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THE EFFECTIVENESS OF THE TARMAC READING PROGRAM

A Dissertation

Presented to

the Faculty of the Department of Education

East Tennessee State University

In Partial Fulfillment

of the Requirements for the Degree

Doctor of Education

by

Dan G. Wilder

June 1976

APPROVAL

This is to certify that the Advanced Graduate Committee of

DAN G. WILDER

met on the

24th day of May 19 76.

The committee read and examined his dissertation, supervised his defense of it in an oral examination and decided to recommend that his study be submitted to the Graduate Council and the Dean of the School of Graduate Studies in partial fulfillment of the requirements for the degree Doctor of Education.

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THE EFFECTIVENESS OF THE TARMAC READING PROGRAM

Statement of the Problem. It was the problem of this study to determine if educationally-deprived students participating in the TARMAC Diagnostic-Prescriptive Reading Program would show significant differences in reading abilities compared with educationally-deprived students who were not participants in that program.

Limitations of the Study. The following limitations were imposed upon the study:

1. Initial grade levels in reading in control and experimental groups were measured by California Achievement Test scores as criteria for defining educationally deprived.
2. The 1975-76 school year was used as the experimental period.
3. The results were limited to one school and forty student participants.
4. The results of the experiment were measured by Stanford Achievement Test scores and social studies grades as a related course.

Hypotheses. The following null hypotheses were considered pertinent to the study:

1. Students in the experimental group will not show a significant difference in accuracy of vocabulary knowledge when compared to the control group at the .05 level of confidence.
2. Students in the experimental group will not show a significant difference in reading skills when compared to the control group at the .05 level of confidence in both subtests: word reading and reading comprehension.
3. Students in the experimental group will not show a significant difference in word study skills when compared to the control group at the .05 level of confidence.
4. Students in the experimental group will not show a significant difference for a related course, social studies, when compared to the control group at the .05 level of confidence.

Methodology. The independent variable in the study was the TARMAC Individualized, Diagnostic-Prescriptive Reading Program. The dependent variable for the study was the test scores from the Stanford Achievement Test. Another dependent variable was the grades from the related course, social studies, for carry-over reading abilities.

The procedural analysis for the study was the posttest-only control group design. According to Donald Campbell and Julian Stanley, if properly administered, the following sources of internal invalidity were automatically controlled by this design: history, maturation, testing, instrumentation, regression, selection, mortality, and interaction of selection. As for sources of external invalidity, the design also controlled for interaction of testing and the treatment. Another source of external invalidity, interaction of selection and the treatment, was partially controlled by the fact that neither group knew the project was an experiment. This source was commonly known as the Hawthorne Effect, and with a field study of this type, complete control was near impossible. Reactive arrangements were controlled by the fact that no one test was administered more than once during the study.

The population for the study was the educationally-deprived, third-grade students at Bean Station Elementary School. This population was identified by California Achievement Test (C.A.T.) scores gathered in May, 1975. The educationally deprived were identified as those who were behind third-grade level in reading scores on the C.A.T. From the 143 third-grade students at Bean Station Elementary School, fifty-one were identified as educationally-deprived. From the fifty-one educationally deprived, twenty were randomly selected for the control group, and twenty were randomly selected for the experimental group.

As a posttest, the Stanford Achievement Test was administered to both the control and experimental groups by the experimenter to determine significant differences for Hypotheses 1, 2, and 3. Social studies grades for the 1975-76 school year were gathered for control and experimental groups for Hypothesis 4. The letter grades for this course were converted to a quality point system whereby the following grades received the following points: A, 4; B, 3; C, 2; D, 1; and F, 0.

The t test for independent samples was selected for statistical analysis of all four hypotheses. This statistical analysis was the simplest and most pertinent to the study. The posttest-only control group design was the only setting for which the t test was optimal. The results obtained from the control and experimental groups were examined to determine whether the differences between the means were statistically significant at the .05 level of confidence.

Students of both groups began participation September 2, 1975. Both groups participated in sixty-minute daily periods throughout the experiment. The posttest was administered on April 2, 1976 by the experimenter. Social studies grades were gathered April 2, 1976 for analysis of carry-over reading abilities. Total participation for both groups was seven months.

Summary of Findings. Through statistical analysis using the t test for independent samples for posttest means, a significant difference at the .05 level of confidence was found between experimental and control groups in accuracy of vocabulary knowledge. Therefore, Hypothesis 1 was rejected.

Using the t test for independent samples it was found that there was a significant difference between experimental and control group means in reading skills, as a whole, at the .05 level of confidence. Using the same test for analysis between group means for subtest one, word reading, a significant difference was found at the .05 level of confidence. As for analysis of subtest two, reading comprehension, a significant difference was found at the .05 level of confidence. Therefore, Hypothesis 2 was rejected in all subtests.

Using the t test for independent samples for analysis between group means for word study skills, a significant difference was found between the experimental and control groups at the .05 level of confidence. Therefore, Hypothesis 3 was rejected.

Using the t test for non-independent samples for analysis between 1975 and 1976 means for social studies grades for the control group, no significant difference was found at the .05 level of confidence. Using the same test for analysis between 1975 and 1976 means for social studies grades for the experimental group, a significant difference was found at the .05 level of confidence. Therefore, Hypothesis 4 was rejected.

Recommendations. The following recommendations were made as a result of the study:

1. In order to confirm the findings of this study, the TARMAC Reading Program should be continued an additional year on an experimental basis. Further evidence should be sought in another school in Grainger County, in addition to repeating the program in Bean Station Elementary School.

2. Additional data should be sought through selection of another program, similar to the TARMAC Reading Program, for comparative trial in a third school in Grainger County.

3. For the purpose of measuring the effects of growth in reading abilities on performance in related subjects, such as social studies, two or more standardized achievement tests should be administered to both groups.

4. A survey of student attitudes toward reading should be administered both before and after any special reading program, to identify positive and negative attitudes toward reading, and to measure any improvement in attitudes which may have resulted.

5. Two or more years after students participated in the TARMAC Reading Program, a comprehensive testing of participants should be conducted to identify any long-range effects on the program. Since Title I, ESEA programs in Grainger County are available through sixth grade, a

logical stage at which to make such assessments would be fifth or sixth grade.

6. An analysis of both groups' participants should be made at grade six to identify those who have remained educationally deprived.

ACKNOWLEDGMENTS

The writer wishes to express his sincere appreciation to everyone who helped make this study possible: to Dr. William L. Evernden, Committee Chairman and director of the dissertation for his encouragement, guidance, assistance, and complete devotion through the study and advanced program; and to other committee members Dr. William T. Acuff, Dr. Ted C. Cobun, and Dr. Richard L. Dean for their cooperation and consideration. Appreciation is also expressed to the typist, Martha Honaker.

DEDICATION

The writer dedicates this dissertation to his parents, Earl and Dorothy Wilder, and his wife, Janice Hubbard Wilder, who made tremendous sacrifices which enabled him to pursue his educational goals.

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Chapter 1

INTRODUCTION

The Educational Policies Commission in its 1962 report, Education and the Disadvantaged American, published a statement which supported the growing interest in programs which had particular relevance for under-achieving, culturally and educationally disadvantaged youths.

The problem of the disadvantaged arises because their cultures are not compatible with modern life. One of the greatest challenges facing the United States today is that of giving all Americans a basis for living constructively and independently in the modern age. The requirement is not for conformity but for compatibility. To make all people uniform would be as impractical as it would be inconsistent with American ideals. To give all people a fair chance to meet the challenges of life is both practical and American.¹

Consequently, steps were taken through representative institutions in America to provide for greater development and use of human resources in order to promote individual improvement as well as national economic standing and security. Among the various legislative actions were the National Defense Education Act of 1958, the Area Redevelopment Act, Manpower Development and Training Act, Vocational Education Act of 1963, Economic Opportunities Act of 1964, and the Elementary and Secondary Education Act of 1965. The legislative intent of each of the acts cited was to create a situation whereby fullest possible development and use of human resources would be achieved. To develop human resources, the

¹Educational Policies Commission, Education and the Disadvantaged American (Washington, D.C.: National Education Association, 1962), p. 14.

Congress of the United States referred primarily to educational institutions as the responsible agencies, and made provisions whereby schools might provide greater opportunity for all citizens. A notable requirement and specification in the cited legislation was that guidance personnel and individual counseling services be provided in the education of pupils.

President Johnson, appearing before the National Education Association in New York on July 2, 1965, made the following remarks:

Nor is it enough to give a student a place to sit and a teacher to learn from. We must make sure that the quality of education is equal to his capacity to learn--that it enlarges the mind rather than narrowing it--that he receives not merely a diploma but learning, in its broadest, most meaningful and humane sense It is the door to each man's highest use of his highest powers--which is happiness.²

By far the most pressing academic problem confronting the educationally-deprived child appeared to be the mastery of the discipline of reading. Most experts agreed that without a substantial ability to read, the child registered only small success in all other phases of learning. The teaching of reading is far different from what it was a few years ago. Government support, as well as public awareness, brought to the front more and better materials, a wider variety of methods of teaching reading, and much attention to the outcome of the instruction.³

In recent years, increased emphasis has been placed on teaching all children to read. The federal government made universal literacy a priority goal for the seventies. In 1968, James E. Allen, then

²Benjamin S. Bloom, Contemporary Education for Cultural Deprivation (New York: Holt, Rinehart, and Winston, Inc., 1965), p. 4.

³Gerald B. Duffy and George B. Sherman, Systematic Reading Instruction (New York: Harper and Row Publishers, 1972), p. 1.

Commissioner of Education, announced to the National Association of State Boards of Education that teaching children to read was the number one responsibility of the schools.⁴ He challenged State Boards of Education to eliminate the serious reading difficulties experienced by one of every four students in the nation's schools. The pronouncement was due in part to teacher demands in the sixties for educational improvements. In the seventies educators have the responsibility for producing results to satisfy society.⁵ If there is anything that arouses fear in modern society, especially the parents of school children, it is a statement from an article or book that sweepingly insists that American children are growing up unable to read.⁶ It has been left to educators to develop programs that will produce expected results in the field of reading.

Thus far, research has failed to produce a single method or material which is ultimately superior as an approach to reading instruction.⁷ Teachers, however, have long recognized that students must have a balanced program of reading instruction peculiar to their individual needs if they are to experience success in reading. Experience has demonstrated that commitment to success does not of itself assure success

⁴Robert Karlin, Teaching Elementary Reading (New York: Harcourt, Brace, Jovanovich, Inc., 1971), p. 1.

⁵James E. Allen, "We Can End Juvenile Illiteracy," Reader's Digest, April 1970, p. 157.

⁶Arthur I. Gates, "The Teaching of Reading: Objective Evidence Versus Openness," Reading and the Elementary School Child (New York: MacMillan Co., 1968), p. 397.

⁷Martin E. Shaw and Jack M. Wright, Scales for the Measurement of Attitudes (New York: McGraw-Hill Book Co., 1967), p. 3.

in a reading curriculum, nor does the expenditure of money for equipment and materials guarantee success. Success is the end result of effective design on the part of administrators, teachers, and the professionals with whom they choose to work. This results from cooperative effort to implement a planned program of success based upon identified needs, structured goals, and realistic approaches.

THE PROBLEM

Statement of the Problem

It was the problem of this study to determine if educationally-deprived students participating in the TARMAC Diagnostic-Prescriptive Reading Program would show significant differences in reading abilities compared with educationally-deprived students who were not participants in that program.

Importance of the Problem

The basic premise underlying this study was that reading levels of deprived students participating in the TARMAC Diagnostic-Prescriptive Reading Program would be affected significantly. If administrators and teachers of Grainger County Schools were convinced of the TARMAC Reading Program's significance in teaching the deprived better reading abilities, then plans were to be made to implement the programs in grades two through six not only at Bean Station Elementary School, but also the three other elementary schools in Grainger County: Joppa Elementary School, Rutledge Elementary School, and Washburn Elementary School. If, as a result of careful experimentation and research, it can be demonstrated that a particular type of educational technique can increase reading abilities,

then more educationally-deprived learners can learn more effectively with confidence by means of a proven method.

DEFINITIONS OF TERMS USED

Many of the terms used in this study needed no explanation. Others were explained as used; however, careful definition of seven terms seemed appropriate for the study.

Conventional Reading Program

The conventional reading program is the usual type of program provided by non-specialists in the self-contained classrooms at Bean Station Elementary School.

Diagnostic-Prescriptive Test

A diagnostic-prescriptive test is designed to measure a person's specific abilities and difficulties in reading, and to indicate possible remediation.⁸

Educationally Deprived

Educationally deprived are those behind their grade levels in reading abilities as determined by results on the California Achievement Test.

Elementary and Secondary Education Act, Title I

Elementary and Secondary Education Act, Title I, provides for federally financed projects begun in 1965 for the educationally deprived.⁹

⁸Carter V. Good, Dictionary of Education (New York: McGraw-Hill Book Company, 1973), p. 186.

⁹Ibid., p. 212.

Individualized Instruction

Individualized instruction includes study activities that are differentiated to meet the needs of the students, instead of being the same for all students in the study group.¹⁰

Student

A student is any individual enrolled in grade three at Bean Station Elementary School during the 1975-76 school year.

TARMAC

TARMAC is the name given to the individualized reading program used by the experimental group in this study. The company that produced the program is TARMAC Audio-Visual Instruction Company, Incorporated.

LIMITATIONS OF THE STUDY

The following limitations were imposed upon the study:

1. Initial grade levels in reading in control and experimental groups were measured by California Achievement Test scores as criteria for defining the educationally deprived.
2. The 1975-76 school year was used as the experimental period.
3. The results were limited to one school and forty student participants.
4. The results of the experiment were measured by the Stanford Achievement Test.

