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THE UNIVERSITY OF OKLAHOMA
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AN INVESTIGATIVE STUDY OF TWO METHODS OF TEACHING
GRAMMAR: CONVENTIONAL INSTRUCTION AND
PROGRAMMED INSTRUCTION

A DISSERTATION
SUBMITTED TO THE GRADUATE FACULTY
in partial fulfillment of the requirements for the
degree of
DOCTOR OF EDUCATION

BY
AURELIA D. ROBINSON
Norman, Oklahoma
1972

AN INVESTIGATIVE STUDY OF TWO METHODS OF TEACHING

GRAMMAR: CONVENTIONAL INSTRUCTION AND

PROGRAMMED INSTRUCTION

APPROVED BY

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DISSERTATION COMMITTEE

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Dedicated

to

my Father

Mr. William C. Robinson

and to

the memory

of

my Mother

Mrs. Aurelia D. Robinson

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AN INVESTIGATIVE STUDY OF TWO METHODS OF TEACHING

GRAMMAR: CONVENTIONAL INSTRUCTION AND PROGRAMMED INSTRUCTION

CHAPTER I

INTRODUCTION

In recent years educators as well as laymen have witnessed the emergence of a new era in educational technology. Much of that attention has been attracted by research developments that focus on the use of scientific techniques in educational methodology. One of these techniques, programmed instruction, is utilized in many phases of education as well as in business, industry, and the armed forces. In classrooms at every level one sees evidence of concern for successful implementation and utilization of programmed instruction. Some authorities agree that this approach to instruction is a vital teaching tool and a helpful device for saving time; however, others see it as an approach that poses dangers or disadvantages. Because of these differences of opinions, there is need to be caution in accepting programmed instruction as a panacea in teaching. Yet the suggested opportunities presented through this method of teaching seem too important to

be ignored. Some sources suggest that programmed instruction is a systematic manner of individualizing study which promotes greater achievement among students, and provides more release time for the teacher. On the other hand, one sees that programmed materials cannot initiate, transmit, or receive ideas, thereby creating a handicap for meaningful teaching.

Persistent experimentation with programmed instruction in all areas of learning should in time provide a better basis for formulating valid conclusions about the effectiveness of its use than now exists. There is a dearth of research reports and commercially available programs in certain subject areas; however, the rapid growth of technology apparently will offset that scarcity. Great strides are being made toward supplying programs where these have not been used as well as toward increasing usage where such practice is limited.

Representative of programs used in different subject areas are English 2600, Project PLAN, Basic Russian Reading, Great Themes in American History, TEMAC Mathematics Series, Analysis of Behavior, and LIFE. These titles are also examples of what is found on an extensive list of commercially available programs. It is stated that some programs only last for a short time in some school systems, while in others, they are retained and used effectively. On the other hand, the extremely limited or non-use of programs in certain subject areas cannot be ignored. One of these areas is the social studies. According to Roucek

The availability of programmed instruction in the secondary school social studies is considerably behind many of the other subject areas. In 1962 there were only seven commercially prepared programs available in the social studies which constituted only 5.7 per cent of the total programs in all subject areas.¹

Not only did this writer's observations include social studies, but she also looked at other areas and reported the findings. He found that a number of excellent programs existed in the social sciences. The programmed texts cited were The Analysis of Behavior, Learning and Human Abilities, and Physiological Psychology.² No known programs were available in anthropology and sociology; however, a development of programs for automated teaching in geography had begun. The titles in geography are Earth in Orbit and Geography of the United States, U-3006.³ Examination of the fine arts area also revealed an absence of programs. As late as 1962 commercially available programs could not be verified in religion or philosophy.

Two other programs are LIFE and PLAN. Project LIFE--Language Improvement to Facilitate Education of hearing--is considered to be possibly the largest and most comprehensive endeavor in programmed instruction for the handicapped child.⁴

¹Joseph S. Roucek, Programmed Teaching: A Symposium on Automation in Education (New York: Philosophical Library, Inc., 1965), p. 81.

²Ibid., p. 77.

³Ibid.

⁴Glen S. Pfau, "Programmed Instruction: An Exploration into Its Effectiveness with the Handicapped Child," Audiovisual Instruction, XIV (November, 1969), 34.

This program was launched in 1963, but other research utilizing programmed instruction with the handicapped child was conducted considerably earlier. Project PLAN has been designed to assure that "the quest for learning in an individualized classroom becomes more the responsibility of the student."¹ It is asserted that the project individualized four subject areas: language arts, mathematics, science, and social studies. By September, 1970, a twelve-year program of instruction had been developed. This project has been described as an individualized Program of Learning in Accordance with Needs.

A few titles for programs have been given, and the state of automated instruction in some subject areas in education has been described. The intent was to show the extent of the use of programmed instruction and to give some indication of its present utility. A more recent source reveals pertinent facts about technological methodology and programmed textbooks. Although some doubts persist about the validity of programmed instruction, there are reasons to believe that it is taking on added significance. It is observed that: "The trend is definitely toward more learner-controlled materials, peer mediation, team learning, and more use of the idea of validating instruction."² One envisions the difficulty of

¹Marvin D. Patterson, "Individualizing Science Instruction with Project PLAN," Science Teacher, XXXVII (December, 1970), 34.

²Phil C. Lange, "What's the Score on: Programmed Instruction?" Today's Education, LXI (February, 1972), 59.

getting a factual view of programmed instruction because of the many variables clouding the issue. Nevertheless certain aspects of it stand out. As textbooks represent one of these facets, a bibliographical listing "describes more than 3,000 programmed texts plus 500 machine-based multi-media programs--an increase of 100 per cent in five years."¹ Lang sampled textbook publishers and reported

. . . that collegiate programmed texts and sales have also doubled in five years and that trends will be toward programmed study guides as adjuncts to basic texts. Even greater increases were made at precollege levels, especially with multimedia format and with boxed sets of self-managed materials.²

Aside from the increased output, the programmed textbook has its own unique characteristics. Such a fact is revealed in the statement that

Programmed texts have proved valuable as a method of breaking down subject matter into simple and logical learning steps, providing instruction in which students may proceed as quickly or as slowly as they are capable, and providing homework, laboratory exercises, and other materials which can supplement the exchange of ideas between student and teacher and leave the teacher free to invest his best energies in creative teaching.³

In addition to the value cited, these textbooks are considered advantageous also because

. . . they permit individualized instruction, allowing each student to proceed at his own pace; they ensure that every student in the class answers every question; and they enable the teacher to detect the trouble spots.⁴

¹Ibid.

²Ibid.

³Mary Elizabeth Fowler, Teaching Language, Composition and Literature (New York: McGraw-Hill Book Company, 1965), p. 18.

⁴Ibid.

Considering the facts presented on programmed textbooks, it can be assumed that within limits such materials ultimately will gain increased acceptance. A growing technology for individual instruction will hasten the realization that programmed materials may be invaluable. As significant as these are, however, it is believed that programmed materials should be used to supplement rather than supplant present teaching methods and materials.

Some authorities contend that within the educational process itself technology is most applicable to general administration, testing, and instruction. The present research study concerns itself with an instructional area of the English language arts. Investigations employing automated instruction have been conducted in the language arts as well as in mathematics, science, and the social studies; but those in the language arts area are far less numerous. Researchers assert that the potential contribution of programmed instruction to instruction in the language arts has hardly been tapped. Goff alludes to this when she observes that "many quiries remain unanswered and many hypotheses are yet to be tested."¹ Loban, Ryan, and Squire gave impetus to this kind of thinking in their response to the advocates of modern grammar. These advocates are persons who feel "that the more powerful grammars of today

¹Regina M. Goff, "Programmed Instruction in the Language Arts," Programmed Teaching: A Symposium on Automation, ed. Joseph S. Rousek (New York: Philosophical Library, Inc., 1965), p. 109.

are more likely to contribute to the student's ability to write and speak." These authors suggest that such individuals are perhaps right, "but we do not know this argument to be true. Too little controlled experimentation has been made."¹ In relation to this same position Morsey presents a similar view by directing attention first to an assumption and then to the weakness of that assumption, a weakness linked directly to insufficient scientific investigations. This authority says

The assumption that movie projectors, tape recorders, record players, filmstrips, slides, radio, and television are desirable adjuncts to traditional teaching resources seems unadulterated common sense. But common sense should be verified. We have no evidence that technological aids are indispensable. On the other hand, no one knows whether the classroom teacher is indispensable.²

Statements of this nature clearly imply the tremendous importance of continuing research projects that utilize programmed instruction. It is felt that continuous scientific investigations, sufficiently numerous and properly controlled, will augment the occasion for qualified statements regarding the role of programmed instruction in education. This need to increase research activity is given additional emphasis in the following statement:

Teaching machines and programmed textbooks are assumed to appeal to students because they demand activity rather than passivity, learning rates are

¹Walter Loban, Margaret Ryan, and James Squire, Teaching Language and Literature (New York: Harcourt, Brace and World, Inc., 1969), p. 73.

