EFFECTIVENESS OF A PERFORMANCE CONTRACTING PROGRAM IN READING AND MATHEMATICS RELATIVE TO EDUCATIONALLY DEPRIVED SECONDARY SCHOOL STUDENTS

DISSERTATION

Presented to the Graduate Council of the North Texas State University in Partial Fulfillment of the Requirements

For the Degree of

DOCTOR OF EDUCATION

By

Peggy Lloyd Kelley, B.S., M.A.
Denton, Texas
August, 1973

**Purposes of the Study.** This study has two purposes. The first is to compare the academic skills achievement in reading and mathematics of students participating in a performance contracting program with the academic skills achievement of students not participating in the performance-based program. The second is to determine whether those students participating in the performance contracting program show a significantly different level of achievement (higher or lower) than the control group approximately four months after the conclusion of the program.

**Hypotheses.** Four major hypotheses were tested to reveal differences in academic achievement in reading and mathematics during the experimental and follow-up periods for the following groups: (A) junior high school girls, (B) junior high school boys, (C) senior high school girls, (D) senior high school boys.

**Procedures.** The population for the study consisted of 239 students in the experimental group and 219 students in
the control group. The students were enrolled in grades seven through twelve. The experimental group was instructed in mathematics and reading, using programmed materials, and motivated with various methods of positive reinforcement. The control group was instructed with State of Louisiana approved reading and mathematics textbooks, and was not exposed to any special methods of positive reinforcement.

Alternate forms of the California Achievement Tests were used for pretest, posttest, and follow-up tests of reading and mathematics achievement.

The analysis-of-covariance technique was used to test the hypotheses.

Findings. The statistical analysis of the data reveals a significant difference at the .05 level in mathematics achievement during the experimental period between the junior high school girls of the control group and the junior high school girls of the experimental group. The F-ratio of 4.9851 for the junior high school group indicates that the mathematics adjusted mean for the junior high school girls experimental group is significantly higher than the mathematics adjusted mean for the junior high school girls control group. No significant differences in achievement are found for the other groups in mathematics during the experimental period.

The only significant finding in reading achievement is that between the junior high school boys. The male junior
high experimental group has a reading adjusted mean signifi-
cantly higher than the reading adjusted mean for the junior
high boys' control group.

No significant differences are found during the follow-
up period between the groups in mathematics achievement.

The only significant difference at the .05 level in
reading achievement during the follow-up period is found
between the junior high school girls. The reading adjusted
mean for the junior high girls experimental group is signi-
ficantly higher than that of the junior high girls control
group.

**Conclusions.** Upon the basis of the findings of this
study, the following conclusions are drawn:

1. For the groups in this study, the performance con-
tracting program, in general, does not prove to be superior
to the traditional method of instruction in terms of mathe-
matics achievement.

2. For the groups in this study, the performance con-
tracting program, in general, does not prove to be superior
to the traditional method of instruction in terms of read-
ing achievement.

3. For the groups in this study, the performance con-
tracting program, in general, does not prove to be superior
to the traditional method of instruction in effecting reten-
tion of previously attained levels of achievement in reading
and mathematics.
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TABLE OF CONTENTS

LIST OF TABLES. .................................................. v

Chapter

I. INTRODUCTION .............................................. 1
   Statement of the Problem
   Purposes of the Study
   Hypotheses
   Definition of Terms
   Limitations of the Study
   Basic Assumptions
   Background and Significance of the Study
   Chapter Summary
   Organization of Remainder of the Study
   Chapter Bibliography

II. SURVEY OF RELATED LITERATURE ....................... 22
   Introduction
   Reinforcement Theory
   The Concept of Accountability
   The Original Performance Contract
   Reactions to the Texarkana Project
   Recent Performance Contracts
   Reactions to the OBO Experiments
   The Caddo Parish Project
   Chapter Summary
   Chapter Bibliography

III. METHODS AND PROCEDURES ......................... 63
   Selection of Subjects
   The Experimental Instructional Program
   Control Group Instructional Program
   Procedures for Collection of the Data
   Procedures for Analysis of the Data
   Description of the Instrument
   Chapter Summary
   Chapter Bibliography

IV. PRESENTATION AND ANALYSIS OF THE DATA......... 84
LIST OF TABLES

Table                                      Page
I.  Number of Subjects in the Subcategories
    of the Experimental Program. . . . . . . . . 66
II. Number of Subjects in the Subcategories
    of the Follow-Up Study . . . . . . . . . . . . 67
III. Mean Mathematics Scores and Standard
     Deviations for Junior and Senior
     High School Students for the
     Experimental Period. . . . . . . . . . . . . . 86
IV.  Analysis of Covariance Data for
     Mathematics Achievement for the
     Experimental Period. . . . . . . . . . . . . . 88
V.   Mean Reading Scores and Standard
     Deviations for Junior and Senior
     High School Students for the
     Experimental Period. . . . . . . . . . . . . . 90
VI.  Analysis of Covariance Data for Reading
     Achievement for the Experimental Period. . . 91
VII. Mean Mathematics Scores and Standard
     Deviations for Junior and Senior
     High School Students for the
     Follow-Up Period . . . . . . . . . . . . . . . 93
VIII. Analysis of Covariance Data for Mathematics
      Achievement for Follow-Up Period . . . . . . 95
IX.  Mean Reading Scores and Standard
     Deviations for Junior and Senior
     High School Students for the
     Follow-Up Period . . . . . . . . . . . . . . . 97
X.   Analysis of Covariance Data for Reading
     Achievement for the Follow-up Period . . . . . 99
CHAPTER I

INTRODUCTION

Since the initial Texarkana Dropout Prevention Program in 1969 (8), which utilized an agency outside the school system to "guarantee" academic results and increase retention rates among potential dropouts, the pros and cons of performance contracting have received attention extending from local to national media, education journals, universities, and several national conferences.

It is argued by enthusiasts (8, 10, 12, 14) that, at a time when school systems are sinking under their own organizational weight, performance-based programs give those in charge a tool with which to manage reform, thus providing a possible answer to some of the most critical problems faced by the education system today.

One such problem is integration. A major impediment to the success of desegregation programs educationally, politically, and sociologically is the fact that, as a result of running a dual system, minority-group children are often deficient in basic skills in comparison with peer groups. Under integration there is fear that minority children will lower already threatened standards in public education, and parents will resegregate children into private schools.
Minority children who are deficient may give up on new schools and drop out at an increasing rate. Experience has shown that this is a primary condition under which social disruption and possible violence might occur.

Proponents of performance contracting argue that it offers deficient students the best possible chance of being brought up academically on an accelerated level to equal their peer groups (2, 8, 10, 11, 14).

Adherents of performance contracting also proclaim that their method offers the best hope for accountability. They maintain that the refusal of schools to be held accountable for productivity in terms of student performance and the effectiveness of dollar expenditure has led to a crisis of confidence in the public system of education (1, 3, 8, 12).

Adherents of performance contracting also proclaim that their method offers the best hope for accountability. They maintain that the refusal of schools to be held accountable for productivity in terms of student performance and the effectiveness of dollar expenditure has led to a crisis of confidence in the public system of education (1, 3, 8, 11). There is little doubt that taxpayers are beginning to refuse to support their schools, bond issue defeats are occurring at an increasing rate, and some systems have indicated that they may have to shut down before the full school year is ended.
Performance contractors argue that schools still do not teach enough students to read. It is estimated that fifteen million students do not read well enough to understand what is being taught in the other subjects; thus, further learning is blocked (8, 11).

School officials, particularly since the Coleman report (7), have been under great pressure to raise academic achievement especially among disadvantaged socioeconomic groups whose members often leave schools with severe educational handicaps. At the same time, public attention has been focused on cognitive achievement as measured by standardized test scores (1). Since remedial education methods have shown little impact on these scores, performance contracting has been looked to as the possible answer (11). Contractors claim to possess proven instructional systems, that if properly used, are capable of producing dramatic increases in achievement scores. Indeed, the contractors have been so sure of results that they have been willing to "guarantee" substantial improvements in standardized test scores. Public school administrators find contractors' offer to "do something" about low-achieving students most appealing (9, 10).

Indirectly, it is argued, performance contracting facilitates the introduction of materials and instructional methods better suited for those students who now score poorly on achievement tests. Perhaps, the reasoning goes, low
achievement on standardized tests is the fault of using conventional textbooks and teaching methods designed for middle-class children, but bordering on irrelevant for lower socio-economic groups. If so, it follows that students using such new equipment, materials, and incentives should achieve higher gains on standardized tests.

Such intertwined hopes as those mentioned above have supplied much of the impetus for performance contracting. Perhaps the most important concept is that it might serve as an instrument of change, stimulating innovations in education, which has lagged behind most other fields in the rate of technological change.

While advocates of performance contracting hail the concept of new school-government-business cooperation, critics denounce the beginning of an "educational-industrial complex" (4). This has been particularly true since the Office of Economic Opportunity (OEO) evaluators reported no significant gains in those students participating in performance contracting programs (14). Such critics as Mecklenburger (4) believe that performance contracting has a Pandora's Box quality; American Federation of Teachers spokesmen cry out, "Hucksters in the schools!" (4). Many educators concur.

Clearly, the final verdict on performance contracting is far from in.
Statement of the Problem

The problem with which this study was concerned was that of determining whether changes in academic skills achievement of secondary school students in a performance contracting program differed significantly from students in a conventional program in the same school.

Purposes of the Study

The study was conducted for the purposes of (1) comparing the academic skills achievement in reading and mathematics of students who participated in a performance contracting program with the academic skills achievement of students who did not participate in the performance-based program, and (2) determining whether those students who participated in the performance contracting program showed a significantly different level of achievement (higher or lower) than the control group approximately four months after the conclusion of the program.

Hypotheses

In order to fulfill the purposes of this study, the following hypotheses were formulated:

I. At the end of the experiment there will be no significant difference in mathematics achievement between
   a. the junior high school girls of the experimental group and the junior high school girls of the control group;
b. the junior high school boys of the experimental group and the junior high school boys of the control group;
c. the senior high school girls of the experimental group and the senior high school girls of the control group;
d. the senior high school boys of the experimental group and the senior high school boys of the control group.

II. At the end of the experiment there will be no significant difference in reading achievement between

a. the junior high school girls of the experimental group and the junior high school girls of the control group.
b. the junior high school boys of the experimental group and the junior high school boys of the control group;
c. the senior high school girls of the experimental group and the senior high school girls of the control group;
d. the senior high school boys of the experimental group and the senior high school boys of the control group.

III. Approximately four months following the experimental period there will be no significant difference in the amount of change in achievement level in mathematics between
a. the junior high school girls of the experimental group and the junior high school girls of the control group;
b. the junior high school boys of the experimental group and the junior high school boys of the control group;
c. the senior high school girls of the experimental group and the senior high school girls of the control group;
d. the senior high school boys of the experimental group and the senior high school boys of the control group.

IV. Approximately four months following the experimental period there will be no significant difference in the amount of change in achievement level in reading between

a. the junior high school girls of the experimental group and the junior high school girls of the control group;
b. the junior high school boys of the experimental group and the junior high school boys of the control group;
c. the senior high school girls of the experimental group and the senior high school girls of the control group;
d. the senior high school boys of the experimental group and the senior high school boys of the control group.

Definition of Terms

The following definitions were developed to aid in understanding the terminology used in this study:

**Academic Skills Achievement**--Used in this study to denote a student's ability to obtain a certain score on a standardized test designed to evaluate his capacity to perform academic tasks at the next higher educational level. Specifically, the *California Achievement Test* will be used to measure academic skills achievement in the areas of reading and mathematics for each student.

**Accountability**--Methods utilized by schools insuring productivity in terms of student performance and the effectiveness of dollar expenditure.

**Contractor**--An outside agency (industry, corporation, or private educational firms) which enters into a contract with a school system to perform certain functions.

**Extrinsic Reinforcers**--Any reward given to academic underachievers who find little reinforcement in the normal school setting. These include tickets to school events, transistor radios, record albums, or other rewards of this type to motivate students.
Hardware--A term used in instructional technology which refers to machines and gadgets, such as projectors, television sets, teaching machines. The term is used in contrast to software which refers to materials such as books, pamphlets, newspapers, periodicals, or generally expendable items used in the classroom.

Independent Auditor--An outside agency selected by the school system to administer standardized achievement tests and to evaluate results of achievement for the experimental group. The performance contracting firm is paid on the basis of this independent audit.

Individualized Instruction--A learning situation in which students study alone or in small groups. Individualized audio equipment as well as supplementary materials in the form of varied levels of reading selections, educational games, and filmstrips are made available for students who may progress at their own rate of learning ability. No lectures are given by the teacher, but the teacher and/or teacher aide are available for assistance during the class period and for tutoring sessions scheduled at times other than the regular class period.

Interim Progress Assessment--(IPA's) Tests specifically designated by the contractor to measure academic achievement. These tests are criterion-referenced. They are administered at regular six week intervals in contrast to teacher-made tests administered to the control group.
Peer Tutors--Students from the class who progress quickly who are selected by the teacher to help others with certain aspects of the learning situation.

Performance Contracting--A managerial tool with which a school system can contract for whatever degree of performance it wants. This approach constitutes an agreement between a private agency and a school district in which the contractor guarantees to improve pupil performance in certain basic skills to a prespecified level, or no fee will be charged.

Phase I--Students who are academically deficient and fall into a category at least one or more years behind their peer group in academic achievement.

Premack Principle--A reinforcement probability principle developed by Professor David Premack of the University of California. The principle used in contingency management for positive reinforcement which stated simply is, "Any response A will reinforce any other response B, if, and only if, the independent rate of A is greater than B."

Progress Checks--Criterion-referenced tests administered at frequent intervals to the experimental group. Such progress checks used with individualized, programmed materials are important since some students will tend to try to go through the materials too fast without actually understanding the content. Such behavior can be recognized by observing low scores on progress checks.
Reinforcement Center--(RE Center) An area specifically used to offer activities which act as reenforcers for positive behavior and achievement gains.

Student Contract--A contract is a proposal for some work to be performed by the student which states very explicitly what outcomes may be expected as a result of completion of the work, some alternative means by which the outcomes are to be achieved, and the instrument by means of which the achievement of the outcomes is to be evaluated.

Title I--Section of Public Law 89-10 which sets forth conditions under which Federal assistance may be granted to meet the needs of educationally-deprived children. Participants in a Title I Program must qualify in at least one of the following categories:

(A) Educationally deprived--defined as having an I.Q. of 89 or below;
(B) one year or more behind national norms;
(C) lowest quartile on achievement tests;
(D) poor attendance;
(E) reside in an area where 85 percent of the citizens are economically deprived.

Limitations of the Study

This study was limited to those students enrolled in Caddo Parish, Louisiana Schools, who are categorized as Title I, Phase I students.
This study was limited to those students who participated in both the reading and mathematics areas of the experimental program.

The follow-up portion of the study was limited to students who remained in school for fall semester of 1972. This excluded from the follow-up those students who either graduated or dropped out of school.

Basic Assumptions

For the purpose of this study, it was assumed that

1. the teachers participating in the experimental program were equally proficient and dedicated, since no special qualifications were stipulated by the contractor for selection of teachers;

2. academic achievement could be measured adequately by means of the standardized test used in this study.