¹⁰Ibid., p. 305.

ASSUMPTIONS

The following assumptions were basic to the development of this study:

1. TARMAC provided an innovative, individualized, diagnostic-prescriptive reading program.
2. The reading program in which the control group was enrolled fitted the definition of a conventional reading program.
3. The California Achievement Test was demonstrated to be a valid and reliable instrument for measuring reading abilities because of validation and reliability data presented in the test manual, resulting from respectable field testing.
4. Members of both control and experimental groups were educationally deprived.
5. The Stanford Achievement Test was a valid and reliable instrument for measuring reading abilities based on the recommendation of John Taylor, Reading Specialist and Chairman of the Department of Reading at East Tennessee State University. Also, validation and reliability data presented in the test manual, resulting from respectable field testing, were used in the selection.
6. The difference between the sexes was not considered in the study because recent studies throughout the country resulted in no difference between males and females in reading abilities at the elementary level.

HYPOTHESES

The following null hypotheses were considered pertinent to this study:

1. Students in the experimental group will not show a significant difference in accuracy of vocabulary knowledge when compared to the control group at the .05 level of confidence.

2. Students in the experimental group will not show a significant difference in reading skills when compared to the control group at the .05 level of confidence in both sub-tests: word reading and reading comprehension.

3. Students in the experimental group will not show a significant difference in word study skills when compared to the control group at the .05 level of confidence.

4. Students in the experimental group will not show a significant difference in grades for a related course, social studies, when compared to the control group at the .05 level of confidence.

PROCEDURES OF THE STUDY

A manual search for related literature was accomplished in the following areas: characteristics of the educationally deprived, reading deficiencies of the educationally deprived, and current research studies on individualized instruction. The manual search included books, periodicals, and government documents at Carson-Newman College, Jefferson City, Tennessee, East Tennessee State University, Johnson City, Tennessee, and The University of Tennessee, Knoxville, Tennessee. An ERIC search for related literature was accomplished at The University of Tennessee in the following areas: commercial reading programs and individualized reading instruction.

The independent variable in the study was the TARMAC Individualized, Diagnostic-Prescriptive Reading Program. The dependent variable for the

study was the test scores from the Stanford Achievement Test. Another dependent variable was the grades from the related course, social studies, for carry-over reading abilities.

The procedural analysis for the study was the posttest-only control group design. According to Donald Campbell and Julian Stanley, if properly administered, the following sources of internal invalidity were automatically controlled by this design: history, maturation, testing, instrumentation, regression, selection, mortality, and interaction of selection. As for sources of external invalidity, the design also controlled for interaction of testing and the treatment.¹¹ Another source of external invalidity, interaction of selection and the treatment, was partially controlled by the fact that neither group knew the project was an experiment. This source was commonly known as the Hawthorne Effect, and with a field study of this type, complete control was nearly impossible. Reactive arrangements were controlled by the use of two different tests during the study.

The population for the study consisted of educationally deprived, third-grade students at Bean Station Elementary School. This population was identified by California Achievement Test scores gathered by the experimenter in May, 1975. The educationally deprived were identified as those scoring below third-grade level in reading scores on the California Achievement Test. From the 143 third-grade students at Bean Station Elementary School, fifty-one were identified as educationally deprived. From the fifty-one educationally-deprived students, twenty

¹¹Donald T. Campbell and Julian C. Stanley, Experimental and Quasi-Experimental Designs for Research (Chicago: Rand McNally and Company, 1963), p. 8.

were randomly selected for the experimental group, and twenty were randomly selected for the control group. The randomization was a simple process recommended by Richard Runyon and Audrey Haber.¹² The fifty-one names were written on slips of paper and dropped into a box. A custodian in the school drew the names. A coin was tossed to determine the first-drawn name's group assignment. Then, alternating names were drawn and assigned to the control and experimental groups until twenty students were assigned to each group.

The twenty experimental subjects were assigned to Denise Smith, instructor of the TARMAC Reading Program. The twenty control subjects were assigned to four teachers in self-contained, third-grade classrooms: Pauline Johns, Elsie Beeby, Robert Buchanan, and Jeanette Coffey. Five control subjects were assigned to each of these teachers. Students of both groups began participation September 2, 1975. Both groups participated in sixty-minute daily periods throughout the experimentation. The post-tests were administered April 2, 1976, by the experimenter. Social studies grades were gathered April 2, 1976, for analysis of carry-over reading abilities. Total participation for both groups was seven months.

As a posttest, the Stanford Achievement Test was administered to both the control and experimental groups by the experimenter to determine significant differences for Hypotheses 1, 2, and 3. The data for these hypotheses were presented in percentiles; therefore, the data was ordinal level.¹³ Social studies grades for the 1975 and 1976 school years were

¹²Richard P. Runyon and Audrey Haber, Fundamentals of Behavioral Statistics (Reading, Pennsylvania: Addison-Wesley Publishing Company, 1967), p. 135.

¹³W. James Popham and Kenneth A. Sirotnik, Educational Statistics: Use and Interpretation (New York: Harper and Row, Publishers, 1973), p. 269.

gathered for control and experimental groups for Hypothesis 4. The letter grades were converted to a quality point system whereby the following grades received the following points: A, 4; B, 3; C, 2; D, 1; and F, 0. The data for Hypothesis 4 dealt with categorical; therefore, the data was nominal level.¹⁴

The t test for independent samples was selected for statistical analysis for the first three hypotheses. The t test for non-independent samples was selected for analysis for Hypothesis 4. The t test was selected because it was most pertinent to the study, and the posttest-only control group design was the only setting for which the t test was optimal.¹⁵ The results obtained from the control and experimental groups were examined to determine whether the differences between the means were statistically significant at the .05 level of confidence.

ORGANIZATION OF THE STUDY

Chapter 1 contains an introduction to the study, a statement of the problem, importance of the problem, definitions of terms used, limitations of the study, assumptions, hypotheses, procedures of the study, and organization of the study.

In Chapter 2 an introduction to the chapter, characteristics of the educationally deprived, reading deficiencies of the educationally deprived, description of the TARMAC Reading Program, current research studies on individualized reading, research on similar commercial reading programs, and a summary of the chapter are presented.

¹⁴Ibid., p. 275.

¹⁵Campbell and Stanley, op. cit., p. 26.

Chapter 3 consists of a background of Grainger County, Tennessee, the geographic location of Grainger County, the socio-economic status of Grainger County, and education in Grainger County.

Chapter 4 includes the selection of the school and subjects, the experimental program in operation, the control program in operation, the posttest-only control group research design, selection of instruments, and the method of analysis of data.

Chapter 5 contains the presentation of data and interpretation of findings.

Chapter 6 contains the summary and conclusions. Recommendations are offered based on the conclusions.

especially those from homes with functionally illiterate parents, were likely to be educationally deprived.³

Lester Crow discussed the following factors that often characterized individuals within the educationally-deprived group: (1) low annual income; (2) high rate of unemployment; (3) underutilization of human resources; (4) poor housing; (5) poor sanitary conditions; (6) large families with inadequate living space; (7) excessive reliance on welfare; (8) inadequate education; and (9) attitudes of hopelessness.⁴

Children from deprived environments tended to come to school with a qualitatively different preparation both for the demands of the learning process and the behavioral requirements of the classrooms. The culture of their environment was different from that which molded the school and its educational techniques and theory.⁵

Gordon Thompson pointed out that in organizing school for educationally-deprived children one should consider their feelings and environment. For the most part they were discouraged and felt lost in an unstable, transient, world. They suffered years of defeat in attempting to live up to the middle-class expectations of their female teachers.⁶

³Benjamin S. Bloom, Contemporary Education for Cultural Deprivation (New York: Holt, Rinehart, and Winston, Inc., 1965), p. 26.

⁴Lester D. Crow, Walter I. Murray, and Hugh H. Smythe, Educating the Deprived Child: Principles and Progress (New York: David McKay Company, Inc., 1966), p. 8.

⁵Harry A. Passow, Education in Depressed Areas (New York: Teachers College Press, 1963), p. 163.

⁶Gordon W. Thompson, "Administrative Concerns in the Education of Our Culturally Cheated Citizens" (paper read at school luncheon of the annual conference of the New York State Association of Secondary School Administrators, New York, Queens College, December 16, 1963), p. 1.

Chapter 2

REVIEW OF RELATED LITERATURE

INTRODUCTION

This chapter is a survey of literature related to the major concerns of the study. Basically, the report of this review of literature was directed toward the following areas: characteristics of the educationally deprived, reading deficiencies of the educationally deprived, description of the TARMAC Reading Program, similar commercial reading programs, and individualized reading instruction.

CHARACTERISTICS OF THE EDUCATIONALLY DEPRIVED

In 1950, it was estimated that public schools had one educationally-deprived child in ten; in 1960 there was one in three, and the prediction is that, in the 1970's, there will be one in two.¹ The term educationally-deprived child suggests only a variation of a theme. It denotes a group of children who previously were called problem children, culturally deprived, slow learners, underprivileged, and underachievers.²

Benjamin Bloom pointed out that educational deprivation should not be equated with race. Still, a large number of Negro children,

¹Herbert A. Thelan, Teachability Grouping (New York: Harper and Row Publishers, 1962), p. 2.

²Joseph W. Smith, The Culturally Deprived Child (New York: Harper and Row Publishers, 1962), p. 21.

When the deprived child entered a preprimary program, several paramount deficiencies became apparent. The language deficiency resulted in severe difficulty in communicating with the child. Other handicaps showed up in the way the child looked at himself, approached others, and made use of his environment; and in his ignorance of the environment; and in his ignorance of the environment beyond a very limited geographic range, and of cultural items which in society formed customary infant and early childhood heritage.⁷ Annie Butler stated that the principal means of aiding the child in conceiving himself positively was by providing the child with success experiences. Responsibility must be developed in the child by granting enough freedom and acceptance to allow some trial and error problem solving.⁸

The educationally-deprived child suffered from a lack of the kinds of experiences which transfer into the school situation. Joseph Hunt stated that the child must be reached at the age of three or four if he is going to be helped in off-setting this lack of early intellectual stimulation.⁹

Mark Krugman included many of the ideas presented thus far in the following statement concerning the educationally deprived:

The psychologists describe a syndrome of feelings and attitudes which the majority of deprived children tend to share, as follows: both the family climate and experience tend to induce a feeling of alienation; their self concept is low;

⁷Helen McIntosh, Education of Disadvantaged Children Under Six (New York: McGraw-Hill Book Company, 1965), p. 4.

⁸Annie Butler, "Will Head Start Be a False Start?" Childhood Education (1965), p. 365.

⁹Joseph M. Hunt, Intelligence and Experience (New York: Ronald Press, Inc., 1961), p. 6.

they question their own worth, fear being challenged, have a desire to cling to the familiar, and have many feelings of guilt and shame; there is a limited trust in adults; they tend to respond with trigger-like reactions, are hyperactive, and have generally a low standard of conduct; and they usually show apathy and lack of responsiveness. It is difficult for them to form meaningful relationships.¹⁰

According to Hilda Taba, the tendencies described by Krugman translated themselves into additional orientation which was difficult for teachers to understand; a negative attitude toward school, teachers, and achievement. There was also a tendency to seek immediate gratification over and above any long-range purposes.¹¹

Bloom stated that very few problems in the field of education were as complex as the problems of educational deprivation. An adequate attack on those problems required that educational policymakers, curriculum specialists, teachers, guidance workers, and administrators have an appreciation of the many ways in which social problems of society have born directly on the development of the child and adolescent and influenced the interaction between students and schools.¹²

Jack Kough and Frank DeHaan offered the following characteristics for identifying a deprived child:

1. Is resentful, defiant, rude, sullen, or apt to "sass" adults.
2. Is not noticed by other children. Is neither actively liked or disliked but just left out.
3. Is one or more of the following: shy, timid, fearful, anxious, excessively quiet, tense.
4. Daydreams a great deal.

¹⁰Mark Krugman, "The Culturally Deprived Child in School," NEA Journal, April 1961, p. 365.

¹¹Hilda Taba, "Cultural Deprivation as a Factor in School Learning," The Causes of Behavior (Boston: Allyn and Bacon Company, Inc., 1966), p. 226.

¹²Bloom, op. cit., p. 18.

5. Never stands up for himself or his ideas.
6. Is "too good" for his own good.
7. Finds it difficult to be in group activities or to be relaxed when with others.
8. Is easily upset; feelings are readily hurt; is easily discouraged.
9. Needs an unusual amount of prodding to get work completed.
10. Is inattentive and indifferent, or apparently lazy.
11. Exhibits nervous mannerisms such as nail biting, stuttering, extreme restlessness, muscle twitching, hair twisting, picking and scratching, deep and frequent sighing.
12. Is a failure in school for no apparent reason.
13. Is absent from school frequently or dislikes school intensely.
14. Seems to be more unhappy than most children.
15. Achieves much less in school than his ability indicates he should.¹³

According to Donald Cushenbery, the educationally-deprived student in the Appalachian region was much like the deprived in the larger cities. The characteristics were considered similar in that needs assessments resulted in similar deficiencies. The deprived student in the Appalachian region was thought to have slightly less skill in language development and reading abilities; however, both seemed to have developed a pattern of regionalism that was contrary to acceptable public school language.¹⁴

READING DEFICIENCIES OF THE EDUCATIONALLY DEPRIVED

There was no apparent need for investigation of sex differences in the study, because of the fifty-one students identified as educationally deprived by the California Achievement Test, twenty-seven were females and twenty-four were males. Also recent exhaustive studies throughout

¹³Jack Kough and Frank DeHaan, Identifying Children Who Need Help (Chicago: Science Research Association, 1965), p. 2.