²Royal J. Morsey, Improving English Instruction (Boston: Allyn and Bacon, Inc., 1969), p. 37.

determined by students, new learning evolves from old learning and right answers are rewarded immediately. But there is no evidence they help students appreciate literature; speak and write clearly, thoughtfully, and correctly; and listen intelligently.¹

Relative to the language arts area, grammar and usage distinctly offer the greatest opportunity for experimentation. Since an adequate knowledge of grammar is essential in all school subjects, educators must concern themselves with the most effective means of encouraging pupils to develop a greater awareness and a better understanding of the fundamental grammatical skills. Fader and McNeil express a similar idea in their reference to the educational status of a particular type of student. They maintain that

. . . the greatest failure in the education of the general student lies in his language preparation. . . . The child who can't and won't read or write or listen well cannot be educated in any subject in the school curriculum.²

At least one author believes that success in language arts is closely related to the adolescent's personal development in that

Success in all language arts is crucial to the adolescent's success in fulfilling his potentials as a human being, in terms of his total culture; crucial to his success in finding his personal role in human life.³

¹Ibid., pp. 38-39.

²Daniel N. Fader and Elton B. McNeil, Hooked on Books: Program and Proof (New York: G. P. Putnam's Sons, 1966), pp. 33-34.

³Carl A. Lefevre, "Language and Self: Fulfillment or Trauma?," Elementary English, XLIII (February, 1966), 127.

The arguments for grammar are both positive and negative; but apparently the greatest argument is for the retention of grammar at the desired levels of education. The most urgent questions seem to relate to the kind of grammar to be taught and to the selection of effective methodological approaches. Technology is available to aid in selecting adequate teaching methods and, hopefully, to make learning less complex and more attractive. It is believed that educators have developed a major concern for the adequate preparation of all students. Hopefully this concern will include investigations in the language arts area which will lead toward program designs that are more effective with students in the mastery of our language.

Need for the Study

Many authorities on automated teaching have cited the need for continuous and more profound research with programmed instruction in the subject area of the language arts as well as in certain other areas. Experimentation in this area is needed to fully establish the advantages of programmed instruction as an effective type of methodology. According to Branson such advantages cannot be cited factually "until all instruction is measured on the basis of learner outcomes."¹ A statement of this kind seems to be filled with implications

¹Robert K. Branson, "The Criterion Problem in Programmed Instruction," Education Technology, X (July, 1970), 37.

for continuous investigation, especially in those areas where very little of it has been done. Bassler, et al., also have made certain observations that point to a significant need for this study. They state that

In the last decade, American education has undergone extensive reevaluation. The urgent need to improve the quality and quantity of student scholarship has sparked renewed efforts to identify teaching methods which maximize student learning.¹

Another supporting statement is made by Cable, who contends that experimentation must be undertaken to change the schools' programs as societal changes are made in other areas.²

Other pertinent information point to the need for the present study. The literature reveals that approximately one half of the automated programs presently in existence are in the area of mathematics. The next largest number is reported to be in the field of science. Since the number of investigations in the language arts are fewer than in either mathematics or science, a need for more experimentation in the area with special focus on technological methodology is apparent.

Programmed instruction, as implied early in the chapter, is proclaimed to be a time-saving device. It is seen as a tool for advancing the student in his mastery of grammatical

¹Otto C. Bassler, et al., "Comparison of Two Levels of Guidance in Teaching Elementary School Mathematics," School Science and Mathematics, LXXI (April, 1971), 303.

²Paul E. Cable, "Looking Ahead in Secondary Education," Peabody Journal of Education, XLVI (September, 1968), 91.

skills and as a way of releasing the teacher for greater utilization of his instructional talents. How time, through use of programmed instruction, can be used most wisely may be determined through more extensive research.

Statement of the Problem

The problem of this investigation was to determine if programmed instruction and conventional instruction, two methods of teaching certain grammatical skills, would yield a difference in the performance of the two groups of tenth grade students as measured by the National Achievement Tests, English Test.

Hypothesis

There is no significant difference in the performance of students acquiring proficiency in grammar by means of programmed instruction and the performance of students acquiring proficiency in grammar by means of conventional instruction.

Purpose

The purpose of this study was to utilize programmed instruction as an effective technological method of teaching grammar, to examine the performance of students involved with this method of teaching, and to analyze the basic findings relative to this group as compared to a group taught by conventional instructional approach.

Procedure

An experimental group and a control group constituted the sample for this investigation. The subjects were drawn from the total tenth grade enrollment in a large suburban high school.

Special permission to conduct the investigation was obtained from the research department of the school district. Then the researcher conferred with the school administration relative to the use of school facilities, school records, and any other relevant materials. Finally, the Computing Services Division of the Research Department was contacted for the purpose of confirming procedures utilized in perfecting class division in the school. Immediately after obtaining the essential information, the experiment was initiated.

Definition of Terms

Programmed Instruction.--Programmed instruction is "automatic tutoring by intrinsic programming."¹ Instructional devices are built in the program.

Conventional Instruction.--Conventional instruction is the use of procedures normally resorted to in teaching specific topics in grammar. The investigator utilized the lecture method with student participation supplemented by audiovisual aids.

¹Robert T. Filep (ed.), Prospectives in Programming (New York: The Macmillan Company, 1963), p. 4.

Grammar.--Grammar is a systemized knowledge or theory of the structure of the English language.¹ It is the study of the way the English language functions.

Time Blocks.--Time blocks are prescribed periods of time for classes to meet in a classroom for instructional purposes.

Limitation of the Study

This study is limited to tenth grade students in two English classes at John Marshall High School, Oklahoma City, Oklahoma.

Organization of the Study

Chapter I consists of the need for the study, a statement of the problem, hypothesis, the purpose of the study, the procedure, definition of terms, limitation of the study, and organization of the study. Chapter II includes a review of the related literature. Chapter III reveals the method and procedures followed in conducting the experiment, and Chapter IV is a discussion and an analysis of the data obtained through the instrument. Chapter V reports the findings, states conclusions, and offers recommendations for additional research in the area of programmed instruction.

¹The Commission on the English Curriculum, The English Language Arts in the Secondary School (New York: Appleton-Century-Crofts, Inc., 1956), p. 355.

CHAPTER II

A REVIEW OF THE LITERATURE

As the American education system continues to exist and expand, it demands a more meticulous look at its existence and its expanding features than any time in its history. Such a demand has created a growing awareness of the need for frequent and critical appraisal of the system itself and the numerous services it performs. The intent is to eliminate inadequacies and to promote better performance than has existed in the past.

A history of education reveals the rapid and tremendous advance that educators have made both academically and technically. While apparently there has been little progress in creating that which is entirely new, the educational force certainly has achieved success in discovering new methods and techniques to enhance and hasten the accomplishment of many familiar tasks. Unbelievable advances, made possible through science, attest to this progressiveness.

In spite of certain advances in learning, the alert observer is ever present to identify the weaknesses in a system and to suggest areas of desired improvement. This kind of alertness has brought pressure on the educational system

to improve its administrative and teaching staff, to modify its outmoded curricula, and to construct better schools in order to assure meaningful learning for all students. These very ideas, born in or before the first half of the twentieth century, are being pursued in the last half of this century. Many educators and responsible laymen give evidence of the efforts that have been made to correct these ills and to adjust the existing inadequacies. But it is noted that any number of conditions can contribute to the perpetuation of an undesirable state of affairs in an educational system. Some of these situations seem to be the direct results of occurrences cited by an author who observes that

The problem of mass education, the increasing numbers of students, the large number of drop-outs, the dissatisfaction with the present efficiency of learning, and the cry for individualization of the teacher/learning process have all led educationalists to question the adequacy of the traditional learning system.¹

In addition to these contributing elements, another kind of condition exists frequently unnoticed. The blame for this rests with the adults, but particularly with those persons chiefly responsible for the young learner's acquisition of knowledge. What these individuals fail to realize is that

The child is. We've never managed to find out who or what he is because we've been so fatally distracted by who we are and what we want him to be.²

¹Klaus Hinst, "Educational Technology--Its Scope and Impact: Conference for Educational Policies and Organization of the Teacher-Learning Process," Educational Technology, XI (July, 1966), 39.

²Fader and McNeil, Hooked on Books, p. 2.

The preceding quote sums up the attitude of some individuals responsible for training youth. Yet there is every reason to believe that some headway is being made in discovering who the child is and in trying to make him responsible for much of his own learning. It is expected that programmed instruction will play a vital role in this respect.

A history of technology suggests to the researcher that men of earlier eras conceived ideas pertinent to progress, but their lives could not span the years needed to determine how these ideas could be implemented successfully. Citing such educators and philosophers as Quintilian, Plutarch, Comenius, John Locke, Jean Jacques Rousseau, Johann Bernhard Basedow, Madame Maria Montessori, and E. L. Thorndike, Lawson says naming a "forerunner" of programmed instruction is difficult.¹

Another historian includes as forerunners of instructional technology some of the above names and a long list of others. A few of those additional listings are the elder Sophists, Pierre Abelard, Joseph Lancaster, Pestalozzi, Froebel, Herbart, and John Dewey.² Because of the unique contributions these personalities made to education, they are considered forerunners of technological methodology. Each of these showed

¹Dene R. Lawson, "Who Thought of It First? A Review of Historical References to Programmed Instruction," Educational Technology, IX (October, 1969), 93-95.