Background and Significance of the Study

The performance contracting movement is based upon discontent with the educational system coupled with the interest generated by recent research in innovative experiments in accountability. The public is concerned over the failure of the schools to provide training—particularly in reading—that will convert students into effective and productive citizens. The statistics are numerous and depressing. To illustrate, one-fourth of all students in the nation have major reading deficiencies and more than three million adults
are illiterate (11). This is a national problem, but it is especially severe for culturally and economically disadvantaged student populations.

Poor student achievement is nothing new; what is new is public awareness of its consequences and the realization that neither increasing the gross national product nor spending more money on education is an automatic cure. At the same time, the public is demanding from the schools far more than first-rate teaching of the three R's.

Most important for performance contracting, the schools now get the blame when their students fail (1). In earlier days, learning was up to the student. If he failed to digest what the school offered, it was assumed that the fault lay in his laziness, lack of intelligence, or unwillingness to learn. Today the situation is reversed. Many groups are demanding that schools somehow infuse all students with the skills necessary for the world of the 1970's.

A proclamation in 1969 by James E. Allen, then U.S. Commissioner of Education, of a "national right to read" may be considered as a landmark in the search for more efficient and innovative methods of teaching these skills (11). Every student, Allen said, should leave school with the skill and desire to read to the full limits of his capacity, and public policy and action at both Federal and local levels should be directed to this goal. School systems have responded by searching for new methods to show their commitment to
increasing student attainments, particularly among minority and disadvantaged students. This new school climate has led to a search for educational innovations, and performance contracting was seized upon as a promising candidate.

Another impetus toward performance contracting has been exasperation with the slow pace of technological change in American public school education. Rapid evolution of institutions and procedures has become a way of life in America, but education is a notable exception. The classroom of today may or may not be architecturally different from the classroom of thirty years ago; the usual classroom organization, materials, and techniques, however, are remarkably similar.

The stage was set for performance contracting when, in 1961, according to Elam (8), Leon Lessinger, then Associate Commissioner of Education in the United States Office of Education, pushed hard for the principle of accountability. Lessinger wrote: "The fact that many results are not subject to audit should not deter us from dealing with those aspects that lend themselves to precise definition and assessment" (8).

Accountability includes assessing and measuring pupil growth as well as accepting responsibility for pupil achievement. While these are not new concepts in education, the idea of guaranteed pupil performance is unique.
Where did this idea of performance contracting come from? A partial answer to this question may be found in a study conducted by Sava (17) wherein he states that "Charles Blaschke is presently the father of performance contracting." Blaschke began earning the title as a graduate student at Harvard in 1964 when he wrote a paper on the concept of performance contracting. Later in 1968, he convinced the Texarkana School District (which included Texarkana, Arkansas and Liberty-Eylau, Texas) to try his idea, and subsequently engineered the first performance contract in the country, the "Texarkana Dropout Prevention Program" (5).

This pioneer project in performance contracting has been described by Carpenter (6) as the first attempt to (1) hold a private contractor strictly accountable for academic achievement; (2) use a management support contractor; (3) select performance contractors through competitive bidding; (4) use an outside evaluator of contract performance; and (5) use an outside evaluation auditor.

A test-teaching scandal invalidated the first year's achievement data in the Texarkana Project (6). Although there was a dramatic decrease in the dropout rate during the first and second years of the program, academic gains were insignificant, so the achievement program was returned to the schools which incorporated many of the innovative materials and methods utilized by the contractors (18).
Since the original experiment in Texarkana, many other school districts throughout the nation have entered into private contracts with educational companies for services under the guaranteed performance concept.

To date, the most comprehensive and controversial performance contracting experiments were financed by the Office of Economic Opportunity (OEO) during the 1971-72 school year. OEO funded performance contracts involving eighteen school districts, six educational companies, and 28,000 students in a year long instructional program under the management of private industry at a cost of approximately $6.5 million (14). (See Appendix A.)

The conclusion reached by evaluators in these experiments was that performance contracting was a failure (14). This controversial conclusion has been questioned in a series of articles ranging from a New York Times editorial (13) to Mecklenburger and Goldenbaum (12) in an article appearing in Nation's Schools, April, 1972.

Saretsky (16), in an article entitled "The OEO PC Experiment and the John Henry Effect," states that "while the OEO experiment in performance contracting was in certain aspects rigorous and elaborate, the experimental outcomes do not really provide sufficient basis for reaching such a negative conclusion" (16, p. 579).

OEO's eagerness to "write off" performance contracting is being challenged by many other sources. School officials
and companies involved in performance contracting charge OEO with trying to bury the concept with limited evidence. Edward D. Trice (14), Superintendent of the Texarkana (Arkansas) School District, says OEO's assertion that performance contracting has been valueless to schools is "as far wrong as can be" (14, p. 451). Trice, who participated in the nation's pioneer performance contracting program which began in 1969, says his experience shows that the idea "has a great deal of merit" (14, p. 451). He offered this evidence. "The record of our performance contract anti-dropout program speaks for itself--only eight out of 800 potential dropouts have left school during the past two years. The normal dropout rate for this group is 25 percent--or 200 students" (14, p. 452).

In a study conducted by Rand Corporation, Hall (11) has summarized the effectiveness of performance contracting in five cities aimed at raising reading and mathematic skills. A tentative conclusion reached in this study suggests that performance contracting has produced respectable but not spectacular cognitive growth. When aides, materials, and equipment are substituted for highly-trained personnel, costs can be less than for typical Title I remedial programs. The unique feature of these programs was that business firms were engaged in the instructional process, and their pay was, at least in part, dependent on how much the students learned. There is a wide diversity as to methods, program
management, and evaluation in the performance contracting programs. Evaluation seems to be the weakest link; however, the report indicates that performance contracting has proved very useful for curriculum development (10, pp. 6-9).

Still, many questions remain unanswered. There is no definitive answer to the question, "Is performance contracting a viable and productive force in the educational system?" Because the answer to this question can be obtained only by intensive and painstaking efforts by researchers, this study was undertaken.

Chapter Summary

The purposes of this study were twofold: (1) to compare the academic skills achievement in reading and mathematics of secondary school students who participated in an experimental performance contracting program with students who did not participate in the performance based program, and (2) to determine whether those students who participated in the experimental program showed a significantly different level of achievement than the control group several months after the program ended. Subjects used in the experiment were junior and senior high school students enrolled at Bethune High School in Caddo Parish, Louisiana.

Research tended to indicate that there is still no definitive answer as to whether or not the innovative approach of performance contracting will improve the academic skills
of those students with severe deficiencies in reading and mathematics.

The significance and need for the study rested primarily on the analysis and comparison of the success of these students for future application of such methods for improvement of such basic skills. This was important from an instructional as well as administrative point of view. In addition, the study was enhanced because findings involving both groups might lead to improvement in methods, curriculum development, and areas in which students' strengths and weaknesses could be recognized.

Organization of Remainder of Study

A review of related literature and research is given in Chapter II.

The procedures of the study are presented in Chapter III.

An analysis of the data and the findings relative to the hypotheses are presented in Chapter IV.

Chapter V consists of the summary of the study, findings, and conclusions drawn from the study, and the recommendations.
CHAPTER BIBLIOGRAPHY


CHAPTER II

REVIEW OF RELATED LITERATURE AND RESEARCH

Introduction

Even though many new and innovative techniques have been
developed, the improvement of reading and mathematics achieve-
ment of educationally deficient students continues to be a
challenge. The present methods employed in teaching students
who experience difficulties in these areas are based upon the
premise that intensive and accelerated programs will increase
proficiency. Performance contracting is an example of an
accelerated approach to teaching reading and arithmetic. The
concept of performance contracting involves an agreement
between a private educational company and a school district
in which the company guarantees to improve pupil performance
in certain basic skills to a prespecified level, or no fee
will be charged.

Although there is wide diversity in methods, program
management, and evaluation in the various performance con-
tracting programs, it becomes clear upon examination of the
basic principles involved that all performance contractors
incorporate the theories of Reinforcement and Accountability
into their programs. For that reason, some attention will
be given to these concepts as they relate to performance contracting.

Reinforcement Theory

Reinforcement, a term recently given much attention in the literature, historically has its roots, according to Tapp (57), in the learning theory of Edward Spencer. Tapp states that, "His is the first theory in the modern pattern." Spencer's theory when summarized states that feelings of pleasure strengthen actions that are beneficial to survival, and feelings of pain correlate with actions that are injurious (57, p. 137).

Hilgard and Bower (33) have called the law of reinforcement, or law of effect, the most important in all learning theory. Reinforcement is a rule for shaping behavior by the use of rewards. Because this principle is of central significance in learning theory, there have been attempts to state it in a general yet precise way. Hilgard and Bower offer this definition of the term: "A learnable response followed by a reinforcing event (stimulus, state of affairs) will receive an increment in its strength or probability of occurrence" (33, p. 482).

Thorndike (59) gave impetus to the idea of reinforcement when he published results of his experiments with animals. Thorndike's Law of Effect may be summarized as follows: Rewards or successes further the learning of the rewarded
behavior, whereas punishments or failures reduce the tendency to repeat the behavior leading to punishment, failure or annoyance (59, p. 75). Thorndike's theory was not only an improvement over Spencer's theory, but anticipated the reinforcement principle adopted in many conditioned-response theories.

Credit lies with Skinner (53) for fitting reinforcement theory into an empirical framework. As early as 1953, he defined positive reinforcers as "those events whose presentation strengthens the response and makes the response more likely to occur in later similar situations" (53, p. 157).

Premack (56) of the University of California has offered a useful reappraisal of reinforcement and the law of effect which has increased its generality. Premack's Principle may be stated simply as, "Any response A will reinforce any other response B, if, and only if, the independent rate of A is greater than B" (56, p. 45). Premack suggests that a subject engages in a variety of activities that vary in their intrinsic value for him. Hilgard and Bower (33) have summarized this principle in the following manner:

... if these activities could be ranked in an A, B, C, D fashion in terms of subject preference then any given activity can be used to reinforce those of lesser value but not those of higher value. In the ABCD ranking, B could be used to reinforce C and D, but B will not reinforce A (33, p. 483).

This concept is important to performance contracting since most contractors employ some method of positive reinforcement
to increase the rate of student achievement as well as modification of negative behavior.

Applying the principles of Premack and Skinner, Homme (34) developed a method of reinforcement which he calls Contingency Contracting. Contingency contracting has become an integral part of most performance contracting programs. Homme's theory is deceptively simple: Arrange the conditions so that the student gets to do something he wants to do following something you want him to do. Homme feels that students are more willing to learn "if the framework within which learning takes place has been mutually agreed upon between student and teacher" (34, p. 22).

Under contingency contracting, the teacher makes an agreement with a student, and promises a reward in return for an exhibition of the desired learning behavior by the student. These agreements often take the form of student contracts (4). Such a contract is a proposal for some work to be completed by the student which states explicitly what outcomes may be expected as a result of completion of the work, some alternative means by which the outcomes are to be achieved, and the instrument by which the achievement is to be evaluated (4, p. 16).

Contingency contracting, which is one area of a larger concept called Contingency Management, has become an integral part of performance contracting to control behavior and motivate low-achieving students. Contingency management is
defined as the process of determining student's high-probability behavior, and using this behavior to reinforce a student's low-probability behavior. For example, motivating disinterested students to perform successfully in programmed reading and arithmetic materials may be considered a low-probability behavior, and playing games, reading comic books, and listening to popular recordings, a high-probability behavior; therefore, a high-probability activity can be made contingent upon the successful completion of a low-probability task (40, p. 5).

The Concept of Accountability

Another concept closely associated with performance contracting is accountability. A term classic in management, but relatively new to education, accountability is defined by Kruger (35) as the responsibility to provide effective educational programs and to employ efficiently the resources allocated for that purpose. Rhodes (49) considers accountability a goal-directed management process that permits both the present and the desired operation of the school to be viewed from a common frame of reference, with priority placed on the learner. Accountability provides the means for dealing with the process and product together.

Probably the most well-known definition of accountability is that of Lessinger (38), who calls it "the product of the process of performance contracting." Lessinger has
extended his definition of accountability as a three-part policy. He states:

Accountability requires that the school take three steps, each of them a novelty to most school districts: (1) Frame performance criteria for each program; (2) obtain an independent educational accomplishment audit to measure the actual performance against these criteria; and, (3) provide for the auditor to make a public report of his findings (38, p. 32).

Lessinger concludes that "What accountability means is that members of the public as well as public school officials will be able to compare the costs of producing certain benefits in various ways" (38, p. 32).

Accountability has been endorsed by President Nixon, who, on March 3, 1970, sent a special message on educational reform to Congress, which states in part,

School administrators and school teachers alike are responsible for their performance, and it is in their interest as well as in the interests of their pupils that they be held accountable. We have, as a nation, too long avoided thinking of the productivity of schools. This is a mistake because it undermines the principle of local control of education. Ironic though it is, the avoidance of accountability is the single most serious threat to a continued and even more pluralistic educational system (44, p. 5).

Accountability includes assessing and measuring pupil growth as well as accepting responsibility for pupil achievement; these are not new concepts in education, but the idea of guaranteed pupil performance as a measure of accountability is unique (2). Performance contracting is representative of the approach that tries to foster accountability
by relating "input" to educational "output" in a meaningful way.

The Original Performance Contract

The first performance contract was made possible by the Dropout Prevention Amendment which was sponsored by Senator George Murphy in 1968. Under this amendment, the Bureau of Elementary and Secondary Education developed guidelines providing for the submission of standardized preliminary proposals that would clearly define the areas of educational deficiencies for which aid was being sought, and for equal competition for program money through the award of planning grants to local districts. With the planning grant, a local school district could retain a management support group to help in drafting the formal proposal. The amendment encouraged the concentration of available funds on a workable number of carefully designed programs, and provided funds for hiring an independent educational accomplishment auditor (38, p. 94).

In 1968, Texarkana faced a severe dropout problem which threatened to become worse with the pressure to integrate the schools. Lessinger (38) has described the situation as follows:

In the part of town lying in Arkansas, for example, students at a predominantly white, middle-class junior high school ranked in the seventy-fifth percentile on the Iowa Tests of Basic Skills. At another junior high, however, where the races were
about equally mixed and the average family income was somewhat lower, student achievement averaged in the twentieth percentile, and at a junior high in an all-black neighborhood, the average was no higher than the second percentile (38, p. 92).

Blaschke, who has been referred to by Tack (56) as the "father of performance contracting," wrote the preliminary proposal designed to prevent dropouts and eliminate glaring deficiencies in the basic skills of reading and mathematics. The preliminary proposal was submitted to the U.S. Office of Education, and on March 10, 1968, a grant in the amount of $20,000 was awarded to the Texarkana School District for preparation of a detailed formal proposal. School officials, along with Blaschke and representatives of teachers, students, and the community submitted their completed proposal which was funded in the amount of $250,000 for the first phase of the program in Texarkana (38, p. 94). Since this proposal constitutes the first of its kind, portions have been included in this study. (See Appendix B.)

The request for proposals submitted by the Texarkana School District set forth several general conditions which have been summarized by Lessinger (38) as follows:

No Firm would be considered unless:

(1) The firm was willing to be reimbursed on the basis of student achievement per maximum periods of instructional time, with heavy penalties for failure to meet performance standards;

(2) Its instructional process was relatively non-labor intensive, and also individualized and self-pacing to the greatest extent possible, and
(3) The program once demonstrated, could be implemented into the counterpart grade levels within the local system without creating unnecessary political and social problems within the community (38, p. 9+).