¹⁴Donald C. Cushenbery, Reading Improvement in the Elementary School (New York: Parker Publishing Company, Inc., 1971), p. 17.

the country have resulted in no significant differences between the sexes in reading abilities.¹⁵

Aleda Druding listed the following aims or goals of teachers of the educationally deprived for which one and four were basic to the TARMAC Reading Program, and two and three should have been influenced in the process of growth as a result of the program:

1. To raise the achievement level of each child;
2. To raise his aspirational level;
3. To enrich his cultural background; and
4. To find and to develop potential talent.¹⁶

It was estimated that up to 60 percent of educationally-deprived children were retarded two or more years by the time they entered junior high school.¹⁷ Margaret McKim indicated the importance of experience in learning:

A child who has a wide background of experiences has more ideas about which to talk, to write, to read, and to interpret pictures. He also has a better background from which to understand preprimer stories. Simply written though these first materials are, they call for a working knowledge of suburban family life, wagons, and tricycles, and friendly postmen and firemen.¹⁸

¹⁵Marvin Powell, "Are There Really Sex Differences in Achievement?" The Journal of Educational Research, Spring 1973, p. 447.

¹⁶Aleda Druding, "Selection and Preparation of Teachers for Culturally Deprived," Improving English Skills of Culturally Different Youth (Washington, D.C.: United States Government Printing Office, 1964), p. 187.

¹⁷Martin Deutsch, "Social and Psychological Perspectives on the Development of the Disadvantaged Learner," The Journal of Negro Education, Summer 1964, p. 236.

¹⁸Margaret G. McKim, Guiding Growth in Reading (New York: The MacMillan Company, 1963), p. 36.

Actually, educationally-deprived children understood more language than they used. Such students used a great many words with fair precision, but they were not necessarily the same words which were representative of the school culture.¹⁹ Deprived students were generally effective in face-to-face situations or when communicating with peers, but usually avoided situations which required them to read or write.²⁰ Frank Riessmann felt that an awareness of the positive verbal ability possessed by the educationally deprived would lead to demanding more and expecting more from them.²¹

These students frequently were handicapped in language development because they did not perceive the concept that objects have different names. The deprived kindergarten student used fewer words with less variety to express himself than did a kindergarten student of another background. Deprived students tended to use a significantly smaller proportion of mature sentence structures. It was also found that the deprived child learned less from what he heard than other students.²²

Robert J. Havighurst distinguished between two forms or types of language. One form, restricted, was directly related to the lower class. A family which employed restricted language gave its children a language environment characterized by:

¹⁹Millard H. Black, "Characteristics of the Educationally Deprived Child," The Reading Teacher, March 1965, p. 466.

²⁰Walter G. Daniel, "Problems of Disadvantaged Youth, Urban and Rural," The Journal of Negro Education, Summer 1964, p. 222.

²¹Frank Riessmann, "The Culturally Deprived Child: A New View," The Education Digest, November 1963, p. 71.

²²Black, op. cit., pp. 466-467.

1. Short, grammatically simple, often unfinished sentences with poor syntactical form stressing the active voice;
2. Simple and repetitive use of conjunctions (so, then, because);
3. Little use of subordinate clauses to break down the initial categories of the dominant subject;
4. Inability to hold a formal subject through a speech sequence; thus, a dislocated informational content is facilitated;
5. Rigid and limited use of adjectives and adverbs;
6. Constraint on the self-reference pronoun; frequent use of personal pronoun;
7. Frequent use of statements where the reason and conclusion are confounded to produce a categoric statement;
8. A large number of statements/phrases which signal a requirement for the previous speech sequence to be reinforced: "Wouldn't it? You see? You know?";
9. Individual selection from a group of idiomatic phrases or sequences will frequently occur; and,
10. The individual qualification is implicit in the sentence organization; it is a language of implicit meaning.²³

Children who learned a restricted language at home were likely to have difficulty in school where an elaborate form, the second type suggested by Havighurst, was used and taught by the teachers.²⁴

Educationally-deprived children were found to have inferior auditory discrimination, inferior visual discrimination, and inferior judgement concerning time, number, and other basic concepts. This inferiority was not due to physical defects of eyes and ears, and brain, "but is due to inferior habits of hearing and seeing and thinking."²⁵

Little research was actually accomplished which provided specific insights into how to teach the deprived child, and most of the programs initiated were of demonstration nature, according to Arnold B. Cheyney,

²³Robert J. Havighurst, "Who Are the Socially Disadvantaged?" The Journal of Negro Education, Summer 1964, p. 213.

²⁴Ibid., p. 214.

²⁵Ibid.

an instructor in the School of Education, University of Miami.²⁶ There was much to be done and learned about teaching the deprived child. There were many areas, such as developing language and listening skills, that would serve as springboards for teaching reading to the deprived child. Jerome S. Bruner, professor of Psychology, Harvard University, reiterated the idea: "Nor need we wait for all research findings to be in before proceeding, for skillful teachers can also experiment by attempting to teach what seems intuitively right for children of different ages, correcting as he goes."²⁷

Martin Deutsch related in a paper presented at the Boston University Developmental Conference on the Teaching of Deprived Youth in 1964:

The essential element which is both professionally and psychologically threatening, is simply that, for the child inadequately equipped to handle what the school has to offer, it is up to the school to develop compensatory strategies through a program of stimulation appropriate to his capabilities. Essentially, the deprived child is still further deprived when the school, as a primary socializing agency causes such a child to fail.²⁸

In addition to limited research on how to teach the deprived child, there was great need for suitable materials for teaching reading to the child. There was no panacea in methodology that would open the flood gates of interest and enthusiasm for all children at the same time or at the same rate. Schools and classrooms were needed where each

²⁶Arnold B. Cheyney, Teaching Educationally Deprived in the Elementary School (Columbus, Ohio: Charles E. Merrill Books, Inc., 1967), p. 9.

²⁷Jerome S. Bruner, The Process of Education (New York: Vintage Books, 1960), p. 53.

²⁸Martin Deutsch, "Some Psychological Aspects of Learning in the Deprived" (revised version of a paper presented at Boston University Developmental Conference of the Teaching of Deprived Youth, 1964), p. 4. (Mimeographed.)

child, including the deprived child, would be able to satisfy his curiosity and develop his abilities and talents. Stuart E. Dean expressed the same principles when he stated: "As the stress on academic achievement had increased, the doubt had grown that one teacher could teach all subjects to all children with equal effectiveness and skills."²⁹

The concept of teaching the deprived child has changed. The public became aware of the numerous problems of the deprived child, but little was done to help solve the problems. The whole attitude toward the child and its instruction was misplaced. According to Arnold Cheyney, if there was any place in the forefront of educational thought and experimentation, it was the neighborhood school.³⁰ The contemporary concept was based on the theory that a child from a disadvantaged home had intellectual capacities far greater than he was commonly believed to have.

Cheyney contended that reading was one of the major educational problems attendant to the deprived child. Studies indicated the deprived child, on the whole, was two or three years behind the norm in reading; he did not receive stimuli in the same manner, type, or degree that his favored counterpart did. The task of the teacher was to utilize the environment and the child's potential to motivate the deprived child to a fuller use of the receptive organs. Cheyney also stated: "There was no 'one' best way to teach reading or any other subject to all children or to any one group of children."³¹

²⁹Stuart E. Dean, "Team Teaching: A Review," School Life, September 1961, p. 5.

³⁰Cheyney, loc. cit.

³¹Ibid., p. 81.

A multisensory approach to reading must be paramount to the orientation of the deprived child to the academic sphere in order to close the gap caused by the lack of learning experiences. The teacher who gave the child some personal, undivided time was capable of diagnosing the interests and needs of the child. The deprived child needed someone to talk to; a person who cared could become a model for better speech and learning.³²

Since the deprived child was experience poor by definition, it was necessary that the school provide experiences which would bridge the gap. The reading material should reflect realities to the child in order to make language relate to the world around him. This does not mean that the child should hear only stories about the real and easily "seeable." Joseph O. Loretan, who spent much of his career in the New York City areas known as "deprived," and Shelly Umans, a reading specialist currently involved in initiating, developing, and implementing new curriculum approaches for the deprived, believed that it was of great importance that the child--in view of the bleakness of his life--hear stories that were completely in contrast to the real stories that stirred his imagination, stories that were sheer fantasy.³³

Stories, such as the one about the man who grew ten feet tall, have freed a child from "rational thinking" and probably opened doors to divergent or creative thinking. A large body of books on a variety of subjects should be made available to the child.

³²Ibid., p. 82.

³³Joseph O. Loretan and Shelly Umans, Teaching the Deprived (New York: Columbia Teachers College Press, 1966), p. 53.

Edwin Mengoia observed in his study of deprived pupils in 1964, that reading handicaps seemed to be especially prevalent among multi-problem pupils. Surveys showed that deprived families did not engage in discussions or language training that would stimulate conceptual thinking, vocabulary growth, and appreciation of literature. The child from this family needed experiences to enable him to see a purpose in reading. Formalized reading instruction with basic word attack skills needed to be delayed until the child seemed to be ready for it, which could be the second or third year in school.³⁴

Cheyney concluded that vocabulary and comprehension are developed out of the process of conceptualizing and are most important in learning to read. He stated also that it was logical to base reading instruction on the positives the deprived child possessed, grouped under five headings: physically oriented and visual/artistic; phantasy prone, and verbally abstract; inductive and persistent; problem and spatially oriented, and role players and expressive.³⁵

When a child had a small meaningful vocabulary, the first possible cause to investigate was intelligence. Low general intelligence showed itself clearly in retarded language development and difficulty in acquiring the meanings of words. Some type of intelligence or achievement test should be applied at this point.³⁶

³⁴Edwin M. Mengoia, "The Language Arts and Deprived Pupils," Education, January 1965, p. 284.

³⁵Cheyney, op. cit., p. 89.

³⁶Edgar Dale, "Vocabulary Measurement: Techniques and Major Findings," Elementary English, June 1965, p. 39.

Lack of intellectual stimulation and practice in the use of language were also important causes of vocabulary weakness. Words had meanings to a child only when they were related to things he had experienced or knew about. A child who had a very restricted life was ignorant of many things that were commonplace to the average child and so had no basis for understanding words which referred to those things. Children whose parents were very ignorant in the home were handicapped in their language development because they did not receive enough practice in hearing and speaking good English. Speech defects and defective hearing also interfered with the acquisition of a rich vocabulary because they cut off many conversational opportunities. A child who liked to read enriched his vocabulary continually with words and ideas that he gained from his reading. When a child had made a poor start in reading he usually disliked to read and thus gave up one of the best opportunities to expand his vocabulary. A vicious cycle was begun in which poor reading restricted the opportunity to learn new words, and failure to build up vocabulary prevented improvement in reading.³⁷

The fundamental skill of word recognition was basic to all levels of reading. Unless the individual recognized words and their meanings, reading was literally impossible. However, in contrast, letter knowledge was not significant for beginning reading. Word recognition was not aided by being able to name the letters of the alphabet, or even the letters within a word. Some research attempted to show that the knowledge of letter names was highly related to early reading success. These researchers ignored the patent fact that such learning was a reflection

³⁷Albert J. Harris, How to Increase Reading Ability (New York: David McKay Company, Inc., 1974), p. 393.

of the child's cultural background and the education of his parents. Educationally-deprived children did not know the letter names before entering school, for obvious reasons. Therefore, no one should be so naive as to attribute all the academic difficulties these children experienced to this oversimplification that letter knowledge conditioned success in beginning reading.³⁸

In ever-increasing numbers, reading specialists recognized the relevance of the development of the child's language skills for reading success. Classroom teachers realized that learning to read was more than simply the saying of words by readers. There appeared to be limited knowledge of words and limited comprehension in the process of saying words to the teacher. Vocabularies were limited in that the students could say the words; however, they did not know the meanings of these words. Children could not really learn to read, in the sense that reading was thinking words, unless their own language skills were developed; in other words, unless they first used words in meaningful ways. Reading progress was limited when children used baby talk, or substituted one sound for another. Reading was almost impossible when they could not mentally frame sentences to express what they wished to say, or their ideas were offered in fragments or rudimentary strings of words. Reading continued to be memorized word-naming, if the structure of the printed sentences or ideas they offered were more advanced than the child's own language or his idea background.³⁹

³⁸Evelyn B. Spache, Reading Activities for Child Involvement (Boston: Allyn and Bacon, Inc., 1973), pp. 39-40.

³⁹Harold Blau and Harriet Blau, "A Theory of Learning to Read," Reading Teacher, September 1968, p. 126.

