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Evaluation of the Cedar Falls, Iowa Title I reading program in grades two, three, four: With an emphasis on comprehension instruction

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EVALUATION OF THE CEDAR FALLS, IOWA

TITLE I READING PROGRAM IN GRADES TWO, THREE, FOUR:

WITH AN EMPHASIS ON COMPREHENSION INSTRUCTION

An Abstract

Submitted

In Partial Fulfillment

of the Requirements for the Degree

Master of Arts in Education

by

Katherine Dyke Beebe

May 1981

ABSTRACT

Beebe, Katherine Dyke. M.A. in Education, University of Northern Iowa, May, 1981. AN EVALUATION OF THE CEDAR FALLS, IOWA TITLE I READING PROGRAM IN GRADES TWO, THREE, FOUR: WITH AN EMPHASIS ON COMPREHENSION INSTRUCTION.

Title I of the Elementary and Secondary Education Act of 1965 initiated federal aid to education on a large scale. Since Title I's inception, evaluative data have been attempting to demonstrate conclusively the value of the program in reducing reading failure. This study investigated the effectiveness of the Cedar Falls Title I reading program within the evaluation models established by the Title I Evaluation and Reporting System (TIERS). In addition, this study investigated the effectiveness of the Diagnostic and Instructional Materials and Procedures for Improved Instruction in the Area of Reading Comprehension (DMPRC) in improving reading instruction in Title I.

The study consisted of a three-stage evaluation: first, the reading growth of Title I participants over .
ined based on the no-treatment expectation of a norm-referenced testing instrument; second, the reading growth of Title I students was compared to similarly qualifying students who were not project participants; and third, the reading growth experienced after the implementation of the DMPRC instructional materials was compared to prior reading growth. Specifically three research questions were investigated:

    1. Did second-, third-, and fourth-grade students involved in the Title I reading program experience reading growth greater than would have been expected without Title I assistance?

    Ho: There is no significant difference in reading scores between the no-treatment expectation and the observed reading performance for Title I students.

2. Did second-, third-, and fourth-grade students involved in the Title I program experience greater gains than similarly qualifying students who were not selected for participation?

Ho: There is no significant difference in reading growth between Title I students and non-Title I students.

3. Did second-, third-, and fourth-grade Title I students, after the fall of 1978 demonstrate greater comprehension growth than Title I students prior to that date as a result of instruction with a specifically designed comprehension program?

Ho: There is no significant difference in reading growth of Title I students prior to and after instruction with the specific comprehension program.

To answer the evaluation questions, all second-, third-, and fourth-grade students eligible for Title I instruction in three Cedar Falls, Iowa Title I elementary schools were studied for the four school years between 1976 and 1980.

For the first section of the study, the Title I treatment effect was determined by analyzing the pre- and posttest scores of the Gates-MacGinitie Reading Test. In accordance with Model A1 guidelines of the Title I Evaluation and Reporting System (TIERS), the no-treatment expectation is the NCE rank of the group at pretest time. When the group's posttest score is higher than the pretest NCE rank, the assumption is made that the improvement was the result of Title I participation. Educational significance was established for all three grades over all four years, with statistical significance established for grades two and three. Educational significance ranged from + 3.00 to + 22.00 NCEs.

The second section of the study dealt with the treatment effect of the Title I participation by a comparison of Title I and non-Title I reading scores on the Iowa Test of Basic Skills. In accordance with

Model B1 guidelines of the TIERS, the first procedures in the imple-

mentation of Model B1 were to establish the comparability and simi-

larity of the two groups for evaluation purposes. Because the groups

differed by more than the recommended 4 NCEs, the interpretive value

of these data were limited; however, examination of this section of

the research study posed unanswered questions dealing with establishing

control groups, conducting the appropriate data analysis, and the com-

patability of the TIERS Models A1 and B1 for evaluation purposes. Even

though no statistically significant differences were noted, second- and

third-grade students' scores over the three-year study exceeded their

initial NCE rank in both the Title I and non-Title I groups while fourth

graders did not.

Related to the first two research questions regarding the effec-

tiveness of Title I programs in producing reading growth beyond a no-

treatment expectation is the question of determining what educational

programs are the most effective in eliminating reading failure. The

third research question asked in this study dealt with the implementa-

tion of a diagnostic and prescriptive comprehension program developed

by the Cedar Falls Title I staff with a Title I grant, the Diagnostic

and Instructional Materials and Procedures for Improved Instruction in

the Area of Reading Comprehension. By combining test scores data for

the two years prior to the date the DMPRC materials were implemented,

a no-treatment expectation was established. The combined score of the

two years after the program's implementation formed the treatment com-

parison. While overall students showed greater gain scores after

instruction with the DMPRC, the main effect was at the second-grade level where significance was demonstrated at the .001 level of significance. The results of this research study did establish the effectiveness of comprehension instruction with the DMPRC toward increased reading gain scores for second-grade Title I students.