Ten companies submitted proposals which varied widely in methods by which students would be brought up to expected achievement levels in reading and mathematics, and encouraged to stay in school, thereby decreasing the very high dropout rate in Texarkana schools. According to Lessinger (38), however, all of the proposals stressed the need for student involvement and emphasized individually paced instruction. All of the firms proposed using some form of the new instructional technology. Some emphasized technology in the sense of hardware, such as audio-learning systems and computer-based counseling systems; others placed more confidence in relationships between teachers and students. Some proposals included plans for extrinsic reinforcement in the forms of tokens and trading stamps; others depended more on intrinsic kinds of reinforcement. Some proposed preparing custom-made materials and media to fit the situation. Several companies proposed employing already existing personnel, while several other proposals were less dependent on local resources.

The proposals were evaluated and a contract was approved between the Texarkana School District and Dorsett Educational Systems, an Oklahoma based company (14, p. 35).
The contract between Dorsett and Texarkana may be summarized as follows:

The contract provided that the contractor would instruct a minimum of 200 students in basic reading, math, and study skills until June 5, 1970; that the students be drawn equally from volunteers, students assigned by counselors, and students randomly selected from those with a grade level deficiency of 2.0 or more; that instruction would occur in several areas designated as "Rapid Learning Centers" located in schoolrooms and a mobile facility; that the program would use teaching machines manufactured by the contractor, and that the contractor would employ part-time at least twenty Texarkana teachers and administrators (38, pp. 99-100).

Other aspects of the contract included payment agreements between Dorsett Educational Company and the Texarkana Schools. At a cost of $80 per student, Dorsett agreed to increase the students' math and reading ability by one grade level for each 80 hours of instruction. The contract also called for penalties to be assessed against Dorsett for any student who failed to achieve the specified performance level and for bonuses to be paid for students whose progress exceeded the guarantee (14, p. 35).

The company established "Rapid Learning Centers" in which potential dropouts who were at least two grade levels behind their peers in mathematics and reading enrolled for an average of two hours a day. The students progressed at their own rate through a course of instruction which consisted of programmed reading and math materials presented largely on a film strip and record-teaching machine manufactured by the contractor. Student achievement was rewarded
with such items as green stamps and transistor radios (5, p. 35).

The reported gains were impressive. For instance, in March, 1970, tests given to fifty students showed that they had attained an average of 2.2 grade level increase in reading and 1.4 increase in math after only 60 hours of instruction in each. Further, only one of the participants had dropped out, vandalism was down, and teacher and community support for the program was strong (28, p. 12).

In September, 1970, an independent auditor's report concluded that the first year's achievement was invalid because the contractor was allegedly "teaching the test" (60). Filogamo (60) reports that the charge apparently applied only to May tests which contained questions that had been included verbatim in the instructional program. The actual amount of teaching the test, and the impact it had on achievement scores, is still uncertain (60, p. 60).

Even though the contractor was accused of teaching the test, thereby invalidating results, Filogamo (60), director of the program in Texarkana, insists that there was some progress. He states:

... This does not mean that there was no achievement; because upon visiting the Learning Center many times, you could tell the youngsters were learning. Because many of the youngsters, instead of accepting rewards, such as free time to listen to records or to play checkers or to read magazines were telling the teachers, "Please don't bother me right now. I'm going through this program and when I get through this program, I'd like for you to give me another one."
When you get this type of reaction, you know that something is going on (60, p. 61).

The contractor for the second year was Educational Development Laboratories (EDL), a division of McGraw-Hill. Their program has been described as "intensive," utilizing one teacher and one para-professional in each classroom. EDL increased the class load to twenty students and operated on a point system for reinforcement. They guaranteed a 1.0 to 1.9 grade level increase for 130 hours of instruction. The contractor received 75 percent of its payment on the basis of norm-referenced tests and 25 percent payment from results of criterion-referenced tests (58, p. 32).

Carpenter (15) describes the first two years of the pioneering Texarkana performance contracting program as (1) the first attempt to hold a private contractor strictly accountable for academic achievement; (2) the first to use an outside evaluator of contract performance; (3) the first to use an outside evaluation auditor; and (4) the first to select performance contractors through competitive bidding (15, p. 28).

According to Carpenter (15), achievement gains were insignificant, although the dropout rate dropped dramatically. This was due to major unsolved problems which included measuring achievement, determining contractor payment, and defining roles and responsibilities of the many contractors and managers (15, p. 29).
Reactions to the Texarkana Project

The Texarkana Project received optimistic reviews from a great many sources. In August, 1969, before the program began, the editor of Educational Technology observed that the Texarkana Project was "unique" in several respects:

1. This is the first time a public school has contracted with a private firm to provide academic instruction for its students.

2. This is the first use of performance contracting within a public school system.

3. This is the first time a school system has utilized the services of a management-support group.

4. This is the first attempt by a school system to utilize a separately managed and operated center in order to determine the cost effectiveness of new educational technology approaches and, based on this credible demonstration, to integrate proven techniques into the schools' curricula (46, p. 5).

Spivak (61) reported in the Wall Street Journal that "private industry is beginning to bid for a significant new plan in public education--far beyond anything so humdrum as supplying textbooks, films or records" (63, p. 24).

The Chairman of the House Subcommittee on General Education, Representative Roman C. Pucinski (48), commented on this article as it was placed in the Congressional Record. He stated, "The Texarkana Program is a concept in American education which in my judgment offers great promise of major breakthrough in raising achievement skills for our nation's young people" (38, p. 97).
Wright (19), in an article for the *Dallas Morning News*, described the Texarkana project as "an encouraging attempt by government to break out of the dreary pattern of failure by concentrating on the job of deciding and then assigning the doing to those who can meet performance standards" (19, p. 36).

An editorial in *Nation's Schools* noted that "... if funds for education depend on educational output, not input, then schools will be concerned with the learning, not teaching, and the development of a science of performance measurement may create a new type of educational planning in the country" (37, p. 37).

Lessinger (38) wrote concerning the Texarkana Project in 1970,

*Texarkana may hold other lessons for us, but it is only the first in what we hope will be a long series of projects. The concepts of accountability and educational engineering are catching the imagination of a broad audience, including school officials, educators in a variety of corporations and non-profit centers, and leaders at the highest levels of government. With roots deep in American traditions of enterprise, responsiveness, and flexibility, these concepts are now nurturing a movement in education that will probably affect all of us* (38, p. 103).

Recent Performance Contracts

Since the original experiment at Texarkana, many other school districts throughout the nation have entered into private contracts with educational companies for services under the guaranteed performance concept.
An example of a private contract with an educational company is that between Behavioral Research Laboratories (BRL), a California firm specializing in the development of programmed instruction, and the Gary, Indiana, school board, who agreed on a three-year, not Federally funded, performance contract. Hall (30) in a study conducted for Rand Corporation, has described this contract under which BRL is to run the entire curriculum of the inner-city black Banneker School for three years, plus a fourth year for transition.

The Banneker Contracted Curriculum Center is described by Hall as having fewer licensed teachers than ordinary schools, but it has twenty aides, 20-minute modules, many more materials, and flexible groupings around materials used. Payments to the contractor depend on the reading and arithmetic achievement of the students (30, p. 15).

The report concludes that first-year achievement compared favorably with other remedial programs and performance contracts and that Gary could run similar programs for five percent above present schooling costs (30, p. 16). Controversies with the teachers' union and with state education authorities over curriculum, materials, and personnel make findings difficult to assess and interpret.

Tack (56) has described Westinghouse Learning Corporation's work during the 1970-71 school year at Eliot School in Gilroy, a small district with limited resources in California. Westinghouse Learning Corporation contracted to
improve the reading and mathematics skills of all Title I students in grades two, three, and four in a predominantly Spanish-speaking population where seventy percent of all students were below grade level. Gilroy teachers implemented the program, using self-instructional materials and performance rewards. Para-professionals were used in the instructional and reinforcement centers (56, p. 14).

Problems arose because Westinghouse Learning Corporation was not prepared for the very low entering levels, lacked extra personnel to get the program under way, and was late in relating to the teachers who taught all the other subjects. Measured results disappointed the contractor, but exceeded those of the other Title I remedial programs aimed at the same population. Westinghouse has given up performance contracting, but the school's regular teachers propose to run a similar reading resource center (15, p. 10).

Learning Research Associates (LRA) entered into a performance contract with two, poor, predominantly black Norfolk, Virginia, schools. Carpenter (13) reports that LRA used a diagnostic-prescriptive approach with programmed materials. The report concludes that LRA students seemed happier, worked harder, and behaved more responsibly than students in regular classes in Norfolk (13, p. 30).

Test results were disappointing, according to Carpenter, partly because of a mismatch between test and program content; teacher emphasis was on vocabulary and word recognition,
while the tests emphasize comprehension. Carpenter concludes, however, that the LRA program in Norfolk costs were about 25 percent less than for other Title I reading programs in that area, and that Norfolk plans to adopt the same program used by LRA for all remedial reading classes. He suggests that deficiencies in curriculum content may be corrected by more emphasis on comprehension and by interactive evaluation contributing directly to program development (13, p. 29).

In summarizing the effectiveness of performance contracts in five cities aimed at raising reading and mathematics skills, Carpenter and Hall (16) found that the unique feature of these programs was that business firms were engaged in the instruction process, and that their pay was, at least in part, dependent on how much the students learned (16, p. 37).

Carpenter (15) has completed a study of existing performance contracts, and as a result, has cited three advantages and three disadvantages of the concept of performance contracting. The advantages are,

1. Performance contracting facilitates the introduction of radical change in education.

2. It places increased emphasis on accountability for student learning on the part of school administrators, contractors, and teachers.

3. It has brought new Learning System Contractors into the educational field.
The disadvantages are,

1. Some performance contracting programs have been so complex that management has been severely hampered and costs have been unnecessarily high.

2. Performance contracting programs will probably continue to be narrowly focused because of difficulties of defining objectives in subject areas other than those involving simple skills or, in some cases, difficulties in measuring the attainment of objectives.

3. Performance contracting has exacerbated old problems to the point where they almost seem to be new ones. The most severe have been legal questions, issues of teacher status, difficulties in supplying the needed management skills, and especially problems of test selection and administration (15, pp. 1-2).

The OEO Experiments in Performance Contracting

To date, the most comprehensive and controversial performance contracting experiments were financed by the Office of Economic Opportunity (OEO) during the 1971-72 school year. OEO funded performance contracts involving eighteen school districts (See Appendix A.), six education companies (See Appendix A.), and 28,000 students in a year-long instructional program under the management of private industry at a cost of approximately $6.5 million (11, p. 35).

The purpose of the OEO project was to assess the effect of a "representative group of private education firms using existing instructional materials and technology and working under a specific kind of performance-based contract" compared to the effect of "traditional classroom methods on the reading and math skills of poor, underachieving children" (12,
The conclusion reached by evaluators of these experiments was that "firms operating under performance contracts did not perform significantly better than the more traditional school systems" (25, p. iv).

The contractual procedures between OEO and the eighteen school districts and between the school districts and the private firms have been reported by Stalford (25) for OEO. He points out that in order to understand the relationship of the "parties of the experiment," it is necessary to know that the eighteen school districts involved signed contracts with OEO in which each agreed to participate in the experiment with a designated education technology company. The contracts between the private companies and the school districts "technically then were subcontracts" (25, p. 115).

In addition, OEO had direct contractual agreements with Education Turnkey Systems, Inc., the management support contractor, and the Battelle Memorial Institute, the testing and evaluation contractor (25, p. 118). These relationships are illustrated in Appendix C.

The report of the experiments issued by OEO states that the eighteen schools which served as prime contractors in the experiments agreed to the following provisions in their contract with OEO:

1. Enter into a subcontract with their assigned subcontractors.

2. Cooperate with the management support contractor and the testing and analysis contractor.
3. Not enter into other performance contracts involving the experimental or control group students.

4. Hire a full time professional project director and an assistant to serve as representative and liaison with all parties in the experiment.

5. Provide office and classroom space to the subcontractor.

6. Enroll the students designated by OEO in the experimental and control classrooms.

7. Facilitate test administration.

8. Provide all data needed by Education Turnkey and Battelle.

9. Provide general support in dealing with the community, parents, and teachers.

10. Examine operating procedures and modify them if they would conflict with the experiment (25, p. 118).

The incentive payment structure of the contract has been summarized by Stalford (25). He states,

1. All payments in the contract were based upon individual student test results. Each child in the experiment was to be tested and a payment calculated for him in accordance with his test results and the incentive scales. The aggregate of such payments made up the total reimbursement to the contractor.

2. All contracts stipulated a minimum guaranteed level of achievement before payment was made. The lowest such guarantee was 0.5 grade level equivalents in the elementary grades. The median overall was approximately 1.5 grade level equivalents in the secondary grades. The median overall was approximately 1.0 grade level equivalents. A price was set for each student whose achievement improved to the guarantee level.

3. Contractors were asked to specify the maximum gain, on average, they thought students in their program could achieve, and a price was set for the "maximum average." The payment for each tenth of a grade level improvement between the maximum average and minimum guarantee was determined by dividing the
difference between the maximum and minimum grade level equivalents.

4. Up to 25 percent of the contract ceiling price was based upon results of five interim performance objective (IPO) tests in each subject. These were criterion-referenced tests developed by the firms and oriented to their own curriculum objectives. They were scored on a pass-fail basis, with passing set at 75 percent on each. The sub-contractor was paid 2.5 percent of the calculated ceiling price for each child each time he passed an IPO. Each firm separately negotiated its own combination of minimum guarantee price, incentive price and interim test prices (25, p. 129).

The request for proposals from private firms established a general target of $200 per student per subject as the maximum price of the entire contract. The $200 figure was chosen to keep the contract price at a level which superintendents could consider for a future operational performance contracting project operated by their own school system (25, p. 131).

In the area of student enrollment and attendance, the subcontracts specified that each school district would enroll at least 100 children in each grade, and that any student who dropped out would be replaced within five days. After 20 hours of instruction, the private educational firms could request that a student be dropped only if he had been absent for ten consecutive days or fifteen days in a three-month period. The subcontractors agreed that any student leaving the program after more than 30 hours of instruction would be posttested and his replacement pretested and posttested. Payment for gains by dropouts and their replacements was
established by a separate incentive formula (25, pp. 139-140).

The OEO contract specified that only underachieving students were to be enrolled in the experimental and control groups. Data from the 1969-70 school year were used as a basis of establishing achievement level for each student. From these data, OEO selected the school in each district with the lowest overall achievement test scores as the experimental school and the school with the next lowest overall achievement scores as the control school. Within each school, the students with the greatest combined deficiencies in reading and math were selected for the experiment. Stalford (25) states that "although every attempt was made to screen out children who were mentally retarded or otherwise unable to benefit from the experimental program, a very few of these children were enrolled in it" (25, p. 143).

The original subcontracts with education agencies specified that a full academic year would be available for instruction. Specifically, the contract was based on 180 hours each in mathematics and reading instruction, and payment was based on the assurance that this amount of time would be available. In his report, Stalford (25) states that "several factors combined to decrease both the anticipated number of days and the number of minutes per day available for instruction." Therefore, the subcontracts were renegotiated and payment to the firms was based on 165 hours of
instruction in both areas rather than 180 hours as first determined (25, p. 144).