A recent critical survey of vocabulary instruction classified vocabulary teaching procedures as either direct or context. Direct study methods included: (1) study of word lists--usually a list was assigned to be looked up in a dictionary and used in sentences; (2) study of word parts--English roots, prefixes, and suffixes, particularly those of Latin or Greek origin, were studied and applied; (3) additional direct methods included teaching the use of the dictionary; vocabulary notebooks, study of word origins, synonyms, antonyms, and homonyms; workbooks; programmed materials and audiovisual aids. Context methods included: (1) direct instruction on how to use the context; (2) reliance on incidental learning from wide reading; (3) a variety of related procedures including discussion of connotation and denotation, idioms, multiple meanings, and word origins. The authors of this survey noted that teachers reporting on favorite techniques usually began with discussion of how student interest in word study was stimulated, while research reports often ignored motivation. They concluded that most of the research comparing the effectiveness of different methods of teaching vocabulary was inconclusive, partly because of limitations of research design and partly because methods employed in many of the research studies did not seem representative of good classroom practices.⁴⁰

According to Spache, the reading program must supply the experience, or the ideas, which may be translated into words--the medium of the reading act. Printed words were only symbols for ideas and concepts which, in turn, were familiar or not according to the experiences

⁴⁰Walter T. Petty, Curtis P. Herold, and Earline Stoll, The State of Knowledge About the Teaching of Vocabulary (Champaign, Illinois: National Council for Teachers of English, 1968), p. 2.

of the reader. Reading words was not an end in itself but the amalgamation of the reader's thinking or language ability and first-hand experiences with the concepts offered.⁴¹

The child who read word by word had difficulty in getting the meaning of a larger unit of thought such as a phrase, clause, sentence, or paragraph. He was unable to see the forest because of the trees. Because he was not anticipating meanings, he failed to utilize context clues and so made unnecessary errors in word recognition. After he had read the words, he often had difficulty and had to reread for meaning and even then found it difficult to understand.⁴²

According to Spache, as the pupil entered the study of the content fields, his reading rapidly expanded beyond the simple interpretation of story-type material. Many graphic and visual aids appeared in his textbooks and demanded a different approach than word-by-word or line-by-line reading. Basic reading skills made almost no contribution to handling these new media. The research on children's development of these content reading skills was not encouraging, for it indicated that many pupils could not interpret this illustrative material.⁴³

Dale stated that many writers gave long lists of comprehension skills, despite their complete inability to demonstrate real differences among these various skills. Researchers recognized only three or four components of comprehension. One of these, of course, was the difficulty of the vocabulary for the reader. Attempts to strengthen this component involved training in using word analysis and contextual clues. A second

⁴¹Spache, op. cit., p. 136.

⁴²Harris, op. cit., p. 415.

⁴³Spache, op. cit., p. 138.

major component was the recognition of relationships among ideas; as in adding them together to find a main idea, distinguishing among major and minor details, following a sequence of related directions and adding ideas together to obtain an inference or conclusions. Most other so-called comprehension skills were simply extensions of these basic behaviors.⁴⁴

According to Bruce Amble there were two main ways in which the habit of word-by-word reading was developed. Word-by-word reading was frequently a secondary result of slowness and inaccuracy in word recognition. The child had to concentrate most of his attention on recognizing or figuring out the words and had little attention left for the meaning. Word-by-word reading was also developed as a result of much practice in oral reading of the mechanical reading-in-turn type, when there was little or no discussion of meaning.⁴⁵

Ideally speaking, the child was given special instruction and help by the teacher every time she used a content textbook with a group.⁴⁶ As pupils progressed to more difficult materials, organizing skills and rates of reading began to influence comprehension. Readers must learn to summarize and outline, to separate fact from opinion, and to vary reading rate in different reading tasks to achieve the breadth and depth of comprehension demanded in later school life.⁴⁷

⁴⁴Dale, op. cit., p. 40.

⁴⁵Bruce R. Amble, "Reading by Phrases," California Journal of Educational Research, December 1967, p. 116.

⁴⁶Spache, op. cit., p. 176.

⁴⁷Ibid., p. 187.

DESCRIPTION OF THE DIAGNOSTIC-PRESCRIPTIVE
TARMAC READING PROGRAM

The TARMAC Reading Program was a commercial program developed by TARMAC Audio-Visual Company, Asheville, North Carolina. The program was developed on the basis of recommendations of two professionals in individualized and remedial reading: Eldon E. Ekwall, Professor of Education, University of Texas; and Lowell Oswald, Reading Supervisor, Salt Lake City School District. TARMAC Audio-Visual Company dealt with individualized instruction programs, mainly in reading and mathematics, with the multi-mediated approach to teaching. The company provided two consultants for the program: John N. Gerner, reading specialist; and W. D. Christy, hardware specialist. Visitations were provided to the experimenter by TARMAC consultants to observe its operation in Knoxville, Tennessee. The TARMAC Reading Program was being used in several school systems throughout the state of Tennessee. The program was a relatively new approach with many participants; however, little or no research had been undertaken to determine its effectiveness. A pilot program was used in Hilham Elementary School in Asheville, North Carolina in which sixty-seven students were observed. The program was being observed by several counties in North Carolina and neighboring states. Beryl Reid, reading teacher at Hilham Elementary School stated: "The program is just great; I cannot say enough about it. I can see improvement in these children already, and we have only been using the equipment about two weeks."

The four basic goals of the TARMAC Reading Program were as follows:

1. To diagnose the exact sequential requirements of beginning readers;
2. To prescribe an individualized course of instruction to develop those specific skills;
3. To provide students with all the lessons and materials they need to administer their own course of instruction;
4. To support teachers with complete management systems for testing and teaching that supplements and reinforces the overall teaching of reading.

The curricula of our schools and colleges have always been in a process of change. We have all read and heard a great deal about the need for a good education, but in all this discussion, not enough is being said about the role of reading in achieving this goal. And there is no more important element in reaching this goal than improving skills and attitudes.⁴⁸

The skills laboratory was TARMAC consultants' response to the above quotation. Also included in the program were the most recently validated curricular materials and equipment which insured a consistent sequence of skills development, giving equal emphasis to the process and content of reading.

The educational philosophy upon which the program was predicated was research-supported and student-needs oriented. It recognized reading primarily as skills, not art or science. If given the time and opportunity to master or learn/overlearn all the subskills that make up the processes of reading, students, when properly motivated, will be able to manipulate the content area.

Recognizing the importance of effective utilization of students' time, the methodology of a diagnostic-prescriptive approach to teaching remedial skills of reading best eliminated inefficiencies in the instructional program. Students who fell below peer level in both attitudes and achievement levels benefited through a system that

⁴⁸Anthony J. DiBianon, The Role of the Learning Center in Schools (New York: Harper and Row Publishers, 1971), p. 2.

categorized specific skill deficiencies and allowed sufficient time to remedy the situation. The diagnostic-prescriptive approach centered around a test and skills chart that determined the exact program on which the student should work. Therefore, the test results were used to help plan a course of reading instruction, based on specific needs. Each presentation became the basis for establishing reasonable performance goals as measured by the diagnostic test.

The reading programs included complete perceptual training encompassing the gross motor skills, hand-eye coordination, visual perception and discrimination, as well as auditory perception and discrimination. Recognizing that students did not all learn in the same way, a multisensory approach was devised to benefit under-achieving students through a sense most conducive to their individual learning potentials. Reading materials were based on a sequence of skills, and reinforcement for each level of introductory skill. Lessons presented on tape guided the learner through each of the sequential steps necessary to master the target function of the program. Materials combining taped instruction with a filmstrip, actually showed the learner how various situations should be handled and then gave problems for drill, each of which was then checked by items contained in the film, thus providing immediate and positive reinforcement.

The TARMAC Reading Program, using modern multi-media techniques, was used as a supportive program for building interest within the young student in mastering reading. Flexibility in the presentation of the material was determined by the philosophy of the teacher in charge (teacher directed and student manipulated). The program involved the student in visual, auditory, kinesthetic, perceptual, and motor skills.

Most importantly, the programs were designed to enable the student to become the discoverer. With this approach, the child always was rewarded immediately for making correct responses, again building a positive approach necessary for effective learning.

The programs included in the TARMAC Reading Program were not designed to be complete within themselves, but were used as a supplement to the many approaches to a language arts program. The real value of this support was that of individualized instruction on specific skills or groups of skills using materials that provided instruction sufficient that the student might work independently, freeing the teacher to work with others to coordinate the class effort.

With the information provided, a realistic image of the supplementary instructional program from TARMAC Company, involving equipment and materials, was attained, thus providing a better understanding of the parameters of decision-making for the school administrator. TARMAC consultants agreed upon purchase or preview of this and all subsequent material to provide in-service education for instructional personnel connected with the skills laboratory. This in-service included opportunities for the teacher to become more familiar with the concept of diagnostic-prescriptive teaching, as well as the content of the various programs. Consideration was given to providing an opportunity for TARMAC consultants to acquaint the entire faculty of each school with capabilities and limitations of the laboratory. It must be understood that the success of this and all educational programs was dependent upon a team approach from the central administration, teachers in the normal classroom, and the instructional program that occurred in the laboratory itself. Only with a fully coordinated approach can educators expect

children to reach reasonable goals for themselves; this coordination can only come from the school itself.

Following is a brief description of reading programs provided by TARMAC Audio-Visual Company and included in the Title I learning laboratories at Bean Station Elementary School. Also included is an analysis of the contributions each of these programs made to the development of a proficient student. As noted herein, each description was written as a separate entity because of the wide range of approaches used with these programs within the educational systems approach.

TARMAC Diagnostic Reading Test

This was a tape-presented, self-scoring, diagnostic test which included the skills that a student must master if he was to become a proficient reader. With this test, the teacher was provided the capabilities of identifying those areas that were the weakest for each individual participating in the program and then selecting materials that reinforced those specific areas. This was done either individually or in small groups at the discretion of the teacher.

T-Matic 150 and Programs

This was a tachistoscope that was used equally well with entire classes, small groups, or in individual situations. In addition to the equal perceptual training films, this instructional device was proven most effective in developing a sight vocabulary and improving spelling skills. Programs for the T-Matic included perceptual training materials designed to make valuable sight-meaning associations, to develop rapid and accurate viewing habits, to improve discrimination and memory, and to develop concentration.

Craig Reader

This was a reading instrument which served as a tachistoscope, a controlled reading pacer, and with the accompaniment of a tape recorder, a sequential instrument for development of reading skills for primary readers. With the rear screen projection approach, the Craig Reader provided skill development for kindergarten through adult learners.

The primary skills were presented visually on the Craig screen with a synchronized tape providing auditory instruction and reinforcement. Accompanying duplicated worksheets were used to provide an action response to each skill as it was presented. Due to the broad range of skills presented by the Craig Reader and the individualized method of instruction, the Craig Reader could well be one of the most valuable reading instruments available. Since the Craig Reader involved one-to-one teaching, it was best used in a laboratory.

Auditory Support Tapes

A truly individualized program must have quality audio techniques that enable non-readers and reluctant learners to comprehend basic instructions and skills. Other than a teacher or an aide, prerecorded tapes offered the best auditory support to mastery of many types of skills. The tapes rendered an instructional message designed to help the learner grasp the skills of reading and apply them to real life situations in reading for pleasure.

Colonial Projector and Programs

This rear screen automatic advancing filmstrip projector had great adaptability to laboratory situations because of its versatility.

With automatic shut-down capabilities, the machine gave the child an opportunity to respond to questions on an answer sheet for later review by the teacher. The program covered the various skills of reading.

RX Program

This was a cassette-presented program which utilized the center as a means of presenting the program and included 160 different lessons. This program was included to give a very comprehensive yet motivating instruction in word attack skills and vocabulary development and was designed as a self-directing and self-correcting program for individualized or small group instruction. There were eight skills in each lesson with visual and auditory discrimination exercises built in so that the child might determine the differences in the skills being presented.

Pronounce-Ease Program

This program was a tape-presented syllabication program that enabled the student to learn how the total word attack system blended together. The sequential growth of skills for word pronunciation was built into the complete program with a testing key to make sure each prerequisite skill was learned before proceeding too far or fast for the individual students involved.

Intermediate Reading Program

The Intermediate Reading Program was a tape-centered series of forty lessons specifically designed to help individualize the instructional program. These tapes were programmed and covered reading skills that were normally presented from grades two through nine in sequentially developed format based on increasing difficulty. Each program was

presented on tape with a story card and a student workbook accompanying each lesson. This workbook was purchased either as a consumable item or with the laminated covering making it possible to eliminate consumables completely. The working time on each lesson was from twenty-five to thirty-five minutes depending on the student himself.

Within each taped lesson was a vocabulary study, word attack skills, and comprehension, which were well-defined and gave each student a much better understanding of the skills involved. The flexibility of this program was limited only by the number of tape recorders and earphones, since it was programmed and used by individuals or small groups in the class or reading laboratory.

Colonial Phonics - Linguistics Program

This was a blending of phonetic skills and vocabulary development with the use of the Colonial projector, which was designed to enable the child to listen to a cassette as it was presented on the screen. The projector was programmed to ask a question, turn itself off, and give the student time to respond; he then pushed the advance key to proceed. Immediate reinforcement was given to his question giving him an opportunity to grade his response. These phonics lessons were a blending of the perceptual skills into a sight word recognition program.

Studio Ten

This program was designed to zero in on specific skills showing the relationship of the visual and auditory skills in the act of reading. These tapes covered the production of the consonants and vowels in all possible positions and situations.

Craig Vowels I and II
and Digraphs and Blends

This program supplied the student with the means to discover the phonemic relationships between the spoken and written language, and to become familiar with the rules and generalizations that he needs to develop good reading and spelling skills. Each lesson was presented on filmstrip and tape with a worksheet to correspond with the lesson. He saw, heard, and did, involving all the learning senses.

Sound Learning - Content Reading

This was a tape-presented program that developed and strengthened phonetic analysis, structural analysis, and contextual analysis in the three subject areas (geography, history, and science) at different levels.

