-polar semantic-differential type of test similar to the type of attitude test described by Osgood, Suci, and Tannenbaum (1957).

The bi-polar method of attitude measurement was developed as a direct result of studies by Osgood, Suci, and Tannenbaum (1957) in an attempt to measure the meaning of words and concepts in a multidimensional semantic space.

The studies of word meanings indicated that several factors in space could be identified. However, the most prominent and most stable factor was the evaluative factor, characterized by the use of several pairs of opposite-meaning adjectives as the basis for reaction from subjects of experimental studies. The responses to the bi-polar adjectives could then be analyzed to determine the individual's feeling, or attitude, toward the specific concept described.

The bi-polar accounting attitude test was developed by the investigator with the aid of the accounting instructors at Cameron College, Lawton, Oklahoma. Suggestions of accounting concepts were elicited from the panel of instructors and summarized by the investigator into three areas. From these three primary areas of interest, the investigator, in agreement with the accounting instructors, developed and finalized the three concepts of "accounting homework," "the study of accounting," and "accounting as a vocation," for determining student attitude.

The selection of the exact scales was accomplished by again having the accounting instructors at Cameron College serve as a panel for evaluation. Accounting students at Cameron College during the summer of 1971 submitted lists of adjectives describing their reaction to the three accounting concepts previously approved by the accounting instructors. By grouping and summarizing the adjectives submitted by the students and by consulting other adjective scales developed by

Osgood (1957), the investigator developed and submitted to the accounting instructors a listing of fifty bi-polar adjectives for each concept. The duplicate and less-pertinent terms were eliminated and the final list of bi-polar adjectives was reduced to fifteen for each of the three concepts. Each scale met the criteria of having a pair of adjectives which were opposite in meaning, with one adjective in each pair eliciting a positive feeling toward the concept and with the other adjective eliciting a negative feeling toward the concept. Scales were also devised whereby a numerical value could be made on any response to any scale, a procedure similar to the criteria set forth by Osgood, Suci, and Tannenbaum (1957).

A pilot study was conducted during a three-week session of accounting during the summer of 1971. The students were given the attitude test twice during the first two days of the class. From the two scores, the reliability of the attitude test was computed by using the Pearson r . The newly developed short problems, after they were determined to be acceptable for actual classroom use, were assigned as the homework problems.

The actual experiment was conducted at Cameron College during the fall semester of 1971, and encompassed all of the Principles of Accounting I classes. Two instructors taught the four classes, with each instructor teaching one experimental and one control class. Several instructional variables were recognized and controlled; however, student variables were assumed to be randomly distributed through the process of allowing students to enroll in the class of their choice without the knowledge that an experiment was being conducted.

The classes which were assigned the short homework problems were

designated as the experimental group, and the classes which were assigned the regular homework problems were designated as the control group. Both groups were further subdivided into three ability levels based on the students' composite ACT scores. This design allowed for two independent variables, the length of homework problems assigned and the ACT score level of the students.

Accounting achievement and change in student attitudes were the dependent variables which were analyzed for significant differences relative to the two independent variables. The accounting achievement score for each student was defined as the difference between the pre-test and post-test scores on the USAFI Accounting I Achievement Test. The change in student attitudes was defined as the difference between the pre-test and post-test scores on the bi-polar semantic differential accounting attitude test developed by the investigator. The pre-tests were administered during the initial class meeting, and the post-tests were administered during the last class meeting of the regularly scheduled final examination period.

The multiple-classification analysis of variance was the statistical test applied to the data, with the resulting F values indicating whether or not significant differences existed among the several groups; however, F values do not determine which of the several groups are different. Therefore, Duncan's new multiple-range test was applied to all significant findings to delineate exactly which groups were significantly different.

CHAPTER IV

FINDINGS

The purpose of this study was to secure statistical evidence to determine if there is a significant difference in achievement and in attitude change between accounting students who are assigned short homework problems and accounting students who are assigned long homework problems. Since several writers in the literature believe that students at one academic level may achieve differently and have different attitudes than students at another academic level, this study was structured to test and compare achievement and changes in attitudes at three levels of academic ability, as determined by the ACT scores of the students involved.

The multiple-classification analysis of variance was the primary statistic applied to the data. This statistic made comparisons between all the students in the control group and all the students in the experimental group; among all the low ACT score students, all the average ACT score students, and all the high ACT score students; and among the ACT level groups for interaction. Interaction determined whether or not one type of problem assigned to the students in the experiment was uniformly superior or inferior over the entire ACT score range. However, since a major aim of the study was specifically to determine if a significant difference exists between the low ACT score control group and the low ACT score experimental group; between the

average ACT score control group and the average ACT score experimental group; and between the high ACT score control group and the high ACT score experimental group, particular care was taken to gather information for these three comparisons. In addition, in all cases where the multiple-classification analysis of variance indicated a significant difference among the several groups being tested, Duncan's new multiple-range test was applied to determine exactly which of the groups being compared differed significantly.

The findings of this study are enumerated in the same general order in which the unanswered questions and the null hypotheses in chapter one are listed. The first section discusses the findings related to the students' accounting achievement, while the second section discusses the findings related to the students' attitude responses. In both sections, the data are first checked for homogeneity. Secondly, the data are then compared on the basis of the length of homework problems assigned, the ACT groups involved, and the interaction between the two independent variables.

Findings Related to Accounting Achievement

The data on accounting achievement for the eighty-four students in the experiment were gathered from both the experimental group and the control group. For both groups, the data were further divided into the low, average, and high ACT score categories.

Variance Homogeneity

After the accounting achievement scores were properly categorized, the group variances were checked for homogeneity. Popham (1967)

explains on page 206 that the test for homogeneity is performed by securing the individual group variances of the two independent variables by dividing the smallest variance into the largest variance. The resulting F value is then analyzed for significant differences. If the variances are not significantly different, the investigator may then continue with his analysis of the data.

The variances of the two independent variables, the length of homework problems assigned and the ACT level of the students, are shown in Table I. In both cases, the resulting F values indicate that all variances are homogeneous. Therefore, the statistical analysis of the achievement scores was continued by applying the multiple-classification analysis of variance to the data.

TABLE I

VARIANCE HOMOGENEITY RESULTS FOR THE ACCOUNTING ACHIEVEMENT
SCORES OF 84 STUDENTS CLASSIFIED ACCORDING TO ACT
LEVEL AND LENGTH OF HOMEWORK PROBLEMS ASSIGNED

Group	Variance	F-Value	Significance
Long Problems	449.229	1.428	Not Sig.
Short Problems	314.609		
Low ACT Level	330.656	1.515	Not Sig.
Average ACT Level	301.847		
High ACT Level	218.312		

Enumeration of Findings

The raw accounting achievement scores for all students in the experiment are listed in Appendix C. The pre-test and post-test scores are given in Tables XVI and XVII with the achievement scores shown in Table XXIV. A summation of the achievement scores, however, is shown in Table II.

TABLE II
ACCOUNTING ACHIEVEMENT SCORES: TOTAL GROUP SCORES
OF 84 STUDENTS CLASSIFIED BY ACT LEVEL AND
LENGTH OF HOMEWORK ASSIGNED

Length of Homework	Low ACT	Average ACT	High ACT	Total
Short (experimental)	423	638	746	1,807
Long (control)	425	592	784	1,801
TOTAL	848	1,230	1,530	3,608

The scores shown in Table II were analyzed for significant differences through the application of the multiple-classification analysis of variance on the appropriate accounting achievement data. The results obtained from applying the statistic are shown in Table III and are discussed individually in the findings in this section.

TABLE III

ANALYSIS OF VARIANCE OF THE ACHIEVEMENT OF 84 STUDENTS
ON THE ACCOUNTING TEST, CLASSIFIED BY ACT SCORE
AND LENGTH OF HOMEWORK PROBLEMS ASSIGNED

Source of Variance	Sum of Squares	Degrees of Freedom	Mean Squares	F
ACT Level (High, Average or Low)	8,345.81	2	4,172.91	14.2478*
Length of Homework Problems (Experimental vs Control)	0.43	1	.43	0.0015
Interaction (ACT X Length of Homework Problems)	126.86	2	63.43	0.2166
Within	22,844.71	78	292.88	-
TOTAL	31,317.81	83	-	-

*p < 0.001

The findings of this study are based on a limited number of scores; however, if these data are representative of data for similar groups in similar situations, then the following findings are pertinent to the situation:

1. The achievement scores of all students in the experimental group were compared to the achievement scores of all students in the control group (Table II). The experimental group score of 1,807 and the control group score of 1,801 results in an F value of .0015 (Table III), which is not significant. This finding indicates that when the achievement of all students in the control group is compared to the achievement of all students in the experimental group, there is

no significant difference in achievement at the .05 level of confidence.

2. The total achievement scores of all students in each of the three ACT score groups shown in Table II were compared with each other. The low ACT group score of 848, the average ACT group score of 1,230, and 1,530 as the score for the high ACT group results in an F value of 14.2478 (Table III), which is significant at the .001 level of confidence, and means that there is less than one chance in a thousand that this much variation among the three ACT score groups would happen by chance alone. However, with the knowledge that a significant difference exists among the three ACT score groups, one still does not know exactly which of the groups differ significantly. Thus, Duncan's new multiple-range test was applied to pinpoint the difference.

The results of applying Duncan's test to the achievement data are shown in Table IV. These results indicated that a significant difference in accounting achievement is evident between all the low ACT score students (experimental plus control) and all the average ACT score students (experimental plus control) at the .05 level of confidence, between all the average ACT score students and all the high ACT score students at the .05 level of confidence, and between all the low ACT score students and all the high ACT score students at the .001 level of confidence. A finding of such difference is not surprising since most educators indicate that a difference in scholastic ability often results in a difference in achievement.

3. Interaction in this study measures whether one type of problem assignment (long or short) is uniformly superior or inferior in either the control or experimental group at all three ACT score levels. A further explanation of interaction is contained in Appendix E.

TABLE IV
 DUNCAN'S MULTIPLE-RANGE TEST TO ANALYZE FOR SIGNIFICANT
 DIFFERENCES IN ACCOUNTING ACHIEVEMENT AMONG
 THE THREE ACT LEVEL GROUPS

ACT Groups Being Compared	Standard Error of the Mean	Duncan's Significant Range	Minimum Mean Difference	Actual Mean Difference	Level of Sig.
Low vs. Average	3.235	2.829	9.152	13.64	.05
Average vs. High	3.235	2.829	9.152	10.71	.05
Low vs. High	3.235	2.829	9.152	24.35	.001

Interaction was measured by the multiple-classification analysis of variance. The resulting F value (Table III) of .2166 is not significant at the .05 level of confidence. Therefore, there is no interaction between student membership in both independent variable groups and their accounting achievement scores. This finding means that all three ACT level experimental groups of students have achievement scores which relate in the same basic ratio to the scores of the corresponding ACT level control groups of students. However, simply finding that there is no interaction does not specifically answer the questions of whether significant differences in accounting achievement exist between the low ACT score control group and the low ACT score experimental group or between either of the other two pairs of corresponding ACT score groups. However, a determination of whether such differences exist can easily be derived from a combination of previous findings of

this section. One finding indicates that the achievement scores of all the students in the experimental groups and the control group do not significantly differ from each other at the .05 level of confidence. Likewise, another finding shows no interaction at the .05 level of confidence. Therefore, the following three findings are logically derived from the information just summarized.

4. There is no significant difference between the low ACT score control group and the low ACT score experimental group at the .05 level of confidence.

5. There is no significant difference between the average ACT score control group and the average ACT score experimental group at the .05 level of confidence.

6. There is no significant difference between the high ACT score control group and the high ACT score experimental group at the .05 level of confidence.

Findings Related to Attitude Responses

The data on student attitudes for the eighty-four students in the experiment were gathered from both the experimental and control groups. For both groups, the data were further divided into the low, average, and high ACT score categories.

Variance Homogeneity

After the attitude scores were properly categorized, the group variances were checked for homogeneity. The variances of the two independent variables are shown in Table V. In all cases the resulting F values indicate that all variances are homogeneous. Therefore, the

statistical analysis of the attitude scores was continued.

TABLE V
 VARIANCE HOMOGENEITY RESULTS FOR THE ATTITUDE SCORES
 OF 84 STUDENTS ON THREE ACCOUNTING CONCEPTS
 CLASSIFIED ACCORDING TO ACT LEVEL AND
 LENGTH OF HOMEWORK PROBLEMS ASSIGNED

Group	Concept	Variance	F Value	Significance
Control	Accounting Homework	126.862	1.406	not sig.
Experimental	Accounting Homework	90.254		
All Low ACT	Accounting Homework	135.189	1.764	not sig.
All Average ACT	Accounting Homework	76.619		
All High ACT	Accounting Homework	104.127		
Control	The Study of Accounting	131.865	1.356	not sig.
Experimental	The Study of Accounting	97.259		
All Low ACT	The Study of Accounting	136.343	1.614	not sig.
All Average ACT	The Study of Accounting	84.476		
All High ACT	The Study of Accounting	115.517		
Control	Accounting as a Vocation	127.865	2.552	not sig.
Experimental	Accounting as a Vocation	50.100		
All Low ACT	Accounting as a Vocation	100.868	1.980	not sig.
All Average ACT	Accounting as a Vocation	50.952		
All High ACT	Accounting as a Vocation	79.507		

Enumeration of Findings

The students' raw attitude scores were determined from their responses on the attitude test and are shown in Tables XVI through XXVI in Appendix C. Since a seven-step scale was established for

each of the fifteen pairs of bi-polar adjectives for each concept and since each of the seven parts of the scale was given a numerical value, the attitude score for an individual on a particular concept is simply the summation of the numerical value of the choices selected by the students on the fifteen bi-polar scales. The seven parts of each scale were assigned the values one through seven with the lower values designating the section of each scale which reflects an unfavorable attitude and the higher values designating the section of each scale which reflects a favorable attitude. Thus, with 15 scales for each concept, a score of 15 would indicate the most unfavorable attitude, 105 would indicate the most favorable attitude, and 60 would indicate a neutral attitude.