²Paul Saettler, A History of Instructional Technology (New York: McGraw-Hill, 1968), pp. 13-46.

unusual concern for specific methods of instruction. Of course, history discloses that man has been perplexed often and that this perplexity has driven him to continue his search for adequate solutions to his infinite problems.

This perplexity is also manifested in the history of English, particularly with reference to grammar. Ours is a Latin-oriented grammar and history reveals the circumstances surrounding it from the earliest days to the present. It is stated that

In the past, language study concentrated heavily on grammar. The need for such study and the kind of grammar taught were largely determined in the Middle Ages and the Renaissance by preoccupation with the study of the classical languages rather than the vernacular. As school populations grew and popular interest in Latin and Greek declined, grammar study lost a part of its utility. But the grammar remained, scarcely modified in form, directed now to teaching students how to write acceptable compositions in English by following rules derived largely from "dead," therefore static, languages.¹

The Hosic Report of 1917, having made some of the same observations, cited a prevalent problem relative to English and set forth possible solutions for it. However, the present investigation is not concerned with the broad study of English. Therefore, the researcher will not discuss the report in its entirety. The committee implies that grammar should have a subordinate position within the English curriculum. The Hosic Report is an invaluable one. It supports the position that

¹College Entrance Examination Board's Commission on English, Freedom and Discipline in English (New York: College Entrance Examination Board, 1965), p. 19.

English occupies a paramount place in the curriculum of the American schools at that time. English is grammar according to some authors. Because of its undeniable significance, students must be provided with the opportunity to master grammar sufficiently well.

How grammar can be taught best is a question frequently raised. Not every authority agrees that the traditional or the conventional method is the best approach. Those experts most knowledgeable about the subject suggest using new and different instructional approaches in English. The National Council of Teachers of English (NCTE) has conducted investigations in the subject area, experimenting with different phases of English. Each NCTE report has included a discussion of grammar, but this area does not appear to be one of major concern. Statements in the Hosis Report also support this conclusion. According to Hosis's Committee on Administration Problems, grammar in most schools seems to occupy from one half to three-fifths of the school time devoted to English in the last three years of the eight year course. The committee contends that

The grammar courses considered vary so widely that all that can safely be said about them is that, on the whole, grammar receives altogether too much time and is taught too intensively and too analytically.¹

The fifth statement on a list of recommendations, included in this report, pointed up the small space that grammar should

¹James Fleming Hosis (comp.), Reorganization of English in Schools (Washington: Government Printing Office, 1917), p. 13.

occupy in the uniform college admission requirements in English. It was felt that the formal grammar exercises should in no case be more than a subordinate part of the examination.¹

Grammar is characterized as a necessary and an indispensable part of every English program. Although it appears to have been relegated to a minor position in the study of English, none of the sources consulted would suggest deleting it from the English schedule. This is an indication of its inestimable value to the total language arts program, and the acceptance of it is sufficient reason for being certain that grammar retains its niche in the curriculum. The Commission on the English Curriculum suggests that

It may be safely assumed that in the secondary school the major objective of the English teacher . . . is to help students to listen, to speak, to read, and to write better and that he is trying to discover the best way of teaching grammar to achieve this end.²

In addition to the commission's assumption, Squire and Applebee made the following observation:

Involving only 13.5 per cent of class time, language is the least well taught of all the elements of the English curriculum, concentrating in the majority of schools on mechanical drill and error-based instruction in both grammar and usage.³

¹Ibid.

²The Commission on the English Curriculum of the National Council of Teachers of English, The English Language Arts, (New York: Appleton-Century-Crofts, Inc., 1965), p. 363.

³James R. Squire and Roger K. Applebee, High School Instruction Today (New York: Appleton-Century-Crofts, 1968), p. 255.

The quoted statement clearly implies a need for a different focus for teaching grammar and for better preparation of teachers who are expected to teach this phase of language arts. The teachers are expected to be fully acquainted with the most common justifications for teaching grammar in the secondary schools and to have a thorough knowledge of the most effective teaching methods.

The 1965 report of the Commission on English stated that a restlessness about the quality of English instruction has existed among teachers of English for decades.¹ The statement intimates that such a restlessness is very evident at the present and that this dissatisfaction can be expected to extend into the future. Another reason for concern about quality instruction in this area is eminent in the assertion: "Francis Bacon wrote that 'Reading maketh a full man, conference a ready man, and writing an exact man.'"² Just as Bacon perceived the importance of reading, speaking and writing well, so educators and laymen must be equally as perceptive of how essential reading, speaking and writing are to the national welfare. That grammar has its underlying effects on each area is a fact which needs to be considered and dealt with seriously.

Many problems do become obstacles to quality instruction in English; this refers to the whole area in general and

¹Commission on English, English, with a Foreword by Richard Pearson.

²Ibid.

to grammar in particular. In fact, the Commission on English says

At the present time fewer than half of the English teachers in our schools can claim completion of a college major in their subject. That is the first aspect of the problem.

The second is no less serious. Because three or four years of English are required of all students in grades 9 through 12, the number of classes must be large; and the general practice is to economize by assigning to each class as many students as the classroom will hold.¹

The ideas stated and the problems cited support the need to be discriminate in the selection of teaching methods. One sees a teacher or a group of teachers meeting a specific quota of students each day. Depending upon the preparation and the ability of instructors to utilize the most effective teaching methods, these teachers will contribute either to the students' success or failure in their language experiences. Use of effective teaching methods will tend to offset failure; therefore, such use should be employed in all classrooms.

Determining the most appropriate instructional methods in grammar can be done best through scientific investigation. Relative to research, the fact has been established that less has been done with programmed instruction in the language arts than in either the area of mathematics or science. Recently Nathan Blount deplored the fact that

"The research of the decade has come largely from doctoral students, college professors, and agencies

¹Ibid., p. 5.

funded by Federal or private funds; little research has come from the classroom teacher."¹

Support for Blount of a very similar nature is expressed in another source. Here again teachers are specifically referred to as the authors conclude

. . . successful language programs are all too few.
. . . Teachers not only need to become familiar with new developments in the study of grammar and usage, but also need help in the more practical problems of relating such studies to the other areas of the language arts.²

Irrespective of the limitations, some research has been done in the English language arts. Nunn experimented with English 2600 using as subjects twenty-two senior English pupils with an IQ range of 83 to 135.³ This is a comparative study involving an experimental and a control group. Diagnostic tests were administered to both groups. The experimental group used English 2600 while the control used traditional self-directing review work-books.⁴ Each group was tested with two instruments; these were teacher-made tests as well as tests accompanying the textbooks from which the subjects studied. Results showed that the experimental group scored 95 per cent on the English 2600 test and 80 per cent on the teacher-made test. The

¹Dolores Landerman, "English Teachers and the Advancement of Science and Engineering," English Journal, LX (March, 1972), 397.

²Squire and Applebee, Instruction Today, p. 257.

³Joseph S. Roucek, Programmed Teaching: A Symposium on Automation in Education (New York: Philosophical Library, 1965), p. 104.

⁴Ibid., pp. 104-105.

second group scored 87 per cent on the workbook test and 89 per cent on the teacher-made test. Nunn made speculations about what accounted for the discrepancy and concluded that programmed materials are better suited to the least prepared students.

Another investigation involving the use of English 2600 is one conducted by Sister Mary Hortense, who used for her subjects thirty-six eleventh grade students. Her findings revealed increased efficiency on the part of the learner, increased awareness of effective English usage, and a decisive stand relative to the more beneficial textbook. The learners, in several instances, showed greater preference for the programmed textbook than for the conventional one.¹

Some educational systems that have used programmed instruction in English also elected to experiment with English 2600. Having utilized this type of instruction, these systems were able to cite both the strengths and the weaknesses of the program. Observing those features of English 2600 which were difficult for students, Herbert and Foshay said

One cause of trouble was that this program depends heavily on the ability of the students to read and interpret the short explanations in the frames. Although some are very simple, others require considerable sophistication, as the reading level required varies widely from frame to frame.²

¹Ibid., p. 105.

²John Herbert and Arthur W. Foshay, "Programmed Instruction in the Manhasset Junior High School," Four Case Studies of Programmed Instruction, ed. by Fund for the Advancement of Education (New York: Fund for the Advancement of Education, 1964), p. 23.

Among the public school systems that have experimented with this program are Manhasset, New York, a pioneer in the use of programmed instruction; Denver, Colorado; Weber County, Utah; and certain schools in the Chicago area. These systems and a review of the literature support the thinking that, in spite of limitations, English 2600 has enough strong points to justify a continuation of research with this particular program.