The contracts also specified that school districts would not teach reading and mathematics outside the experiment to students in the experimental classrooms since it was essential to the evaluation that the only instruction in these subjects be given in the experimental classrooms. Stalford reports that this was not a problem in the secondary grades, but in the primary grades "reading and reading-related activities represent a substantial portion of the school day" (25, p. 143). OEO finally adopted a ruling that direct instruction in reading skills, vocabulary, and word attack was to be conducted only in the experimental classrooms; other normal supplemental activities, such as silent reading time and storytelling, were not prohibited (25, p. 144).

In two districts, the Bronx and Philadelphia, the experiment was hampered by such severe obstacles that OEO was forced to settle on an estimate of reasonable costs instead of the agreed upon performance basis of payment to the subcontractor (25, p. 151).

Stalford reports that "controversy marred the Bronx experiment from the time it was announced" (25, p. 152). The local teacher's union attacked the proposed program publicly just as classes were to begin, and continued its campaign through the news media throughout the year. The union
contested the use of para-professionals in classrooms, the lack of union involvement in the contract negotiations, alleged disruption of a program for Spanish-speaking children, and many other factors. The community board answered the allegations, but extreme mistrust between union teachers and those involved in the experimental program continued to hamper the project throughout the year (25, p. 152).

In addition, according to OEO reporters, disruption and disorder during the pretesting sessions became so intolerable that the tests had to be suspended while an intense three-week campaign for community support was undertaken by the school board. Instruction did not actually begin until October. Confusion in identifying and enrolling students in the program produced uncertain rosters of participants; therefore, difficulty in maintaining accurate enrollment and attendance records resulted (25, p. 152).

Absenteeism during both the pre- and posttests sessions was high. Many students who were present skipped all the questions or attended only part of the testing sessions. Consequently, less than one-half of the enrolled students in some grades had both a complete pretest and posttest score in the same subject (25, p. 153).

OEO reports that similar problems plagued Philadelphia. Delays attributable to both the educational firm and the school district were encountered in enrolling students, and when school opened, the two disagreed as to which was
responsible for providing various supplies and for completing refurbishments in the experimental classrooms. The firm was not completely satisfied with the equipping of the classrooms until November, and encountered early difficulties in gaining access to school buildings after hours for planning and logistics. All district schools opened late, and then were further disrupted in October by a brief teacher strike. Stalford points out that "by this time the subcontractor was having difficulty maintaining discipline and providing instruction in the secondary grades. In addition, the firm's property was vandalized and stolen" (25, p. 154).

There were pretest and posttest difficulties in other school districts taking part in the OEO experiments. In Grand Rapids, Michigan, the project director, Webster (60), commented concerning the posttests. "We are just hopeful that we can duplicate the chaos we had in the fall so we have some reliable results" (60, p. 58).

Reactions to the OEO Experiments

Four of the six companies involved in the OEO experiments issued a joint statement reflecting their views of the project and its results. The companies represented were Alpha Learning Systems, Inc., Learning Foundations, Inc., Plan Education, Inc., and Singer-Graflex, Inc.

The statement by the contractors reads:

The contractors believe that, from its inception, elements of the experiment were so poorly conceived
and conducted, particularly in its provisions for testing and evaluation, that these deficiencies should raise serious questions within the educational community on the broad generalized conclusions released by OEO. The limited time for proposal submission, contract negotiations, school-contractor familiarization, program start-up, and over reaction to concerns about "teaching to the test" plagued the experiment throughout (25, p. 221).

In the joint statement, the educational companies which conducted the experimental programs complained that "in 17 of the 18 sites of the experiment, the average pretest level of the control group was significantly higher than that of the experimental group (25, p. 223). They also questioned "the absence of randomization of pupil assignment to experimental and control groups" charging that "the failure to effect such randomization constitutes a substantive and significant departure from the essential definition of a true experiment" (25, p. 243).

The joint statement summarized the subcontractor's feelings about the experiment in the following statements:

In summary, the performance contracting program cannot realistically be described as a definitive, rigorous experimental investigation of the impact of performance contracting in the remediation of basic learning skills or educational achievement among the disadvantaged in general. It was actually a very large quasi-experiment of limited external validity, fraught with start-up difficulties, teacher resistance, poor testing conditions, and other problems that adversely affected the experimental groups. Apart from the testing and evaluation inconsistencies, limitation of the experiment to a one-year life term was a serious mistake. It is conservatively estimated that the first four months were devoted to reaching the normal September status for experimental students (6, p. 234).
Issues such as those described have made contractors and others involved in the OEO performance contracting experiments wary of applying its results to other performance contracting programs. Blaschke (10) has commented on the statement issued by the contractors. He states, "It's a safe guess that no firm made any profits on the OEO experiments. Indeed, at least four of the six have been forced out of the performance contracting field" (10, p. 25).

The negative conclusion reached by OEO has been questioned in a series of articles. An editorial which appeared in the New York Times (45) claimed a "premature burial" of performance contracting by OEO. The editorial pointed out that "a number of factors cannot be ignored in a critical appraisal of the OEO report. Recent studies of some contracts, including an assessment by Rand Corporation, appear at variance with the OEO's pessimism" (45, p. 31).

Mecklenburger and Goldenbaum (41), reporting on the experiment for Nation's Schools, stated, "If the experiment failed, a good part of the reason is because OEO failed the experiment--by acting hastily, by expecting a panacea, by adopting a shaky experimental design, by carelessly analyzing data, and by only partially releasing pertinent information" (41, p. 31).

Mecklenburger and Goldenbaum (41) have summarized their argument against OEO's conclusion in the following statements:
1. OEO began the experiment in whirlwind fashion, forcing the contracting companies to prepare programs, train teachers, and refurbish facilities during the summer months, and consequently beginning their programs late at several sites;

2. pretests administered by Battelle Memorial Institute varied in quality and reliability from city to city; and

3. OEO did not investigate whether the contractors were capable of doing what it anticipated. Relying solely on the proposals of the companies for evidence of their capabilities, they selected six companies that had little or no experience in public schools. Although OEO claimed that each company had a unique and innovative approach, OEO project directors report that company approaches often resembled conventional instruction and closely resembled each other (41, p. 32).

Saretsky (51), in an article entitled "The OEO PC Experiment and the John Henry Effect" states that "while the OEO experiment in performance contracting was in certain aspects rigorous and elaborate, the experimental outcomes do not really provide sufficient basis for reaching such a negative conclusion" (51, p. 579).

The most interesting argument in Saretsky's analysis is that OEO did not control for the "John Henry Effect." He describes the "John Henry Effect" as that extra effort put forth by a control group when placed in competition with an experimental group using an innovative procedure which threatens to replace the "control" procedure. He maintains that "unless OEO researchers can ascertain that the control group were exhibiting typical levels of performance, they cannot confidently assume that they are
Saretsky argues that OEO neither accurately compared performance contracting with traditional classroom methods, differential effects of performance contracting across experimental sites, nor differential effects among learners. He concludes that since OEO did not randomly select or assign students, carefully match students in experimental and control groups, nor rigorously define "instructional procedures in performance contracting" and "traditional classroom instruction" that no clear or reliable assessment can be drawn regarding the comparative effectiveness of performance contracting and traditional classroom instruction (51, p. 581).

Calvin (12), chairman of a performance contracting firm, Behavioral Research Laboratories, has accused OEO of "deliberately failing performance contracting" (10, p. 25). He challenged OEO officials to disclose Government Accounting Office documents that question the validity of the study.

A report entitled "What OEO Did Not Say," cites one reason why experimental groups at ten sites in the OEO program showed no achievement gains which it calls "interface difficulty" (11). This term is defined as "trouble in the form of teacher strikes or massive resistance, management conflicts between firm and school, bad pretest conditions or threats of contract termination" (11, p. 35).
Blaschke (11) reports that a review of OEO's performance contracting documents reveal that "interface difficulties" occurred thirty times at the ten unsuccessful sites, compared to only seven times at the eight successful sites. Most of the 30 problems arose during the first month of school and disrupted operations to such an extent that, according to Blaschke, "the experimental classes may never have had a chance to test the effectiveness of performance contracting" (11, p. 36). Blaschke contends that "no matter what OEO said in its preliminary contracting report experimental students significantly outgained control students in eight of the projects" (11, p. 36).

Miller (42) attacks the OEO experiment for ignoring selection bias "by taking experimental and control groups from entirely different schools, from two mutually exclusive pools of subjects" (42, p. 394). He contends that pretest differences favored control groups over experimental groups on the achievement criteria of reading and mathematics skills at all grade levels involved, and in a substantial majority of the eighteen participating school districts. These pretest differences, according to Miller, were "great by any reasonable standard of substantive or statistical significance" (42, p. 395).

There were also notable group differences in racial origin and on social and economic status between experimentals and controls. Miller declares that "OEO's decision to treat
these discrepancies as a statistical problem rather than a
design problem is absurd" (42, p. 395). He concludes,

Perhaps no study ever conducted deserves a more lasting
place in the annals of unimpressive experimental re-
search in education. It has certainly violated on a
grander scale than any other widely publicized experi-
iment, cardinal principles of all three methodological
components of experimental science—experimental
design, analysis, and measurement (42, p. 396).

The Caddo Parish Project

Thiokol Corporation, better known for its leadership in
the missile industry, began to diversify its interests by
establishing an Education Division in 1965. The first ven-
ture of this new division was the establishment of the Job
Corps Center located in Clearfield, Utah. Thiokol has been
involved since 1965 in motivational and occupational training
of the hard-core unemployed at the Clearfield Job Corps Cen-
ter. This school annually trains over 1,000 young men and
women from all parts of the country. From this beginning
and the experience in the educational, vocational, and moti-
vational fields which resulted, the Thiokol Education Divi-
sion entered into performance contracting with public school
systems (43, p. 5).

Prior to Thiokol's contract with the Caddo Parish School
Board in 1971, the corporation's Education Division con-
ducted the achievement motivation component of the perform-
ance contracting program in Dallas, Texas. However, the
contract with the Caddo Parish Schools was the first attempt
by Thiokol to provide an instructional program to raise academic achievement levels in a public school.

The Thiokol contract with the Caddo Parish School Board provided for instructional and motivational procedures to raise academic achievement levels in the areas of reading and mathematics for students with severe deficiencies in these subjects. The contractor was reimbursed on the basis of student achievement.

Bethune High School in Caddo Parish, Louisiana, was selected as the experimental site because of the high dropout, low income school population. The school is located in an area where census figures indicate that 85 percent of the citizens are classified as economically deprived. School census figures indicate that at least 30 percent of the students who begin 7th grade drop out of school before graduation, and that at least 70 percent of the student population have reading deficiencies of at least two years as measured by standardized tests. Many of these students have reading deficiencies of four to five years behind their peers (12, pp. 10-15).

Teachers who participated in the experimental program were all certified and employed by the Caddo Parish School Board. Teachers were selected by school administrators from the faculty of Bethune High School. Teachers in the experimental program received incentive pay based on the achievement gains made by their students. Teachers in the
experimental program compared favorably in years of teaching experience and educational background with those of the control group.

Para-professionals working in the experimental program were also selected by school administrators. The educational requirements for teacher aides was graduation from high school, although several of the aides were college graduates. Each teacher in the experimental program was assisted by one teacher aide whose duties included scoring progress checks, filing reading selections, checking materials completed by the students and filing them in the student's folder, assisting in the reinforcement center, and other duties deemed necessary by the teacher.

Chapter Summary

A review of the literature and research of performance contracts indicates that while there is a great deal of diversity in methods, program management, and evaluation techniques, the theories of positive reinforcement and accountability are an integral part of the performance based concept in education.

Compensatory education programs have generally failed to improve the cognitive skills of students in need of remedial education. Thus, great enthusiasm greeted early reports that a private firm operating under a performance contract had succeeded in dramatically increasing achievement
gains of academically deficient students in the original Texarkana Project. Educators, policymakers, and economists alike were intrigued by this attempt to introduce accountability into the education business. Although the achievement gains in the Texarkana performance contract are now considered dubious because the contractor allegedly taught the test, there is little doubt that there were dramatic decreases in the dropout rate as a result of the program.

The pioneer program in Texarkana was the first attempt to hold a private contractor strictly accountable for academic achievement; and while there were major unsolved problems, it provided the impetus for future efforts by business firms outside the school system to enter the field of contracting for performance in basic skills and vocational training.

More recent performance contracts, such as those studied by Rand Corporation analysts, reveal several weaknesses as well as advantages of such an innovative approach in dealing with academically deficient students who have not achieved success within the traditional curriculum offered by the public schools.

The most comprehensive, and as yet controversial, performance contracting experiments were financed by the Office of Economic Opportunity in which six educational companies conducted programs in eighteen cities across the United States. Despite the magnitude, scope, and costs involved,
the negative results of the experiment as reported by OE0 have been disputed by authorities in several fields. The experimental design has been called inadequate by such critics as Blaschke, Saretsky, Miller, Calvin, and others; thus, casting some doubt as to the validity of the results obtained by OE0.

Thiokol Corporation's performance contract in Caddo Parish, Louisiana, the subject of this study, involved junior and senior high school students at a predominantly black school located in an impoverished area where many of the students suffered academic deficiencies in the basic skills of reading and mathematics. The procedures used in studying this program, the method of selecting students for participation, and the instructional processes involved will be discussed in Chapter III.
CHAPTER BIBLIOGRAPHY


42. Miller, John K., "Not Performance Contracting, But the OEO Experiment Was a Failure," Phi Delta Kappan, 54 (February, 1973), 394-396.


CHAPTER III

METHODS AND PROCEDURES

As previously stated in Chapter I, the purpose of this study was to compare the academic skills achievement in reading and mathematics of students who participated in a performance contracting program with students who did not participate in the performance-based program. A follow-up study was conducted to determine whether those students who participated in the performance contracting program showed a significantly different level of achievement than the control group approximately four months after the conclusion of the program.

To accomplish these purposes the overall design selected for this study was the nonequivalent control group design which is described by Campbell and Stanley in this way:

One of the most widespread experimental designs in educational research involves an experimental group and a control group both given a pretest and a posttest but in which the control group and the experimental group do not have preexperimental equivalence. Rather, the groups constitute natural collectives . . . as similar as availability permits but not so similar that one can dispense with the pretest (3, p. 47).

This chapter is organized under the various headings which make up the major elements of the methods and procedures used in gathering the data for this study. These headings are
(1) the selection of subjects, (2) description of the experimental instructional program, (3) description of the instructional program for the control group, (4) procedure for collecting the data, (5) description of the instrument, and (6) procedure for analysis of data.

This study was concerned with two groups of students: One group which participated in a year-long experimental performance contracting program in reading and mathematics and one group which received instruction in these subjects using conventional teaching techniques. The significance and need for this study rested primarily on the analysis and comparison of the success of these students in terms of academic achievement. From an instructional point of view, it was important to discover whether students who participated in the experiment differed significantly from those students who did not participate in the program.

Selection of Subjects

The students who participated in the study met the requirements for Federal assistance to meet the special educational needs of educationally deprived children under Title I of the Elementary and Secondary Act of 1956, (Public Law 89-10) (5). Participants qualified in at least one of the following categories:

(A) Educationally deprived--defined as having an I.Q. of 89 or below;
(B) one year or more behind national norms;
(C) lowest quartile on achievement tests;
(D) poor attendance;
(E) reside in an area where 85 percent of the citizens are economically deprived.