The overwhelming majority of the students in the experiment indicate favorable attitudes toward each of the three accounting concepts. As shown in Table VI, from 88 per cent to 100 per cent of the 42 students in each of the groups have favorable attitudes toward the accounting concepts. All three ACT level experimental groups have either the same or a slightly higher percentage of favorable attitude responses on the post-test than on the pre-test while the three ACT level control groups have either the same or a slightly lower percentage of favorable attitude responses on the post-test than on the pre-test. However, in all instances, a relatively large percentage of favorable responses is evident in both the pre- and post-test.

Most of the ACT student groups changed their attitudes slightly toward the three accounting concepts from the pre-test to the post-test. The amount of attitude change for all student groups on the concept "accounting homework" is shown in Table VII. The low ACT score

groups in both the experimental and control sections show an overall attitude decrease. Conversely, all the average and high ACT score groups indicate an overall attitude increase toward accounting homework.

TABLE VI
PER CENT OF STUDENTS GIVING FAVORABLE RESPONSES ON THE
PRE-TEST AND POST-TEST ATTITUDE SCALES

Group	Concept Evaluated	Per Cent in Pre-test	Per Cent in Post-test
Experimental	Accounting Homework	95	95
Control	Accounting Homework	98	88
Experimental	The Study of Accounting	93	98
Control	The Study of Accounting	95	88
Experimental	Accounting as a Vocation	95	100
Control	Accounting as a Vocation	<u>93</u>	<u>93</u>
COMPOSITE		95	94

TABLE VII
CHANGE IN ATTITUDE SCORES: TOTAL GROUP SCORES OF 84 STUDENTS
ON THE CONCEPT "ACCOUNTING HOMEWORK" CLASSIFIED ACCORDING
TO ACT SCORE AND LENGTH OF HOMEWORK PROBLEMS ASSIGNED

Length of Homework	Low ACT	Average ACT	High ACT	Total
Short	-30	15	10	-5
Long	-77	7	14	-56
Total	-107	22	24	-61

The information in Table VIII indicates the amount of attitude change for all student groups toward the concept "the study of accounting." Both low ACT score groups indicate an overall attitude decline while the average and high ACT score groups reveal either no attitude change or an overall attitude increase toward the study of accounting.

TABLE VIII

CHANGE IN ATTITUDE SCORES: TOTAL GROUP SCORES OF 84 STUDENTS
ON THE CONCEPT "THE STUDY OF ACCOUNTING" CLASSIFIED
ACCORDING TO ACT SCORE AND LENGTH OF HOMEWORK
PROBLEMS ASSIGNED

Length of Homework	Low ACT	Average ACT	High ACT	Total
Short	-14	0	24	10
Long	-63	12	31	-20
Total	-77	12	55	-10

The amount of attitude change for all student groups toward the concept "accounting as a vocation" is shown in Table IX. Both low ACT score groups show an overall attitude decrease. However, all the average and high ACT score groups indicate an overall attitude increase toward accounting as a vocation.

TABLE IX

CHANGE IN ATTITUDE SCORES: TOTAL GROUP SCORES OF 84 STUDENTS
ON THE CONCEPT "ACCOUNTING AS A VOCATION" CLASSIFIED
ACCORDING TO ACT SCORE AND LENGTH OF HOMEWORK
PROBLEMS ASSIGNED

Length of Homework	Low ACT	Average ACT	High ACT	Total
Short	-60	44	47	31
Long	-48	76	34	62
Total	-108	120	81	93

The scores representing the attitude changes on each of the three accounting concepts for all 84 students were analyzed by applying the multiple-classification analysis of variance. The resulting F values applicable to the concept "accounting homework" are shown in Table X. The F values indicate no significant differences. However, the findings are discussed in detail later in this section.

The F values applicable to the concept "the study of accounting" are given in Table XI. Although the values indicate no significant differences, they will be discussed in greater detail later in this section.

The F values pertaining to the concept "accounting as a vocation" are listed in Table XII. One significant difference is determined to exist, but the findings will be discussed in greater detail later in this section.

TABLE X

ANALYSIS OF VARIANCE OF THE ATTITUDE CHANGE ON THE CONCEPT
 "ACCOUNTING HOMEWORK" OF 84 STUDENTS, CLASSIFIED BY
 ACT SCORE AND LENGTH OF HOMEWORK
 PROBLEMS ASSIGNED

Source of Variance	Sum of Squares	Degrees of Freedom	Mean Squares	F
ACT Level (High, Average or Low)	402.45	2	201.23	1.8579
Length of Homework Problems (Experimental vs Control)	30.96	1	30.96	0.2858
Interaction (ACT X Length of Homework Problems)	50.79	2	25.40	0.2345
Within	8,448.50	78	108.31	
TOTAL	8,932.70	83		

TABLE XI

ANALYSIS OF VARIANCE OF THE ATTITUDE CHANGE ON THE CONCEPT "THE
 STUDY OF ACCOUNTING" OF 84 STUDENTS, CLASSIFIED BY ACT
 SCORE AND LENGTH OF HOMEWORK PROBLEMS ASSIGNED

Source of Variance	Sum of Squares	Degrees of Freedom	Mean Squares	F
ACT Level (High, Average or Low)	323.74	2	161.87	1.4046
Length of Homework Problems (Experimental vs Control)	10.71	1	10.71	0.0929
Interaction (ACT X Length of Homework Problems)	81.93	2	40.97	0.3555
Within	8,988.43	78	115.24	
TOTAL	9,404.81	83		

TABLE XII

ANALYSIS OF VARIANCE OF THE ATTITUDE CHANGE ON THE CONCEPT
 "ACCOUNTING AS A VOCATION" OF 84 STUDENTS, CLASSIFIED
 BY ACT SCORE AND LENGTH OF HOMEWORK
 PROBLEMS ASSIGNED

Source of Variance	Sum of Squares	Degrees of Freedom	Mean Squares	F
ACT Level (High, Average or Low)	1,062.21	2	531.11	6.6840*
Length of Homework Problems (Experimental vs Control)	11.44	1	11.44	0.1440
Interaction (ACT X Length of Homework Problems)	36.31	2	18.16	0.2285
Within	6,198.07	78	79.46	
TOTAL	7,308.03	83		

*p < 0.01

The findings of this section are based on a limited number of scores; however, if these data are representative of data for similar groups in similar situations, then the following findings are pertinent to the situation:

1. The changes in attitude of all students in the experimental group were compared to the changes in attitude of all students in the control group on each of the three accounting concepts. The F value for the concept "accounting homework" is .2858, for the concept "the study of accounting" is .0929, and for the concept "accounting as a vocation" is .1440. None of the F values are significant at the .05 level of confidence. This finding indicates that when the changes in

attitude of all students in the control group are compared to the changes in attitude of all students in the experimental group, there is no significant difference between the groups on any of the three accounting concepts at the .05 level of confidence.

2. The changes in attitude of all students in each of the three ACT score groups were compared with each other on each of the three accounting concepts. The F value for the concept "accounting homework" is 1.8579 and for the concept "the study of accounting" is .0929, neither of which is significant at the .05 level of confidence. This section of the finding indicates, therefore, that there is no significant difference among the three ACT score groups on the two concepts "accounting homework" and "the study of accounting." However, the F value for the concept "accounting as a vocation" is 6.6840 and is significant at the .01 level of confidence. However, with the knowledge that a significant difference exists among the three ACT score groups on the concept "accounting as a vocation," one still does not know exactly which of the groups differ significantly. Thus, Duncan's new multiple-range test was applied to pinpoint the difference.

The results of applying Duncan's test to the achievement data are shown in Table XIII. These results indicate that a significant difference in attitude change is evident between all the low ACT score students and all the average ACT score students and is also evident between all the low ACT score students and all the high ACT score students, both at the .01 level of confidence. However, there is no significant difference between the average ACT score students and the high ACT score students at the .05 level of confidence.

TABLE XIII

DUNCAN'S MULTIPLE-RANGE TEST TO ANALYZE FOR SIGNIFICANT DIFFERENCES IN ATTITUDE ON THE CONCEPT "ACCOUNTING AS A VOCATION" AMONG THE THREE ACT LEVEL GROUPS

ACT Groups Being Compared	Standard Error of the Mean	Duncan's Significant Range	Minimum Mean Difference	Actual Mean Difference	Level of Sig.
Low vs Average	1.684	2.829	4.764	6.750	.01
Average vs High	1.684	2.829	4.764	1.393	not sig.
Low vs High	1.684	2.976	5.012	8.143	.01

3. The resulting F values for interaction are not significant for any of the three accounting concepts at the .05 level of confidence. Therefore, there is no interaction between student membership in both independent variable groups and their change in attitude for any of the three accounting concepts. This finding means that all three ACT level experimental groups of students have changes in attitude scores which relate in the same basic ratio to the scores of the corresponding ACT level control groups of students. However, simply finding that there is no interaction does not specifically answer the questions of whether significant differences in attitude change on any of the three concepts exist between the low ACT score control group and the low ACT score experimental group or between either of the other two pairs of corresponding ACT score groups. A determination of whether such differences exist can easily be derived, however, from a combination of previous

findings of this section. One finding indicates that the attitude changes of all the students in the experimental group and the control group do not significantly differ from each other at the .05 level of confidence for any of the three accounting concepts. Likewise, another finding shows no interaction at the .05 level of confidence for any of the three accounting concepts. Therefore, the following three findings are logically derived from the information just summarized.

4. There is no significant difference between the low ACT score control group and the low ACT score experimental group in attitude change on any of the three accounting concepts at the .05 level of confidence.

5. There is no significant difference between the average ACT score control group and the average ACT score experimental group in attitude change on any of the three accounting concepts at the .05 level of confidence.

6. There is no significant difference between the high ACT score control group and the high ACT score experimental group in attitude change on any of the three accounting concepts at the .05 level of confidence.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

The material in this chapter is divided into three major sections. The first part summarizes the purposes, procedures, and findings of the study. The second section contains conclusions drawn from the findings of the previous chapter listed in a sequential manner basically corresponding to the questions and null hypotheses contained in chapter one. Section three is comprised of a listing of recommendations of suggested practices and future studies.

Summary

The purpose of this experiment was to determine if assigning short homework problems as opposed to long homework problems results in a significant difference in accounting achievement and in changes of student attitudes toward accounting in a college principles of accounting class.

Accounting achievement was defined as the difference between the pre- and post-test scores on the standardized Level I Accounting Achievement Test produced by the United States Armed Forces Institute.

Student attitudes toward three concepts in accounting, "accounting homework," "the study of accounting," and "accounting as a vocation," were measured by using 15 bi-polar semantic-differential-type scales for each of the three concepts. Each scale was divided into seven

numbered parts, and the students' attitude score on a concept was defined as the total numerical value of the selections which the students marked on the scales. The change in student attitude for a particular concept was defined as the difference between the pre- and post-test scores on the attitude test.

Four classes in Principles of Accounting I at Cameron College, Lawton, Oklahoma were used in the experiment conducted during the fall semester of 1971. Two instructors taught the classes, with each instructor teaching one experimental and one control class.

The data for eighty-four accounting students were used in the experiment. The data for both the control and the experimental groups were divided into three subgroups based on the ACT score level of the students involved. Thus, there were two independent variables, the ACT score of the student and the length of homework problems assigned.

The multiple-classification analysis of variance was the statistic used to analyze the data for both student achievement and student attitudes. The results of the statistical analysis of the students' accounting achievement indicate the only significant differences in achievement exist among the three ACT level groups. Likewise, the only significant differences in student attitude changes were among the three ACT level groups on the concept "accounting as a vocation." The remaining comparisons between student groups indicate no significant differences for either student accounting achievement or changes in student attitudes.

Conclusions

The conclusions are based on the findings from chapter four and are listed to basically correspond with the findings, the questions asked in chapter one, and the null hypotheses presented in chapter one. Additionally, general conclusions which may not relate to any one specific hypothesis or finding are also listed.

Accounting Achievement Conclusions

1. The findings indicate no significant difference exists in accounting achievement between all students who were assigned short homework problems and all students who were assigned long homework problems. Therefore, the investigator concludes that the null hypothesis stating that there will be no significant difference in accounting achievement between all the students in the experimental group and all the students in the control group cannot be rejected. Further, the investigator concludes that since the length of accounting problems assigned is not significant, the instructors should not choose problems for assignments based only on their length, but should use some other criteria, such as the concepts covered.