The preceding discussion has concentrated on fore-runners of programmed instruction, the past and present status of grammar, and the extent of research practices in the language arts. Some interesting facts have been revealed about the use of programmed instruction, not only in the language arts, but also in its general application to education. Deterline believes that this method of teaching is advantageous since teachers and programmers learn to solve some of the problems of individualizing instruction as they learn how to develop and use programmed materials of many kinds.¹

Theoretically, education demonstrates concern for the most efficient methods of helping students develop the ability for acquisition, retention, and application of knowledge. An example of this interest is the effort to perfect programmed instruction in education, government, and industry. It is indicated, however, that this method of teaching is not new.

¹William A. Deterline, "Programmed Instruction Today," Educational Technology, X (July, 1970), 29.

Jacobs, Maier, and Stolurow cite Sidney L. Pressey, who first used a teaching machine in 1915, and then with his students developed a variety of devices to provide immediate knowledge of results.¹ In spite of Pressey's contribution, B. F. Skinner is recognized for having provided the current impetus to programmed instruction.² He supports mechanized instruction and expresses the conviction that America can afford to mechanize her schools. To substantiate his belief he states that

A country which annually produces millions of refrigerators, dish-washers, automatic clothes-driers, and automatic garbage disposers can certainly afford the equipment necessary to educate its citizens to high standards of competence in the most effective way.³

Markle and Bossone express similar thinking, but they approach the problem from the standpoint of how programmed instruction can strengthen teaching. They specifically concentrate their attention on teachers of English. Markle and Bossone say that

It is evident . . . programmed instruction will make the teacher more effective because it will help to make him more objective, analytical, and experimental in his approach to the subject matter.⁴

¹Paul I. Jacobs, Milton H. Maier, and Lawrence M. Stolurow, A Guide to Evaluating Self-Instructional Programs (New York: Holt, Rinehart and Winston, Inc., 1966), p. 15.

²Ibid.

³B. F. Skinner, "The Science of Learning and the Art of Teaching," Harvard Educational Review, XXIV (Spring, 1954), 97.

⁴Susan Markle and Richard M. Bossone, "Programmed Materials: A Teaching Aid," Clearing House, XXXVIII (November, 1963), 151.

These authors emphasize that programmed instruction is no "cure-all" for the problems in education, that it is a teaching tool, and must be accepted as such. Nevertheless, careful scrutiny of how well programmed instruction can serve the student and the teacher has led Markle and Bossone to declare that

Its potential contributions in relieving the work load of teachers, in reducing the cultural lag in the curriculum, and in providing an experimentally based analysis of what is being taught guarantee it a significant place in education.¹

Pressey saw the average teacher being burdened unnecessarily by the routine of drill and information-fixing.² He maintained that the teacher should be made freer for inspirational and thought-stimulating activities as he presumed the function of a teacher to be that of guiding students into these kinds of pursuits.

The value of using programming with the talented student constitutes another issue. Feldhusen acknowledges that one major problem facing the teacher of the academically talented children is how to provide for their capacity for accelerated instruction in basic skills.³ The implications are that educators must acquaint themselves with the variety of programmed materials and determine which of these is most applicable

¹Ibid.

²S. L. Pressey, "Educational Research and Statistics," School and Society, XXIII (March 6, 1926), 374.

³John Feldhusen, "Programing and the Talented Pupil," Clearing House, XXXVIII (November, 1963), 152.

to the ability level of the talented pupil.

Saettler has viewed programmed instruction from several aspects and has cited numerous facts regarding its history. As the discussion evolves, one discerns the attitudes toward it and the pattern of use throughout the country. Observations beginning with the early 60's reveals that

Although the most common use of programmed materials indicated by 1962 and 1963 surveys was within large school systems, the programs were tried in most cases with individuals or small groups of students rather than with entire classes. There also appeared to be more frequent use of programmed materials in junior high schools than in either senior high or elementary schools. Most programs used were in the areas of mathematics (60 per cent), followed by English (21 per cent), foreign language (4 per cent), spelling (4 per cent), science (3 per cent), and social science (3 per cent).¹

While programmed instruction has gained much attention, a sense of need for broader acceptance of this kind of methodology is still present. Saettler suggests that there are problems involved in adopting programmed instruction in the schools. Introducing it as an innovation is difficult and time-consuming. Unlike the traditional textbooks, it is felt that an optimum time is significant in introducing certain types of programs to particular groups of students. It has been indicated that curriculum change can make programs obsolete and that the use of programs in a school could hamper or obstruct curriculum change.²

¹Saettler, Instructional Technology, p. 255.

²Ibid., p. 260.

Programmed instruction can generate problems, but solutions to these problems can be discovered through systematic experimentation. It is felt that the variability of the learner demands alternate approaches to instruction. Programmed instruction seems to be a feasible approach. Paul Witt observes that

The first thing we have to recognize is that really not very much is known about teaching any students. . . . It also argues for our persisting in trying to learn more about teaching and learning in relation to all students and thus for our continuing to experiment with different models of instruction.¹

In spite of the difficulties encountered with programmed instruction, many of the opinions favor retaining it. Some sources indicate that administrators, teachers, students, and parents find programs very satisfying; but the adverse opinions remain.

The fact is evident that more schools need to commit themselves to the use of technological methods. Apparently this kind of instruction must be used for a sufficient period of time and by a well-trained staff in order to give fair evaluation to its potentials. The value of this kind of instruction is given additional emphasis in the statement that follows:

To suggest as I have done that we are still merely on the threshold of introducing programmed instruction into the schools is not in any way to criticize the excellent work that goes on at present,

¹Paul W. F. Witt (ed.), Technology and the Curriculum (Teachers College, Columbia University: Teachers College Press, 1968), p. 114.

but to point to the need for more of it and for more organization and support.¹

Another authority, though speculative about the subject, is convinced about the merit of autoinstruction. He tends to believe that

. . . the here-and-now values of computer technology to education may have been oversold, but eventually computer technology will have a tremendous impact on education, and we should anticipate some of the changes that may result.²

Criticisms of programmed instruction do not appear negative enough to discourage experimentation in the area. Because of its merit as an instructional technique more investigations are certain to be conducted. Just as this holds true for programmed instruction, so it is considered applicable to the English language arts. According to Steeves

The English language arts program holds a position of priority in the curriculum since the skills and content of English are the foundations upon which other learning is based.³

Therefore, one sees the need to employ new methods wherever feasible in order to assure desired outcomes in learning. This interest in methods is evidenced also in the thinking

¹Derik Unwin and John Leedham (eds.), Aspects of Educational Technology (London: Methuen and Co., Ltd., 1967), p. 27.

²Robert M. Gagne and William J. Gephart (eds.), Learning Research and School Subjects (Itasca, Illinois: F. E. Peacock Publishers, Inc., 1968), p. 242.

³Frank L. Steeves, The Subjects in the Curriculum: Selected Readings (New York: The Odyssey Press, Inc., 1968), p. 37.

of G. Robert Carlsen who wrote: "We have not really learned as yet how to set up situations in which our students are stimulated and permitted to make discoveries on their own. . ."¹ Carlsen was referring to the instructional situation as it existed in the discipline of English; apparently the assumption is that whatever effects the whole of a discipline effects its separate parts. His statement, therefore, refers to grammar as well as the other phases of English.

It must be remembered that discussions of innovations in teaching are not new; these are a continuation of what has transpired in the past. From Freedom and Discipline in English, one observes that

As early as the late 1800's, moreover, certain of the assumptions and methods of the traditional grammatical analysis of English had been challenged by such distinguished scholars as Henry Sweet and Otto Jespersen.²

This challenge to traditional methods is reported to have begun to effect the content of textbooks used in the schools. Some modern textbooks are reportedly adopting the structural or the generative approach to teaching grammar. It would seem that a change in texts will force a change in methods of teaching, not to the extent desired by some, however.

Some specifics about grammar have been pointed out. On the one hand the ineffectiveness of teaching grammar has been discussed while on the other the reasons become evident

¹G. Robert Carlsen, "How Do We Teach?," English Journal, LIV (May, 1965), 364.

²Commission on English, English, p. 21.

for retaining this division of the language arts. The Commission on English reports

. . . the teaching of grammar was not always effective--it may indeed have been effective far less often than its proponents believed; yet, it did offer an attempt to deal with the facts of language. Because it did that, and because it provided an intellectual discipline, it preserved for itself a respected place in the curriculum.¹

The Commission goes further in explaining the value that it placed on English grammar. Stated more definitely

Grammar can tell a good deal about the way the human mind works. Ideally, then, though too rarely in practice, the study of grammar has great intrinsic value and intellectual appeal, aside from practical benefits.²

The preceding ideas lend support to the contention that grammar is a significant part of the English language arts. But the general consensus relative to the ineffectiveness of traditional instructional techniques still prevails. This is alluded to as the Commission cites that

Many teachers have been under the impression . . . that they can teach the language arts as objectively as they can teach geography or typing. But this view is inaccurate; it proceeds from a concept of language, or more commonly of grammar, as a subject matter consisting chiefly of rules and definitions that students should be able to master through memory and drill.³

Because of the many reasons that authorities consider grammar essential in the language arts program, the need exists to examine different instructional approaches. This must be

¹Commission on English, English, p. 19.