Students participating in the program were also classified as Phase I students. Phase I students are so designated on the basis of extremely low scores on such standardized tests as the California Achievement Test or the Iowa Test of Basic Skills, low I.Q. test scores, failure in one or more subject areas, poor attendance, disciplinary problems, and apathy toward the learning situation presented within the traditional curriculum. The Phase I student generally suffers severe deficiencies in the basic skills, particularly in reading ability. A student is classified as Phase I on the recommendations of teachers, counselors, and coordinators on the basis of the criteria mentioned above.

The determination of eligibility for participation in the experimental program was made by school administrators, counselors, and coordinators at Bethune High School. Students were selected from grades 7 through 12. The criteria for assigning students were previous academic achievement, achievement test scores, I.Q. scores, and Phase I classification. It was determined that out of the total school population approximately 900 students were eligible for participation. The total number of students participating in the experimental program with valid pretest and posttest
scores on the California Achievement Tests administered for evaluation are shown in Table I.

**TABLE I**

**NUMBER OF SUBJECTS IN THE SUBCATEGORIES OF THE EXPERIMENTAL PROGRAM**

<table>
<thead>
<tr>
<th>Grades</th>
<th>Control Group</th>
<th></th>
<th>Experimental Group</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Boys</td>
<td>Girls</td>
<td>Boys</td>
<td>Girls</td>
</tr>
<tr>
<td>Junior High</td>
<td>45</td>
<td>46</td>
<td>75</td>
<td>61</td>
</tr>
<tr>
<td>Senior High</td>
<td>80</td>
<td>48</td>
<td>46</td>
<td>57</td>
</tr>
<tr>
<td>Total</td>
<td>125</td>
<td>94</td>
<td>121</td>
<td>118</td>
</tr>
</tbody>
</table>

Table I shows that there were 125 boys and 94 girls in the control group and 121 boys and 118 girls in the experimental group.

This study was limited to those students who participated in both the reading and mathematics portions of the program. The follow-up portion of the study was limited to those students who returned to Bethune High School for the 1972-73 term, and who took the California Achievement Tests administered in the fall of 1972.

The numbers of students participating in the follow-up portion of the study are shown in Table II. There were 90 boys and 76 girls in the control group during the follow-up study. There were 88 boys and 84 girls in the experimental
TABLE II
NUMBER OF SUBJECTS IN THE SUBCATEGORIES OF THE FOLLOW-UP STUDY

<table>
<thead>
<tr>
<th>Grades</th>
<th>Control Group</th>
<th></th>
<th>Experimental Group</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Boys</td>
<td>Girls</td>
<td>Boys</td>
<td>Girls</td>
</tr>
<tr>
<td>Junior High</td>
<td>33</td>
<td>35</td>
<td>65</td>
<td>48</td>
</tr>
<tr>
<td>Senior High</td>
<td>57</td>
<td>41</td>
<td>23</td>
<td>36</td>
</tr>
<tr>
<td>Total</td>
<td>90</td>
<td>76</td>
<td>88</td>
<td>84</td>
</tr>
</tbody>
</table>

The Experimental Instructional Program

Thiokol Corporation provided instruction in the areas of reading and mathematics to the experimental group in this study. The materials and procedures for the reading and mathematics program will be examined separately.

The Reading Program

The reading program consisted of three basic components:
1. Level A, Beginning Reading, Grade Levels 0--3.5
2. Level B, Intermediate Reading, Grade Levels 3.5--7.5
3. Level C, Advanced Reading, Grade Levels 7.5 and up.
   Students selected for participation in the program were given a diagnostic screening test and placed in either Level
A or Level B, where additional diagnostic tests were administered. With the help of such tests, students were placed in the program at their own level of achievement.

Students with severe reading deficiencies were placed in Level A. On this level, the student was exposed to a variety of audio and visual techniques designed to teach decoding skills basic to reading. This phase of the program relied on a phonics-oriented approach in which the students used cassette players to acquaint them with basic sounds, programmed instruction sequences, recorded stories, wall charts, and educational games.

Students in this level were given frequent progress checks to monitor performance as they advanced from level to level within the beginning reading program.

Level B consisted of a variety of reading materials in the range from grade level 3.5 to 7.5. The majority of students in the program began in this level of reading achievement. The reading materials were largely those used in the Job Corps Reading Program (See Appendix D.) which consisted of the following:

(A) SRA Lab Cards
(B) SRA Pilot Lab Books
(C) Reader's Digest Books
(D) EDL Workbooks
(E) Merrill Modern Reading Books
(F) SRA Dimensions in Reading Cards
(G) Grolier Reading Attainment Series
(H) Spring Board Materials
(I) Step-Up Your Reading Power Books
Supplementary reading materials included Scholastic Reluctant Reader's library and various reading selections from the school library.

In order to progress from one level to another, students were required to score at least 80 percent on fourteen Progress Checks and one Level Advancement Test. Progress checks consisted of follow-up tests which followed each reading assignment. These tests were checked and the scores recorded by the teacher aide. Progress checks were criterion-referenced, and were used primarily to ascertain whether or not the student actually understood the content of reading materials. Such progress checks used with individualized, programmed materials are important since some students will tend to try to go through the materials too fast without actually understanding the content. Such behavior can be recognized by observing low scores on the progress checks.

The Level Advancement Tests were also criterion-referenced and designated by the contractor to measure proficiency by students at given reading levels. In order to progress to a higher reading level, the student was required to score at least 80 percent on the Level Advancement Test. These tests were maintained and scored by the teacher.

If the student failed to score 80 percent on the Level Advancement Test, he was required to read five additional selections on the same level, passing the progress checks.
with 80 percent accuracy. At that time, another Level Advancement Test was administered along with an oral reading assignment to further diagnose problem areas. The same procedure was repeated if the student failed on the second attempt.

Additionally, students were tested at six-week intervals, utilizing criterion-referenced tests designated by the contractor as Interim Progress Assessments. These tests, referred to as IPA's, were scored and utilized by the contractor to assess the percentage of students who scored 80 percent or better as some indication of achievement by the experimental group as a whole. Students were advised of their score and incentive points given for scores of 80 percent or better.

When a student fulfilled all requirements of Intermediate Reading (Level B), he began the Advanced Reading Program (Level C). Very few students attained the reading skills necessary to progress to this level.

The following list constitutes the required and supplementary materials used on the Advanced Reading Level:

(A) SRA Reading Lab IV-A
(B) Better Reading, Books 1-3
(C) Reading Progress Folders for Better Reading
(D) EDL Controlled Reader (Advanced)
(E) Controlled Reader Study Guides--10 Volumes
(F) EDL Controlled Reader Filmstrips
(G) Library Books
(H) Newspapers
(I) Magazines
(J) Comic Books
The SRA Lab IV-A provided the basic program for the Advanced Level. This series of reading material is divided into seven color-coded levels. There are two types of reading material in the Laboratory, Power Builders and Rate Builders. There are twenty Power Builders for each color level. Progress Checks are printed with each Power Builder selection. Answer keys are located on the right side of the Reading Laboratory on color-coded cardboard strips. These keys were maintained and scored by the teacher.

The student was required to read and pass seven selections on each color-coded level, beginning with the most elementary and progressing through the most difficult. Level Advancement Tests were given to check student progress. Upon successful completion of the Level Advancement Test, the student proceeded to the next color level. If he failed the Level Advancement Test, he was required to read an additional five selections on the same color level and take a second Level Advancement Test. The procedure was repeated on successive failures.

Two Power Builders from each of the seven color levels in the SRA Reading Lab IV-A were designated by the contractor as Level Advancement Selections. This procedure provided the student with tests similar in difficulty to the reading materials for his particular level of achievement. The student's improvement in reading skill was
measured by his Reading Rate, Comprehension Score, and Reading Index Score.

The reading program was designed to diagnose specific reading deficiencies, and then remediate them through individualized prescriptions, activities, and progress checks. The program was structured to improve achievement, not only in comprehension, vocabulary and rate, but also to improve the higher level cognitive processes associated with reading ability, such as auditory reception, auditory discrimination, auditory association, sequential memory, and reasoning.

The Mathematics Program

The mathematics program was structured around 300 specific and mutually exclusive instructional objectives ranging from basic number facts through skills associated with consumer-oriented activities, such as shopping, interest rates, and household budgeting. A series of diagnostic tests were used to identify areas in which the student had deficiencies. Programmed materials could then be assigned to correct such deficiencies. The program was divided into three categories: Entry, Instructional, and Exit phases.

Students entering the program were given diagnostic tests to determine placement. After placement, the student completed the materials prescribed within the area where he was placed. After each unit of work, the student was
administered a progress check, which indicated the student's progress and deficiencies, as well as needed individualized instruction. Level Advancement Tests, as well as progress checks passed with 80 percent accuracy, were required for completion of each skill area and advancement to the next skill area. Additionally, mathematics students were administered Interim Progress Assessments (IPA's) each six weeks.

Programmed materials included those published by such companies as Sullivan Associates, Grolier, Addison Wesley, Behavioral Research Laboratory, and the Continental Press. To reinforce computation skills and for remedial work, the Computation Skills Development Kit designed by Science Research Associates was used.

The following units of mathematics were used in the program in sequence:

1. Addition of Whole Numbers
2. Subtraction of Whole Numbers
3. Multiplication of Whole Numbers
4. Division of Whole Numbers
5. Addition and Subtraction of Fractions
6. Multiplication and Division of Fractions
7. Decimals
8. Percentage and Measurement
9. Consumer Mathematics
The materials used were largely self-instructional; however, the teacher and teacher aide were available to help students when problems arose.

A corollary of the experimental program, Contingency Management, has been defined as "the systematic arrangement of reinforcing consequences of behavior" (7). This concept was utilized with the experimental group as a method of behavior modification and to improve academic performance.

Contingency Management in the classroom is based on the theories of Premack (7) and Homme (6) who maintain that low-achieving students perform better academically and act more responsibly when some "high probability behavior" can be found to reinforce a "low probability behavior" (6, p. 483). Research indicates that students, particularly those who are a year or more below grade level, do not work efficiently or consistently (1, 5, 6); therefore, it was necessary to find activities which the student found attractive enough to encourage him to perform the required work in order to engage in the preferred activity. Such preferred activities designated as "high probability behavior" by Premack (6) were identified by observation and used to reinforce "lower probability behavior," such as successfully completing assigned instructional units or displaying positive instead of disruptive behavior in the classroom.

Student contracts were extremely useful since the program was largely individualized and, therefore, self-pacing.
Students entered into a contract with the teacher in which a specified unit of work was to be completed for some agreed-upon incentive. The reward was contingent upon the successful completion of the objective. Students became more responsible about managing their own learning behavior.

Student incentives (rewards) were adapted throughout the year based upon what worked to improve student performance. The pattern was to award points for successful completion of specific tasks, nondisruptive behavior, and good attendance. Incentives were thus earned on the basis of the number of points earned. Incentives included items such as tickets to school events, free time to be spent in the Reinforcement Center where the student could listen to records, play various games, or just talk with other students, and other items of an extrinsic nature designated by the contractor and agreed upon by teachers and students in the program.

Student incentives seemed to correct some difficult behavior problems and encouraged cooperative efforts between teachers and students.

The matter of extrinsic rewards for modifying behavior and improving student performance has been a controversial issue among educators. Many educators feel that such extrinsic motivators somehow violate the traditional values of the intrinsic worth of learning simply for the sake of knowledge itself. It is indeed a question in need of intensive research,
particularly as it applies to those students who are unmotivated by the sheer satisfaction of learning.

Control Group Instructional Program

The 219 students who constituted the control group and who were also Title I, Phase I students were instructed in a traditional classroom situation, using the Louisiana State adopted textbooks as the basic source of instruction.

Although the textbook and teacher provided the basic framework for the control group, there were some supplementary reading materials available to some classes, purchased with Title I funds. (See Appendix D.) These reading materials included,

A. The Kaleidoscope Readers--Field Educational Publications, Inc.
B. S C O P E--Language Skills I--published by Scholastic Magazines, Inc.
C. Conquests in Reading--McGraw-Hill Book Company
D. Encounters--Houghton-Mifflin, Inc.

The teachers of the control group were provided with guidelines in the form of behavioral objectives by the school administrators. A partial list of the objectives are listed below:

I. Reading Comprehension
   A. Comprehension of stories and illustrated materials.
1. Recalls details from reading selections.
2. Recalls story events in sequence.
3. Tells main ideas from paragraphs.
4. From illustrated materials, tells information and identifies objects.
5. States inferences and draws conclusions about questions when the answer is implied but not given in the content.
6. Classifies and compares types of literature (historical fiction, fable, essay, biographical pieces, poetry).
7. Identifies and interprets the author's purpose from materials read.
8. States and evaluates character traits, reactions, and motives.
9. Relates materials read to personal experiences and previous readings.
10. Classifies objects and ideas.
11. Interprets figurative language.

B. Word Meaning and Function

1. Defines words in terms of prefix, suffix, element, and agent meanings.
2. Formulates logical definitions of words.
3. Defines words using context clues.
4. Selects and writes multiple meaning of words.
5. Identifies heteronyms.
6. Selects homonyms to complete sentences.

7. Identifies and uses common abbreviations and acronyms.

8. Identifies and uses antonyms.

Methods of implementing the objectives mentioned above were left to the discretion and ingenuity of the individual teacher.

The control group was not exposed to any special method of positive reinforcement other than the praise normally given academic accomplishment.

Procedures for Collection of the Data

As is frequently true with early attempts to implement new techniques, the beginning of the performance contracting experiment in this study was less than ideal. Due to administrative difficulties, the experimental program did not begin until approximately three weeks after the regular school term began. Experimental students were randomly selected by school administrators from already existing Phase I classes.

The experimental subjects, with no orientation or explanation, were told to report to specific teachers. This, of course, caused some resentment and hostility among students, initially. Interestingly enough, the majority of the experimental students became enthusiastic about their work, and many were inquiring at the end of the school term about
the possibility of becoming involved in the same type of program the following year.

Additional start-up problems included the lack of materials at the beginning of the program. Teachers in the experimental program were forced to devise instructional projects to occupy students until programmed materials arrived.

The experimental group was administered the pretest in October, 1971, by an independent evaluation team. The same test, Form X of the California Achievement Test, was administered concurrently to the control group by school counselors and coordinators.

Posttests were administered to both groups in May, 1972. The experimental groups test was administered by school counselors and evaluated by the same outside agency, while the control group scores were evaluated by school personnel. Form Y of the California Achievement Test was utilized as the posttest instrument.

A follow-up test, utilizing the Z form of the California Achievement Test was administered in October, 1972. The results of that test were used in this study to compare the two groups on retention factors.

Procedures for Analysis of the Data

The purpose of this study was to compare academic skills achievement in reading and arithmetic between participants
and nonparticipants in a performance contracting program. A follow-up study was conducted to determine whether those students who participated in the performance contracting program showed a significantly different level of achievement than the control group approximately four months after the conclusion of the program. Four hypotheses were expressed. All hypotheses were stated and tested as null hypotheses. The analysis-of-covariance technique was used to test the hypotheses. The .05 level of significance was used as a basis for accepting or rejecting the hypotheses.