Each reading level contained twenty-four reading lessons in content materials; six in geography, nine in history, and nine in science. Each reading level was completely directed by the cassette tape and was developed around a short, graded selection from content material. The vowel letters were omitted from many of the words in the selection. To replace the missing vowels correctly, the pupil was given oral vocabulary by the cassette tape and then directed in applying sounding on the existing consonants (phonic analysis), guided in analyzing the structure of words for prefixes, suffixes, inflectional endings, and syllabication (structural analysis), and once some of the words were solved, led to examine the context for clues to the unsolved words (contextual analysis).

Each cassette tape lesson was accompanied by a non-consumable lesson card. The teacher used the lesson card to make a duplicating master and duplicated enough copies for her pupils or she elected to have the pupils write on a separate sheet of paper using the card as a guide.

Tachomatic 500

The Tachomatic 500 was designed to simulate the act of reading and provide for regular extended practice in learning how to see and read. It was the ideal group training instrument for use at all grade levels. The Visual Tracking Programs were designed to improve perceptual skill development during the years when children were first beginning to learn to read. These films contained a variety of recognition and discrimination tasks that helped establish simple sight-meaning associations. These films were designed for group use and were generally used in a game-type approach. All of these programs used a five fixation format with left to right projection with return sweep. This helped in developing the child's habit of reading from left to right. The individual programs used in the Visual Tracking series were:

Gross Forms. This was simply a symbol presentation for sight recognition and visual discrimination.

Letter Recognition. This gave the child an opportunity to recognize and learn, and over-learn, the letters of the alphabet.

Words and Phrases. This was a vocabulary program which combined specific training in sight word recognition with related phrases to provide additional opportunities for students to develop word understanding through the use of context clues. There were twenty-five words on each lesson and twenty lessons in each level. The repeated exposure of the word list insured over-learning and skill development training.

Basic Reading Vocabulary. This program contained all the basic words a child needed to know on sight to be a good reader. The program was

organized around 268 key words that made up most of the words found in basal reading texts and were presented in the visual tracking format.

Radio Reading Series. This was a reading/listening program of high interest and easy readability. The complete program was made up of films, tapes, and stories. Each story was presented as a directed reading/listening lesson and contained a story booklet, tape cassette, and series of follow-up exercises. Special activities included vocabulary understanding, improving comprehension, finding the main idea, using figurative language and discussion questions.

The list of equipment and materials was specifically prescribed for Bean Station Elementary School of Grainger County, Tennessee. At least five cassette audiotape playback units were recommended for each lab in order that flexibility could be achieved. One teacher's aide who had a basic knowledge of reading skills was highly recommended, as well as a fifty-minute planning period for the teacher aide.

CURRENT RESEARCH STUDIES ON INDIVIDUALIZED READING PROGRAMS

Herbert Klausmeir, Juanita Sorenson, and Mary Quillen compared word recognition performances of pupils in two schools before and after the Wisconsin Design for Reading Skill Development was implemented. The system involved individually guided instruction and had seven major components. They were organization, instructional programming, curriculum materials, measurement, home-school communications, a facilitative environment, research, and development. One aspect of the year-long study showed that 281 were acquiring mastery of subskills in word recognition at a rate that would enable most students to achieve

independence by the third grade of school, or earlier. Another aspect of the study demonstrated that a comparison of percent of children who mastered various reading skills before experience with the individually guided instructional program to the percent of those who had mastered these various skills after one year of its use at the school disclosed that more of the experienced pupils attained higher percent of mastery than did the inexperienced pupils. Similarly, based on the Doren Diagnostic Reading Test of Word Recognition Skills, the experienced pupils attained higher mean scores than did pupils with no experience with the system.⁴⁹

Third graders with poor prognosis of reading success were subjects in a study by Ward Cramer to ascertain the effect of a highly structured form of individualized instruction by aides on reading achievement. Children who ranked in the lowest percentiles of the Metropolitan Achievement Tests (M.A.T.) were assigned randomly to experimental and control classes. In addition to the regular basal reading program, the experimentals were tutored in daily sessions of fifteen minutes each by trained aides who followed carefully prescribed procedures in an approach called "programmed tutoring." At the end of a year's study, posttest scores were obtained from thirty pairs of subjects on the M.A.T. A comparison of mean scores between the two groups showed that the tutored pupils scored significantly higher in both word knowledge and reading subtests of the M.A.T. than did the

⁴⁹Herbert J. Klausmeir, Juanita S. Sorenson, and Mary R. Quillen, "Instructional Programming for the Individual Pupil in the Multiunit Elementary School," Elementary School Journal, November 1971, p. 88.

controls. No significant difference was found between the two groups on the word discrimination subtests.⁵⁰

To determine the effect of using individualized programmed material to teach young children reading skills, Barbara Watkins matched twelve British seven year olds into six pairs according to social class, reading levels, and knowledge of letter sounds. Members of each pair were assigned randomly to one of two groups. One group was taught with materials designed to cover letter-sounds and vocabulary of the programmed approach. The other group was taught with the programmed approach. Pretest and posttest results were secured on the Neale Analysis of Reading Ability; no significant differences were found in comparison of means.⁵¹

The effects of an individualized reading program utilizing social studies materials were studied by Thomas Goalsby and Joseph Stoltman. They were concerned with the improvement in reading of seventy-seven third graders from Southern Appalachia. Three treatment groups were formed according to ability levels of the subjects. The special treatment consisted of self-directed, self-pacing reading experiences for fifty-minute periods for fifteen days for the low and medium groups and twenty-five days for the high ability group. Analysis of pre-post data on the Iowa Tests of Basic Skills showed increases in reading attainment

⁵⁰Ward Cramer, "My Mom Can Teach Reading Too!" Elementary School Journal, November 1971, p. 72.

⁵¹Barbara Watkins, "Using Individualized Programmed Material to Teach Reading," Reading, June 1971, p. 22.

and improvement beyond that level normally expected during an equivalent period of instructional time.⁵²

A total of 460 first, second, and third graders was used by Robert Shore and Leonard Marascuilo in an experiment to ascertain the effects of three instructional approaches on reading achievement. Sullivan individualized programmed materials were used by all three treatment groups with Group 1 taught according to conventional strategies. Group 2 and 3 were taught according to a prescribed programmed fashion with stress on synthetic approaches to word identification. Also, Group 3 was exposed to additional reinforcement through the use of audiotapes. Multivariate analysis of variance was employed at each level to determine whether prior to initial instruction the experimental groups differed on a number of reading skills. Appropriate levels of the Stanford Achievement Test were administered as measures of growth. In general, comparisons of average scores favored Groups 2 and 3 at the first and second grade levels, but no significant differences were produced at the third grade level.⁵³

The effect of daily high intensity practice for a month on reading comprehension was investigated by Marvin Oliver in a study of forty-eight children in the third, fourth, and fifth grades. The experimental group of twenty-eight students participated in an intensive individualized directed reading program; the control group of twenty

⁵²Thomas M. Goalsby and Joseph P. Stoltman, "Effects of an Individualized Reading Curriculum in Southern Appalachia," Reading Improvement, Winter 1973, p. 57.

⁵³Robert E. Shore and Leonard Marascuilo, "Individualized Programmed Approach vs. Conventional Approach in Teaching Reading," California Journal of Educational Research, January 1974, p. 11.

students participated in programs that stressed uninterrupted sustained silent reading at increasing increments of time. Based on mean comparisons of pretest and posttest scores on the Gates-MacGenetic Reading Test, comprehension subtest, the gains favored the experimentals although the difference was not statistically significant.⁵⁴

SIMILAR COMMERCIAL READING PROGRAMS

The ERIC search resulted in limited research studies on commercial reading programs; however, many studies were found on individualized instruction, many of which were included in the appropriate section of this chapter. Consequently, six studies were found appropriate to this section of the study.

Leslie Malpass designed a study to evaluate the usefulness of automated teaching procedures for helping deprived children learn word recognition, reading, and spelling. The subjects for the study (66) were drawn from established public school classes for the educationally deprived. Subjects, ranging in ages from 8 to 10 years, were matched and assigned randomly to either an automated teaching group or to a conventional classroom group. Three hypotheses were tested: (1) there will be no significant differences between automated teaching and standard instruction for teaching selected tasks; (2) effective retention of skills, taught through automated means, will be demonstrated by post-learning tasks; and, (3) no significant differences will be found between an automated procedure utilizing a multiple-choice method and one utilizing

⁵⁴Marvin Oliver, "The Effect of High Intensity Practice on Reading Comprehension," Reading Improvement, Fall 1973, p. 17.

a typewriter keyboard method. Hypothesis one was rejected in light of significant skill improvement by subjects using both automated teaching procedures over conventional methods. Hypothesis two was partially supported. Spelling improvement was retained over a relatively short period. Hypothesis three was partially supported. In view of the findings, further research concerning automated teaching with the deprived was recommended.⁵⁵

Eunice Newton conducted a study comparing the rise of audio-visuals and the conventional methods of teaching reading to deprived children. The subjects (60) were matched and randomly assigned to control and experimental groups with 30 members each. The two null hypotheses tested were word recognition and reading comprehension. The two groups were tested with the Gates Word Recognition and Comprehension Test. Both hypotheses were rejected. As a result of the study, Newton offered the following recommendations: (1) many and varied audiovisual materials should be utilized; (2) the teacher should serve as an example and seek to involve the students in the teaching-learning process; and, (3) use should be made of programmed learning machines and programmed materials, textbooks, geared to deprived children's experiences, and peer teaching.⁵⁶

Leah Mahaney conducted an evaluation of reading programs in three small elementary schools. The first and second schools' programs

⁵⁵Leslie F. Malpass, "Comparison of Two Automated Teaching Procedures for Deprived Children" (Doctoral dissertation, University of South Florida, Tampa, Florida, 1973), pp. 177-179.

⁵⁶Eunice S. Newton, "Planning for the Language Development of Deprived Children and Youth," Journal of Negro Education, Spring 1969, pp. 48-49.

involved commercial, individualized, multilevel reading materials and reading labs. Testing indicated, and instructors felt, that students showed more growth than they had under former methods. The third program involved commercial taped daily reading lessons with earphones for students, thus allowing the teacher to give more individual attention to the students. The teacher of this program concluded that the thorough presentation of reading skills on the tape recorder gave students the ultimate in reading instruction.⁵⁷

Robert J. Nearine conducted a study of commercial programs with a comprehensive ESEA, Title I Program of small-group reading instruction for 500 elementary school children. Decoding, comprehension, vocabulary development, and independent reading were emphasized as a part of a team approach. Results of the evaluative studies found significant gains in word forms and word recognition at the primary level and significant gains in vocabulary, comprehension, and total reading for the majority of the intermediate-grade pupils. Questionnaire results indicated that parents, students, and teachers responded quite favorably toward the program and its subsequent effects.⁵⁸

Herbert Klausmeir and Mary Quillen conducted a study comparing commercial individualized reading instruction and the basal reading program for the research and development activities of research and instruction units at four elementary schools in Madison, Wisconsin.

⁵⁷Leah Mahaney, "Reading Programs in Small Schools" (Denver: Colorado State Department of Education, 1971), pp. 9-11.

⁵⁸Robert J. Nearine, "Patterns for Progress: An Evaluation" (Washington, D.C.: U.S. Office of Education, Bureau of Elementary and Secondary Education, 1970), p. 38. (Mimeographed.)

Evaluation of the project found that pupils using the individualized reading materials performed better than pupils using basal readers. As a result of the study, the reading program was being implemented at all grade levels in the four schools.⁵⁹

Doris M. Stumpe designed a study on an experimental communications skills improvement program for low-achieving pupils. The scope of the study was to investigate certain assumed pupil personal-social characteristics on which the program was based, and to assess the effectiveness of the program. Two basic features incorporated into the new program were: (1) a non-graded, supplementary group of 16 to 20 pupils which met two hours daily and which were taught by an auxiliary teacher employing group processes and individualized instruction; and, (2) integrated teaching of listening, speaking, reading, and writing together with utilization of commercial programmed readers and other commercial media specifically selected to contribute to positive conditions of learning. Eight classes from grades 3, 4, and 5 received instruction in eight elementary schools in St. Louis County, Missouri, for fifteen weeks. Tests given prior to the program indicated that the experimental students differed from the average students in personality, classroom peer acceptance, and positive classroom behavior. The differences in pretest scores at the .05 level, favoring the control group, disappeared in posttest scores. The control group gained only in reading comprehension,

⁵⁹Herbert Klausmeir and Mary Quillen, "Research and Development Activities in Research and Instruction Units of Four Elementary Schools of Madison, Wisconsin" (Washington, D.C.: U.S. Office of Education, Bureau of Research, 1971), p. 16. (Mimeographed.)

but the experimental group gained in vocabulary, comprehension, punctuation, total language, spelling, and capitalization.⁶⁰

SUMMARY

It was evident from the review of related literature that educational deprivation was a paramount problem, and it seemed that the problem was becoming more severe with the passage of time. It was also evident that the deprived child came to school with a different preparation than other students. The deprived student's culture was found to be quite different from other students' cultures, and suffered years of defeat in attempting to live up to the middle-class expectations of teachers. According to Krugman, all of these things made the child lean toward alienation with a low self-concept. Deprived children in the Appalachian region were thought to have slightly less skill in language development and reading abilities than deprived children in the cities. However, they had similar characteristics in many other areas of limitations.

According to recent exhaustive studies throughout the country, there were no significant differences between the sexes in reading abilities; therefore, these differences were not investigated in this study. It was said that experience was an important factor in teaching reading to the deprived child. These students were found to be effective in face-to-face communication, but avoided situations which required them to read or write. They were handicapped in language development

⁶⁰Doris M. Stumpe, "Study of a Non-Graded Supplementary Group Communications Skills Program" (Doctoral dissertation, University of St. Louis, St. Louis, Missouri, 1969), pp. 142-144.

because they did not perceive the concept that objects have different names. It was also found that the deprived child learned less from what he heard than other students. Educationally deprived children were found to have inferior auditory discrimination, inferior visual discrimination, and inferior judgement concerning time, number, and other basic concepts. This inferiority was not due to physical defects of eyes, ears, and brain, but was due to inferior habits of hearing and seeing, and thinking.