²Ibid., p. 19.

³Ibid., p. 23.

done for the purpose of finding the most effective ways of teaching grammar in order to make it a meaningful and rewarding experience for all students. Programmed instruction is believed to be one solution to the search for appropriate instructional methods, but only sufficient scientific experimentation can make it a fact.

CHAPTER III

METHOD AND PROCEDURE

The researcher selected a school at which the investigation could be conducted and went through the proper channels to secure official permission to direct the study. This investigation was conducted at John Marshall High School in Oklahoma City, Oklahoma. The daily schedule at John Marshall was divided into periods of time designated as time blocks. Some classes met daily while others either met twice per week or four times per week.

The sample used for the study was composed of two intact classes in tenth grade English, both of which were taught by the researcher. One class represented the Experimental Group; the other the Control Group. Groups were selected and equated on the basis of the grade point averages for the Fall Semester of the 1971-1972 school year as well as the converted reading scores on the STEP Test administered in the fall of 1971. From all eligible students, the two groups used in this investigation were finalized by random computer selection.

Pre-enrollment for the 1971-1972 school year was completed in the Spring Semester of 1971. At that time the

administration of the school made a survey of the courses that students desired to pursue for the 1971-72 academic year and channeled the necessary data to the Computing Services Department of the Board of Education. This department then programmed the students into class sections in accordance with the principal's specifications. The survey was accomplished through the use of an enrollment sheet, a complete list of the courses that the school proposed to schedule during the present school year.

Because of the enrollment procedure these two groups were very similar. They were also comparable according to two factors discussed earlier, the grade point average (GPA) and the converted reading scores on the STEP Test. The Experimental Group had a mean GPA of 2.58 compared to a mean of 2.51 for the Control Group. The Experimental Group mean for the converted reading scores was 292 as compared with a mean of 289 for the Control Group. A t-ratio of .3561 indicated no significant difference in the two groups. The social and economic differences of these groups were also comparable because of random selection. Having established the equality of the two groups, the researcher will refer, henceforth, to the Experimental Group as Group A and the Control Group as Group B.

This investigation, which was conducted during the Spring Semester of 1972, entailed pretesting and posttesting. The instrument used was the National Achievement Tests, English

Test, Form A and Form B., Grades 7-12. Form A served as the pretest and Form B the posttest. The instrument, containing one hundred and ten items, was constructed to measure a variety of skills, specifically word usage, punctuation, vocabulary, language usage--sentences, expressing ideas, and expressing feeling.

The thirty-two students in the Time Block Two Class constituted Group A. There were eighteen boys and fourteen girls. These subjects met for a period of seventy minutes four days per week. Treatment required the use of English 2600, a programmed text comprised of twenty-six hundred frames. When the book was issued, specific instructions were given to Group A about every detail of the text and its use.

Before the first initial assignment, the group was instructed to examine along with the experimenter the introductory pages of the text. Reading these pages provided the opportunity for the subjects to learn what English 2600 is, how the programmed text differs from the traditional textbook, and what responsibility the student must assume in order to get the most out of his experience.

The experiment did not include the first units and lessons in the text. Therefore, the investigator considered it crucial that each subject know how to read the frames and how to locate each assigned unit and lesson. As an item was designated, an individual was randomly selected to locate the page on which the information was found and identify the frame containing it. Knowing how to find and keep track of the correct

frames was just as imperative. This random selection was continued until there was assurance that each student was familiar with the procedure. When subjects showed evidence of adequate knowledge of the unique features of English 2600, the experiment was begun.

The pretest was administered to both groups prior to the beginning of treatment, which was applied thirty minutes per class period for five weeks. Since several topics in grammar were taught during the first six months of the school year, the researcher was forced to select from the remaining list of units in English 2600 those topics that seemed most relevant for the group. The units and topics that were used in the treatment were the following:

Unit 5: "Using Verbs Correctly"

Unit 6: "Agreement of Subject and Verb"

Unit 7: "Choosing the Right Modifier"

Unit 10: "Learning to Use Commas"

One to two lessons from a unit were assigned to Group A each day. The programmed text was issued at the beginning of each class period and collected at the close of the thirty minutes period. If a subject completed his work before time was called, he was permitted to use his free time profitably on his own in class. Through the help of the school's librarians, suitable tenth grade reading materials were made available for the subjects' use. Although many students made use of these materials, others worked on individual assignments

from other classes or read meaningful materials which they brought into class.

At the close of the thirty minutes period all English 2600 texts were returned to the investigator, and a related film, filmstrips, or a set of transparencies was shown. These were selected materials that paralleled each day's lesson. At the conclusion of a unit, subjects requested from the experimenter a test accompanying that unit. The purpose of the test was to provide the opportunity for subjects to assess their individual progress as they advanced through the experiment.

Group B, the Control Group, had a total of thirty-three students. This group included seventeen boys and sixteen girls. This was the Time Block Four Class that met in the afternoon. Like Group A, Group B also met for a period of four days per week. Group B continued to study grammar from the assigned textbook, American English Today, Structure of English. Their topics were identical with those used with Group A, but Group B was never exposed to programmed instruction. However, both groups used the same films, filmstrips, and transparencies where these were considered supportive of their experiences in grammar. The textbooks were very different in content and organization. This difference required careful selection of only those items related to the topics chosen from English 2600. The daily planning guided the proper selection of materials, and permitted all subjects to acquire a certain amount of knowledge about the same topics.

Following the last day of treatment, both groups received the posttest, Form B of the instrument. When the test was completed the data were collected and analyzed.

The tests were scored and scores were recorded in descending order. The t-test was utilized for determining if a significant difference in the performance of the two groups existed at the .05 level of significance. As this was the test for significance of the difference between two means for independent samples, these formulae were used.

$$s^2 = \frac{N_1 x^2 - (N_1 \bar{x})^2 / N_1 + N_2 x^2 - (N_2 \bar{x})^2 / N_2}{N_1 + N_2 - 2}$$

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{s^2 / N_1 + s^2 / N_2}}$$

Students excluded were those who did not participate in the pretest and/or the posttest. The school records for each subject were examined for any information that would pertain to the study. The only noticeable variables applicable to every subject were date of birth, school last attended, and the grade in English.

Observation of Subjects' Reaction to Treatment

Group A was not informed that it was a part of an experiment, as the researcher employed every means to prevent contamination. However, there was this desire to know what the subjects' reactions to the experiment were. Hence, each

was asked to record his opinions in writing. The text English 2600 was described as "elementary" and "easy." To describe the teaching method, the group used the following adjectives: excellent, likeable, interesting, enjoyable, fair, boring, neat, and good. A small percentage of Group A injected the element "difficulty." The four subjects, making the comment about the most difficult part of the experiment, suggested Unit 10: "Learning to Use Commas." One individual considered well and good as an area of usage creating a problem.

The final observation shows what the subjects felt that they did or did not acquire from the study of English 2600. A semblance of their statements are recorded below.

"I liked English 2600 to the extent that I think every student should work with it."

"I can learn more from English 2600 than from the text American English Today."

"I have learned some facts about grammar that I had really never understood before."

"English 2600 has helped me understand some areas of grammar that have been troublesome previously."

"Frankly, I am pleased that we are finished with English 2600."

"I thought English 2600 to be a waste of time."

Only one student stated that he preferred American English Today to the programmed text. Two students admitted the ease with which one could look ahead for the answer before arriving at it through reasoning.

These observations were vital for the researcher because they pointed to the need to continue experimenting

with this instructional technique. The majority of the subjects showed evidence of acquiring something of value from the experience, and statistics point up specific areas where the greatest achievement was noticeable. It is believed that students will accept more of the responsibility for their learning if they know they are being held accountable. Only extensive experimentation can reveal this to be a fact.

CHAPTER IV

ANALYSIS OF DATA

Chapter IV involves a discussion of data collection and tabulation, a description of the instrument, method of scoring the test, and treatment and statistical analysis of the data. The instrument utilized was the National Achievement Tests, English--Forms A and B. The pretest, Form A, was administered March 6, 1972, and the posttest, Form B, was given May 8, 1972. Both forms were identical in structure, containing the same directions, same number of items, and the same number of divisions. Forty-five minutes were allocated to subjects for completion of the instrument. At the close of each testing period these forms were collected and hand-scored.

Following the collection and scoring of the tests, the data were tabulated into sections for the purpose of statistical analysis. The kind of data recorded were total test scores for the pre- and posttests, total pre- and posttest scores for each part of the instrument, and test performance by sex on Parts I, II, and IV of the examination. These specific divisions were treated since they were a major representation of

the areas covered for the duration of the experiment.

The investigation tested the hypothesis which states there is no significant difference in the performance of students acquiring proficiency in grammar by means of programmed instruction and the performance of students acquiring proficiency in grammar by means of conventional instruction. The researcher elected to use for this investigation an experimental group and a control group. Both groups were administered the same instrument in the same room on the same day.