After the data were collected, the answer sheets for each experimental subject's responses to the instrument selected for use in this study were scored by an independent evaluation team and the results transcribed onto data sheets. The responses of the control group were scored by the publisher and the results transcribed onto data sheets.

All statistical computations necessary to test the tenability of the four hypotheses of this study were conducted by the North Texas State University Computer Center.

Description of the Instrument

The alternate forms of the California Achievement Tests (1957 edition) were used to compare academic achievement of the groups in this study.
These tests, renormed in 1963, yield scores in the areas of reading, arithmetic and language achievement in the grade range of 1-14.

In the Sixth Mental Measurements Yearbook (2), the California Achievement Tests are described as having satisfactory reliability for the total reading, total arithmetic, and total language scores. These reliability estimates, which fall in the range of .86 to .96, were obtained by applying the Spearman-Brown formula to the average reliability of the six subtests, equally weighted, of each level.

One reviewer in the Sixth Mental Measurements Yearbook reports that validity data are given in the 1957 Technical Report in terms of correlations with other test scores, item analysis statistics, and other criteria. He suggests that "while this type of validity is helpful, schools will no doubt want to make their validity appraisals mainly in terms of the relation between the tests' coverage and their curriculum objectives" (2).

Chapter Summary

The subjects used in this study were 246 males and 212 females classified as Title I, Phase I students from grades 7 through 12. The subjects were subdivided into two groups: experimental and control. The study was limited to those students who participated in both the reading and mathematics portions of the experimental program. The follow-up
portion of the study was limited to those students who re-
turned to Bethune High School for the 1972-73 term.

The experimental group was provided with an individ-
ualized programmed reading and mathematics program designed
by the contractor, along with incentives to modify behavior
and to promote academic achievement. The control group was
instructed in a traditional instructional program, utilizing
Louisiana State approved textbooks, some supplementary read-
ing materials, and teacher-made tests for evaluative purposes.

Alternate forms of the California Achievement Tests
(1957 edition) were administered to both groups. The pre-
tests (form X) were administered in the fall semester and
the posttests (form Y) were administered at the end of the
school year. A follow-up test (form Z) was administered in
October of 1972.

Subjects used in the study were compared on the variables
of sex and grade levels in academic achievement in both read-
ing and mathematics. Data were compiled and information
 transferred to IBM data sheets for computation at the North
Texas State University Center, Denton, Texas. The F-ratios
obtained through analysis-of-covariance were tested for
significance at the 5 percent level of significance.

For clarity of presentation, these mathematical
computations have been entered into tables. These tables
and an analysis of the data are reported in Chapter IV.
CHAPTER BIBLIOGRAPHY


CHAPTER IV

PRESENTATION AND ANALYSIS OF THE DATA

The purpose of this chapter is to present and analyze the statistical results based on the data collected in this study. The statistical computations necessary to test the tenability of the hypotheses stated in this study were performed at the North Texas State University Computer Center. The analysis-of-covariance technique was used to test for significance of differences between the means of the experimental and control groups on the criterion measures. The analysis-of-covariance was used because

...it is a blending of regression and the analysis of variance, which permits statistical rather than experimental control of variables. The result is equivalent to matching the variable or variables being controlled (1, p. 254.)

The formula used in the computation of the analysis-of-covariance was the standard formula used by the North Texas State University Computer Center.

The research hypotheses were stated in the null form for statistical treatment. The .05 level of significance was selected as the level at which these null hypotheses would be rejected or retained.
Hypothesis I

Research Hypothesis I stated there would be no significant difference in mathematics achievement between

a. the junior high school girls of the experimental group and the junior high school girls of the control group,

b. the junior high school boys of the experimental group and the junior high school boys of the control group,

c. the senior high school girls of the experimental group and the senior high school girls of the control group,

d. the senior high school boys of the experimental group and the senior high school boys of the control group.

In order to test this hypothesis, adjusted group means based on pretest and posttest scores from alternate forms of the California Achievement Test were compared. The pretest, posttest, adjusted means, and standard deviations for the experimental and control groups are shown in Table III.

For three of the four major groups shown in Table III, the differences between the experimental and control pretest means are relatively small. A sizable difference can be seen between pretest means of the senior high school male experimental group (52.1522) and the senior high male control group (43.6875). For all four major groups, the adjusted means (which provide the basis for testing the hypothesis) were higher for the experimental group than for the control group.
<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Pretest Means</th>
<th>Posttest Means</th>
<th>Adjusted Means</th>
<th>Pretest SD</th>
<th>Posttest SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female--Jr.High Experimental</td>
<td>61</td>
<td>37.9672</td>
<td>40.5082</td>
<td>40.0651</td>
<td>13.5953</td>
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<tr>
<td>Female--Jr.High Control</td>
<td>46</td>
<td>36.7391</td>
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<td>Male--Jr.High Experimental</td>
<td>75</td>
<td>35.9600</td>
<td>38.2533</td>
<td>37.7018</td>
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<td>11.3960</td>
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<tr>
<td>Male--Jr.High Control</td>
<td>45</td>
<td>34.0889</td>
<td>34.9778</td>
<td>35.8969</td>
<td>10.8289</td>
<td>9.3724</td>
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<tr>
<td>Female--Sr.High Experimental</td>
<td>57</td>
<td>45.3158</td>
<td>46.8596</td>
<td>47.0275</td>
<td>12.3248</td>
<td>11.5007</td>
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<tr>
<td>Female--Sr.High Control</td>
<td>48</td>
<td>45.7708</td>
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<td>46.4881</td>
<td>9.1145</td>
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<tr>
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<td>46</td>
<td>52.1522</td>
<td>53.8261</td>
<td>49.6367</td>
<td>14.4990</td>
<td>13.1036</td>
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<tr>
<td>Male--Sr.High Control</td>
<td>80</td>
<td>43.6875</td>
<td>46.8625</td>
<td>49.2714</td>
<td>11.7124</td>
<td>12.5262</td>
</tr>
</tbody>
</table>
The F-ratios, which were computed to determine whether the differences between the experimental group adjusted means and the control group adjusted means are significant, are shown in Table IV.

The only F-ratio found to be significant at the .05 level of significance is the F-ratio of 4.9851 for the female junior high school group. This means that the mathematics adjusted mean for the junior high girls' experimental group was significantly higher than the mathematics adjusted mean for the junior high school girls' control group.

Only one other F-ratio approached significance at the desired level of significance. This was the F-ratio of 2.7617 for the junior high males.

Hypothesis II

Research Hypothesis II stated there would be no significant difference in reading achievement between

a. the junior high school girls of the experimental group and the junior high school girls of the control group,

b. the junior high school boys of the experimental group and the junior high school boys of the control group,

c. the senior high school girls of the experimental group and the senior high school girls of the control group,

d. the senior high school boys of the experimental group and the senior high school boys of the control group.
TABLE IV

ANALYSIS OF COVARIANCE DATA FOR MATHEMATICS ACHIEVEMENT FOR THE EXPERIMENTAL PERIOD

<table>
<thead>
<tr>
<th>Group</th>
<th>Data</th>
<th>Source of Variance</th>
<th>SS</th>
<th>DF</th>
<th>MS</th>
<th>F</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Females, Jr.High</td>
<td></td>
<td>Between</td>
<td>183.9185</td>
<td>1</td>
<td>183.9185</td>
<td>4.9851*</td>
<td>0.0277</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Within</td>
<td>3836.9600</td>
<td>104</td>
<td>36.8938</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>4020.8784</td>
<td>105</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Females, Sr.High</td>
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<td>1</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>Within</td>
<td>5251.7383</td>
<td>102</td>
<td>51.4876</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>5259.3203</td>
<td>103</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males, Jr.High</td>
<td></td>
<td>Between</td>
<td>91.0417</td>
<td>1</td>
<td>91.0417</td>
<td>2.7617</td>
<td>0.0992</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Within</td>
<td>3857.0120</td>
<td>117</td>
<td>32.9659</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>3948.0537</td>
<td>118</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males, Sr.High</td>
<td></td>
<td>Between</td>
<td>3.5352</td>
<td>1</td>
<td>3.5352</td>
<td>0.0558</td>
<td>0.8136</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Within</td>
<td>7788.8828</td>
<td>123</td>
<td>63.3242</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>7792.4180</td>
<td>124</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*4.9851—Significant at .05 level.
In order to test this hypothesis, group means based on pretest and posttest scores from the California Achievement Test were compared. The pretest, posttest, adjusted means, and standard deviations for the experimental and control groups are shown in Table V.

The experimental group had higher reading pretest means than the control group in all except the female senior high group. For this group, the control pretest mean was 43.0208 as compared to the experimental mean of 39.0702.

For all of the major groups, except the male senior high group, the experimental group adjusted means were greater than the control group adjusted means.

The F-ratios, which were computed to determine whether the differences between the experimental group adjusted means and the control group adjusted means in reading achievement are significant, appear in Table VI.

Only one of the F-ratios shown in Table VI is significant at the .05 level. This significant F-ratio indicates that the male junior high experimental group had a significantly higher reading mean than the male junior high control group.

The F-ratio of 2.7542 for the female junior high students approached but did not reach the desired level of significance.
### TABLE V

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Pretest Means</th>
<th>Posttest Means</th>
<th>Adjusted Means</th>
<th>Pretest SD</th>
<th>Posttest SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female--Jr. High Experimental</td>
<td>61</td>
<td>46.6229</td>
<td>49.8197</td>
<td>48.8199</td>
<td>10.1787</td>
<td>10.2624</td>
</tr>
<tr>
<td>Female--Jr. High Control</td>
<td>46</td>
<td>44.2391</td>
<td>45.7174</td>
<td>47.0432</td>
<td>9.4850</td>
<td>12.0475</td>
</tr>
<tr>
<td>Male--Jr. High Experimental</td>
<td>75</td>
<td>41.4933</td>
<td>44.1733</td>
<td>44.1609</td>
<td>10.1161</td>
<td>9.0902</td>
</tr>
<tr>
<td>Male--Jr. High Control</td>
<td>45</td>
<td>41.4444</td>
<td>41.9111</td>
<td>41.9318</td>
<td>10.9411</td>
<td>9.3538</td>
</tr>
<tr>
<td>Female--Sr. High Experimental</td>
<td>57</td>
<td>39.0702</td>
<td>40.5789</td>
<td>42.1271</td>
<td>11.3230</td>
<td>11.8487</td>
</tr>
<tr>
<td>Female--Sr. High Control</td>
<td>48</td>
<td>43.0208</td>
<td>43.5625</td>
<td>41.7240</td>
<td>11.6573</td>
<td>12.3941</td>
</tr>
<tr>
<td>Male--Sr. High Experimental</td>
<td>46</td>
<td>42.6522</td>
<td>42.5869</td>
<td>41.4041</td>
<td>14.5117</td>
<td>15.2397</td>
</tr>
<tr>
<td>Male--Sr. High Control</td>
<td>80</td>
<td>40.3750</td>
<td>41.9125</td>
<td>42.5926</td>
<td>10.9641</td>
<td>11.1880</td>
</tr>
</tbody>
</table>
TABLE VI

ANALYSIS OF COVARIANCE DATA FOR READING ACHIEVEMENT FOR THE EXPERIMENTAL PERIOD

<table>
<thead>
<tr>
<th>Group</th>
<th>Source of Variance</th>
<th>SS</th>
<th>DF</th>
<th>MS</th>
<th>F</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Females, Jr.High</td>
<td>Between</td>
<td>81.5945</td>
<td>1</td>
<td>81.5945</td>
<td>2.7542</td>
<td>0.1000</td>
</tr>
<tr>
<td></td>
<td>Within</td>
<td>3080.9946</td>
<td>104</td>
<td>29.6249</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>3162.5891</td>
<td>105</td>
<td>. . .</td>
<td>. . .</td>
<td>. . .</td>
</tr>
<tr>
<td>Females, Sr.High</td>
<td>Between</td>
<td>4.1133</td>
<td>1</td>
<td>4.1133</td>
<td>0.0821</td>
<td>0.7751</td>
</tr>
<tr>
<td></td>
<td>Within</td>
<td>5111.7266</td>
<td>102</td>
<td>50.1150</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>5115.8398</td>
<td>103</td>
<td>. . .</td>
<td>. . .</td>
<td>. . .</td>
</tr>
<tr>
<td>Males, Jr.High</td>
<td>Between</td>
<td>139.7380</td>
<td>1</td>
<td>139.7380</td>
<td>4.0464*</td>
<td>0.0466</td>
</tr>
<tr>
<td></td>
<td>Within</td>
<td>4040.4807</td>
<td>117</td>
<td>34.5340</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>4180.2188</td>
<td>118</td>
<td>. . .</td>
<td>. . .</td>
<td>. . .</td>
</tr>
<tr>
<td>Males, Sr.High</td>
<td>Between</td>
<td>40.9297</td>
<td>1</td>
<td>40.9297</td>
<td>0.6589</td>
<td>0.4185</td>
</tr>
<tr>
<td></td>
<td>Within</td>
<td>7640.9336</td>
<td>123</td>
<td>62.1214</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>7681.8633</td>
<td>124</td>
<td>. . .</td>
<td>. . .</td>
<td>. . .</td>
</tr>
</tbody>
</table>

*4.0464--Significant at .05 level.
Hypothesis III

Research Hypothesis III stated that approximately four months following the experimental period there would be no significant difference in the amount of change in achievement level in mathematics between

a. the junior high school girls of the experimental group and the junior high school girls of the control group,

b. the junior high school boys of the experimental group and the junior high school boys of the control group,

c. the senior high school girls of the experimental group and the senior high school girls of the control group,

d. the senior high school boys of the experimental group and the senior high school boys of the control group.

The tables which follow present data obtained from the follow-up portion of the study. The posttest scores from the California Achievement Tests administered during the experimental period were used as the covariate measure in the follow-up study. The pretest, posttest, adjusted means, and standard deviations for the experimental and control groups for mathematics achievement are shown in Table VII.

For all four major groups, the experimental pretest means exceeded the control pretest scores. The greatest difference in pretest means was found for the male senior
TABLE VII
MEAN MATHEMATICS SCORES AND STANDARD DEVIATIONS
FOR JUNIOR AND SENIOR HIGH SCHOOL STUDENTS
FOR THE FOLLOW-UP PERIOD

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Pretest Means</th>
<th>Posttest Means</th>
<th>Adjusted Means</th>
<th>Pretest SD</th>
<th>Posttest SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female--Jr.High Experimental</td>
<td>48</td>
<td>40.5417</td>
<td>42.0208</td>
<td>41.0969</td>
<td>12.1969</td>
<td>11.8797</td>
</tr>
<tr>
<td>Female--Jr.High Control</td>
<td>35</td>
<td>37.5714</td>
<td>40.5428</td>
<td>41.8100</td>
<td>9.8288</td>
<td>10.5923</td>
</tr>
<tr>
<td>Male--Jr.High Control</td>
<td>33</td>
<td>34.1212</td>
<td>37.7273</td>
<td>39.6400</td>
<td>7.1229</td>
<td>9.5763</td>
</tr>
<tr>
<td>Female--Sr.High Experimental</td>
<td>36</td>
<td>47.0555</td>
<td>48.5278</td>
<td>48.3277</td>
<td>10.6904</td>
<td>11.0311</td>
</tr>
<tr>
<td>Female--Sr.High Control</td>
<td>41</td>
<td>46.6341</td>
<td>48.0488</td>
<td>48.2244</td>
<td>10.8990</td>
<td>14.4689</td>
</tr>
<tr>
<td>Male--Sr.High Experimental</td>
<td>23</td>
<td>56.9130</td>
<td>54.0869</td>
<td>47.3336</td>
<td>9.7790</td>
<td>14.0225</td>
</tr>
<tr>
<td>Male--Sr.High Control</td>
<td>57</td>
<td>46.7368</td>
<td>48.0526</td>
<td>50.7776</td>
<td>12.4851</td>
<td>13.4542</td>
</tr>
</tbody>
</table>
high students. The pretest mean for the senior high boys' experimental group was 56.9130, while the senior high boys' control group pretest mean was 46.7368.