2. The findings show that a significant difference in accounting achievement exists among the three ACT score groups. Therefore, the investigator concludes that the null hypothesis stating that there will be no significant difference in accounting achievement among the three ACT score groups (high versus average versus low) of all students combined (both experimental and control) is rejected.

3. The results of the study show no interaction concerning student

accounting achievement. Therefore, the investigator concludes that the null hypothesis stating that there will be no significant interaction between student membership in both independent variable groups and their accounting achievement scores cannot be rejected. Each set of accounting problems has the same relative effect on student achievement when compared to the other set of problems at all three ACT score levels.

4. The test scores indicate no significant differences exist between the two low ACT score groups. The investigator concludes, therefore, that the null hypothesis stating that there will be no significant difference in accounting achievement between the students in the low ACT score experimental group and the students in the low ACT score control group cannot be rejected. The length of homework problems assigned has no significant effect on accounting achievement for the low ACT score student.

5. The investigator finds that no significant difference in accounting achievement is evident between the two average ACT score groups. The investigator concludes, therefore, that the null hypothesis stating that there will be no significant difference in accounting achievement between the students in the average ACT score experimental group and the students in the average ACT score control group cannot be rejected. The length of homework problems assigned has no significant effect on accounting achievement for the average ACT score student.

6. The findings indicate no significant difference in achievement exists between the two high ACT score groups. Thus, the investigator concludes that the null hypothesis that there will be no significant difference in accounting achievement between the students in the high

ACT score experimental group and the students in the high ACT score control group cannot be rejected. The length of homework problems assigned has no significant effect on accounting achievement for the high ACT score student.

Conclusions About Student Attitudes

1. The attitude scores indicate that no significant difference in attitude change exists for any of the accounting concepts between the students who were assigned short homework problems and the students who were assigned long homework problems. Therefore, the investigator concludes that the null hypothesis stating that there will be no significant difference in attitude change on any of the three accounting concepts (accounting homework, the study of accounting, and accounting as a vocation) between all the students in the experimental group and all the students in the control group cannot be rejected. Further, since the length of the homework problems does not affect student attitudes toward accounting, the instructor should select homework problems on some criteria other than length.

2. The results of the study show that a significant difference in attitude change among the three ACT groups exists for the concept "accounting as a vocation", but that no significant difference in attitude change among the three ACT groups exists for the concepts "accounting homework" and "the study of accounting." Thus, the investigator concludes that the null hypothesis stating that there will be no significant difference in attitude change on any of the three accounting concepts among the three ACT groups (high versus average versus low) of all students combined (both experimental and control) cannot be

rejected for the concepts "accounting homework" and "the study of accounting." However, the null hypothesis is rejected for the concept "accounting as a vocation." Student ACT score level does not influence their attitude change toward studying accounting or working problems, but ACT score level does influence their attitude change toward accounting as a vocation. The investigator is unable to determine with certainty why this one attitude score is significant while the rest of the scores do not reach the level of significance. The investigator would offer as conjecture, however, that perhaps the beginning accounting students, especially those of lesser ability, enter the initial accounting class with idealistic opinions concerning both their accounting ability and the attractiveness of the accounting profession. Since other researchers have found that the poorer students spend more time working problems and achieve less than do the better students, this investigator concludes that poorer students began to take a more realistic look at themselves in relation to long-term goals in accounting as a result of probably spending more time on homework than the better students but with much poorer results.

3. The test scores indicate no interaction concerning attitude change on any of the three accounting concepts. Therefore, the investigator concludes that the null hypothesis stating that there will be no significant interaction between student membership in both independent variable groups and their attitude change on any of the three accounting concepts cannot be rejected. Each set of accounting problems has the same relative effect on student attitude change when compared to the other set of problems on all concepts at all ACT levels.

4. The investigator finds that no significant difference in

attitude change exists between the two low ACT score groups. Therefore, the investigator concludes that the null hypothesis stating that there will be no significant difference in attitude change on any of the three accounting concepts between the students in the low ACT score experimental group and the students in the low ACT score control group cannot be rejected. The length of homework problems assigned has no effect on attitude change for the low ACT score student.

5. The findings indicate that no significant difference in attitude change exists between the two average ACT score groups. Therefore, the investigator concludes that the null hypothesis stating that there will be no significant difference in attitude change on any of the three accounting concepts between the students in the average ACT score experimental group and the students in the average ACT score control group cannot be rejected. The length of homework problems assigned does not result in a difference in attitude change for the average ACT score student.

6. The findings show that no significant difference in attitude change exists between the two high ACT score groups. Thus, the investigator concludes that the null hypothesis stating that there will be no significant difference in attitude change on any of the three accounting concepts between the students in the high ACT score experimental group and the students in the high ACT score control group cannot be rejected. The length of homework problems assigned has no effect on attitude change for the high ACT score student.

General Conclusions

1. There were other uncontrolled factors operating in the experiment in addition to the two independent variables being considered.

2. The positive student attitude toward accounting is not greatly affected by the length of the homework problems assigned.

3. The reason the low ACT score students had a negative change in attitude during the experiment while the average and high ACT score students had either no change or a positive change in attitude toward accounting during the same time period cannot be determined from the information in this study.

4. Since the homework problems in the study were of contrasting lengths but covered the same concepts, the investigator concludes that the coverage of concepts in the homework problems is of more importance than the length of each individual problem.

Recommendations

1. A similar experiment should be conducted using subjects grouped by means other than ACT level scores alone to eliminate some of the possible unrecognized intervening variables in this study.

2. Authors of accounting textbooks should include problems of varying lengths, and should insure that both the longer and shorter problems include all the important concepts, to allow instructors to choose the length of problem which complements their teaching methods.

3. A larger experiment should be conducted which includes several concepts of attitude toward accounting to determine a more exact picture of the students' attitudes and their changes in attitude.

4. Accounting instructors should choose problems which complement their method of instruction and which cover the important concepts rather than problems based on length alone.

5. A study should be conducted to contrast the attitudes and attitude change of students who withdraw from the accounting class to the attitudes of students who remain enrolled in the course.

A SELECTED BIBLIOGRAPHY

Accola, Lucile M , and Eldora O. Brechlin.

- 1967 "A Revision and Comparison of Traditional Bookkeeping Concepts with Bookkeeping Concepts Utilized in Job Situations." (Unpub. M.S. thesis, Wisconsin State University.)

American Accounting Association.

- 1968 Accounting Instruction: Concepts and Practices. Second Edition. Cincinnati. South-Western Publishing Company.

American College Testing Program.

- 1966 College Student Profile Norms for the ACT Assessment. Iowa City, Iowa.

Asperger, Otto.

- 1932 "The Use of Study Guides as Aids in Learning First-Year Bookkeeping in the Senior High School." (Unpub. M.A. thesis, the University of Southern California.)

Bedke, Ruby C.

- 1969 "The Development and Evaluation of a Unit of Programmed Instruction for the Purchases Journal in Bookkeeping." (Unpub. M.S. thesis, Utah State University.)

Bruning, James L., and B. L. Kintz.

- 1968 Computational Handbook of Statistics. Glenview, Illinois. Scott, Foresman and Company.

Cameron College Catalog 1971-72

- 1971 Lawton: Cameron State College.

Cockshoot, Lawrence Jay.

- 1935 "A Study to Determine the Comparative Adequacy and Efficiency of the Project and Problem Methods of Teaching Bookkeeping in a Private Business School." (Unpub. M.S. thesis, the University of Southern California.)

Corcoran, Mary, E.

- 1953 "Reading Aids for Bookkeeping." (Unpub. Master's thesis, Boston College.)

Daily, Victoria Lee DeFore.

- 1969 "The Effect of Programmed Instruction in the Teaching of Principles of Accounting." (Unpub. Doctor's thesis, Colorado State College.)

deReyna, Raymon Jose, II.

- 1959 "A Study of Accounting Achievement and Opinions Concerning Non-Accounting Majors in Conventional and Television Classes." (Unpub. Master's thesis, University of Miami, Coral Gables.)

Donahue, John F.

- 1968 "Research and Its Implications for Bookkeeping--A Comparison of Instructional Methods Using A Practice Set." Business Education Forum. Vol. 23. (December), 507.

Douglas, Lloyd Virgil.

- 1936 "An Experimental Development of Techniques and Materials for the Teaching of Certain General Business Objectives in a Course in Nonvocational Bookkeeping." (Unpub. Doctor's thesis, the State University of Iowa.)

Dow, Alice S.

- 1965 "The Effectiveness of Practice Sets in Elementary Accounting." National Business Education Quarterly. Vol. 33, No. 3 (Spring), 5.

Duarte, Daniel.

- 1967 "The Value of a Practice Set in First-Year Bookkeeping." Business Education Forum. Vol. 22 (November), 16-17.

Edwards, Allen L.

- 1957 Techniques of Attitude Scale Construction. New York. Appleton-Century-Crofts, Inc.

Fairchild, Charles H.

- 1970 "A Comparison of Student Achievement in High School Bookkeeping." (Unpub. M.S. thesis, Mankato State College.)

Glover, Mildred W.

- 1970 "An Experiment in the Use of Programmed Instruction in Elementary College Accounting." (Unpub. Doctor's thesis, the University of Georgia.)

Halverson, Gaylon L.

- 1963 "The Development and Evaluation of Programmed Instruction Materials For Use in Supplementing the Teaching of High School Bookkeeping." (Unpub. M.A. thesis, State College of Iowa.)

Hendrick, Robert Edward.

- 1954 "The Payroll--A Text and Practice Set." (Unpub. Master's thesis, Western Kentucky State College.)

House, Forrest Wayne.

- 1951 "Factors Affecting Student Achievement in Beginning Bookkeeping in the High School." (Unpub. Doctor's thesis, Ohio State University.)
- 1961 "Implications of Research in Bookkeeping." National Business Education Quarterly. Vol. 29 (Spring), 18.
- 1966 "Length of Assignments as it Relates to Success in Bookkeeping." Business Education Forum. Vol. 20, No. 6 (March), 21.

Johns, John Mark.

- 1955 "A Comparison Between Two Methods of Teaching Bookkeeping." (Unpub. Master's thesis, Ball State Teachers College.)

Johnson, M. Clemens.

- 1969 "New Data Analysis Techniques and Their Implications for Research Design in Business Education." National Business Education Quarterly. Vol. 37, No. 3 (Spring), 57.

Jones, Burton C.

- 1953 "A Course of Study in Beginning Bookkeeping." (Unpub. Master's thesis, Western Kentucky State College.)

Kaeding, Harold E.

- 1957 "The Development and Evaluation of Practical Discussion Problems to be Used in the Teaching of Beginning Bookkeeping." (Unpub. M.A. thesis, Iowa State Teachers College.)

Kahn, Gilbert.

- 1962 "Developments in Bookkeeping." The Ball State Commerce Journal. Vol. 33, No. 2 (February).

Kindle, Nellon Dean.

- 1955 "Course of Study and Supplementary Aids for Teaching First Year High School Bookkeeping." (Unpub. Master's thesis, the University of Texas, Austin.)

Knost, Ralph P.

- 1946 "A Classroom Teaching Procedure in Bookkeeping." (Unpub. M.S. thesis, University of Cincinnati.)

McKinley, Lawrence R.

- 1952 "Development of Bookkeeping Problems to Supplement the Textbook in Second-Year Bookkeeping Classes." (Unpub. Master's thesis, Boston University.)

Marsolek, Jerome R.

- 1954 "Teaching of Farm Record Keeping in a Bookkeeping Course." (Unpub. Master's thesis, University of Minnesota.)

Meng, Bernice E.

- 1957 High School Bookkeeping and the Slow Learner. San Jose, California. San Jose State College.

Mullen, Louis Edwin,

- 1958 "Effective Presentation of Accounting to Non-Accounting Major Business Students." (Unpub. M.S. thesis, University of Illinois.)

Nolan, C. A., Carlos K. Hayden, and Dean R. Malsbary.

- 1967 Principles and Problems of Business Education. Cincinnati. South-Western Publishing Company.

Oppenheim, A. N.

- 1966 Questionnaire Design and Attitude Measurement. New York. Basic Books, Inc.

Osgood, Charles E., George J. Suci, and Percy H. Tannenbaum.

- 1957 The Measurement of Meaning. Urbana, Illinois. University of Illinois Press.

Pearson, Ralph E.

- 1959 "An Introduction to Bookkeeping with Complete-Cycle Problems and Units." (Unpub. M.A. thesis, University of Minnesota.)

Popham, W. James.

- 1967 Educational Statistics. New York. Harper and Row.

Pyle, William W., and John Arch White.

- 1969 Fundamental Accounting Principles. Homewood, Illinois. 5th ed. Richard D. Irwin, Inc.

Rainey, Bill G.

- 1958 "Why the High Mortality Rate in Bookkeeping." Business Education World. Vol. 39 (September), 28.

Reynard, Loren F.

- 1936 "An Evaluation of Practice Sets in the First Semester of High School Bookkeeping." (Unpub. Master's thesis, the State University of Iowa.)

Reynolds, Robert G.