To test for a significance of difference in performance, the t-test was utilized. The t-test is classified as parametric and parametric tests are considered more powerful even when assumptions are violated. Kerlinger states:

Unless there is good evidence to believe that populations are rather seriously non-normal and that variances are heterogeneous, it is usually unwise to use a nonparametric statistical test in place of a parametric one.¹

Therefore, the t-test was the parametric test selected for use. It was utilized for testing differences in performance on the entire instrument, and the test is non-directional. The investigator's concern with the absolute magnitude of the difference accounted for the choice of test.

Means were computed for the overall GPA, the GPA in English, and for the reading scores on the STEP Test. Table

¹Fred N. Kerlinger, Foundations of Behavioral Research (New York: Holt, Rinehart and Winston, Inc., 1964), p. 259

1 shows these means by groups as well as t-ratios of .1979 and .0771. Both values, being less than the required 2.021, indicated no significant difference in grade point averages. A t-ratio of .4629 showed no significant difference in group performance on the reading test.

TABLE 1
GROUP MEANS FOR OVERALL GPA, GPA
(ENGLISH), AND READING SCORES

(N = 56) Group	Overall GPA	GPA (English)	Reading Score <u>STEP Test</u>
A	2.59	2.50	279
B	2.60	2.61	276
	t = .1979 p < .05	t = .0771 p < .05	t = .4629 p < .05

The total score on the National Achievement Tests was observed in terms of group performance. The mean, standard deviation, and the standard error were computed. As the instrument was divided into six parts, these six scores combined represent the total test score. The posttest means for Group A and Group B were 60.42 and 58.57 respectively. Group A increased the pretest mean of 56.75 by 3.67 points whereas the increase for Group B was fractional. But the critical values of t showed no significant difference in the two groups with respect to overall performance. Table 2 reveals these facts.

TABLE 2

MEAN, STANDARD DEVIATION, AND STANDARD ERROR FOR
TOTAL PERFORMANCE ON PRE- AND POSTTEST

(N = 56) Group	Posttest			Pretest		
	$\bar{X}$	S	S_e	$\bar{X}$	S	S_e
A	60.42	14.56	2.7532	56.75	14.63	2.7649
B	58.57	13.97	2.6409	58.50	10.64	2.0125

$t = .4421$	$t = .6862$
$p < .05$	$p < .05$

Tables 3 and 4 restate the group means for pre- and posttests, but means for Parts I, II, III, IV, V, and VI of the instrument are added. The t-ratio for Parts I, II, and III was computed because these divisions were emphasized in the experiment. Such an emphasis was not planned; however, the units and lessons were structured to the extent that a direct emphasis on Parts III, V, and VI was excepted.

Having examined the results for the separate parts of the instrument, the investigator observed that the mean 60.42 for Group A and 58.57 for Group B represented an increase from pretest to posttest performance. But the increase was not consistent on all parts of the test. Part I showed that the mean for Group A decreased from 20.21 on the pretest to 17.75 on the posttest, while the mean for Group B decreased from 22.14 on the pretest to 18.07 on the

posttest. Although there was a drop in both group means, the mean 18.07 would seem to indicate the Group B did not perform quite as well on the posttest as Group A. But a t-ratio of .6862 showed no significant difference in performance. For 54 degrees of freedom a t equal to 2.021 is required for significance at the .05 level.

Performance on Part II of the posttest yielded a mean of 7.82 for Group A and a mean 7.21 for Group B. A difference in performance is noticed, but the t-ratio .8010 revealed no significant difference at the .05 level. The pretest means were 4.67 and 4.53 for Groups A and B respectively.

The performance on Part III of the instrument indicated a slight decrease in the mean for both groups. On the pretest Group A showed a mean of 12.50 compared to a mean of 13.85 for Group B on the same test. Results on the posttest, Part III, revealed a mean of 11.96 for Group A and 11.25 for Group B. Because Part III "Vocabulary" was not emphasized through formal instruction, computing a t-ratio for significance of difference was not essential to this study.

Part IV, "Language Usage--Sentences," was stressed during the period of experimentation. Means showed an increase in performance from pretest to posttest, but the t-ratio .1967 revealed no significant difference on the pretest, while the t-ratio .0397 on the posttest indicated no significant difference in the performance of these two groups.

The fifth division of the instrument showed means that

TABLE 3
PRETEST MEANS FOR TOTAL TEST PERFORMANCE
AND FOR SECTIONAL PERFORMANCE

Test Observation	(N = 28) Group A $\bar{X}$	(N = 28) Group B $\bar{X}$	t-ratio
Total Performance	56.75	58.50	.6862
Part I	20.21	22.14	1.3928
Part II	4.67	4.53	.2336
Part III	12.50	13.85	
Part IV	4.82	4.71	.1967
Part V	7.75	8.10	
Part VI	5.46	5.39	
All values of $t < 2.021$ $df\ 54$ $p < .05$			

appeared stable. The pretest mean for Group A on Part V was 7.75 compared with a mean of 8.10 for Group B. On the posttest there was no striking increase or decrease in means. Group A raised its mean from 7.75 to 7.77 while Group B decreased the mean 8.10 to 7.17. Part V was concerned with how good the subjects were in "expressing ideas."

Part VI, titled "Expressing Feeling," presented means that were almost identical on the pre- and posttest. Pretest performance showed a mean of 5.46 for Group A and 5.39 for Group B. On the posttest, Group A increased the mean 5.46 to

TABLE 4
POSTTEST MEANS FOR TOTAL TEST PERFORMANCE
AND FOR SECTIONAL PERFORMANCE

Test Observation	(N = 28) Group A $\bar{X}$	(N = 28) Group B $\bar{X}$	t-ratio
Total Performance	60.42	58.57	.4421
Part I	17.75	18.07	.6965
Part II	7.82	7.21	.8010
Part III	11.96	11.25	
Part IV	8.64	8.67	.0397
Part V	7.77	7.17	
Part VI	7.17	7.46	
All values of $t < 2.021$ $df = 54$ $p < .05$			

7.17 and Group B increased its mean from 5.39 to 7.46. Like Parts III and V, no special emphasis through instruction had been given relative to expressing feeling effectively. Therefore, no test of significance was applied to the data tabulated in Part VI.

Tables 5 and 6 show the data treated by sex. The male subjects in Group A showed a mean on the pretest nearly equivalent to that of Group B. Both groups increased the mean for the posttest, but Group A revealed a significant increase in its mean from pre-to posttest performance. The range, standard deviation, and standard error are included to show the extent

of variation in scores and in deviation. The t-test was employed to determine the level of significance. For the pretest a t-ratio of .1189 with 28 degrees of freedom indicated no significant difference in performance at the .05 level. But significance was evident on the posttest. A t-ratio 2.6021 with 28 degrees of freedom did show a significant difference in performance at the .05 level.

TABLE 5
OVERALL PERFORMANCE BY SEX
MALE

Average and Measures of Variation	N = 16 Group A		N = 14 Group B	
	Posttest	Pretest	Posttest	Pretest
$\bar{X}$	59.68	54.78	56	54.96
Range	44	50	40	34
S	13.38	13.35	9.62	8.45
S_e	3.34	3.36	2.57	2.25
$t_{\text{pretest}} = .1189, df = 28, p < .05$				
$t_{\text{posttest}} = 2.6021, df = 28, p > .05$				

Group means on the posttest for female subjects were identical, 61.14 for Group A and Group B. But there was a difference in pretest means. The mean for Group A on the pretest was 59.37 compared to a mean of 62.03 for Group B. With 24 degrees of freedom and a t-ratio of 1.2497, there was no significant difference in the performance on the pretest. The

t-ratio .0543 for the posttest also indicated no significant difference at the .05 level.

TABLE 6
OVERALL PERFORMANCE BY SEX
FEMALE

Average and Measures of Variation	N = 12 Group A		N = 14 Group B	
	Posttest	Pretest	Posttest	Pretest
$\bar{X}$	61.14	59.37	61.14	62.03
Range	49	50	51	41
S	16.57	16.28	17.28	11.71
S_e	4.78	4.70	4.61	3.13
$t_{\text{pretest}} = 1.2497, df = 24, p < .05$				
$t_{\text{posttest}} = .0543, df = 24, p < .05$				

Tables 5 and 6 show that the means for female subjects are strikingly higher than the means for male subjects. It was noted also that there was greater variation in raw scores for female than in the scores for male.

Other variables on which the performance of subjects was compared are indicated in Table 7. The variables were treatment, teaching methods, GPA (overall and English), and reading scores on the STEP Test. As indicated earlier in the chapter, there is no significant difference in the overall group performance. For the pre- and posttest, t-ratios .6862 and .4421 respectively showed no significant difference at

the .05 level. A t-ratio of .1979 for the GPA in English and a t-ratio of .0771 for the overall GPA revealed no significant difference in performance ability. A t equal to .4629 also showed no significant difference between group means for the reading scores.