Little research was done to give specific insights into how to teach the deprived child, and most of the programs initiated were of demonstration nature. In addition to limited research on how to teach the deprived child, there was great need for suitable materials for teaching reading to the child. There was no panacea in methodology that would open the flood gates of interest and enthusiasm for all children at the same time or at the same rate. It was found that reading was one of the major educational problems associated with the deprived child. The deprived student seemed to require more individual attention than any other student. The fundamental skill of word recognition was said to be basic to all levels of reading. Language skills were also recommended as a necessity for reading success.

The study by Klausmeir and others demonstrated that students should have a background of subskills in vocabulary and comprehension before entering any type of reading, whether it be completely individualized or not. Cramer's study indicated the specific need for individualized reading instruction in the early grades. A study by Goalsby and Stoltman in Southern Appalachia concerning programmed individualized reading instruction resulted in significant differences

in the experimental group in all reading abilities. The studies reviewed in the related literature seemed to be equal in proof of effectiveness and ineffectiveness of individualized reading instruction.

The ERIC search resulted in limited research studies concerning similar specific reading programs. However, of the studies found, most seemed to attribute an increasing value to commercial materials for teaching the deprived student. It seemed that the commercial programs were more effective than both conventional classroom approach and teacher-made individualized reading programs.

The TARMAC Reading Program was a commercial program developed by consultants of the TARMAC Audio-Visual Company and reading specialists Ekwall and Oswald. It seemed that the program was in keeping with the recommended procedures of the related literature concerning educationally-deprived students.

The TARMAC Reading Program was a multi-mediated approach to teaching reading. It was a diagnostic-prescriptive approach centered around a test and skills chart that determined the exact program on which the student should work. The educational philosophy upon which the program was predicated was research-supported and student-needs oriented. It recognized reading primarily as skills, not art nor science. Recognizing that students did not learn in the same way, a multisensory approach was devised to benefit deprived students through a sense most conducive to their individual learning potentials. Reading materials were based on a sequence of skills, and reinforcement for each level of introductory skill. The program involved the student in visual, auditory, kinesthetic, perceptual, and motor skills. Most important, the programs were designed to enable the student to become the discoverer. With this

approach, the child always was rewarded immediately for making correct responses, again building a positive approach necessary for effective learning.

In conclusion, it seemed that the objectives and functions devised by Ekwall and Oswald for the TARMAC Reading Program were sound. The objectives and procedures outlined by the various authors throughout the related literature were apparently matched by the TARMAC program. Also, it was quite evident throughout the related literature and research studies that conventional classroom procedures and basal reading programs were failing to teach many students the fundamental skills of reading. Apparently, they were geared for the middle- and high-achieving students, and not the educationally-deprived student. However, individualized reading programs, especially the commercial programs, were reaching deprived students. The TARMAC Reading Program was designed to meet the specific needs of the educationally-deprived student. The student began the program at his own particular level, and he proceeded as far as possible on an individual basis.

Chapter 3

BACKGROUND OF GRAINGER COUNTY, TENNESSEE

GEOGRAPHIC LOCATION

Grainger County lies in the northeastern part of Tennessee. It is bordered on the north by Claiborne County; on the south by Hamblen County; on the east by Hawkins County; and on the west by Knox County. The county is divided into nine civil districts, with a county court member representing each district. The county is divided by Clinch Mountain, with Washburn and Thorn Hill located on its east side. Rutledge, Bean Station, and Blaine are located on the west side. There are two major highways in Grainger County: U.S. Route 11-W crosses the county going from east to west, and U.S. Route 25 crosses the eastern end of the county going from north to south. Probably, the most notable landmark in the county is Cherokee Lake.

According to the 1970 census, the population of Grainger County was approximately 14,892 with 6,895 males and 7,997 females. The non-white population made up only 1.4 percent of the total population.¹

The religious preference of the county was predominantly Protestant with nineteen Baptist churches and five Methodist churches. According to election commission secretary, Fern Thomas, the county had

¹County Census Summary, Part I, Report No. ET-SS-9B-71 (Knoxville: East Tennessee Development District, September, 1971), p. 5.

approximately 69 percent registered Republicans and approximately 31 percent registered Democrats. Rutledge, the only incorporated city in the county, had a mayor and five aldermen, all of whom were elected by residents of the city. Governance of the remainder of the county was by the county court members. All of the county court members of the nine civil districts were elected by popular vote within their particular district. The county seat was also located in Rutledge. All court officials were elected by popular vote throughout the county.

SOCIO-ECONOMIC STATUS OF GRAINGER COUNTY

Grainger County bordered two industrial areas that had a bearing on its labor force: Knox County and Hamblen County. Bean Station was the fastest growing community in the county. It was also the area closest to Hamblen County. Some of this population growth was due to in-migration of workers at new plants. The plants were four small furniture factories and one rather large mobile home factory. Many people worked at jobs in and around Hamblen County.

Blaine had the second highest population growth rate in the county. U.S. 11-W provided easy access to Knox County, where many of its inhabitants traveled to work. Industry had not moved into the area, probably because of the poor conditions of the highway.

Rutledge experienced a rapid growth between 1960 and 1970. The town established a small industrial part and a sewer system that attracted some small industries.

Thorn Hill and Washburn showed declines in populations, mainly because of their locations. Clinch Mountain made it difficult to travel

to any industrial area for work, especially in winter months. Therefore, many migrated closer to industrial locations.²

Economically, Grainger County improved substantially from 1960 to 1970. Median family income more than doubled between 1960 and 1970, from \$2,473 in 1959 to \$5,086 in 1969. Unemployment declined only slightly, from 5.7 percent in 1960 to 5.3 percent in 1970. Underemployment dropped from 36.2 percent of those employed in 1959 to 23.8 percent employed in 1969.³

Unemployment in both the Bean Station and Blaine areas in 1970 was very low, 3.7 and 3.4 percent respectively. Both of these areas contained large numbers of commuters. In the Bean Station area 54 percent of the employed labor force worked in Hamblen County, and another ten percent worked in counties other than Grainger and Hamblen. In the Blaine area 56 percent of the labor force worked in Knox County and twenty percent worked in counties other than Grainger and Knox. The Rutledge area had the highest proportion of unemployment, 7.0 percent, but the lowest rate of underemployment in the county, 21.3 percent. The Thorn Hill area had the highest percentage of underemployment in the county, 36.8 percent.⁴

Manufacturing was the major industry in all areas of the county. Approximately 43 percent of the labor force was employed in manufacturing in 1970. Agriculture was still important in the county with 30 percent of the labor force in Thorn Hill employed in agriculture.⁵

²Ibid., p. 4.

³County Census Summary, Part II, Report No. ET-SS-13-B-73 (Knoxville: East Tennessee Development District, January, 1973), p. 2.

⁴Ibid., p. 7.

⁵Ibid.

Bean Station had the highest percentage of families of four in the poverty level in 1970 with 49.8 percent. Thorn Hill and Washburn had 34.1 percent of families in the poverty level. Blaine had the lowest percentage of families in the poverty level, 23.0 percent.⁶

Even though Bean Station represented the highest proportion of families in the poverty level, using housing values as a basis for estimating income levels, it was considered the most prosperous area in the county.⁷ The Bean Station area presented both a surprise and a problem in the 1970's. The area near the intersection of U.S. 11-W and U.S. 25-E underwent substantial suburban and industrial development. Much of the new housing had been built in the area to accommodate the substantial population growth. There was every reason to believe that Bean Station was the most vigorously growing and most prosperous area of the county. The vigorous growth occurred, but the prosperity did not. While growth and prosperity occurred near the highway intersection, most of this area was still relatively poor.⁸

EDUCATION IN GRAINGER COUNTY

According to many authorities, the level of educational achievements and facilities in a community was a reliable indicator of its socio-economic status. Counties with a high incidence of families with incomes below the poverty cutoff were likely to be the counties with a poorly educated population.

⁶Ibid., p. 8.

⁷Ibid., p. 9.

⁸County Census Summary, Part I, op. cit., p. 8.

The median school years in 1950, 1960, and 1970 completed by Grainger countians were below the national norm. Although Grainger County followed the national trend of increases in years of school from 1950 to 1970, the levels were still lower than national norms. Also, functional illiteracy, measured by those attending less than five years of school, was far higher in Grainger County than the national norm.⁹

The percentage of local government expenditures utilized for education was a good indicator of the emphasis placed on education by a community. The average percentage for Grainger County was slightly over half of the national average.¹⁰

Within the past seven years, Grainger County has taken giant steps in updating its educational system. Through a program of consolidation, the elementary program was housed in four new elementary schools, one located in each area of the county: Rutledge, Bean Station, Joppa, and Washburn Schools. Prior to consolidation, twenty-two elementary schools were scattered throughout the county, many of which were one- and two-roomed elementary schools. During this same process, a new high school was built in Rutledge, and the old one at Washburn was renovated. The old high school at Rutledge was renovated and renamed Rutledge Middle School.

The policy-making body for Grainger County Schools was a nine-member board of education, one member from each of the civil districts. They were elected by popular vote within each district. The superintendent of schools was also elected by popular vote county-wide. The superintendent headed the central office staff, with the following supporting staff:

⁹Ibid., p. 10.

¹⁰Ibid.

one assistant superintendent/supervisor of instruction, one Title I coordinator, one attendance officer, one lunchroom supervisor, and one maintenance supervisor. Each elementary school, each high school, and the middle school had full-time supervising principals.

For many years, Grainger County teachers were not well-certificated, with many having less than bachelor's degrees; however, due to retirement and new certification laws, by 1975 about 65 percent had at least bachelor's degrees and about 10 percent had master's degrees. All principals held certification endorsements in their particular school levels in 1975. According to 1975-76 Grainger County Schools Preliminary Reports,¹¹ Grainger County schools employed 139 classroom teachers, eight Title I teachers, eight Title I aides, and one reading resource teacher. The number of students in Grainger County was 3,439 making the student-teacher ratio approximately 24 to 1. The breakdown in student population by schools was as follows: Washburn High, 162; Washburn Elementary, 567; Rutledge High, 660; Joppa Elementary, 596; Rutledge Middle School, 424; Bean Station Elementary, 808; Rutledge Elementary, 222.

Being highly-concentrated with educationally-deprived students, Grainger County received much Title I, ESEA money. According to Ronald Combs,¹² Title I coordinator, 1972 evaluation and diagnostic measures indicated that approximately 35 percent of students attending Grainger County Schools were educationally deprived. The largest concentration

¹¹1975-76 Grainger County Schools Preliminary Reports (MSS in the Office of the County Superintendent of Schools, Rutledge, Tennessee), report to Tennessee State Department of Education, October, 1975.

¹²Statement by Ronald Combs, Grainger County (Tennessee) Title I Coordinator, personal interview, Rutledge, Tennessee, September, 1975.

was in Bean Station with approximately 38 percent of the students being educationally deprived. These federal projects provided many innovative programs for the county. The programs have been used mostly in reading and mathematics instruction. Aides were also hired to help teachers with those students who qualified for Title I funds.

Bean Station Elementary School was the school chosen by the experimenter for the study. It was the largest elementary school in Grainger County, and the school most heavily populated with educationally-deprived students. James E. Steele was principal at Bean Station Elementary School. The total student population for the school was 808. The school housed grades K through eight with twenty-seven classroom teachers, two Title I teachers, two special education teachers, one speech therapist, one librarian, four Title I aides, and one secretary. There were two kindergartens, three first grades, three second grades, four third grades, four fourth grades, three fifth grades, three sixth grades, three seventh grades, and two eighth grades. Grades one through six were operated on a one-teacher, self-contained basis. Seventh and eighth grades had a departmentalized system with five alternating teachers. The faculty had various academic preparations and backgrounds. Of the thirty-four certificated staff members, four had three-year certificates, twenty-nine had B.S. degrees, and two had M.A. degrees.

The housing facilities at Bean Station Elementary School had become quite a problem. The school ~~was situated~~ in such a way that the amount of land owned by the county would not permit building to the existing plant, because of a lack of acreage that could be purchased. Plans were being made for building a separate plant in the area at another location. The existing facilities consisted of the main plant,

which housed classrooms from grades one through eight, gymnasium, cafeteria, library, office space, and four portable classrooms. Two of the portable classrooms were used for kindergarten, and two were used for Title I teaching: one for reading instruction and the other for mathematics instruction. The existing plant was built in 1967 and occupied September, 1968, as a part of the consolidation program for Grainger County. It was centrally located to serve the second, sixth, and eighth civil districts. It was an excellent facility; however, due to an unexpected growth of population in Bean Station, the plant became too small for effective operation.¹³

In summary, it may be said that Grainger County had made great progress in the past ten years in both economic and educational developments. A program of consolidation of elementary schools had created respectable housing facilities for educational programs. Most of the areas had grown in population with the Bean Station area being the strongest in growth. All schools were qualified for Title I, ESEA funds which had greatly improved the school facilities and educational programs.

¹³Statement by J. T. Acuff, Grainger County (Tennessee) Superintendent of Schools, personal interview, Rutledge, Tennessee, September, 1975.