- 1953 "A Study of the Effect of Outside Assignments on Achievement in High School Bookkeeping." (Unpub. M.S. thesis, University of Wisconsin.)

Robinson, James L.

- 1959 "Bookkeeping Success Must Come Early." Business Education Forum. Vol. 14 (December).

Rosenberg, Arvie A.

- 1957 "Learning Units in Bookkeeping." (Unpub. Master's thesis, University of Minnesota.)

Satlow, I. David.

- 1942 "Problems in Beginning Bookkeeping." (Unpub. Doctor's thesis, New York University.)

Schultheis, Robert A.

- 1968 "A Descriptive Model of the Slow Learner: A Frame of Reference for the Analysis of Recordkeeping Positions." The Delta Pi Epsilon Journal. Vol. X (August), 21.

Schultheis, Robert A.

- 1971 "Research Priorities for Business Education." The Delta Pi Epsilon Journal. Vol. 13 (February), 8.

Shaw, Marvin E., and Jack M. Wright.

- 1967 Scales for the Measurement of Attitudes. New York. McGraw-Hill Book Company.

Smith, Wendell I., and William J. Moore, ed.

- 1962 Programmed Learning: Theory and Research. Princeton, New Jersey. D. Van Nostrand Company, Inc.

Stearns, Ray A.

- 1969 "An Experiment With Class Size in the Teaching of Elementary Accounting." (Unpub. Doctor's thesis, Oklahoma State University.)

Steel, Robert G. D., and James H. Torrie.

- 1960 Principles and Procedures of Statistics. New York. McGraw-Hill Book Company, Inc.

Summers, Gene F., ed.

- 1970 Attitude Measurement. Chicago. Rand McNally and Company.

Thorndike, Robert L., and Elizabeth Hagen.

- 1961 Measurement and Evaluation in Psychology and Education. 2nd ed. New York. Wiley.

Titus, Dorothy M.

- 1946 "Unit Organization of Two Topics for a Class in Bookkeeping." (Unpub. Master's thesis, Boston University.)

Tonne, Herbert A., Estelle L. Popham, and Herbert M. Freeman.

- 1965 Methods of Teaching Business Subjects. 3rd ed. New York. Gregg Division, McGraw-Hill Book Company.

Tupper, Clyde W.

- 1930 "The Influence of Certain Factors Upon Success in a Book-keeping Class." (Unpub. Master's thesis, Leland Stanford Junior University.)

Turabain, Kate L.

- 1967 A Manual for Writers of Term Papers, Theses, and Dissertations.
3rd ed., rev. Chicago. The University of Chicago Press.

U'Ren, Alan W.

- 1931 "A Comparison of Two Methods of Teaching Bookkeeping in High School." (Unpub. Master's thesis, University of Wisconsin.)

United States Armed Forces Institute.

- 1971 Information on the USAFI Subject Standardized Tests. (May).

Wagner, Harvey F. J.

- 1934 "An Experimental Comparison of the Daily Assignment Recitation and the Contract Methods of Teaching Bookkeeping in High School." (Unpub. Master's thesis, University of Minnesota.)

West, Leonard J.

- 1958 "What's the Matter with Research in Business Education?" Delta Pi Epsilon Journal. Vol. 2 (October), 3.
- 1966 "Experimental Research in Business Education." National Business Education Quarterly. Vol. 35, No. 2 (Winter), 48-51.
- 1971 "Experimental and Quasi-Experimental Research," in Contribution of Research to Business Education, ed. by Calfrey C. Calhoun, and Mildred Hillstad. Washington, D. C. National Business Education Association.

Yourd, Bryce W.

- 1955 "Students' Guide and Practice Set in Machine Bookkeeping." (Unpub. Master's thesis, Sacramento State College.)

APPENDIX A

ACCOUNTING ACHIEVEMENT TEST

AN EXPLANATION OF THE ACCOUNTING

ACHIEVEMENT TEST

The accounting achievement test used in this experiment was a standardized achievement test for the beginning accounting course from the United States Armed Forces Institute. The test is a controlled item and cannot be reproduced in this study. However, further information concerning the test may be obtained from USAFI. The address is:

Test Administration branch
United States Armed Forces Institute
Madison, Wisconsin 53713

APPENDIX B

ATTITUDE TEST

AN EXPLANATION OF THE ATTITUDE TEST

The attitude test used in the experiment was constructed by the investigator and is a bi-polar semantic-differential type of test.

An attitude score on each of the three concepts was determined for each student taking the attitude test. One of each pair of the bi-polar evaluative adjectives is considered to have a positive connotation. After the student takes the attitude test, the scales are numbered for scoring purposes with the numerals 1-7. The most extreme negative segment of the seven-part scale is given the value of "1," while the most positive segment is valued as "7." All other segments are consecutively numbered. Thus, the neutral center segment is valued for scoring purposes as "4." A student's attitude score is the summation of the values of all the segments he marks.

The scales are alternated in a random manner so that some scales begin with the positive adjective on the left side, while other scales have the positive adjective on the right side.

NAME _____

SOCIAL SECURITY NUMBER _____

GENERAL INSTRUCTIONS

The purpose of this paper is to measure your feelings toward certain concepts by having you judge these concepts against a series of descriptive scales. On each page you will find a different concept to judge and beneath it a set of scales. The scale is a numbered line with a word at each end of the line. The words at the ends of a scale are basically opposite in meaning as they might apply to the concept being judged. You are to rate the concept listed at the top of each page on each of these scales listed below it. There are no "wrong" answers, so mark each concept according to the way you personally feel about it.

Here is how you are to use these scales:

If you feel that a concept at the top of the page is very closely related to one or the other end of the scale, you should place your check-mark in one of the following ways:

fair $\frac{X}{3}$: $\frac{\quad}{2}$: $\frac{\quad}{1}$: $\frac{0}{0}$: $\frac{\quad}{1}$: $\frac{\quad}{2}$: $\frac{\quad}{3}$ unfair
or

fair $\frac{\quad}{3}$: $\frac{\quad}{2}$: $\frac{\quad}{1}$: $\frac{\quad}{0}$: $\frac{\quad}{1}$: $\frac{\quad}{2}$: $\frac{X}{3}$ unfair

If you feel that the concept is related to one or the other end of the scale (but not extremely), you should place your check-mark in one of the following ways:

strong $\frac{\quad}{3}$: $\frac{X}{2}$: $\frac{\quad}{1}$: $\frac{\quad}{0}$: $\frac{\quad}{1}$: $\frac{\quad}{2}$: $\frac{\quad}{3}$ weak
or

strong $\frac{\quad}{3}$: $\frac{\quad}{2}$: $\frac{\quad}{1}$: $\frac{\quad}{0}$: $\frac{\quad}{1}$: $\frac{X}{2}$: $\frac{\quad}{3}$ weak

If the concept seems slightly related to one side as opposed to the other side (but is not really neutral), then you should check in one of the following ways:

active $\frac{\quad}{3}$: $\frac{\quad}{2}$: $\frac{X}{1}$: $\frac{\quad}{0}$: $\frac{\quad}{1}$: $\frac{\quad}{2}$: $\frac{\quad}{3}$ passive
or

active $\frac{\quad}{3}$: $\frac{\quad}{2}$: $\frac{\quad}{1}$: $\frac{\quad}{0}$: $\frac{X}{1}$: $\frac{\quad}{2}$: $\frac{\quad}{3}$ passive

ACCOUNTING HOMEWORK

clear	$\frac{\quad}{3}$:	$\frac{\quad}{2}$:	$\frac{\quad}{1}$:	$\frac{\quad}{0}$:	$\frac{\quad}{1}$:	$\frac{\quad}{2}$:	$\frac{\quad}{3}$	hazy
difficult	$\frac{\quad}{3}$:	$\frac{\quad}{2}$:	$\frac{\quad}{1}$:	$\frac{\quad}{0}$:	$\frac{\quad}{1}$:	$\frac{\quad}{2}$:	$\frac{\quad}{3}$	easy
dull	$\frac{\quad}{3}$:	$\frac{\quad}{2}$:	$\frac{\quad}{1}$:	$\frac{\quad}{0}$:	$\frac{\quad}{1}$:	$\frac{\quad}{2}$:	$\frac{\quad}{3}$	interesting
good	$\frac{\quad}{3}$:	$\frac{\quad}{2}$:	$\frac{\quad}{1}$:	$\frac{\quad}{0}$:	$\frac{\quad}{1}$:	$\frac{\quad}{2}$:	$\frac{\quad}{3}$	bad
haphazard	$\frac{\quad}{3}$:	$\frac{\quad}{2}$:	$\frac{\quad}{1}$:	$\frac{\quad}{0}$:	$\frac{\quad}{1}$:	$\frac{\quad}{2}$:	$\frac{\quad}{3}$	systematic
informative	$\frac{\quad}{3}$:	$\frac{\quad}{2}$:	$\frac{\quad}{1}$:	$\frac{\quad}{0}$:	$\frac{\quad}{1}$:	$\frac{\quad}{2}$:	$\frac{\quad}{3}$	uninformative
long	$\frac{\quad}{3}$:	$\frac{\quad}{2}$:	$\frac{\quad}{1}$:	$\frac{\quad}{0}$:	$\frac{\quad}{1}$:	$\frac{\quad}{2}$:	$\frac{\quad}{3}$	short
meaningful	$\frac{\quad}{3}$:	$\frac{\quad}{2}$:	$\frac{\quad}{1}$:	$\frac{\quad}{0}$:	$\frac{\quad}{1}$:	$\frac{\quad}{2}$:	$\frac{\quad}{3}$	meaningless
necessary	$\frac{\quad}{3}$:	$\frac{\quad}{2}$:	$\frac{\quad}{1}$:	$\frac{\quad}{0}$:	$\frac{\quad}{1}$:	$\frac{\quad}{2}$:	$\frac{\quad}{3}$	unnecessary
simple	$\frac{\quad}{3}$:	$\frac{\quad}{2}$:	$\frac{\quad}{1}$:	$\frac{\quad}{0}$:	$\frac{\quad}{1}$:	$\frac{\quad}{2}$:	$\frac{\quad}{3}$	complex
unfair	$\frac{\quad}{3}$:	$\frac{\quad}{2}$:	$\frac{\quad}{1}$:	$\frac{\quad}{0}$:	$\frac{\quad}{1}$:	$\frac{\quad}{2}$:	$\frac{\quad}{3}$	fair
unpleasant	$\frac{\quad}{3}$:	$\frac{\quad}{2}$:	$\frac{\quad}{1}$:	$\frac{\quad}{0}$:	$\frac{\quad}{1}$:	$\frac{\quad}{2}$:	$\frac{\quad}{3}$	pleasant
unrealistic	$\frac{\quad}{3}$:	$\frac{\quad}{2}$:	$\frac{\quad}{1}$:	$\frac{\quad}{0}$:	$\frac{\quad}{1}$:	$\frac{\quad}{2}$:	$\frac{\quad}{3}$	realistic
unrewarding	$\frac{\quad}{3}$:	$\frac{\quad}{2}$:	$\frac{\quad}{1}$:	$\frac{\quad}{0}$:	$\frac{\quad}{1}$:	$\frac{\quad}{2}$:	$\frac{\quad}{3}$	rewarding
vague	$\frac{\quad}{3}$:	$\frac{\quad}{2}$:	$\frac{\quad}{1}$:	$\frac{\quad}{0}$:	$\frac{\quad}{1}$:	$\frac{\quad}{2}$:	$\frac{\quad}{3}$	precise