For all except one of the groups the differences between the experimental adjusted means and control adjusted means were very slight. The greatest difference was found for the male senior high control group, which showed an adjusted mean of 50.7776 as compared to an experimental adjusted mean of 47.3336.

The F-ratios, which were computed to determine whether the differences in the experimental group adjusted means and the control group adjusted means in the follow-up portion in mathematics achievement are significant, appear in Table VIII.

All of the F-ratios in Table VIII are non-significant. The largest F-ratio (2.5549) was found for the male senior high group. This F-value approaches, but did not reach, the desired level of significance. Thus, the experimental group did not show a significantly higher or lower level of achievement than the control group. This means that the academic achievement skills in mathematics did not diminish significantly more for the control group than for the experimental group during the follow-up period.
TABLE VIII
ANALYSIS OF COVARIANCE DATA FOR MATHEMATICS ACHIEVEMENT FOR FOLLOW-UP PERIOD

<table>
<thead>
<tr>
<th>Group</th>
<th>Source of Variance</th>
<th>SS</th>
<th>DF</th>
<th>MS</th>
<th>F</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Females, Jr. High</td>
<td>Between</td>
<td>10.1133</td>
<td>1</td>
<td>10.1133</td>
<td>0.1666</td>
<td>0.6842</td>
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<tr>
<td></td>
<td>Within</td>
<td>4855.7266</td>
<td>80</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>4865.8399</td>
<td>81</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>Females, Sr. High</td>
<td>Between</td>
<td>0.2031</td>
<td>1</td>
<td>0.2031</td>
<td>0.0026</td>
<td>0.9591</td>
</tr>
<tr>
<td></td>
<td>Within</td>
<td>5674.2891</td>
<td>74</td>
<td>76.6796</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>5674.4922</td>
<td>75</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>Males, Jr. High</td>
<td>Between</td>
<td>28.1094</td>
<td>1</td>
<td>28.1094</td>
<td>0.6239</td>
<td>0.4316</td>
</tr>
<tr>
<td></td>
<td>Within</td>
<td>4280.2109</td>
<td>95</td>
<td>45.0548</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>4308.3203</td>
<td>96</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>Males, Sr. High</td>
<td>Between</td>
<td>168.0508</td>
<td>1</td>
<td>168.0508</td>
<td>2.5549</td>
<td>0.1140</td>
</tr>
<tr>
<td></td>
<td>Within</td>
<td>5064.6719</td>
<td>77</td>
<td>65.7749</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>5232.7227</td>
<td>78</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
</tbody>
</table>
Hypothesis IV

Research Hypothesis IV stated that approximately four months following the experimental period there would be no significant difference in the amount of change in achievement level in reading between

a. the junior high school girls of the experimental group and the junior high school girls of the control group,

b. the junior high school boys of the experimental group and the junior high school boys of the control group,

c. the senior high school girls of the experimental group and the senior high school girls of the control group,

d. the senior high school boys of the experimental group and the senior high school boys of the control group.

In order to test this hypothesis, group means based on pretest and posttest scores from the California Achievement Test were compared. The pretest, posttest, adjusted means, and standard deviations are given in Table IX.

For both the female and male junior high school groups, the pretest means were higher for the experimental group than for the control group. However, for both the female and male senior high group, the control pretest means were higher than the experimental pretest means.

Three of the four major groups showed higher adjusted means for the control group than for the experimental group. For the female junior high group, the experimental mean exceeded the control mean.
<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Pretest Means</th>
<th>Posttest Means</th>
<th>Adjusted Means</th>
<th>Pretest SD</th>
<th>Posttest SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female-Jr.High Experimental</td>
<td>58</td>
<td>49.7931</td>
<td>49.7586</td>
<td>48.8073</td>
<td>10.3598</td>
<td>10.0217</td>
</tr>
<tr>
<td>Female--Jr.High Control</td>
<td>40</td>
<td>46.3250</td>
<td>44.4750</td>
<td>45.8543</td>
<td>11.0787</td>
<td>9.5461</td>
</tr>
<tr>
<td>Male--Jr.High Experimental</td>
<td>72</td>
<td>43.8055</td>
<td>43.5833</td>
<td>43.1833</td>
<td>8.9987</td>
<td>9.7429</td>
</tr>
<tr>
<td>Male--Jr.High Control</td>
<td>39</td>
<td>42.3333</td>
<td>43.4359</td>
<td>44.1744</td>
<td>9.8337</td>
<td>8.9907</td>
</tr>
<tr>
<td>Female--Sr.High Experimental</td>
<td>36</td>
<td>39.2778</td>
<td>40.8333</td>
<td>42.4329</td>
<td>13.2096</td>
<td>11.6827</td>
</tr>
<tr>
<td>Female--Sr.High Control</td>
<td>42</td>
<td>43.3810</td>
<td>46.9762</td>
<td>45.6051</td>
<td>11.2747</td>
<td>13.1511</td>
</tr>
<tr>
<td>Male--Sr.High Experimental</td>
<td>27</td>
<td>37.8889</td>
<td>39.9259</td>
<td>42.7938</td>
<td>12.8043</td>
<td>13.3068</td>
</tr>
<tr>
<td>Male--Sr.High Control</td>
<td>62</td>
<td>43.0000</td>
<td>47.2419</td>
<td>45.9930</td>
<td>10.5099</td>
<td>11.6319</td>
</tr>
</tbody>
</table>
The F-ratios which were computed to determine the significance of differences in the experimental group adjusted means and the control group adjusted means in the follow-up portion in reading achievement are shown in Table X.

Only one of the F-ratios shown in Table X is significant at the .05 level. This is the F-ratio of 4.3895 for the junior high females. This indicates that for this group the level of reading achievement decreased significantly more for the control group than for the experimental group during the follow-up period.

The F-ratios for the senior high girls approached, but did not reach, the desired level of significance.

Summary

The overall design selected for the research was the non-equivalent control group design, an experimental design that involved an experimental group and a control group, both of which were given a pretest, posttest, and a follow-up test. The two groups did not have experimental equivalence but were natural collectives as similar as availability permitted. The analysis-of-covariance technique was used to achieve statistical control over variables. The F-ratios obtained through the analysis-of-covariance were examined for significance at the 5 percent level of significance.
TABLE X
ANALYSIS OF COVARIANCE DATA FOR READING ACHIEVEMENT FOR THE FOLLOW-UP PERIOD

<table>
<thead>
<tr>
<th>Group</th>
<th>Source of Variance</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>SS</td>
<td>DF</td>
<td>MS</td>
<td>F</td>
<td>P</td>
</tr>
<tr>
<td>Females, Jr. High</td>
<td>Between</td>
<td>201.1797</td>
<td>1</td>
<td>201.1797</td>
<td>4.3895*</td>
<td>0.0388</td>
</tr>
<tr>
<td></td>
<td>Within</td>
<td>4354.0625</td>
<td>95</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>4555.2422</td>
<td>96</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males, Jr. High</td>
<td>Between</td>
<td>24.7109</td>
<td>1</td>
<td>24.7109</td>
<td>0.6394</td>
<td>0.4257</td>
</tr>
<tr>
<td></td>
<td>Within</td>
<td>4174.1445</td>
<td>108</td>
<td>38.6495</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>4198.8554</td>
<td>109</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Females, Sr. High</td>
<td>Between</td>
<td>189.5898</td>
<td>1</td>
<td>189.5898</td>
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<tr>
<td></td>
<td>Within</td>
<td>4934.7617</td>
<td>75</td>
<td>79.1301</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>6124.3515</td>
<td>76</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males, Sr. High</td>
<td>Between</td>
<td>184.2656</td>
<td>1</td>
<td>184.2656</td>
<td>2.7704</td>
<td>0.0996</td>
</tr>
<tr>
<td></td>
<td>Within</td>
<td>5720.0781</td>
<td>86</td>
<td>66.5125</td>
<td></td>
<td></td>
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<td>Total</td>
<td>5904.3437</td>
<td>87</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*4.3895--Significant at .05 level.
With respect to mathematics achievement during the experimental period, the only F-ratio found to be significant at the .05 level of significance is the F-ratio of 4.9851 for the female junior high school group. Only one other F-ratio approached significance at the desired level of significance. This was the F-ratio of 2.7617 for the junior high males.

With respect to reading achievement during the experimental period, the only F-ratio found to be significant at the .05 level of significance is the F-ratio of 4.0464 for the male junior high experimental group. Only one other F-ratio approached significance at the desired level. This was the F-ratio of 2.7542 for the female junior high students.

In the follow-up portion of the study, where the post-test scores from the California Achievement Tests were used as the covariate measure, it was found that in mathematics achievement all of the F-ratios were nonsignificant. The largest F-ratio (2.5549) was found for the male senior high group. This F-value approached, but did not reach, the desired level of significance.

In the follow-up study, with respect to reading achievement, only one of the F-ratios was found to be significant at the desired level of significance. This is the F-ratio of 4.3895 for the junior high girls. The F-ratios for the
senior high girls approached, but did not reach, the .05 level required.
CHAPTER BIBLIOGRAPHY

CHAPTER V

SUMMARY, FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The purpose of this study was to compare the academic skills achievement in reading and mathematics of secondary school students who participated in an experimental performance contracting program with students who did not participate in the performance-based program. Additionally, a follow-up study was conducted to determine whether those students who participated in the performance contracting program showed a significantly different level of achievement than the control group approximately four months after the conclusion of the program. Subjects used in the program were junior and senior high school students enrolled at Bethune High School in Caddo Parish, Louisiana.

Research tended to indicate that there is still no definitive answer as to whether or not the innovative approach of performance contracting will improve the academic skills of those students with severe deficiencies in reading and mathematics.

The significance and need for the study rested primarily on the analysis and comparison of the success of these students for future application of such methods for improvement.
of such basic skills. This was important from an instructional as well as administrative point of view.

A review of the literature and research of performance contracts indicated that while there is a great deal of diversity in methods, program management, and evaluation techniques, the theories of positive reinforcement and accountability are integral parts of the performance based concept in education.

Compensatory education programs have generally failed to improve the cognitive skills of students in need of remedial education. Thus, great enthusiasm greeted early reports that a private firm operating under a performance contract had succeeded in dramatically increasing achievement gains of academically deficient students in the original Texarkana Project. Educators, policymakers, and economists alike were intrigued by this attempt to introduce accountability into the education business. Although the achievement gains in the Texarkana performance contract are now considered dubious because the contractor allegedly taught the test, there is little doubt that there were dramatic decreases in the dropout rate as a result of the program.

The pioneer program in Texarkana was the first attempt to hold a private contractor strictly accountable for academic achievement; and while there were major unsolved problems, it provided the impetus for future efforts by business firms outside the school system to enter the field.
of contracting for performance in basic skills and vocational training.

More recent performance contracts such as those studied by Rand Corporation analysts reveal several weaknesses as well as advantages of such an innovative approach in dealing with academically deficient students who have not achieved success within the traditional curriculum offered by the public schools.

The most comprehensive (and as yet controversial) performance contracting experiments were financed by the Office of Economic Opportunity in which six educational companies conducted programs in eighteen cities across the United States. Despite the magnitude, scope, and costs involved, the negative results of the experiment as reported by OEO have been disputed by authorities in several fields. The experimental design has been called inadequate by such critics as Blaschke (1), Saretsky (6), Miller (4), Mecklenburger (3), and others, thus, casting some doubt as to the validity of the results obtained in the OEO study.

Thiokol Corporation's performance contract in Caddo Parish, Louisiana, the subject of this study, involved junior and senior high school students at a predominantly black school located in an impoverished area where many of the students suffered academic deficiencies in the basic skills of reading and mathematics.
The subjects used in this study were 246 males and 212 females classified as Title I, Phase I students from grades 7 through 12. The subjects were subdivided into two groups: experimental and control. The study was limited to those students who participated in both the reading and mathematics portions of the experimental program. The follow-up portion of the study was limited to those students who returned to Bethune High School in the fall of 1972 and who were administered the California Achievement Test (Form Z).

The experimental group was provided with an individualized programmed reading and mathematics program designed by the contractor, along with incentives (rewards) for behavior modification and promotion of academic achievement. The control group was instructed in a traditional instructional program, utilizing Louisiana State approved textbooks, some supplementary reading materials, and teacher-made tests for evaluative purposes.

Alternate forms of the California Achievement Tests (1957 edition) were administered to both groups. The pre-tests (Form X) were administered in the fall (1971) semester and the posttests (Form Y) were administered at the end of the school year. A follow-up test (Form Z) was administered in October of 1972.

The subjects used in the study were compared on the variables of sex and grade levels in academic achievement in both reading and mathematics. The data were compiled and
information transferred to IBM data sheets for computation at the North Texas State University Computer Center, Denton, Texas. The F-ratios obtained through analysis-of-covariance were examined for significance at the 5 percent level of significance.

Findings

The hypotheses were stated in the null form as follows:

I. At the end of the experiment there will be no significant difference in mathematics achievement between
   a. the junior high school girls of the experimental group and the junior high school girls of the control group,
   b. the junior high school boys of the experimental group and the junior high school boys of the control group,
   c. the senior high school girls of the experimental group and the senior high school girls of the control group,
   d. the senior high school boys of the experimental group and the senior high school boys of the control group.

The statistical analysis of the data revealed that there was a significant difference at the .05 level in mathematics achievement during the experimental period between the junior high school girls of the control group and the
junior high school girls of the experimental group. The F-ratio of 4.9851 for the female junior high school group indicates that the mathematics adjusted mean for the junior high girls' experimental group was significantly higher than the mathematics adjusted mean for the junior high school girls' control group. For that reason, part (a) of Hypotheses I was rejected. The other portions of Hypothesis I were retained.

Hypotheses II stated, at the end of the experiment there will be no significant difference in reading achievement between

a. the junior high school girls of the experimental group and the junior high school girls of the control group,

b. the junior high school boys of the experimental group and the junior high school boys of the control group,

c. the senior high school girls of the experimental group and the senior high school girls of the control group,

d. the senior high school boys of the experimental group and the senior high school boys of the control group.

There was a significant difference at the .05 level in reading achievement for the experimental period between the junior high boys. The F-ratio of 4.0464 for the male junior
high experimental group indicates that the reading adjusted mean for the junior high boys' experimental group was significantly higher than the reading adjusted mean for the junior high boys' control group; therefore, part (b) of Hypothesis II was rejected. The other portions of Hypothesis II were retained.