TABLE 7

MEANS FOR GROUP A AND GROUP B BY TESTS, TEACHING METHODS, GPA (OVERALL AND ENGLISH), AND READING SCORES

	$\frac{PI}{\bar{X}}$	$\frac{CI}{\bar{X}}$
	N = 28 Group A	N = 28 Group B
Posttest	60.42	58.57
Pretest	56.75	58.50
GPA (Overall)	2.59	2.60
Reading Scores	279	276
GPA (English)	2.50	2.61
$t_{pre} = .6862, df = 54, p < .05$ $t_{GPA(English)} = .1979,$ $t_{post} = .4421, df = 54, p < .05$ $df = 54, p < .05$ $t_{Reading\ Scores} = .4629,$ $t_{GPA(Overall)} = .0771,$ $df = 46, p < .05$ $df = 54, p < .05$		

The performance of subjects has been examined from the standpoint of total participation without regard to sex and overall performance by sex. Having compared the groups in the manner described, the researcher made a final observation of

test results on Parts I, II, and IV of the instrument, using sex as a variable. This was done by comparing male subjects in Groups A with male subjects in Group B and female subjects in Group A with female subjects in Group B.

Table 8 presents the data relative to make performance on Part I, "Word Usage." This section of the instrument tested the subjects' ability to use pronouns, verbs, adjectives, adverbs, and prepositions correctly.

TABLE 8
PERFORMANCE ON PART I. WORD USAGE
MALE

Test	N = 16 Group A $\bar{X}$	N = 14 Group B $\bar{X}$
Pre-	19.68	21.64
Post-	17.68	17.92
$t_{pre} = .1237, df = 28, p < .05$		
$t_{post} = .6593, df = 28, p < .05$		

The results gave evidence that the male subjects in both groups did less well on the posttest than on the pretest. However, the difference between means point to the fact that Group A boys performed better on the posttest than did Group B boys. The pretest means were 19.68 for Group A and 21.64 for Group B. Posttest means indicated a decrease from the pretest values to 17.68 for Group A and 17.92 for Group B. For 28 degrees of

freedom the t-ratios .1237 for the pretest and .6593 for the posttest showed no significant difference in performance at the .05 level of significance.

Female performance on Part I is recorded in Table 9. Like the male subjects, female subjects also scored higher on the pretest and lowered their scores on the posttest. The pretest means were 20.19 for Group A and 22.64 for Group B. Subjects in Group A lowered their mean on the posttest to 17.83 and those in Group B decreased their mean to 18.21. A t of -5.0940 for the pretest indicated no significant difference between female group performance at the .05 level, while a t-ratio .8292 indicated no significant difference in posttest performance for the two groups.

Table 10 reveals the results of male performance on Part II, "Punctuation." This division of the instrument concerned itself with correct use of apostrophes, commas, and end punctuation marks. Male subjects in both groups had equivalent means, an indication of no significant difference in performance on the pretest. A different picture was presented for posttest performance. Group A nearly doubled its pretest mean showing that this group did considerably better on the posttest than did Group B males whose mean was 5.85 against a 7.56 mean for Group A. A t of .0323 reveals no significant difference in performance on the pretest, but the t-ratio 3.3497 for 28 degrees of freedom did show significance at the .05 level. The male groups performed better on the posttest,

TABLE 9
PERFORMANCE ON PART I. WORD USAGE
FEMALE

Test	N = 12 Group A $\bar{X}$	N = 14 Group B $\bar{X}$
Pre-	20.19	22.64
Post-	17.83	18.21
$t_{pre} = -5.0940, df = 24, p < .05$		
$t_{post} = .8292, df = 24, p < .05$		

TABLE 10
PERFORMANCE ON PART II. PUNCTUATION
MALE

Test	N = 16 Group A $\bar{X}$	N = 14 Group B $\bar{X}$
$t_{pre} = .0323, df = 28, p < .05$		
$t_{post} = 3.3497, df = 28, p > .05$		

and there was a significant difference in that performance.

Table 11 shows how the female subjects demonstrated their knowledge of punctuation. On the pretest Group A had a mean of 5.50 compared to a mean of 4.92 for Group B. Both female groups raised their pretest values to means of 8.16 (Group A) and 8.57 (Group B).

TABLE 11
 PERFORMANCE ON PART II. PUNCTUATION
 FEMALE

Test	N = 12 Group A $\bar{X}$	N = 14 Group B $\bar{X}$
Pre-	5.50	4.92
Post-	8.16	8.57
$t_{pre} = 1.0147, df = 24, p < .05$		
$t_{post} = .4958, df = 24, p < .05$		

Such an increase seemed to represent an additional acquisition of knowledge relative to punctuation, but there was no significant difference in group performance. It was also indicated that the means for the female groups exceeded the means on pre- and posttests for the male groups.

The last division of the instrument to be discussed is Part IV, "Language Usage--Sentences." This portion of the test was composed of groups of sentences designed to test the subjects' ability to recognize good usage. Table 12 presents data revealing how the male subjects scored on the pre- and posttests. Groups A and B males had pretest means of 4.90 and 4.35 respectively. There was a noticeable increase in the posttest mean indicating values of 8.68 for Group A and 8.28 for Group B. Irrespective of the mean increase, the pretest t-ratio 1.2310 and the posttest t-ratio 1.6740 showed

TABLE 12

PERFORMANCE ON PART IV. LANGUAGE USAGE--SENTENCES
MALE

Test	N = 16 Group A $\bar{X}$	N = 14 Group B $\bar{X}$
Pre-	4.90	4.35
Post-	8.68	8.28
$t_{pre} = 1.2310, df = 28, p < .05$		
$t_{post} = 1.6740, df = 28, p < .05$		

that there was no significant difference in group performance at the .05 level.

Table 13 concerns itself with the female groups' performance on Part IV. The group means for pretest and posttest are almost identical to those for the male groups. Group A girls showed a mean 4.70 for the pretest compared to a mean 5.07 for Group B girls. These measures were increased on the posttest to 8.58 for Group A and 8.35 for Group B. The t-ratio .4887 and 1.1858 for the pretest and posttest respectively indicate no significant difference in group performance at the .05 level.

The analysis of the data revealed no significant difference in the overall test performance of Group A and Group B at the .05 level of significance. This was evident for the pretest as well as for the posttest. However, both overall

TABLE 13

PERFORMANCE ON PART IV. LANGUAGE USAGE--SENTENCES
FEMALE

Test	N = 12 Group A $\bar{X}$	N = 14 Group B $\bar{X}$
Pre-	4.70	5.07
Post-	8.58	8.35
$t_{pre} = .4887, df = 24, p < .05$		
$t_{post} = 1.1858, df = 24, p < .05$		

means for Group A do suggest a difference in pre- and posttest performance. That is, this group did better on the posttest than on the pretest. Group B, on the other hand, had overall means that indicated very nearly identical performance on the two tests. No significant difference existed between Group B's pretest and posttest performance.

CHAPTER V

SUMMARY, FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

The problem of this investigation was to determine if programmed instruction and conventional instruction, two methods of teaching certain grammatical skills, would yield a difference in the performance of two groups of tenth grade students as measured by the National Achievement Tests, English Test. The major hypothesis of the study stated there was no significant difference in the performance of students acquiring proficiency in grammar by means of programmed instruction and the performance of students acquiring proficiency in grammar by means of conventional instruction.

The researcher selected a school in which the investigation could be conducted. The groups were selected and equated in the manner described below. A pretest Form A, was administered to the control and experimental groups. Following the pretest, the treatment was effected for a period of five weeks. At the expiration of five weeks a posttest, Form B, was given to both groups. The data were then collected and analyzed.

An experimental group and a control group constituted the sample for this investigation. The subjects were drawn

from the total tenth grade enrollment in a large suburban high school and were equated on the basis of the grade point averages for the Fall Semester of the 1971-72 school year as well as the converted reading scores on the STEP Test administered in the fall of 1971. From all eligible students, the two groups were finalized by random computer selection.

Group A, the experimental group, constituted the Time Block Two Class. In the group were eighteen boys and fourteen girls who met for a period of seventy minutes four days per week. Group B, the control group, had a total of thirty-three students numbering seventeen boys and sixteen girls. Because of the enrollment procedure Group A and Group B were very similar. They were also comparable according to the factors discussed earlier in this writing.

Findings

The following findings resulted from this study:

1. There was no significant difference in the total performance of Group A and Group B.

2. A significant difference in total performance was evidenced by male subjects. Male subjects in the experimental group, Group A, scored considerably higher on the posttest than did the control group, Group B.

3. The results on "Punctuation," Part II of the instrument, revealed a significant difference from pre-to posttest performance for male subjects in Group A. Group A boys projected a higher mean on Part II than did Group B boys.

4. There was no significant difference from the pre- to posttest in the performance of Group A girls, the experimental group, and Group B girls, the control group.

5. Group A boys and Group A and Group B girls scored significantly higher on the posttest in punctuation than on the pretest. The means were increased by 3.50, 2.66, and 3.65 respectively. Group B boys increased their average from the pre- to posttest by 1.78.

6. Programmed instruction was more effective in teaching boys the acceptable use of punctuation.

7. Programmed instruction and conventional instruction were equally effective in teaching girls the correct use of punctuation.

Conclusions

A number of conclusions were drawn from this study.