THE STUDY OF ACCOUNTING

commonplace	$\frac{\quad}{3}$:	$\frac{\quad}{2}$:	$\frac{\quad}{1}$:	$\frac{\quad}{0}$:	$\frac{\quad}{1}$:	$\frac{\quad}{2}$:	$\frac{\quad}{3}$	unique
difficult	$\frac{\quad}{3}$:	$\frac{\quad}{2}$:	$\frac{\quad}{1}$:	$\frac{\quad}{0}$:	$\frac{\quad}{1}$:	$\frac{\quad}{2}$:	$\frac{\quad}{3}$	easy
good	$\frac{\quad}{3}$:	$\frac{\quad}{2}$:	$\frac{\quad}{1}$:	$\frac{\quad}{0}$:	$\frac{\quad}{1}$:	$\frac{\quad}{2}$:	$\frac{\quad}{3}$	bad
haphazard	$\frac{\quad}{3}$:	$\frac{\quad}{2}$:	$\frac{\quad}{1}$:	$\frac{\quad}{0}$:	$\frac{\quad}{1}$:	$\frac{\quad}{2}$:	$\frac{\quad}{3}$	systematic
hazy	$\frac{\quad}{3}$:	$\frac{\quad}{2}$:	$\frac{\quad}{1}$:	$\frac{\quad}{0}$:	$\frac{\quad}{1}$:	$\frac{\quad}{2}$:	$\frac{\quad}{3}$	clear
interesting	$\frac{\quad}{3}$:	$\frac{\quad}{2}$:	$\frac{\quad}{1}$:	$\frac{\quad}{0}$:	$\frac{\quad}{1}$:	$\frac{\quad}{2}$:	$\frac{\quad}{3}$	dull
meaningful	$\frac{\quad}{3}$:	$\frac{\quad}{2}$:	$\frac{\quad}{1}$:	$\frac{\quad}{0}$:	$\frac{\quad}{1}$:	$\frac{\quad}{2}$:	$\frac{\quad}{3}$	meaningless
necessary	$\frac{\quad}{3}$:	$\frac{\quad}{2}$:	$\frac{\quad}{1}$:	$\frac{\quad}{0}$:	$\frac{\quad}{1}$:	$\frac{\quad}{2}$:	$\frac{\quad}{3}$	unnecessary
pleasant	$\frac{\quad}{3}$:	$\frac{\quad}{2}$:	$\frac{\quad}{1}$:	$\frac{\quad}{0}$:	$\frac{\quad}{1}$:	$\frac{\quad}{2}$:	$\frac{\quad}{3}$	unpleasant
simple	$\frac{\quad}{3}$:	$\frac{\quad}{2}$:	$\frac{\quad}{1}$:	$\frac{\quad}{0}$:	$\frac{\quad}{1}$:	$\frac{\quad}{2}$:	$\frac{\quad}{3}$	complex
uninformative	$\frac{\quad}{3}$:	$\frac{\quad}{2}$:	$\frac{\quad}{1}$:	$\frac{\quad}{0}$:	$\frac{\quad}{1}$:	$\frac{\quad}{2}$:	$\frac{\quad}{3}$	informative
unrewarding	$\frac{\quad}{3}$:	$\frac{\quad}{2}$:	$\frac{\quad}{1}$:	$\frac{\quad}{0}$:	$\frac{\quad}{1}$:	$\frac{\quad}{2}$:	$\frac{\quad}{3}$	rewarding
unscholarly	$\frac{\quad}{3}$:	$\frac{\quad}{2}$:	$\frac{\quad}{1}$:	$\frac{\quad}{0}$:	$\frac{\quad}{1}$:	$\frac{\quad}{2}$:	$\frac{\quad}{3}$	scholarly
vague	$\frac{\quad}{3}$:	$\frac{\quad}{2}$:	$\frac{\quad}{1}$:	$\frac{\quad}{0}$:	$\frac{\quad}{1}$:	$\frac{\quad}{2}$:	$\frac{\quad}{3}$	precise
worthless	$\frac{\quad}{3}$:	$\frac{\quad}{2}$:	$\frac{\quad}{1}$:	$\frac{\quad}{0}$:	$\frac{\quad}{1}$:	$\frac{\quad}{2}$:	$\frac{\quad}{3}$	valuable

ACCOUNTING AS A VOCATION

bad	$\frac{\quad}{3}$:	$\frac{\quad}{2}$:	$\frac{\quad}{1}$:	$\frac{\quad}{0}$:	$\frac{\quad}{1}$:	$\frac{\quad}{2}$:	$\frac{\quad}{3}$	good
colorful	$\frac{\quad}{3}$:	$\frac{\quad}{2}$:	$\frac{\quad}{1}$:	$\frac{\quad}{0}$:	$\frac{\quad}{1}$:	$\frac{\quad}{2}$:	$\frac{\quad}{3}$	colorless
complex	$\frac{\quad}{3}$:	$\frac{\quad}{2}$:	$\frac{\quad}{1}$:	$\frac{\quad}{0}$:	$\frac{\quad}{1}$:	$\frac{\quad}{2}$:	$\frac{\quad}{3}$	simple
dishonorable	$\frac{\quad}{3}$:	$\frac{\quad}{2}$:	$\frac{\quad}{1}$:	$\frac{\quad}{0}$:	$\frac{\quad}{1}$:	$\frac{\quad}{2}$:	$\frac{\quad}{3}$	honorable
important	$\frac{\quad}{3}$:	$\frac{\quad}{2}$:	$\frac{\quad}{1}$:	$\frac{\quad}{0}$:	$\frac{\quad}{1}$:	$\frac{\quad}{2}$:	$\frac{\quad}{3}$	unimportant
interesting	$\frac{\quad}{3}$:	$\frac{\quad}{2}$:	$\frac{\quad}{1}$:	$\frac{\quad}{0}$:	$\frac{\quad}{1}$:	$\frac{\quad}{2}$:	$\frac{\quad}{3}$	dull
meaningless	$\frac{\quad}{3}$:	$\frac{\quad}{2}$:	$\frac{\quad}{1}$:	$\frac{\quad}{0}$:	$\frac{\quad}{1}$:	$\frac{\quad}{2}$:	$\frac{\quad}{3}$	meaningful
pleasant	$\frac{\quad}{3}$:	$\frac{\quad}{2}$:	$\frac{\quad}{1}$:	$\frac{\quad}{0}$:	$\frac{\quad}{1}$:	$\frac{\quad}{2}$:	$\frac{\quad}{3}$	unpleasant
professional	$\frac{\quad}{3}$:	$\frac{\quad}{2}$:	$\frac{\quad}{1}$:	$\frac{\quad}{0}$:	$\frac{\quad}{1}$:	$\frac{\quad}{2}$:	$\frac{\quad}{3}$	nonprofessional
profitable	$\frac{\quad}{3}$:	$\frac{\quad}{2}$:	$\frac{\quad}{1}$:	$\frac{\quad}{0}$:	$\frac{\quad}{1}$:	$\frac{\quad}{2}$:	$\frac{\quad}{3}$	nonprofitable
regressing	$\frac{\quad}{3}$:	$\frac{\quad}{2}$:	$\frac{\quad}{1}$:	$\frac{\quad}{0}$:	$\frac{\quad}{1}$:	$\frac{\quad}{2}$:	$\frac{\quad}{3}$	advancing
unnecessary	$\frac{\quad}{3}$:	$\frac{\quad}{2}$:	$\frac{\quad}{1}$:	$\frac{\quad}{0}$:	$\frac{\quad}{1}$:	$\frac{\quad}{2}$:	$\frac{\quad}{3}$	necessary
unrewarding	$\frac{\quad}{3}$:	$\frac{\quad}{2}$:	$\frac{\quad}{1}$:	$\frac{\quad}{0}$:	$\frac{\quad}{1}$:	$\frac{\quad}{2}$:	$\frac{\quad}{3}$	rewarding
unusual	$\frac{\quad}{3}$:	$\frac{\quad}{2}$:	$\frac{\quad}{1}$:	$\frac{\quad}{0}$:	$\frac{\quad}{1}$:	$\frac{\quad}{2}$:	$\frac{\quad}{3}$	commonplace
varied	$\frac{\quad}{3}$:	$\frac{\quad}{2}$:	$\frac{\quad}{1}$:	$\frac{\quad}{0}$:	$\frac{\quad}{1}$:	$\frac{\quad}{2}$:	$\frac{\quad}{3}$	routine

APPENDIX C

TABLES

AN EXPLANATION OF THE TABLES

The information contained in Tables XIV through XXV includes the raw scores of the students on the accounting achievement test and on the concepts of the attitude test. The information on the scores was condensed and presented in a brief version as part of the information in the chapter on findings. The tables in this appendix, however, contain some additional information. Student ACT scores and an identification of the instructors who taught the students are included in many of the tables in Appendix C, as well as information concerning the scores.

Tables XXVI through XXX contain the information used to calculate the correlation of the two scores from the attitude test when it was given on two consecutive days to a trial-study group of students.

TABLE XIV
 DATA FOR ACHIEVEMENT IN ACCOUNTING ATTAINED
 BY THE EXPERIMENTAL GROUP

Student Number	ACT Score	Instructor	Pre-test Achievement Score	Post-test Achievement Score	Gain in Achievement
1	11	2	23	43	20
2	12	1	38	63	25
3	12	2	27	57	30
4	13	1	29	49	20
5	13	1	34	70	36
6	13	1	36	103	67
7	14	2	41	68	27
8	14	2	40	63	23
9	14	1	24	78	54
10	14	1	44	85	41
11	15	2	36	45	09
12	15	2	34	49	15
13	15	2	34	64	30
14	16	2	36	62	26
15	18	1	38	94	56
16	18	1	49	76	27
17	19	2	50	89	39
18	20	1	42	106	64
19	20	2	29	102	73
20	20	2	24	100	76
21	20	2	49	89	40
22	21	1	47	85	38
23	21	1	37	66	29
24	21	1	45	76	31
25	21	1	52	93	41
26	21	1	41	60	19
27	21	1	34	85	51
28	21	1	43	97	54
29	22	1	41	95	54
30	22	1	49	96	47
31	22	2	50	108	58
32	23	2	34	76	42
33	23	1	32	93	61
34	24	2	43	98	55
35	24	1	65	106	41
36	25	1	50	114	64
37	26	2	34	91	57
38	26	2	29	68	39
39	27	1	28	64	36
40	28	2	29	106	77
41	29	1	41	113	72
42	31	1	39	82	43

TABLE XV
 DATA FOR ACHIEVEMENT IN ACCOUNTING ATTAINED
 BY THE CONTROL GROUP

Student Number	ACT Score	Instructor	Pre-test Achievement Score	Post-test Achievement Score	Gain in Achievement
43	8	1	32	44	12
44	10	1	37	66	29
45	10	2	40	48	08
46	11	2	31	44	13
47	12	2	28	58	30
48	12	1	33	85	52
49	13	1	49	52	03
50	14	2	35	50	15
51	14	1	41	51	10
52	14	2	34	76	42
53	15	2	40	99	59
54	15	1	31	102	71
55	16	2	31	76	45
56	16	1	51	87	36
57	17	2	47	67	20
58	17	2	30	58	28
59	17	2	47	64	17
60	18	1	43	100	67
61	18	1	23	77	54
62	18	1	34	99	65
63	19	2	80	107	27
64	19	1	27	72	45
65	19	2	26	83	57
66	20	2	35	62	27
67	20	2	40	109	69
68	20	2	37	73	36
69	21	1	32	65	33
70	21	1	38	85	47
71	22	1	45	97	52
72	22	2	34	76	42
73	22	2	53	105	52
74	23	1	32	101	69
75	23	1	45	100	55
76	23	2	61	93	32
77	24	1	34	111	77
78	24	1	78	121	43
79	24	1	48	78	30
80	25	1	40	107	67
81	26	1	30	116	86
82	27	1	33	110	77
83	28	2	45	93	48
84	31	1	51	105	54

TABLE XVI

DATA FOR ATTITUDE OF THE EXPERIMENTAL GROUP ON
THE CONCEPT "ACCOUNTING HOMEWORK"

Student Number	ACT Score	Instructor	Pre-test Attitude Score	Post-test Attitude Score	Change in Attitude Score
1	11	2	75	66	-09
2	12	1	61	82	21
3	12	2	65	77	12
4	13	1	71	69	-02
5	13	1	84	82	-02
6	13	1	77	54	-23
7	14	2	77	81	04
8	14	2	73	80	07
9	14	1	92	81	-11
10	14	1	95	92	-03
11	15	2	77	81	04
12	15	2	58	61	03
13	15	2	88	75	-13
14	16	2	81	63	-18
15	18	1	90	92	02
16	18	1	82	85	03
17	19	2	86	83	-03
18	20	1	90	89	-01
19	20	2	78	79	01
20	20	2	83	77	-06
21	20	2	67	75	08
22	21	1	62	86	24
23	21	1	92	81	-11
24	21	1	85	84	-01
25	21	1	89	88	-01
26	21	1	61	62	01
27	21	1	99	102	03
28	21	1	85	81	-04
29	22	1	83	84	01
30	22	1	88	82	-06
31	22	2	77	86	09
32	23	2	68	60	-08
33	23	1	68	77	09
34	24	2	79	85	06
35	24	1	71	75	04
36	25	1	80	79	-01
37	26	2	72	70	-02
38	26	2	88	67	-21
39	27	1	56	53	-03
40	28	2	60	67	07
41	29	1	84	93	09
42	31	1	79	85	06

TABLE XVII

DATA FOR ATTITUDE OF THE CONTROL GROUP ON THE
CONCEPT "ACCOUNTING HOMEWORK"

Student Number	ACT Score	Instructor	Pre-test Attitude Score	Post-test Attitude Score	Change in Attitude Score
43	08	1	61	59	-02
44	10	1	75	56	-19
45	10	2	85	70	-15
46	11	2	68	66	-02
47	12	2	80	78	-02
48	12	1	79	86	07
49	13	1	68	71	03
50	14	2	71	40	-31
51	14	1	74	66	-08
52	14	2	76	79	03
53	15	2	99	87	-12
54	15	1	77	85	08
55	16	2	79	65	-14
56	16	1	81	88	07
57	17	2	87	85	-02
58	17	2	72	61	-11
59	17	2	65	57	-08
60	18	1	81	87	06
61	18	1	47	72	25
62	18	1	81	71	-10
63	19	2	77	83	06
64	19	1	69	74	05
65	19	2	85	84	-01
66	20	2	93	90	-03
67	20	2	82	82	00
68	20	2	73	85	12
69	21	1	82	76	-16
70	21	1	81	75	-06
71	22	1	91	81	-10
72	22	2	64	86	22
73	22	2	90	83	-07
74	23	1	71	84	13
75	23	1	79	77	-02
76	23	2	92	82	-10
77	24	1	63	89	26
78	24	1	83	80	-03
79	24	1	61	55	-06
80	25	1	84	92	08
81	26	1	99	93	-06
82	27	1	91	88	-03
83	28	2	83	71	-12
84	31	1	77	81	04