Hypotheses III and IV which were concerned with a follow-up study of the experimental and control groups revealed the following:

Hypothesis III stated that approximately four months following the experimental period there will be no significant difference in the amount of change in achievement level in mathematics between

a. the junior high school girls in the experimental group and the junior high school girls in the control group,

b. the junior high school boys in the experimental group and the junior high school boys in the control group,

c. the senior high school girls in the experimental group and the senior high school girls in the control group,

d. the senior high school boys in the experimental group and the senior high school boys in the control group.
All of the F-ratios for mathematics achievement were nonsignificant. The largest F-ratio of 2.5549 was found for the boys in the senior high group. The F-value approached, but did not reach, the desired level of significance. Therefore, the null hypothesis was retained for all groups in Hypothesis III.

Hypothesis IV stated that approximately four months following the experimental period there will be no significant difference in the amount of change in achievement level in reading between

a. the junior high school girls of the experimental group and the junior high school girls of the control group,

b. the junior high school boys of the experimental group and the junior high school boys of the control group,

c. the senior high school girls of the experimental group and the senior high school boys of the control group,

d. the senior high school boys of the experimental group and the senior high school boys of the control group.

There was a significant difference at the .05 level in reading achievement during the follow-up period between the females of the high school experimental and control group. The F-ratio of 4.3895 indicates that the reading adjusted
mean for the junior high girls' experimental group was significantly higher than the reading adjusted mean for the junior high girls' control group. Therefore, part (a) of Hypothesis IV was rejected.

The F-ratios for the senior high girls (2.3959) approached, but did not reach, the desired level of significance. The remaining portions of Hypothesis IV were retained.

Conclusions

Findings pertinent to assessing the effects of a performance contracting program on the achievement of academically deficient secondary school students were revealed through the testing of four major null hypotheses and are limited to the sample utilized in this study. All subjects involved were students at Bethune High School in Caddo Parish, Louisiana.

The conclusions which follow were drawn on the basis of careful treatment and analysis of data collected to ascertain changes in academic achievement skills in reading and mathematics as a result of participating in the experiment.

1. For the groups which were included in the present study, the performance contracting program, in general, did not prove to be superior to the traditional method of instruction in terms of mathematics achievement.
2. It may be concluded that for the groups which were included in the present study, the performance contracting program, in general, did not prove to be superior to the traditional method of instruction in terms of reading achievement.

3. For the groups included in this study, the performance contracting program, in general, did not prove to be superior to the traditional method of instruction in effecting retention of previously attained levels of achievement in reading and mathematics.

4. It may be concluded that, in terms of the population included in this study, performance contracting has not been a vastly superior management tool for eliminating academic deficiencies in underachieving students. This implies that the concept of performance contracting, presently in the infancy stage, may need to undergo reevaluation of aims and methods if private firms are to play a viable role in effecting change within the public schools.

Recommendations

The study revealed a number of problems which have implications for further investigation. Based on the findings of this study and upon the review of research, the following recommendations are offered for consideration:

1. That a longitudinal study be conducted, beyond this one year study, using, if possible, the same subjects
or a comparable group, and adjusting the curriculum and methods of instruction with the recommendations of local staff and the performance contractor.

2. That research be conducted to study the effects on students as revealed by criterion-referenced tests as compared to norm-referenced tests currently used in evaluating most performance contracting experiments.

3. That a study be conducted on the effects of incentives (rewards) on retention factors since this study would seem to indicate that such incentives may have short term, but not lasting, effects on achievement test scores.

4. That the public schools investigate the possibility of employing more para-professionals to perform clerical tasks now being performed by the classroom teachers. Relieved of these tasks, the teacher would have more time for planning and preparing for instruction of students.

5. That performance contracting programs be well planned and that adequate time be allowed for orientation of students as well as teachers who are to participate in such programs. Job descriptions should be developed for personnel.

6. That an investigation be made into the role of the teacher manager in an individualized, programmed classroom as compared with the role of the teacher as lecturer instructor in the conventional type program.

7. That educators with the Caddo Parish School System adopt a long-range plan of evaluation and development of
procedures for continual upgrading of the curriculum content and methods of instruction that will meet the educational, societal, and emotional needs of academically deficient students such as those included in this study.
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APPENDIX A

EDUCATION COMPANIES AND SITES IN THE OEO PERFORMANCE CONTRACTS

I. Alpha Learning Systems, Inc., Albuquerque, New Mexico
   A. Grand Rapids, Michigan
   B. Hartford, Connecticut
   C. Taft, Texas

II. Learning Foundations, Inc., Athens, Georgia
    A. Bronx, New York
    B. Jacksonville, Florida
    C. Hammond, Indiana

III. Plan Education Centers, Little Rock, Arkansas
     A. Athens, Georgia
     B. Selmer, Tennessee
     C. Wichita, Kansas

IV. Quality Educational Development, Inc., Washington, D.C.
    A. Rockland, Maine
    B. Anchorage, Alaska
    C. Dallas, Texas

V. Singer-Graflex, Inc., Rochester, New York
   A. McComb, Mississippi
   B. Portland, Maine
   C. Seattle, Washington

VI. Westinghouse Learning Corporation, Albuquerque, New Mexico
    A. Fresno, California
    B. Las Vegas, Nevada
    C. Philadelphia, Pennsylvania
APPENDIX B

PORTIONS OF PROPOSAL BY DORSETT EDUCATIONAL SYSTEMS, INC. TO THE TEXARKANA SCHOOLS

I. STUDENT FLOW

A. Overall

One of the important ways in which our approach differs from that outlined in the Request for Proposal is in the area of geography and logistics. Precisely because the system we are proposing is largely self-instructional, and because the equipment we are proposing is both portable and inexpensive, we see no necessary reason for transporting all students to one location.

For a wide variety of reasons, primarily economic and social, we would much prefer to locate decentralized branches of the Rapid Learning Center at or in the schools they will serve.

On economic grounds, the merits are obvious. No addition to our staff will be necessary, since six persons will be required either way for the 150 student level and little extra instructional materials or equipment will be necessary; and our basic cost structure for grade-level achievement will remain unchanged. But since we will not be wasting up to one hour of the student's time per day in travel and administration, this hour will be available for additional instruction either in the school setting or in the RLC (Rapid Learning Center). It should be noted that this cost-benefit will not be passed along to the contractor, since we will be paid on the basis of clock-time in the RLC, not on calendar-time. But it will work to the benefit of the schools, since more students can be handled per unit time, and thus the fixed costs of operating the RLC will be spread over perhaps a third more students than would otherwise be anticipated.

On social grounds, it seems obvious that the students' self-perception, as well as their perception of the project, would be improved by eliminating the somewhat degrading element of bussing. It is our firm intention to make the RLC concept so attractive, environmentally and
educationally, that our students and their peers will look upon attendance as a privilege rather than a stigma. The removal of the bussing interlude will also eliminate one unnecessary potential discipline problem. Further, it will eliminate one possible source of concern within the community.

And finally, it will make for a more meaningful experimental design and model for replication in other communities which will often not have an empty school building available to them.

One of the features of the Center will be carpeting. It is Dorsett's experience that not only will floor maintenance be reduced, but student behavioral level will be substantially affected by the appearance, resilience, and acoustically quieting effects of carpeting. Adequate reserves will be established for maintenance due to wear and damage due to accidents or vandalism. Another feature of the Center may be the installation of FM stereo receivers which could be tuned to the Texarkana FM station at most times during the school day. In this context, it should be remembered that study will be completely individualized, with permanently assigned headsets, and that lectures and group discussions will be rare, small, and used as reinforcement contingencies or breaks. Obviously, any procedure which depends primarily upon the special personal skill of unique imported professionals is not one which can be rapidly expanded and widely disseminated.

If the utilization of centrally-located space within each school proves to be impracticable, we would then propose the use of pre-fabricated steel classrooms or wheeled mobile classrooms adjacent to each of the four schools, to be installed at the contractor's expense if necessary.

We would like to assure the project management that we do not think the student's environment is a trivial consideration. Time after time, one or another of our learning centers has found that a given learning task takes 2½ to 3 times as long when performed in a typical public school environment as it does in our facilities. We feel that this is at least partially attributable to the businesslike atmosphere induced by consistently applied contingency management schedules. We work consciously at exhibiting our seriousness of purpose, and when the student perceives that we are actually on his side, he supports and works at that purpose. Accordingly, we will do everything within reason to make the transition from routine school activities to the RLC a "through the looking-glass" type experience, whereby the student will leave behind avoidance
behaviors, such as how-not-to-study and how-to-play the game. To this end we will attire our staff distinctively, for example in blazers of a particular color. We will also want to insulate our students as completely as possible from routine school activities while they are in the RLC; in order to help enforce this insulation, we will propose that any time one of our students is called out of the RLC for any reason, that no time be charged against our accounting for that student for that day. Finally, we will want the privilege of dismissing students from the program if and as they disrupt our controlled environment. We do not, by the way, consider the last to be a serious problem quantitatively, based on our previous experience with similar populations.

B. Student Flow Within the Center

1. Orientation Period

   It is critically important that a student's first contact with the center be non-threatening and non-aversive. To this end, there will be no testing during the first week of attendance. Instead, cassette tape players will be made available the first day, and each student will listen to a recorded presentation of the purpose and philosophy of the Rapid Learning Center. During the remaining four days of the week he will be encouraged to familiarize himself with the self-instructional equipment, including the Dorsett M86, to select filmstrips that interest him for viewing, to look at single-concept 8mm films, and to browse in the available free-reading material. The only exception to the no-testing rule during the first week will be administration of a 5-minute "fun-and-games" reading quiz on Friday. This instrument, the Ohio Literacy Quiz, has been found in our research to have a high correlation with lengthier and more tedious reading measures.

   It is anticipated that many, if not most, of our students will be reading below the 7th grade level. Although our overall approach will be heavily audiovisual in nature, thus minimizing the effect of initial reading problems, it is of course obvious that the production of reading achievement is critical to the success of the project, and this area will receive first attention in the Center.

2. Basic Level

   As discussed previously we will initially also utilize the Job Corps Reading System, including
programmed instruction booklets, available from the General Services Administration, for our basic reading program. Therefore, the first event of the second week in the center will be the administration of the appropriate screening instrument. Based on these results, each individual will be entered at the appropriate level of the Reading System. . . . As students complete the Job Corps reading sequence or their initial screening tests indicate no need for it, they will be branched to more advanced reading materials, both programmed instruction and audio-visual. Because of the importance of reading skills to other subject-matter, including arithmetic reasoning ("word problems") we will use both of the two study-hours in the RLC for reading instruction until the student has demonstrated a minimum of 7th grade achievement. At this time, the second hour of each study period will be converted to math instruction.

Here again, the Job Corps system will be used initially. . . .

II. INDIVIDUALIZED AUDIO-VISUAL INSTRUCTION

Few would argue with the suggestion that, all other things being equal, audio-visual instruction should be used whenever possible with disadvantaged populations since these groups typically exhibit both reading disability and reading disinclination.

There is also a considerable body of educational research indicating that students learn more from an audio-visual presentation when some sort of active response is required. And, there is little doubt regarding the effectiveness of immediate and automatic reinforcement of correct answers in any sort of instructional sequence.

It is difficult for us to over-emphasize the importance which we attach to the fact that we are proposing the use of an instructional system that capitalizes on just these techniques, our Dorsett M86 audio-visual teaching machine. Of our own knowledge, this is the only comparable device on the market today, that is both in production and inexpensive enough to be used in sufficient quantity to carry much of the instructional burden, as distinguished from a laboratory model or curiosity item.

As noted earlier, we expect to use this machine as the primary source of instruction at the intermediate and advanced levels, and if permission can be obtained to convert
Job Corps reading and math programs to this format, at the basic level as well.

Add to this the versatility of also being able to use the same device to individualize the instructional use of hundreds of existing educational filmstrips, and we submit that we will bring to the Texarkana project an instructional system unavailable from any other source, and one which will help us immeasurably in guaranteeing the achievement of the goals cited in the Request for Proposal. . . .
APPENDIX C

CONTRACTING RELATIONSHIPS IN THE OEO EXPERIMENT

Diagram:
- Testing and Analysis Contractor
- OEO
  - Management Support Contractor
  - School District (Contractor)
  - Educational Company (Sub-Contractor)
APPENDIX D

The most commonly used reading materials in the performance contracting program as well as the supplementary reading materials utilized in the conventional classrooms are examined below:

1. *Conquests in Reading*—Edited by William Kottmeyer and Kay Ware and published by Webster Division, McGraw-Hill Book Company, New York. A workbook which contains material for the non-reader and the very poor reader with exercises to illustrate each unit. This workbook may be used with supplementary cassette recordings to aid the non-reader. Examples of units include, Consonant Sounds, Sounding Words (vowel sounds), Prefixes, Suffixes, Syllabication, Synonyms, Antonyms, and Sight Words.

2. *Encounters*—Published by Houghton Mifflin Company, Boston, Massachusetts. Each teaching unit begins with an outline entitled "Skills Objectives," and is divided into two main sections: Vocabulary Skills and Comprehension Skills. These sections contain detailed instructions for teaching vocabulary and word-analysis skills. There are also instructions for developing interpretive skills by analyzing plot development, characterization, and other significant aspects of stories and plays. The instructional form used in each teaching unit consists of directions to
the teacher, statements to be made and questions to be asked by the teacher.

3. **Kaleidoscope Series**—Published by Field Educational Publications, 4040 Harry Hines Boulevard, Dallas, Texas. There are eight books in the series, ranging from a reading difficulty level of second grade to ninth grade. This series enables students to acquire skills in recognizing words, deriving word meanings, comprehending sentences, paragraphs, and whole selections.

4. **Merrill Modern Reading Books**—Published by Charles E. Merrill Publishing Company, 1300 Alum Creek Drive, Columbus, Ohio. This series of books contains reading materials ranked on a continuum of difficulty. The short stories and articles contained in this series are followed by exercises entitled "Understanding the Words," "Knowing the Facts," and "Organizing Ideas."

5. **Reader's Digest Reading Skill Builders**—Published by the Educational Division, Reader's Digest Services, Inc., Pleasantville, New York. Each of the books in this series consists of several short stories and articles, followed by a comprehension check designated as "Skill Builders." This series consists of nineteen books. The reading materials are ranked on a continuum of difficulty.

6. **S.C.O.P.E Series**—Published by Scholastic Book Services, 900 Sylvan Avenue, Englewood Cliffs, New Jersey. The **S.C.O.P.E Series** consists of the following workbooks:
Jobs in Your Future, Across and Down (Word Skills I), Word Puzzles and Mysteries, Trackdown, Spotlight, and Dimensions. These books are designed for the slow and reluctant reader. The books are designed to provide facts and ideas about the world of work as well as to reinforce reading skills and grammar.


The SRA Reading Laboratories provide materials designed for readers in four categories: (1) Primary Grades, one through three; (2) Intermediate Grades, four through six; (3) Junior High (Lab. IIIa); (4) High School and College (Lab. IVa).

The SRA Reading Laboratory which is designed for the primary grades consists of three parts: Word Games, Power Builders, and Listening Skill Builders.

The SRA Reading Laboratory designed for grades seven through nine (SRA IIIa) contains materials with a reading difficulty of grades three through twelve.

SRA Reading Laboratory IV is designed for students in grades nine through twelve who are able to read at the eighth grade reading level and above.
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