1. Programmed instruction can be used successfully to supplement the conventional methods of teaching grammar.

2. In teaching grammar, programmed instruction was more effective with boys than conventional instruction but it was equally effective with girls. Therefore, if the major objective as determined by the test is paramount, it appears that programmed instruction would be more effective.

3. Tenth grade students disenchanted with the conventional method of teaching grammar may be motivated to acquire more knowledge about grammar through effective use of programmed instruction.

4. Considering the fact that Group A and Group B were equated with respect to academic ability and performance on the STEP Test (converted reading scores), it was concluded that programmed instruction was less time-consuming.

Recommendations

Based on the findings and on the apparent benefits that can be derived from an experience with programmed instruction, the following recommendations were formulated:

1. That programmed instruction be utilized in most tenth grade English classes at the school investigated.
2. That provisions be made for preparing more tenth grade English teachers to use programmed instruction effectively.
3. That all tenth grade students at the school investigated be permitted to accept much of the responsibility for learning grammar with a minimum of teacher assistance.
4. That students who are involved in subsequent programmed learning activities in grammar be included in evaluating the instructional methods of these programs.
5. That continuous and more rigorous experimentation be conducted in the area of grammar and that such experimentation make more extensive use of programmed instruction.
6. That investigations be conducted relating to the place of grammatical instruction to the total language arts program in the school.

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APPENDIX A

ENGLISH 2600

Introductory Information for Group A

For the next five weeks you will be using English 2600 and concentrating on specific grammatical skills. Only your class will use this text, but the other classes will be involved in the study of the same grammatical topics. During the five weeks period you will be timed. Please be especially cooperative so that you may acquire the most essential knowledge from this year's last experience with grammar. Each day you will use textbooks for thirty minutes only. The last thirty minutes of your class period will be consumed with the use of films, filmstrips, or transparencies consisting of subject matter that will parallel each day's topic.

English 2600 is an unusual book and it differs from the traditional grammar text. But as you read it, you will discover there are some rules that you will need to abide by. This text involves reading and being able to understand what you read. Your reading will make it necessary that you always make a response by supplying a written answer. DO NOT write in your textbooks, but record your answers on the prepared answer sheet which you will receive each Monday morning at the

beginning of that class period. Keep this sheet as it will be used daily during that week. On each answer sheet at the top of the page fill in the information requested.

Assignments will be given daily. Please do not work beyond the designated lesson or lessons. When you complete a day's assignment in the text, close your book and use your remaining time reading from your novel or any other book of interest that is available. Be sure that you are not continuing to read in English 2600. Magazines and novels are available in the cabinet for your use.

The preceding paragraphs served as an introduction to the treatment. Immediately following the introduction, English 2600 was issued to the subjects; and they were given the opportunity to examine the text. The researcher acquainted them with each important feature of the text. Selecting students randomly, the experimenter took special care to familiarize the group with the procedure for locating lessons and correct frames, making and recording responses, and locating answers. When the subjects exhibited an adequate knowledge about the text, the beginning unit and lesson were assigned. The assignments were made daily for the duration of the experiment.

APPENDIX B

PROGRAMMED INSTRUCTION

Lesson Outline

Time: Spring Semester of 1972

Lesson Titles: A title for each day's lesson(s) is recorded
in the outline for each week.

Unit Titles: USING VERBS CORRECTLY

AGREEMENT OF SUBJECT AND VERB

CHOOSING THE RIGHT MODIFIER

LEARNING TO USE COMMAS

Subject Area: Grammar

Grade Level: Tenth

I. Objectives

- A. To use programmed instruction to acquaint the subjects with some specific grammatical concepts.
- B. To give subjects the responsibility for teaching themselves certain grammatical skills.
- C. To have the experimental group evaluate their ability to retain what they have learned.
- D. To make a statistical comparison of subjects' pre- and posttest performance on the National Achievement Tests.

II. Introduction

- A. Duration of the experiment

B. Indicates three unique features of the textbook English 2600

1. Differs from the traditional English textbook
2. Involves reading and being able to understand what is read
3. Written response mandatory

C. Discussion of assignments

1. Frequency of assigned lessons
2. Procedure to follow upon completion of daily assigned lessons

III. Activities

A. Reading

1. Utilization of English 2600 for thirty minutes per class period
2. Reading of magazines, novels, and other selected materials by students not using the full thirty minutes for programmed instruction

B. Use of audiovisual aids

1. Films viewed and discussed
2. Filmstrips presented and discussed
3. Transparencies shown and explained

IV. Instructional Aids

A. Textbook

B. Answer sheet

C. Films

D. Transparencies

E. Filmstrips

F. Magazines, novels, and other reading material suited to the subjects' interests

APPENDIX C

LESSON OUTLINE

First Week

Group A

Monday----Unit 5: USING VERBS CORRECTLY

Introduction to English 2600

Assignment 1:

Lesson 30 "Overcoming the Dangerous Six"

Page 201, Frames 1201-1247

Tuesday----Unit 5

Assignment 2: Lesson 31 "Thirteen Irregular Verbs"

Page 295, Frames 1248-1294

Filmstrips on verbs

Wednesday----Unit 5

Assignment 3: Lesson 32 "Straightening Out Lie and
Lay" Page 389, Frames 1295-1337

Transparencies on Verbs

Thursday----Unit 5

Assignment 4: Lesson 33 "Learning the Difference
Between Sit and Set" Page 36, Frames 1338-1372

Filmstrips on verbs

Second Week

Monday----Unit 5:

Assignment 5: Lesson 34 "Straightening Out Rise and

Raise: Page 106, Frames 1373-1407

Film (11 minutes) "Verbs and the Way We Use Them"

Transparencies on verbs

Tuesday----Unit 5

Assignment 6: Lesson 35 "Leave and Let"
Page 176, Frames 1408-1433

Lesson 36 "Bring and Take" Page 228,
Frames 1434-1455

Test on Unit 5; subjects will correct and score
their individual papers. The correct answer will
be supplied by the experimenter.

Wednesday----Unit 6: AGREEMENT OF SUBJECT AND VERB

Assignment 7: Lesson 37 Was and Were; Don't and
Doesn't" Page 272, Frames 1456-1499

Free Reading Period (30 minutes)

Thursday----Unit 6

Assignment 8: Lesson 38 "Keeping Track of the
Subject" Page 360, Frames 1500-1547

Filmstrips on nouns and verbs (linking and action)

Third Week

Monday----Unit 6

Assignment 9: Lesson 39 "Words That Mean One"
Page 18, Frames 1548-1574

Lesson 40 "And, Or, and Nor Problem"
Page 72, Frames 1575-1593

Film: Grammar, Part I

Tuesday----Unit 6

Assignment 10: Lesson 41 "Sentences Beginning with
Here, There, and Where" Page 110, Frames 1594-
1614

Lesson 42 "Review" Making Subjects and Verbs Agree" Page 152, Frames 1615-1642

Filmstrip on adverbs

Wednesday----Unit 7: CHOOSING THE RIGHT MODIFIER

Assignment 11: Lesson 43 "Words That Describe Actions" Page 208, Frames 1643-1682

Free Period: A film - "Heritage in Black"

Thursday----Unit 7

Assignment 12: Lesson 44 "Choosing Between Good and Well" Page 288, Frames 1683-1704

Lesson 45 "Choosing Between Bad and Badly" Page 332, Frames 1705-1723

Filmstrip on Adjectives and Adverbs

Fourth Week

Monday----Unit 7

Assignment 13: Lesson 46 "Modifiers After Sense Verbs" Page 370, Frames 1724-1765

Transparencies: Adjectives and Adverbs

Tuesday----Unit 7

Assignment 14: Lesson 47 "Making Comparisons Correctly" Page 16, Frames 1766-1806

Filmstrip: Comparison of Adjectives and Adverbs

Wednesday----Unit 7

Assignment 15: Lesson 48 "One No is Enough!" Page 98, Frames 1807-1833

Lesson 49 "An A-An Checkup" Page 152, Frames 1834-1855

Test on Unit 7

Thursday----Unit 10: "Learning to Use Commas"

Assignment 16: Lesson 60 "Commas in Series"
Page 138, Frames 2265-2304

Film: Punctuation

Fifth Week

Monday----Unit 10

Assignment 17: Lesson 61 "Commas in Compound
Sentences" Page 218, Frames 2305-2339

Transparencies: Correct Use of Commas

Tuesday----Unit 10

Assignment 18: Lesson 62 "Commas After Introductory
Phrases and Clauses" Page 288, Frames 2340-2375

Transparencies: Uses of the Comma

Wednesday----Unit 10

Assignment 19: Lesson 63 "Commas for Setting Off
Interrupters" Page 360, Frames 2376-2415

Film: Punctuation

Thursday----Unit 10

Assignment 20: Lesson 64 "Commas in Addresses and
Dates" Page 2, Frames 2416-2439

Lesson 65 "Review: Where Do the Commas Go?"
Page 50, Frames 2440-2457

Test on Unit 10

Answer Sheet

Week _____

[illegible]