TABLE XVIII

DATA FOR ATTITUDE OF THE EXPERIMENTAL GROUP ON THE
CONCEPT "THE STUDY OF ACCOUNTING"

Student Number	ACT Score	Instructor	Pre-test Attitude Score	Post-test Attitude Score	Change in Attitude Score
1	11	2	71	67	-04
2	12	1	84	86	02
3	12	2	45	81	36
4	13	1	82	79	-03
5	13	1	82	84	02
6	13	1	81	78	-03
7	14	2	76	79	03
8	14	2	87	80	-07
9	14	1	82	78	-04
10	14	1	98	90	-08
11	15	2	81	79	-02
12	15	2	64	61	-03
13	15	2	93	80	-13
14	16	2	91	81	-10
15	18	1	99	97	-02
16	18	1	81	81	00
17	19	2	88	83	-05
18	20	1	88	97	09
19	20	2	78	77	-01
20	20	2	82	77	-05
21	20	2	74	75	01
22	21	1	65	77	12
23	21	1	90	78	-12
24	21	1	83	94	11
25	21	1	93	90	-03
26	21	1	65	72	07
27	21	1	99	98	-01
28	21	1	88	77	-11
29	22	1	85	84	-01
30	22	1	92	79	-13
31	22	2	80	100	20
32	23	2	71	56	-15
33	23	1	67	76	09
34	24	2	79	86	07
35	24	1	79	74	-05
36	25	1	93	84	-09
37	26	2	77	73	-04
38	26	2	82	93	11
39	27	1	58	61	03
40	28	2	60	66	06
41	29	1	78	95	17
42	31	1	82	80	-02

TABLE XIX

DATA FOR ATTITUDE OF THE CONTROL GROUP ON THE
CONCEPT "THE STUDY OF ACCOUNTING"

Student Number	ACT Score	Instructor	Pre-test Attitude Score	Post-test Attitude Score	Change in Attitude Score
43	08	1	64	57	-07
44	10	1	71	49	-22
45	10	2	71	67	-04
46	11	2	82	52	-30
47	12	2	82	84	02
48	12	1	86	79	-07
49	13	1	73	71	-02
50	14	2	47	44	-03
51	14	1	73	75	02
52	14	2	80	87	07
53	15	2	93	90	-03
54	15	1	71	90	19
55	16	2	92	78	-14
56	16	1	78	77	-01
57	17	2	75	88	13
58	17	2	82	78	-04
59	17	2	64	49	-15
60	18	1	97	90	-07
61	18	1	44	73	29
62	18	1	77	79	02
63	19	2	82	86	04
64	19	1	77	70	-07
65	19	2	90	87	-03
66	20	2	90	90	00
67	20	2	94	84	-10
68	20	2	93	94	01
69	21	1	77	77	00
70	21	1	79	88	09
71	22	1	86	92	06
72	22	2	78	96	18
73	22	2	89	89	00
74	23	1	92	91	-01
75	23	1	83	85	02
76	23	2	93	90	-03
77	24	1	69	94	25
78	24	1	83	82	-01
79	24	1	68	63	-05
80	25	1	86	100	14
81	26	1	97	90	-07
82	27	1	82	91	09
83	28	2	85	68	-17
84	31	1	83	74	-09

TABLE XX

DATA FOR ATTITUDE OF THE EXPERIMENTAL GROUP ON THE
CONCEPT "ACCOUNTING AS A VOCATION"

Student Number	ACT Score	Instructor	Pre-test Attitude Score	Post-test Attitude Score	Change in Attitude Score
1	11	2	70	64	-06
2	12	1	90	75	-15
3	12	2	93	84	-09
4	13	1	93	86	-07
5	13	1	79	75	-04
6	13	1	94	88	-06
7	14	2	88	82	-06
8	14	2	85	84	-01
9	14	1	86	84	-02
10	14	1	99	99	00
11	15	2	90	87	-03
12	15	2	73	80	07
13	15	2	98	90	-08
14	16	2	89	89	00
15	18	1	98	97	-01
16	18	1	84	83	-01
17	19	2	75	81	06
18	20	1	89	92	03
19	20	2	82	86	04
20	20	2	69	80	11
21	20	2	69	78	09
22	21	1	81	87	06
23	21	1	91	90	-01
24	21	1	82	91	09
25	21	1	95	99	04
26	21	1	97	95	-02
27	21	1	95	98	03
28	21	1	82	76	-06
29	22	1	92	90	-02
30	22	1	87	80	-07
31	22	2	84	97	13
32	23	2	76	76	00
33	23	1	69	69	00
34	24	2	75	83	08
35	24	1	74	73	-01
36	25	1	93	88	-05
37	26	2	67	83	16
38	26	2	78	92	14
39	27	1	60	61	01
40	28	2	60	73	13
41	29	1	88	93	05
42	31	1	74	66	-08

TABLE XXI

DATA FOR ATTITUDE OF THE CONTROL GROUP ON THE
CONCEPT "ACCOUNTING AS A VOCATION"

Student Number	ACT Score	Instructor	Pre-test Attitude Score	Post-test Attitude Score	Change in Attitude Score
43	08	1	78	55	-23
44	10	1	79	41	-38
45	10	2	67	67	00
46	11	2	68	76	08
47	12	2	80	86	06
48	12	1	86	84	-02
49	13	1	77	78	01
50	14	2	49	52	03
51	14	1	86	85	-01
52	14	2	79	89	10
53	15	2	96	94	-02
54	15	1	78	89	11
55	16	2	95	84	-11
56	16	1	92	82	-10
57	17	2	89	94	05
58	17	2	90	84	-06
59	17	2	54	75	21
60	18	1	87	88	01
61	18	1	56	80	24
62	18	1	64	73	09
63	19	2	90	95	05
64	19	1	74	86	12
65	19	2	89	92	03
66	20	2	84	87	03
67	20	2	99	93	-06
68	20	2	88	85	-03
69	21	1	74	81	07
70	21	1	91	92	01
71	22	1	93	87	-06
72	22	2	74	85	11
73	22	2	78	78	00
74	23	1	87	89	02
75	23	1	87	87	00
76	23	2	97	96	-01
77	24	1	76	98	22
78	24	1	76	85	09
79	24	1	64	75	11
80	25	1	73	83	10
81	26	1	89	91	02
82	27	1	86	87	01
83	28	2	86	77	-09
84	31	1	81	63	-18

TABLE XXII

ACCOUNTING ACHIEVEMENT TEST SCORES: SCORES OF 84 STUDENTS
CLASSIFIED ACCORDING TO AMERICAN COLLEGE TEST SCORE
AND LENGTH OF HOMEWORK PROBLEMS ASSIGNED

Length of Homework Problems Assigned	Low ACT		Average ACT		High ACT		TOTAL	
	X	X ²	X	X ²	X	X ²	X	X ²
Short Homework Problems	20	400	56	3,136	54	2,916		
	25	625	27	729	47	2,209		
	30	900	39	1,521	58	3,364		
	20	400	64	4,096	42	1,764		
	36	1,296	73	5,329	61	3,721		
	67	4,489	76	5,776	55	3,025		
	27	729	40	1,600	41	1,681		
	23	529	38	1,444	64	4,096		
	54	2,916	29	841	57	3,249		
	41	1,681	31	961	39	1,521		
	09	81	41	1,681	36	1,296		
	15	225	19	361	77	5,929		
	30	900	51	2,601	72	5,184		
	<u>26</u>	<u>676</u>	<u>54</u>	<u>2,916</u>	<u>43</u>	<u>1,849</u>		
	423	15,847	638	32,992	746	41,804	1,807	90,643
Long Homework Problems	12	144	20	400	52	2,704		
	29	841	28	784	42	1,764		
	08	64	17	289	52	2,704		
	13	169	67	4,489	69	4,761		
	30	900	54	2,916	55	3,025		
	52	2,704	65	4,225	32	1,024		
	03	9	45	2,025	77	5,929		
	15	225	27	729	43	1,849		
	10	100	57	3,249	30	900		
	42	1,764	27	729	67	4,489		
	59	3,481	69	4,761	86	7,396		
	71	5,041	36	1,296	77	5,929		
	45	2,025	33	1,089	48	2,304		
	<u>36</u>	<u>1,296</u>	<u>47</u>	<u>2,209</u>	<u>54</u>	<u>2,916</u>		
425	18,763	592	29,190	784	47,694	1,801	95,647	
Totals	848	34,610	1,230	62,182	1,530	89,498	3,608	186,290

TABLE XXIII

CHANGE IN ATTITUDE SCORES ON THE CONCEPT "ACCOUNTING HOMEWORK."
 SCORES OF 84 STUDENTS CLASSIFIED ACCORDING TO ACT SCORE
 AND LENGTH OF HOMEWORK PROBLEMS ASSIGNED

Length of Homework Problems Assigned	Low ACT		Average ACT		High ACT		TOTAL	
	X	X ²	X	X ²	X	X ²	X	X ²
	- 9	81	2	4	1	1		
	-21	441	3	9	- 6	36		
	12	144	- 3	9	9	81		
	- 2	4	- 1	1	- 8	64		
	- 2	4	1	1	9	81		
	-23	529	- 6	36	6	36		
Short	4	16	8	64	4	16		
Homework	7	49	24	576	- 1	1		
Problems	-11	121	-11	121	- 2	4		
	- 3	9	- 1	1	-21	441		
	4	16	- 1	1	- 3	9		
	3	9	1	1	7	49		
	-13	169	3	9	9	81		
	<u>-18</u>	<u>324</u>	<u>- 4</u>	<u>16</u>	<u>6</u>	<u>36</u>		
	-30	1,916	15	849	10	936	- 5	3,701
	- 2	4	- 2	4	-10	100		
	-19	361	-11	121	22	484		
	-15	225	- 8	64	- 7	49		
	- 2	4	25	625	13	169		
	- 2	4	6	36	- 2	4		
	7	49	-10	100	-10	100		
Long	3	9	6	36	26	676		
Homework	-31	961	5	25	- 3	9		
Problems	- 8	64	- 1	1	- 6	36		
	3	9	- 3	9	8	64		
	-12	144	0	0	- 6	36		
	8	64	12	144	- 3	9		
	-14	196	- 6	36	-12	144		
	<u>7</u>	<u>49</u>	<u>- 6</u>	<u>36</u>	<u>4</u>	<u>16</u>		
	-77	2,143	7	1,237	14	1,896	-56	5,276
Totals	-107	4,059	22	2,086	24	2,832	-61	8,977

TABLE XXIV

CHANGE IN ATTITUDE SCORES ON THE CONCEPT "THE STUDY OF ACCOUNTING." SCORES OF 84 STUDENTS CLASSIFIED ACCORDING TO ACT SCORE AND LENGTH OF HOMEWORK PROBLEMS ASSIGNED

Length of Homework Problems Assigned	Low ACT		Average ACT		High ACT		TOTAL	
	X	X ²	X	X ²	X	X ²	X	X ²
Short Homework Problems	- 4	16	- 2	4	- 1	1		
	2	4	0	0	-13	169		
	36	1,296	- 5	25	20	400		
	- 3	9	9	81	-15	225		
	2	4	- 1	1	9	81		
	- 3	9	- 5	25	7	49		
	3	9	1	1	- 5	25		
	- 7	49	12	144	- 9	81		
	- 4	16	-12	144	- 4	16		
	- 8	64	11	121	11	121		
	- 2	4	- 3	9	3	9		
	- 3	9	7	49	6	36		
	-13	169	- 1	1	17	289		
	<u>-10</u>	<u>100</u>	<u>-11</u>	<u>121</u>	<u>- 2</u>	<u>4</u>		
-14	1,758	0	726	24	1,506	10	3,990	
Long Homework Problems	- 7	49	13	169	6	36		
	-22	484	- 4	16	18	324		
	- 4	16	-15	225	0	0		
	-30	900	- 7	49	- 1	1		
	2	4	29	841	2	4		
	- 7	49	2	4	- 3	9		
	- 2	4	4	16	25	625		
	- 3	9	- 7	49	- 1	1		
	2	4	- 3	9	- 5	25		
	7	49	0	0	14	196		
	- 3	9	-10	100	- 7	49		
	19	361	1	1	9	81		
	-14	196	0	0	-17	289		
	<u>- 1</u>	<u>1</u>	<u>9</u>	<u>81</u>	<u>- 9</u>	<u>81</u>		
63	2,135	12	1,560	31	1,721	-20	5,416	
Totals	-77	3,893	12	2,286	55	3,227	-10	9,406

TABLE XXV

CHANGE IN ATTITUDE SCORES ON THE CONCEPT "ACCOUNTING AS A
 VOCATION." SCORES OF 84 STUDENTS CLASSIFIED ACCORDING
 TO ACT SCORE AND LENGTH OF HOMEWORK
 PROBLEMS ASSIGNED