California Achievement Test. From the 143 third-grade students at Bean Station Elementary School, fifty-one were identified as educationally-deprived. From the fifty-one educationally deprived, twenty were randomly selected for the experimental group, and twenty were randomly selected for the control group. The randomization was a simple process. The fifty-one names were written on slips of paper and dropped into a box. A custodian in the school drew the names. A coin was tossed to determine the first-drawn name's group assignment. Then, alternating names were drawn and assigned to the control and experimental groups until twenty students were assigned to both programs.

THE TARMAC READING PROGRAM IN OPERATION

The TARMAC Reading Program was funded through Title I, ESEA. The experimenter, Title I coordinator, and TARMAC Reading Consultants worked together in the planning and establishment of the program for Bean Station Elementary School. One of the consultants was a specialist in hardware and maintenance, and another was a specialist in teaching reading. The consultants analyzed the program in terms of placement of hardware and the teaching of reading. Since the portable classroom was previously provided by Title I funds, and the TARMAC Reading Program would also be funded by Title I, there was no conflict in funding regulations.

The experimenter interviewed and recommended Denise Smith for the teaching position for the program. She had previously worked with an individualized reading program in another county. She held a B.S. degree in elementary education from The University of Tennessee, Knoxville, Tennessee. She had four years of previous elementary teaching experience.

Chapter 4

METHODOLOGY

SELECTION OF SCHOOLS AND SUBJECTS

Bean Station Elementary School was selected by the experimenter for the experimental pilot program. It was the largest elementary school in Grainger County, and the school most heavily populated with educationally-deprived students. Bean Station Elementary School was best suited to a laboratory situation because of its excellent facilities. The portable classroom was used for remedial instruction in reading, and had been provided through previous Title I funds. It has previously been used in several different capacities for educationally-deprived students. It was constructed in such a way that open-space programs could be facilitated with no problems. The building had no interior walls; therefore, the housing provided much flexibility to the TARMAC Reading Program. The single subject area teaching and multi-levels within this third-grade experimental project was used, because in a remedial situation the emphasis should be placed on the skill sequence needed for mastery, and not the grade level.

The population for the study consisted of educationally deprived, third grade students at Bean Station Elementary School. This population was identified by California Achievement Test scores gathered by the experimenter in May, 1975. The educationally deprived were identified as those scoring below third-grade level in reading scores on the

An aide, Imogene Harris, was recommended on the basis of her experience. She had worked with the Title I program since its beginning in 1965 and had a variety of experiences in developmental reading.

TARMAC consultants provided inservice education for the teacher and aide. The inservice was thorough in that the teacher and aide were directly involved in the operation of hardware, and also they were presented with the theoretical basis of the program which involved them in the total process of teaching reading. TARMAC consultants were available throughout the year for maintenance of hardware, and for advice concerning the curriculum and actual teaching of individualized reading.

The experimental program involved twenty educationally-deprived students, as identified by California Achievement Test scores. At the beginning of the program students were given diagnostic tests to determine particular strengths and weaknesses in reading. Then, students were individually prescribed reading activities according to the needs assessment. TARMAC provided the diagnostic test, the prescription (lesson plan), and the hardware required for the prescription. After each prescription was completed, students were evaluated by another diagnostic test to determine mastery of the prescription and to identify needs for the next prescription. Continuous evaluation for the effectiveness of each prescription was stressed throughout the program. Thorough skill-development charts were provided by TARMAC whereby a record of mastery was kept for each individual during the program. Reinforcement was provided in the program by independent study units of particular interests allowed after completion of each prescription. Participation in the experimental program began September 2, 1975. The posttest data and social studies grades were gathered April 2, 1975 by the experimenter.

The participants in the program were involved in sixty-minute period daily for seven months.

The experimenter and Title I coordinator worked together with the TARMAC consultants in setting up the program. To provide supervision, the Title I coordinator and the experimenter worked regularly with the teacher and aide, especially in the formulation, implementation, and evaluation of the program.

THE CONTROL GROUP READING PROGRAM IN OPERATION

The students assigned to the control group were participants in a conventional reading program provided by non-specialists in self-contained classrooms at Bean Station Elementary School. The twenty control subjects were assigned to four teachers in the self-contained, third-grade classrooms: Pauline Johns, Elsie Beeby, Robert Buchanan, and Jeanette Coffey. Five control subjects were assigned to each of these teachers. Participation in the control program began September 2, 1975. The posttest data and social studies grades were gathered April 2, 1976. The participants were involved in sixty-minute periods daily, five days per week, for seven months.

The teachers in the four control classrooms had various backgrounds; however, their academic preparations were similar. Pauline Johns held a B.S. degree in elementary education from Carson-Newman College in Jefferson City, Tennessee. She had fifteen years of experience; five year in Hamblen County as an elementary teacher, and ten years in Grainger County as a third-grade teacher.

Elsie Beeby held a B.S. degree in elementary education from East Tennessee State University, Johnson City, Tennessee. She had ten years

of experience in elementary teaching; three years in the second grade at Bean Station Elementary School, and seven years in the third grade at Bean Station Elementary School.

Robert Buchanan held the A.B. degree from Hiwassee College, Madisonville, Tennessee, and a B.S. degree in elementary education from The University of Tennessee, Knoxville, Tennessee. He was in pursuit of the M.A. in education at Union College, Barbourville, Kentucky. He was a beginning teacher with no years of experience.

Jeanette Coffey held a B.S. degree in elementary education from Carson-Newman College, Jefferson City, Tennessee. She had three years of elementary teaching experience at Bean Station Elementary School.

The basal readers provided these classrooms were published by the Economy Company, Incorporated. The adopted reading series spanned grades one through six. Within these six grades, there were textbooks divided into thirteen levels. The levels for third grade used in this study were as follows: level nine, Air Pudding and Windsauce; and, level ten, Mysterious Wisteria.

The control subjects were participants in the regular reading program with the other third-grade students. All four teachers seemed to use similar techniques in the teaching of reading. They all used the phonics approach to teaching. They all used a variety of teacher-made materials to supplement the basal reading program. Very little commercial material was used except for some phonics materials provided by the basal series. All used a system of grouping students according to their particular reading abilities; however, due to the time element, very little individualized instruction was provided students.

POSTTEST-ONLY CONTROL GROUP DESIGN

The independent variable in the study was the TARMAC Individualized, Diagnostic-Prescriptive Reading Program. The dependent variable for the study was the test scores from the Stanford Achievement Test. Another dependent variable was the grades from the related course, social studies, for carry-over reading abilities.

The procedural analysis for the study was the posttest-only control group design. The basis for this study was proper randomization. With proper randomization and administration of the design, the following sources of internal invalidity were automatically controlled: history, maturation, testing, instrumentation, regression, selection, mortality, and interaction of selection. As for sources of external invalidity, the design also controlled for interaction of testing and the treatment. Another source of external invalidity, interaction of selection and the treatment, was partially controlled by the fact that neither group knew the project was an experiment. This source was commonly known as the Hawthorne Effect, and with a field study of this type, complete control was nearly impossible. Reactive arrangements were controlled by the use of two different tests during the study.

SELECTION OF THE INSTRUMENTS

California Achievement Test

The California Achievement Test was selected as the instrument for identifying educationally-deprived students for the study. The battery spanned grades 2 through 4. It contained tests in three basic skills areas: reading, mathematics, and language. The three skills

areas contained seven normed sections which were administered in ten units. Four of the sections were administered as one unit. The other three sections were administered in two units. Both the experimental and control groups were tested with this same battery. Only the skills area of reading was chosen for this study. The skills area of reading was composed of the following tests and subtests.

Reading Vocabulary

This section contained two parts: Word Skills and Words in Context.

Word Skills. The first part contained twenty items of four words each. In some items, the words were printed in capital letters, and, in others, the words were in small letters. For each item, the examiner read a word, and the student chose the identical word in written form.

Words in Context. The second part was also a twenty-item test. Each item consisted of a stem word in context and a list of four alternative words. The student's task was to choose the alternative that had the best meaning when added to the stem.

Reading Comprehension

Forty-five items comprised this section, divided into three problem areas. The first five items were designed to measure the student's ability to put words in alphabetical order. The second group of five items concerned the student's ability to use a table of contents and an index. The last thirty-five multiple-choice items tested the student's comprehension and evaluation of the five brief stories which

were arranged in an order of increasing length and difficulty. To enhance the student's interest, some of the stories were illustrated.¹

Stanford Achievement Test

The Stanford Achievement Test was selected by the experimenter as the instrument for posttesting both groups in the experiment. The instrument was recommended by John Taylor, Reading Specialist and Chairman of the Department of Reading at East Tennessee State University. The battery spanned grades 2 through 4. It included tests of vocabulary, reading, word study skills, mathematics, spelling, social science, and listening comprehension. Only the skills area of reading was chosen for this study. The skills area of reading was composed of the following tests and subtests.

Vocabulary

The Vocabulary Test consisted of 37 multiple-choice items. They were dictated in order to give a measure of each pupil's verbal competency independent of his reading ability. The items were selected in such a way that half of them were content-dependent; they tested for the kinds of vocabulary encountered in school textbooks in mathematics, science, and social studies. The other half were more general items covering the kinds of words frequently encountered in the language arts. The test words were selected by sampling word counts covering both children's usage and the kinds of reading materials they were likely to encounter.

¹Ernest W. Tiegs and Willis W. Clark, California Achievement Test Examiners Manual (Monterey, California: McGraw-Hill, Inc., 1970), pp. 7-8.

The Vocabulary Test basically measured the verbal competency the child brought to school and was not interpreted as a school achievement. It was included because of its diagnostic utility for educational planning.

Reading

This section contained two parts: Word Reading, and Reading Comprehension.

Word Reading. The Word Reading Test employed a novel format, with forty-five items arranged in groups of three, all three using the same illustration. The pupil looked at a picture and marked the words that went with the illustration. The pupil learned from the very beginning that one illustration could stand for many things. For example, the picture of a quarter (25-cent piece) could illustrate such words as quarter, coin, money, or cash. The test words were selected by sampling lists of the words generally taught in grades 2 through 4. This was also true of the words used as distractors. The pupil could identify the right answer either through his sight vocabulary, or by applying his knowledge of phonics. The distractors were generally not light phonetic variations of test words, because such distractors would make the Word Reading Test a phonics test. The words tested in Word Reading were in the average child's speaking and listening vocabulary, so it was essentially a measure of the ability to decode.

Reading Comprehension. The Reading Comprehension Test consisted of sixteen paragraphs with a total of forty-eight four-choice items. Starting with relatively simple two-sentence paragraphs, the items increased in difficulty,

until at the end of the test there was a paragraph of six or seven sentences. The options were printed in with the text to make it easier for the pupils to follow a train of thought. An exception was made in the last paragraph which was presented as a whole passage, the items appearing below the paragraph with the options still incorporated into the text as part of each question. In addition to using the reading vocabulary of the primary grades, the paragraphs sampled content which appealed to a variety of young children. Emphasis was placed on comprehending connected discourse. The phonics and vocabulary elements were kept to a minimum since they were measured in other subtests. The Reading Comprehension Test sampled the following comprehension skills:

1. Comprehension of explicit meaning; that is, the recall and identification of details and main ideas which were clearly stated in the text.
2. Comprehension of implicit meaning; that is, the use of context, and deductions made on the basis of stated facts.

Word Study Skills

The Word Study Skills Test consisted of sixty-five items and was divided into two parts. Part A measured the pupil's ability to discriminate visually the letter sounds, blends, and digraphs of the English language. Part B measured the pupil's knowledge of major variant spellings (graphemes) of the sounds (phonemes).

In Part A the pupils chose from among three option words the one word that the teacher dictated. The incorrect options differed from the correct answer only with respect to the skill tested. For example, when testing for the child's knowledge of the short u-sound, as in bud, the distractors were words like bed and bad.

Part A had six item groups of five items each. They covered these letter-sound combinations: consonant blends, consonant digraphs, simple (short) vowel sounds, long vowel sounds, vowel digraphs, and uncommon vowels.

In Part B the pupils were given a word in which one or two letters were underlined; they must decide which sound was represented by the underlined part, and then find the one word out of three which contained that same sound. That sound was usually represented by a respelling. Part B was also divided into item clusters, covering the letter-sound combinations enumerated under Part A.

Each word used to measure the objectives of this test was one that pupils should be able to decode if they learned the specific skill measured by the word. The test was not greatly influenced by the size of pupil's vocabulary. The words used were generally within the listening vocabulary of first graders.²

METHOD OF ANALYSIS OF DATA

Participants of both groups were determined by the California Achievement Test scores administered May, 1975. The posttest, Stanford Achievement Test, was administered to both groups by the experimenter April 2, 1976. The control subjects began participation in the conventional classrooms September 2, 1975; the experimental subjects began participation in the TARMAC Reading Program on the same date. After seven months, on April 2, 1976, both groups were posttested using the Stanford Achievement

²Richard Madden and others, Stanford Achievement Test Teacher Administration Manual (New York: Harcourt, Brace, Jovanovich, Inc., 1973), pp. 30-31.

Test to determine reading abilities. Raw scores for the test are shown in Appendixes A through G. The completed answer sheets were scored by the State Testing Agency, The University of Tennessee, Knoxville, Tennessee. Social studies grades for the 1975 and 1976 school years were gathered April 2, 1976 for analysis. The letter grades were converted to a quality point system whereby the following grades received the following points: A, 4; B, 3; C, 2; D, 1; and F, 0. The t test for independent samples was selected for statistical analysis for the first three hypotheses (see Appendix H for formula). The t test for non-independent samples was selected for analysis of Hypothesis 4 (see Appendix H for formula). The t test was selected for analysis because it was the most pertinent to the study, and the posttest-only control group design was the only setting for which the method was optimal. The statistical analysis was done manually. The results obtained from the control and experimental groups were examined to determine whether the differences between the means were statistically significant at the .05 level of confidence.