Length of Homework Problems Assigned	Low ACT		Average ACT		High ACT		TOTAL	
	X	X ²	X	X ²	X	X ²	X	X ²
Short Homework Problems	- 6	36	- 1	1	- 2	4		
	-15	225	- 1	1	- 7	49		
	- 9	81	6	36	13	169		
	- 7	49	3	9	0	0		
	- 4	16	4	16	0	0		
	- 6	36	11	121	8	64		
	- 6	36	9	81	- 1	1		
	- 1	1	6	36	- 5	25		
	- 2	4	- 1	1	16	256		
	0	0	9	81	14	196		
	- 3	9	4	16	1	1		
	7	49	- 2	4	13	169		
	- 8	64	3	9	5	25		
	<u>0</u>	<u>0</u>	<u>- 6</u>	<u>36</u>	<u>- 8</u>	<u>64</u>		
	-60	606	44	448	47	1,023	31	2,077
Long Homework Problems	-23	529	5	25	- 6	36		
	-38	1,444	- 6	36	11	121		
	0	0	21	441	0	0		
	8	64	1	1	2	4		
	6	36	24	576	0	0		
	- 2	4	9	81	- 1	1		
	1	1	5	25	22	484		
	3	9	12	144	9	81		
	- 1	1	3	9	11	121		
	10	100	3	9	10	100		
	- 2	4	- 6	36	2	4		
	11	121	- 3	9	1	1		
	-11	121	7	49	- 9	81		
	<u>-10</u>	<u>100</u>	<u>1</u>	<u>1</u>	<u>-18</u>	<u>324</u>		
	-48	2,534	76	1,442	34	1,358	62	5,334
-108	3,140	120	1,890	81	2,381	93	7,411	

TABLE XXVI

ATTITUDE SCORES REGISTERED ON THE CONCEPT "ACCOUNTING HOMEWORK,"
AND OTHER INFORMATION NECESSARY FOR THE CALCULATION OF
THE CORRELATION OF TWO SEPARATE SETS OF
SCORES ON THE SAME ATTITUDE TEST

Subject	Test 1 X	Test 2 Y	X ²	Y ²	XY
a	87	82	7,569	6,724	7,134
b	83	85	6,889	7,225	7,055
c	74	73	5,476	5,329	5,402
d	79	77	6,241	5,929	6,083
e	89	93	7,921	8,649	8,277
f	82	81	6,724	6,561	6,642
g	70	68	4,900	4,624	4,760
h	73	69	5,329	4,761	5,037
i	71	80	5,041	6,400	5,680
j	74	79	5,476	6,241	5,846
k	74	74	5,476	5,476	5,476
l	69	75	4,761	5,625	5,175
m	75	68	5,625	4,624	5,100
n	82	80	6,724	6,400	6,560
o	60	60	3,600	3,600	3,600
p	61	65	3,721	4,225	3,965
q	60	60	3,600	3,600	3,600
r	70	85	6,241	7,225	6,715
s	78	81	6,084	6,561	6,318
t	75	72	5,625	5,184	5,400
u	<u>84</u>	<u>70</u>	<u>7,056</u>	<u>4,900</u>	<u>5,880</u>
	1,579	1,577	120,079	119,863	119,705

TABLE XXVII

ATTITUDE SCORES REGISTERED ON THE CONCEPT "THE STUDY OF ACCOUNTING," AND OTHER INFORMATION NECESSARY FOR THE CALCULATION OF THE CORRELATION OF TWO SEPARATE SETS OF SCORES ON THE SAME ATTITUDE TEST

Subject	Test 1 X	Test 2 Y	X ²	Y ²	XY
a	79	76	6,241	5,776	6,004
b	93	86	8,649	7,396	7,998
c	71	78	5,041	6,084	5,538
d	72	72	5,184	5,184	5,184
e	94	90	8,836	8,100	8,460
f	88	84	7,744	7,056	7,392
g	72	69	5,184	4,761	4,968
h	71	73	5,041	5,329	5,183
i	84	87	7,056	7,569	7,308
j	83	82	6,889	6,724	6,806
k	79	77	6,241	5,929	6,083
l	79	81	6,241	6,561	6,399
m	76	73	5,776	5,329	5,548
n	81	81	6,561	6,561	6,561
o	87	79	7,569	6,241	6,873
p	77	62	5,929	3,844	4,774
q	84	85	7,056	7,225	7,140
r	88	89	7,744	7,921	7,832
s	91	85	8,281	7,225	7,735
t	73	76	5,329	5,776	5,548
u	90	79	8,100	6,241	7,110
	<u>1,712</u>	<u>1,664</u>	<u>140,692</u>	<u>132,832</u>	<u>136,444</u>

TABLE XXVIII

ATTITUDE SCORES REGISTERED ON THE CONCEPT "ACCOUNTING AS A
 VOCATION," AND OTHER INFORMATION NECESSARY FOR THE
 CALCULATION OF THE CORRELATION OF TWO SEPARATE
 SETS OF SCORES ON THE SAME ATTITUDE TEST

Subject	Test 1 X	Test 2 Y	X ²	Y ²	XY
a	79	81	6,241	6,561	6,399
b	74	82	5,476	6,724	6,068
c	79	82	6,241	6,724	6,478
d	84	79	7,056	6,241	6,636
e	84	87	7,056	7,569	7,308
g	85	79	7,225	6,241	6,715
g	68	69	4,624	4,761	4,692
h	75	73	5,625	5,329	5,475
i	82	81	6,724	6,561	6,642
j	85	91	7,225	8,281	7,735
k	82	86	6,724	7,396	7,056
l	88	89	7,744	7,921	7,832
m	75	72	5,625	5,184	5,400
n	81	84	6,561	7,056	6,804
o	82	73	6,724	5,329	5,986
p	81	80	6,561	6,400	6,480
q	88	89	7,744	7,921	7,832
r	98	89	9,604	7,921	8,722
s	96	94	9,216	8,836	9,024
t	69	75	4,761	5,625	5,175
u	88	77	7,744	5,929	6,776
	<u>1,723</u>	<u>1,712</u>	<u>142,501</u>	<u>140,510</u>	<u>141,235</u>

TABLE XXIX

TOTAL ATTITUDE SCORES REGISTERED ON ALL THREE CONCEPTS AND
OTHER INFORMATION NECESSARY FOR THE CALCULATION OF THE
CORRELATION OF TWO SEPARATE SETS OF SCORES
ON THE SAME ATTITUDE TEST

Subject	Test 1 X	Test 2 Y	X ²	Y ²	XY
a	245	239	60,025	57,121	58,555
b	250	253	62,500	64,009	63,250
c	224	233	50,176	54,289	52,192
d	235	228	55,225	51,984	53,580
e	267	270	71,289	72,900	72,090
f	255	244	65,025	59,536	62,220
g	210	206	44,100	42,436	43,260
h	219	215	47,961	46,225	47,085
i	237	248	56,169	61,504	58,776
j	242	252	58,564	63,504	60,984
k	235	237	55,225	56,169	55,695
l	236	245	55,696	60,025	57,820
m	226	213	51,076	45,369	48,138
n	244	245	59,536	60,025	59,780
o	229	212	52,441	44,944	48,548
p	219	207	47,961	42,849	45,333
q	232	234	53,824	54,756	54,288
r	265	263	70,225	69,169	69,695
s	265	260	70,225	67,600	68,900
t	217	223	47,089	49,729	48,391
u	<u>262</u>	<u>226</u>	<u>68,644</u>	<u>51,076</u>	<u>59,212</u>
	5,014	4,953	1,202,976	1,175,219	1,187,792

TABLE XXX

RELIABILITY SCORES FOR EACH OF THREE ACCOUNTING CONCEPTS
AND FOR THE COMBINED SCORE OF ALL THREE CONCEPTS

Concept	Reliability
Accounting Homework	.81
The Study of Accounting	.75
Accounting as a Vocation	.75
Combined Scores	.81

APPENDIX D

LETTERS TO JURY MEMBERS

AN EXPLANATION OF THE LETTERS

The two letters shown in Appendix D are an example of the letters sent to each of the five accounting instructors who comprised the validating jury for the material on homework problems.

April 12, 1971

Jack F. Amyx
Department of Business
Cameron College
Lawton, Oklahoma 73501

Mr. Carlos Johnson
Department of Business Administration
East Central College
Ada, Oklahoma

Dear Carlos:

In the preliminary stages of my dissertation, I need the opinion of someone who, I believe, is knowledgeable in the field of accounting. I would like for you and four other individuals from colleges around the state to assist me in this project.

Each of you would individually evaluate a group of accounting problems to determine if, in your opinion, they met the criteria of being more segmented and shorter than another group of problems. It would not be necessary for you to consult with any of the other individuals concerning your opinion of the problems. Therefore, your portion of the evaluation could be completed during a time period at your convenience.

I shall be grateful for your permission to work with me in this assignment.

As soon as I hear from you, I shall send you the details of the accounting problems and the criteria they should meet.

Sincerely,

Jack Amyx

April 29, 1971

Jack F. Amyx
Department of Business
Cameron College
Lawton, Oklahoma 73501

Mr. Carlos Johnson
Department of Business Administration
East Central College
Ada, Oklahoma

Dear Carlos:

I greatly appreciate your willingness to be a member of the jury to examine and validate material for an experimental study in a Principles of Accounting I class. The general purpose of this experimental study is to determine if there is any significant difference in achievement between accounting students who have studied accounting by utilizing experimental "short" homework problems during the semester as compared to students who have studied accounting by utilizing selected standard homework problems which are contained in their accounting textbook. Therefore, the validation of these short homework problems is an important part of the study.

The material you have been asked to examine consists of material covering the first 14 chapters of the fifth edition of the text, Fundamental Accounting Principles, by Pyle and White.

For the purpose of your examination of the material, the following definition of a "short" accounting problem should be used: Short accounting problems are defined as those that may be dichotomized from standard accounting problems in that they are more limited in the number of concepts involved and the amount of continuity required for their completion. Specifically, they might be considered as segmented problems which could be synthesized into a longer standard problem. As an example, a standard accounting problem might consist of finding account balances, completing a work sheet, preparing an income statement, and a balance sheet, journalizing adjusting and closing entries, and taking a post-closing trial balance. However, the same concepts could be incorporated by utilizing several segmented or short problems, each requiring the completion of only one of the steps, or even only a portion of a step.

Carlos Johnson
Page 2
April 29, 1971

The material for your analysis and validation is separated into 14 chapter divisions to correspond with the textbook. Each chapter division of the material is further broken down into three parts.

The first part of the material of each chapter consists of the outline of the chapter covering those areas that are compatible with the composition of a problem situation. Further contained in this part is a table showing which of the chapter outline concepts are contained in the experimental short problems and the standard problems. The problems that are listed first are the experimental problems, and the problems listed below the double-ruled lines in the tables are the standard problems.

The second part of the material of each chapter consists of the experimental short accounting problems and the instructions to the students for their completion.

The third part of the material of each chapter consists of the standard accounting problems as they are listed in the textbook, with the instructions to the students for their completion. Also accompanying the material is a copy of the textbook being used.

After the materials have been analyzed, would you please indicate: (a) Do the chapter outlines adequately list the concepts in the chapters of the textbook? (b) Do the experimental problems, in your opinion, meet the criteria to be designated as a short accounting problem? Any specific reason you could give as to why a problem does not meet the "short" problem criteria would be helpful. (c) Do the two sets of problems cover the concepts of the chapters adequately?

I would hope that the problems can be analyzed prior to June 1 in order that all changes and corrections can be incorporated and a short pilot study conducted in July. There is no specific need for you to return the materials after your analysis, unless this would facilitate the reporting of your analysis.

The adequacy of the chapter outlines or of the problem coverage of those concepts which are outlined would also be appreciated and considered.

Sincerely,

Jack Amyx

APPENDIX E

EXPLANATION OF STATISTICS

AN EXPLANATION OF THE STATISTICS

The multiple-classification analysis of variance was the primary statistic used in the study. This statistic allows experiments to be designed to permit the simultaneous investigation of two experimental variables. The two variables in this study were the length of homework problems assigned and the ACT level of the students involved.

The multiple-classification analysis of variance determines the amount of variation which is attributed to each independent variable. The scores are first viewed in a manner to determine the difference on one independent variable and are then viewed to determine the difference on the second independent variable. In this study, the scores were first viewed to determine if there were any significant differences between all the students who were assigned short problems as compared to all the students who were assigned long problems. Secondly, all the students in the study, both experimental and control, were compared on the basis of ACT score level. All the low ACT score students (both experimental plus control), all the average ACT score students (both experimental plus control), and all the high ACT score students (both experimental plus control) were simultaneously contrasted to each other.

In addition to testing for differences in each independent variable, this statistic tests for interaction. In an interaction effect, the potential relationship under analysis is between the dependent variable and the combined interacting of the two independent variables.

For example, assume that there are two methods of teaching math and two teachers, each of whom uses the two methods on separate groups of students. After the pupils' achievement is measured, if one method of instruction is uniformly superior or inferior, regardless of which teacher uses it, then there is no interaction. Likewise, there is no interaction if both methods of instruction are equally effective for both teachers. However, if the first teacher obtains better results with method of instruction "A," while the second teacher obtains better results with the method of instruction "B," then teachers and methods are said to interact.