Chapter 5

PRESENTATION OF DATA AND INTERPRETATION OF FINDINGS

Data and findings in the study were grouped according to the hypotheses tested. Each of the statements was tested for validity at the .05 level of confidence.

Hypothesis 1: Students in the experimental group will not show a significant difference in accuracy of vocabulary knowledge when compared to the control group at the .05 level of confidence.

Using the t test for independent samples for analysis between experimental and control group means, the result was a t of 2.331, which was a significant difference at the .05 level of confidence (see Table 1, page 73). Therefore, Hypothesis 1 was rejected.

Hypothesis 2: Students in the experimental group will not show a significant difference in reading skills when compared to the control group at the .05 level of confidence in both subtests: word reading and reading comprehension.

Using the t test for independent samples for analysis between experimental and control group means for reading skills, as a whole, the results was a t of 2.267, which was a significant difference at .05 level of confidence (see Table 2, page 73). Using the same test for analysis between group means in subtest one, word reading, the result was a t of 2.353, which was a significant difference at the .05 level of confidence (see Table 3, page 74). As for analysis of subtest two, reading

Table 1
Comparison of Posttest Means of Experimental and Control
Groups on Vocabulary Skills

Group	N	Variance	Mean	Difference
Control	20	.42	2.10	.50*
Experimental	20	.49	2.60	
$\underline{t} = 2.331$		d.f. = 38		P < .05

*difference significant at .05 level of confidence

Table 2
Comparison of Posttest Means of Experimental and Control
Groups on Reading Skills

Group	N	Variance	Mean	Difference
Control	20	.30	2.29	.39*
Experimental	20	.32	2.68	
$\underline{t} = 2.267$		d.f. = 38		P < .05

*difference significant at .05 level of confidence

Table 4

Comparison of Posttest Means of Experimental and Control Groups
on Reading Skills: Subtest 2; Reading Comprehension

Group	N	Variance	Mean	Difference
Control	20	.33	2.31	.42*
Experimental	20	.31	2.73	

$t = 2.374$ d.f. = 38 P < .05

*difference significant at .05 level of confidence

Table 5

Comparison of Posttest Means of Experimental and Control
Groups on Word Study Skills

Group	N	Variance	Mean	Difference
Control	20	.20	2.33	.39*
Experimental	20	.26	2.72	

$t = 2.567$ d.f. = 38 P < .05

*difference significant at .05 level of confidence

level of confidence (see Table 6). Using the same test for analysis between 1975 and 1976 means for social studies grades for the experimental group, the result was a \underline{t} of 3.9411, which was a significant difference at the .05 level of confidence.

Table 6
Comparison of Means of Experimental and Control Groups
on Social Studies Grades in Quality Points

Group	N	ED	ED ²	(ED) ²	\underline{t}
Control	20	3	25	9	.5914*
Experimental	20	15	25	225	3.9411**

* \underline{t} for control group not significant at .05 level of confidence

** \underline{t} for experimental group significant at .05 level of confidence

In summary, there were statistically significant differences for all four hypotheses favoring the experimental group. Therefore, all four hypotheses were rejected.

Chapter 6

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

SUMMARY

Through statistical analysis using the t test for independent samples for posttest means, a significant difference at the .05 level of confidence was found between experimental and control groups in accuracy of vocabulary knowledge. Therefore, Hypothesis 1 was rejected.

Using the t test for independent samples it was found that there was a significant difference between experimental and control group means in reading skills, as a whole, at the .05 level of confidence. Using the same test for analysis between group means for subtest one, word reading, a significant difference was found at the .05 level of confidence. As for analysis of subtest two, reading comprehension, a significant difference was found at the .05 level of confidence. Therefore, Hypothesis 2 was rejected in all subtests.

Using the t test for independent samples for analysis between group means for word study skills, a significant difference was found between the experimental and control groups at the .05 level of confidence. Therefore, Hypothesis 3 was rejected.

Using the t test for non-independent samples for analysis between 1975 and 1976 means for social studies grades for the control group, no significant difference was found at the .05 level of confidence. Using the same test for analysis between 1975 and 1976 means for social studies

grades for the experimental group, a significant difference was found at the .05 level of confidence. Therefore, Hypothesis 4 was rejected.

CONCLUSIONS

It may be concluded from the results of this study that the TARMAC Reading Program was successful for teaching reading skills to the deprived students in this experiment. Using the t test for independent samples for analysis between posttest means for vocabulary knowledge, reading skills, and word study skills, significant differences were found for all three areas at the .05 level of confidence. Therefore, the first three hypotheses were rejected. Even though all three hypotheses were rejected, the greatest strength of the program was found in word study skills, because the level of rejection was stronger.

Improvement in reading abilities attributable to the TARMAC Reading Program did prove to carry over to the field of social studies. Therefore, Hypothesis 4 was rejected, and the program proved effective in carry-over reading abilities.

RECOMMENDATIONS

The following recommendations were made as a result of the study:

1. In order to confirm the findings of this study, the TARMAC Reading Program should be continued an additional year on an experimental basis. Further evidence should be sought in another school in Grainger County, in addition to repeating the program in Bean Station Elementary School.
2. Additional data should be sought through selection of another program, similar to the TARMAC Reading Program, for comparative trial in a third school in Grainger County.

3. For the purpose of measuring the effects of growth in reading abilities on performance in related subjects, such as social studies, two or more standardized achievement tests should be administered to both groups.

4. A survey of student attitudes toward reading should be administered both before and after any special reading program, to identify positive and negative attitudes toward reading, and to measure any improvement in attitudes which may have resulted.

5. Two or more years after students participated in the TARMAC Reading Program, a comprehensive testing of participants should be conducted to identify any long-range effects on the program. Since Title I, ESEA programs in Grainger County are available through sixth grade, a logical stage at which to make such assessments would be fifth or sixth grade.

6. An analysis of both groups' participants should be made at grade six to identify those who have remained educationally deprived.

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APPENDIXES

APPENDIX A

RAW SCORES FOR VOCABULARY SKILLS POSTTEST
FOR CONTROL AND EXPERIMENTAL GROUPS

APPENDIX A

RAW SCORES FOR VOCABULARY SKILLS POSTTEST
FOR CONTROL AND EXPERIMENTAL GROUPS

<u>Control Group</u>		<u>Experimental Group</u>	
Subject Number	Grade Level	Subject Number	Grade Level
1	2.9	1	3.5
2	3.0	2	3.7
3	2.6	3	2.8
4	2.9	4	2.6
5	3.2	5	3.1
6	2.5	6	2.7
7	2.8	7	3.2
8	2.0	8	2.1
9	2.5	9	2.6
10	2.0	10	3.1
11	1.8	11	2.4
12	1.5	12	3.0
13	1.4	13	2.4
14	1.0	14	3.2
15	1.5	15	2.6
16	1.3	16	1.9
17	2.0	17	1.0
18	1.6	18	1.3
19	1.3	19	1.6
20	2.1	20	3.2

APPENDIX B

RAW SCORES FOR READING SKILLS POSTTEST
FOR CONTROL AND EXPERIMENTAL GROUPS

APPENDIX B

RAW SCORES FOR READING SKILLS POSTTEST
FOR CONTROL AND EXPERIMENTAL GROUPS

<u>Control Group</u>		<u>Experimental Group</u>	
Subject Number	Grade Level	Subject Number	Grade Level
1	3.0	1	3.1
2	2.9	2	3.4
3	2.8	3	3.0
4	2.5	4	3.3
5	3.2	5	2.9
6	2.8	6	2.9
7	2.7	7	3.5
8	2.8	8	2.2
9	2.5	9	2.3
10	2.4	10	3.2
11	2.3	11	2.2
12	1.8	12	3.2
13	1.8	13	2.8
14	1.6	14	2.9
15	1.8	15	2.5
16	1.6	16	2.3
17	2.4	17	1.5
18	1.5	18	1.6
19	1.5	19	2.0
20	1.8	20	2.9

APPENDIX C

RAW SCORES FOR READING SKILLS POSTTEST
FOR CONTROL AND EXPERIMENTAL GROUPS: SUBTEST 1, WORD READING

APPENDIX C

RAW SCORES FOR READING SKILLS POSTTEST
 FOR CONTROL AND EXPERIMENTAL GROUPS: SUBTEST 1, WORD READING

<u>Control Group</u>		<u>Experimental Group</u>	
Subject Number	Grade Level	Subject Number	Grade Level
1	2.8	1	2.9
2	3.0	2	3.3
3	2.7	3	3.1
4	2.6	4	2.9
5	3.1	5	3.4
6	2.9	6	3.1
7	2.5	7	3.4
8	2.8	8	2.1
9	2.6	9	2.4
10	2.3	10	3.4
11	2.2	11	2.0
12	1.9	12	2.8
13	1.9	13	2.7
14	1.5	14	3.0
15	2.0	15	2.4
16	1.5	16	2.4
17	2.4	17	1.3
18	1.6	18	1.5
19	1.3	19	1.9
20	1.7	20	2.8

APPENDIX D

RAW SCORES FOR READING SKILLS POSTTEST
FOR CONTROL AND EXPERIMENTAL GROUPS: SUBTEST 2, READING COMPREHENSION

APPENDIX D

RAW SCORES FOR READING SKILLS POSTTEST
 FOR CONTROL AND EXPERIMENTAL GROUPS: SUBTEST 2, READING COMPREHENSION

<u>Control Group</u>		<u>Experimental Group</u>	
Subject Number	Grade Level	Subject Number	Grade Level
1	3.2	1	3.3
2	2.8	2	3.5
3	2.9	3	2.9
4	2.4	4	2.9
5	3.3	5	3.2
6	2.7	6	2.7
7	2.9	7	3.6
8	2.8	8	2.3
9	2.4	9	2.2
10	2.5	10	3.0
11	2.4	11	2.4
12	1.7	12	3.6
13	1.6	13	2.9
14	1.7	14	2.8
15	1.7	15	2.6
16	1.7	16	2.2
17	2.4	17	1.7
18	1.4	18	1.7
19	1.7	19	2.1
20	1.9	20	3.0

APPENDIX E

RAW SCORES FOR WORD STUDY SKILLS POSTTEST
FOR CONTROL AND EXPERIMENTAL GROUPS

APPENDIX E

RAW SCORES FOR WORK STUDY SKILLS POSTTEST
FOR CONTROL AND EXPERIMENTAL GROUPS

<u>Control Group</u>		<u>Experimental Group</u>	
Subject Number	Grade Level	Subject Number	Grade Level
1	2.7	1	3.3
2	2.6	2	3.6
3	2.5	3	2.9
4	3.0	4	2.1
5	3.3	5	2.5
6	2.6	6	3.0
7	2.7	7	3.4
8	2.5	8	2.8
9	2.6	9	3.1
10	2.4	10	3.0
11	2.3	11	2.6
12	2.1	12	2.9
13	2.0	13	2.6
14	1.4	14	3.0
15	2.3	15	2.8
16	1.7	16	2.3
17	1.7	17	1.8
18	1.9	18	1.7
19	2.0	19	2.0
20	2.2	20	3.0

APPENDIX F

RAW SCORES FOR 1975 SOCIAL STUDIES GRADES
FOR CONTROL AND EXPERIMENTAL GROUPS

APPENDIX G

RAW SCORES FOR 1976 SOCIAL STUDIES GRADES
FOR CONTROL AND EXPERIMENTAL GROUPS

APPENDIX F

RAW SCORES FOR 1975 SOCIAL STUDIES GRADES
FOR CONTROL AND EXPERIMENTAL GROUPS

<u>Control Group</u>		<u>Experimental Group</u>	
Subject Number	Grades	Subject Number	Grades
1	C	1	C
2	C	2	C
3	D	3	D
4	D	4	C
5	C	5	D
6	D	6	F
7	C	7	D
8	F	8	F
9	C	9	C
10	F	10	D
11	C	11	C
12	C	12	D
13	C	13	F
14	C	14	D
15	C	15	C
16	C	16	F
17	C	17	C
18	C	18	C
19	F	19	C
20	C	20	C

APPENDIX G

RAW SCORES FOR 1976 SOCIAL STUDIES GRADES
FOR CONTROL AND EXPERIMENTAL GROUPS

<u>Control Group</u>		<u>Experimental Group</u>	
Subject Number	Grades	Subject Number	Grades
1	C	1	B
2	D	2	C
3	C	3	C
4	C	4	C
5	D	5	C
6	C	6	D
7	C	7	C
8	C	8	C
9	D	9	C
10	D	10	B
11	C	11	C
12	F	12	B
13	B	13	C
14	C	14	C
15	C	15	C
16	C	16	D
17	B	17	D
18	C	18	C
19	C	19	B
20	F	20	C

APPENDIX H

FORMULAS FOR \bar{t} TESTS FOR INDEPENDENT SAMPLES
AND NON-INDEPENDENT SAMPLES

APPENDIX H

FORMULAS FOR t TESTS FOR INDEPENDENT SAMPLES
AND NON-INDEPENDENT SAMPLES

Independent

$$t = \bar{x}_1 - \bar{x}_2$$

$$\sqrt{\frac{s_1^2}{N_1} + \frac{s_2^2}{N_2}}$$

Non-Independent

$$t = \frac{\bar{D}}{\sqrt{\frac{ED^2 - \frac{(ED)^2}{N}}{N(N-1)}}$$