In this study, for example, there would be no interaction if each of three ACT level groups in the experimental classes achieved significantly higher (or lower) than did their corresponding ACT level groups in the control classes. Likewise, there would be no interaction if each of the three ACT level groups in both classes achieved the same as their corresponding ACT level groups. Thus, to indicate there is no interaction would mean that all three of the ACT level groups in the experimental classes achieved at the same ratio when compared to the three corresponding ACT level groups in the control classes.

If a significant difference is found among three or more groups by using the analysis of variance, further interpretation must be undertaken to determine exactly which of the groups differ significantly from the others. For example, if a significant difference in achievement were indicated among the three ACT level groups, information from the statistic would not indicate exactly which of the three groups differed. Duncan's new multiple-range test is applied to the data where a significant difference is indicated among three or more groups. This

statistic allows the investigator to determine exactly which groups differ significantly.

APPENDIX F

EXAMPLE OF CHAPTER OUTLINE AND PROBLEM ANALYSIS

AN EXPLANATION OF THE CHAPTER OUTLINE
AND PROBLEM ANALYSIS

Each chapter of the textbook was outlined and included as part of the material sent to the five-member jury. The jury validated the outline saying that it adequately covered the concepts of the textbook. One of the chapter outlines, chapter three, is included in Appendix F as an example. The other chapters were outlined in a similar manner.

All the short and long homework problems used in the study were analyzed on the basis of which concepts were contained in the problems. A problem analysis was completed for the problems of each chapter, and the analysis for chapter three is contained in this appendix. The numbers across the top of Table XXXI, the problem analysis, correspond to the concept of the same number as outlined in the chapter. The type of problem and the problem number is given along the left edge of Table XXXI. The "X" indicates the concepts contained in each of the problems. For example, short problem number four contains concept 3b, depreciation.

Chapter Three Outline

1. The classified income statement.
2. The classified balance sheet.
3. Adjustments.
 - a. Prepaid expenses.
 - b. Depreciation.
 - c. Accrued Expenses.
4. The adjusted trial balance.
5. Preparation of statements from the adjusted trial balance.

TABLE XXXI

AN IDENTIFICATION OF THE CHAPTER CONCEPTS CONTAINED
IN EACH OF THE SHORT AND LONG HOMEWORK
PROBLEMS FOR CHAPTER THREE

Type of Problem	Prob. No.	Chapter Concepts						
		1	2	3a	3b	3c	4	5
Short Homework Problems	1			x				
	2					x		
	3			x				
	4				x			
	5			x	x	x	x	
	6	x						x
	7		x					x
Long Homework Problems	3-2	x	x	x	x	x	x	x
	3-5	x	x	x	x	x	x	x

APPENDIX G

EXAMPLE OF SHORT HOMEWORK PROBLEMS

AN EXPLANATION OF SHORT HOMEWORK PROBLEMS

The problems appearing in Appendix G are an example of the short homework problems developed by the investigator. The problems were validated as meeting the criteria of short homework problems by a five-member jury of accounting instructors. The seven short homework problems for chapter three are analyzed in relation to the chapter outline. Both the chapter outline for chapter three and the analysis of these seven problems are contained in Appendix F.

Chapter 3

Problem 1.

The balance in the prepaid insurance account before adjustment at the end of the fiscal period is \$1,480.

Instructions: (a) Journalize the adjusting entry in general journal form if insurance expired during the year is \$1,020.

(b) Journalize the adjusting entry in general journal form if the amount of unexpired insurance at the end of the fiscal period is \$580.

Problem 2.

A company pays weekly salaries of \$500 for each five-day week ending Friday.

Instructions: (a) Journalize in general journal form the adjusting entry if the fiscal period ends on Monday.

(b) Journalize in general journal form the adjusting entry if the fiscal period ends on Thursday.

Problem 3.

A company had \$50 of supplies on hand at the beginning of the fiscal period, purchased \$300 of supplies during the fiscal period, and had \$75 of supplies on hand at the end of the fiscal period.

Instructions: Journalize in general journal form the necessary adjusting entry in view of the above information.

Problem 4.

A piece of delivery equipment which cost \$5,000, depreciates \$30 each fiscal period.

Instructions: (a) Journalize in general journal form the depreciation on the delivery equipment for the first fiscal period.

(b) Determine the total accumulated depreciation on the equipment after one fiscal period.

(c) Journalize in general journal form the depreciation on the delivery equipment for the second fiscal period.

(d) Determine the total accumulated depreciation on the equipment after the second fiscal period.

Problem 5.

Below in part (1) is the trial balance of the Turner Laundry, and in part (2) are the adjusting entries as they were journalized in the general journal at the end of the fiscal period.

Turner Laundry
Trial Balance
December 31, 1971

Cash	1,160	
Laundry Supplies	1,930	
Prepaid Rent	516	
Laundry Equipment	20,600	
Accumulated Depreciation		5,400
Accounts Payable		325
Mary Turner, Capital		11,126
Mary Turner, Drawing	4,800	
Laundry Revenue		21,720
Wages Expense	6,920	
Rent Expense	1,200	
Utilities Expense	950	
Miscellaneous	495	
	<u>38,571</u>	<u>38,571</u>

(2) The following adjustments were journalized:

1. Laundry Supplies used	1,730	
Laundry Supplies		1,730
To record the amount of laundry supplies used.		
2. Rent Expense	387	
Prepaid Rent		387
To record amount of rent expired.		
3. Depreciation Expense	1,600	
Accumulated Depreciation		1,600
To record depreciation expense.		
4. Wages Expense	100	
Wages Payable		100
To record the amount of accrued wages.		

Instructions: (a) Record the balance of each account shown in the trial balance in part (1) in the proper "T" account in the ledger. (b) Post the adjusting entries in part (2) to the "T" accounts and for each "T" account involved indicate its new balance. (c) Transfer the final balances from the "T" accounts to an adjusted trial balance and determine the balance.

Problem 6.

Listed below is the information that is found in the adjusted trial balance of the Sunny Bowling Lanes:

Sunny Bowling Lanes
Adjusted Trial Balance
December 31, 1971

Cash	6,600	
Prepaid Rent	9,600	
Supplies	4,000	
Equipment	38,000	
Accumulated Depreciation, Equipment		3,400
Accounts Payable		10,000
Howard Smith, Capital		50,000
Howard Smith, Drawing	10,000	
Bowling Fees Earned		80,000
Salaries Expense	15,000	
Advertising Expense	18,700	
Utilities Expense	12,000	
Repairs Expense	10,000	
Supplies Expense	14,000	
Miscellaneous Expense	5,500	
	<u>143,400</u>	<u>143,400</u>

Instructions: From the above information in an adjusted trial balance, prepare an Income Statement for Sunny Bowling Lanes.

Problem 7.

Listed below is the information contained in an adjusted trial balance of Foremost Bowling for the fiscal period ended December 31, 1971.

Foremost Bowling
Adjusted Trial Balance
December 31, 1971

Cash	2,470	
Prepaid Insurance	845	
Supplies	260	
Equipment	82,600	
Accumulated Depreciation, Equipment		13,200
Building	45,700	
Accumulated Depreciation, Building		2,800
Land	10,000	
Accounts Payable		1,220
Mortgage Payable		40,000
Salaries Payable		100
George Rey, Capital		75,846
George Rey, Drawing	2,400	
Bowling Fees Earned		17,947
Salaries Expense	3,800	
Advertising Expense	1,065	
Supplies Expense	860	
Repairs Expense	654	
Miscellaneous Expense	459	
	<u>151,113</u>	<u>151,113</u>

Instructions: From the above information, prepare a classified balance sheet. An income statement previously prepared from the above information determined that the correct figure for net income was \$11,109.

APPENDIX H

EXAMPLE OF LONG HOMEWORK PROBLEMS

AN EXPLANATION OF LONG HOMEWORK PROBLEMS

The problems in Appendix H are an example of the long homework problems appearing in the textbook by Pyle and White (1967). The problems were validated as meeting the criteria of long homework problems by a five-member jury of accounting instructors. The problems from chapter three are shown as an example of the problems designated as long problems. These problems from chapter three are analyzed in terms of the chapter outline, and the analysis is shown in Appendix F.

Chapter 3

Problem 3-2.

Apache Lanes operates with annual accounting periods that end each December 31. At the end of the current year, after all transactions were recorded, a trial balance of the bowling alley's ledger appeared as follows:

Apache Lanes
Trial Balance, December 31, 19__

Cash	\$ 3,235	
Bowling supplies	1,175	
Prepaid insurance	865	
Bowling equipment	22,550	
Accumulated depreciation, bowling equipment		\$ 8,140
Building	32,600	
Accumulated depreciation, building		5,560
Land	12,500	
Brunswick Company		585
Walter Robbins, capital		47,115
Walter Robbins, withdrawals	6,000	
Bowling revenue		31,980
Wages expense	12,440	
Advertising expense	675	
Heat, lights, and power	1,340	
	<u>\$93,380</u>	<u>\$93,380</u>
Totals	<u>\$93,380</u>	<u>\$93,380</u>

Required:

1. Open the accounts of the trial balance plus these additional accounts: Bowling Supplies Used; Expired Insurance; Depreciation Expense, Bowling Equipment; Depreciation Expense, Building; and Wages Payable. Enter the trial balance amounts in the accounts.
2. Use the following information to prepare and post adjusting entries:
 - a. Bowling supplies used, \$825.
 - b. Expired insurance, \$410.
 - c. Estimated depreciation of bowling equipment, \$2,525, and of the building, \$1,250.
 - d. There were \$115 of accrued but unpaid wages on December 31.
3. Prepare an adjusted trial balance, income statement, and classified balance sheet.

Problem 3-5.

The following trial balance was taken from the ledger of Fifth Avenue Cleaners at the end of its annual accounting period:

Fifth Avenue Cleaners
Trial Balance, December 31, 19__

Cash	\$ 1,175	
Valley Hotel	135	
Cleaning supplies	885	
Prepaid insurance	465	
Prepaid rent	600	
Cleaning equipment	14,860	
Accumulated depreciation, cleaning equipment		\$ 4,740
Delivery equipment	6,250	
Accumulated depreciation, delivery equipment		2,615
Gary Bush, capital		13,120
Gary Bush, withdrawals	8,400	
Cleaning revenue		34,485
Cleaning plant wages	11,180	
Rent expense	1,600	
Heat, lights, and power	945	
Truck drivers' wages	7,850	
Gas, oil, and repairs	615	
Totals	\$54,960	\$54,960

Required:

1. Open the accounts of the trial balance plus these additional accounts: Wages payable; Property Taxes Payable; Rent Payable; Cleaning Supplies Used; Insurance Expense, Cleaning Equipment; Depreciation Expense, Cleaning Equipment; Property Taxes, Cleaning Equipment; Insurance Expense, Delivery Equipment; Depreciation Expense, Delivery Equipment; and Property Taxes, Delivery Equipment. Enter the trial balance amounts in the accounts.
2. Use the following information to prepare and post adjusting entries:
 - a. The year-end inventory of unused cleaning supplies totaled \$155.
 - b. An examination of insurance policies showed expired insurance cleaning equipment, \$135, and delivery equipment, \$185.
 - c. At the beginning of the year three months' rent was prepaid on building occupied by the cleaning plant. Rent for the months of April through November was paid on the first day of each of these months and was debited to the Rent Expense account. Rent for December was unpaid on the trial balance date.
 - d. Estimated depreciation on cleaning equipment, \$1,550, and on the delivery equipment, \$875.
 - e. There were accrued cleaning plant wages of \$105 and accrued truck drivers' wages of \$70 on the trial balance date.

- f. On the trial balance date there were \$145 accrued and un-recorded personal property taxes on the cleaning equipment and \$65 of such taxes on the delivery equipment.
3. After posting the adjusting entries, prepare an adjusted trial balance, a classified income statement, and a classified balance sheet.

VITA

Jack Fred Amyx

Candidate for the Degree of
Doctor of Education

Thesis: AN EXPERIMENT TO DETERMINE THE EFFECTS OF THE LENGTH OF
HOMEWORK PROBLEMS ON THE ACHIEVEMENT AND ATTITUDES OF COLLEGE
ACCOUNTING STUDENTS

Major Field: Business Education

Biographical:

Personal Data: Born February 8, 1937, at Frederick, Oklahoma, the
son of Fred and Vivian Amyx.

Education: Attended elementary and secondary school at Loveland,
Oklahoma, and graduated from Loveland High School in May,
1955. Received the Bachelor of Science degree and the Master
of Science degree from the Oklahoma State University, with
a major in Business Education, in May, 1959, and May, 1963,
respectively. Attended the University of Oklahoma in 1967;
enrolled in the doctoral program at the Oklahoma State
University in September, 1968; and completed requirements for
the Doctor of Education degree in July, 1972.

Professional Experience: Taught in the school system of Lawton,
Oklahoma, 1963-65; taught as an instructor at Cameron College,
1965-68; worked quarter-time as a graduate assistant in the
Department of Administrative Services and Business Education,
Oklahoma State University, 1968-69; and taught in the
Department of Business, Cameron College, as an instructor and
assistant professor, 1969-72.

Professional Organizations: Member of Delta Pi Epsilon, National
Business Education Association, Oklahoma Business Education
Association, Oklahoma Education Association, and Higher
Education Alumni Council.