EVALUATION OF THE CEDAR FALLS, IOWA

TITLE I READING PROGRAM IN GRADES TWO, THREE, FOUR:

WITH AN EMPHASIS ON COMPREHENSION INSTRUCTION

A Thesis

Submitted

In Partial Fulfillment

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May 1981

This Study by: Katherine Dyke Beebe

Entitled: Evaluation of the Cedar Falls, Iowa Title I Reading Program

in Grades Two, Three, Four: With an Emphasis on Comprehension

Instruction.

has been approved as meeting the thesis requirement for the Degree of

Master of Arts in Education

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5/12/81
Date

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TABLE OF CONTENTS

LIST OF TABLES

CHAPTER I

The Elementary and Secondary Education Act (ESEA) was signed
into law on April 11, 1965. Title I is a federally funded compensa-
tory education program implemented under this act. The objectives of
the program are to expand and to improve educational programs to meet
the needs of educationally disadvantaged children in low-income areas.
The main thrust is the projects operated by local education agencies
for the educationally deprived children although the program includes
provisions for aid to the handicapped, American Indians, institution-
alized, and migrant children. In 1979 nearly five million children
were served by Title I projects in over 14,000 school districts
(Coles, 1979).

Within the last few years, in addition to general program funding,
state reallocation of unused local funds has allowed school districts
to procure special funding for the development of such activities as
instructional materials, strategies, and educational plans. A stipula-
tion, included in the grant, stated that these materials must be dis-
seminated to other interested Title I programs (Leinen, Note 1).

Since Title I was first enacted, the federal requirement for an
annual program evaluation has resulted in over one-third of a million
Title I evaluation reports during the first twelve years. Historically,
these evaluation efforts have yielded inconclusive evidence as to the
effectiveness of Title I programs (Tallmadge, 1976).

Information obtained through program evaluation can be used to validate the program itself, demonstrating to what degree the program is succeeding in overcoming reading failure; in addition, it can also be used to determine the effectiveness of specific materials developed within a local Title I program. Therefore information obtained through program evaluation may be utilized in two ways.

In 1967, the Cedar Falls Community Schools received its first funding under Title I of ESEA. At that time, the Title I program was consolidated at the Main Street Reading Center. Presently, the Cedar Falls, Iowa Title I program consists of five elementary school centers, one junior high center, and a part-time center at the senior high school. St. Patrick's, a parochial school in the district, also receives help for eligible students. The Title I staff consists of one part-time and five full-time remedial reading teachers (Cedar Falls Title I).

All elementary students in the Cedar Falls Title I schools, grades two through six, take the Iowa Test of Basic Skills each November, which serves as a needs assessment test. Students whose scores fall below the 40th percentile (Iowa norms) form the eligibility list for the following school year. Priority is given to students in rank order from the lowest percentile to the highest. Second-grade students are selected through the use of a system-wide basal reader exit-level criterion, classroom teacher evaluation, and the Peabody Picture Vocabulary Test as measure of language potential (Cedar Falls Title I, 1979).

All students selected for the Cedar Falls Title I program are pre-
and posttested using the Gates-MacGinitie Reading Test. During the
school year, students are involved in Title I classes, supplemental
to the classroom reading instruction, for approximately one-half hour
per day from three to five times a week (Cedar Falls Title I, 1979).

In 1978, the Cedar Falls Title I Staff received a special funding
grant made available by reallocation funds. The teachers felt that
their remedial program was too strongly based on the bottom-up model
of reading acquisition by its stress on word-analysis techniques and
instruction. After an examination of the literature, the teachers
decided to incorporate the top-down model of reading acquisition
and to organize their instruction systematically on a top-down model
of reading development stressing such factors as syntax, semantics,
and lexicon within an instructional format. The resulting program,
developed and implemented in the fall of 1978, is now operating on an
interactive model of reading acquisition by both stressing top-down
comprehension skills while developing decoding strategies. In devel-
oping the materials, Miles Zintz's hierarchy of reading comprehension
skills was used as the basis for the instructional materials. Included
in the materials are diagnostic instruments with accompanying materials,
both teacher-made and commercial.

Statement of the Problem

This study was designed to evaluate the educational effectiveness
of the elementary Title I program as it operates in grades two through
four. In addition, the study evaluated reading growth prior to and

after implementation of the specific comprehension program. Specifically, the study addresses the following questions:

1. Did second-, third-, and fourth-grade students involved in the Title I reading program experience reading growth greater than would have been expected without Title I assistance?

Ho: There is no significant difference in reading scores between the no-treatment expectation and observed reading performance for Title I students.

2. Did second-, third-, and fourth-grade students involved in the Title I program experience greater gains than similarly qualifying students who were not selected for participation?

HO: There is no significant difference in reading growth between Title I students and non-Title I students.

3. Did second-, third-, and fourth-grade Title I students, after the fall of 1978 demonstrate greater comprehension growth than Title I students prior to that date as a result of instruction with a specifically designed comprehension program?

Ho: There is no significant difference in reading growth of Title I students prior to and after instruction with the specific comprehension program.

Significance of the Study

This study examines the effectiveness of the Cedar Falls Title I project as it operates at the local level within the guidelines

established by the federal government. Specifically the question addressed is "How much more do pupils learn by participating in the Title I project than they would have learned without it?" The success of the Title I project in the remediation of reading problems is the focus of the evaluation.

Secondly, the study examined the relative merit of the specific comprehension materials developed with the special funding grant.

Assumptions

This study was based on the following assumptions:

1. The Cedar Falls School System was and continues to be in full compliance with federal and state guidelines.

2. Since the investigator had no control over the testing situation or record keeping, the data identified from school records were yielded from standardized tests administered according to the directions and accurately scored and recorded.

Limitations

The utilization of single community results in the major limitation of the study, that of external validity. Further, there were instances of incomplete test data caused by student attrition.

Definition of Terms

Impact. Impact is defined as the amount of growth shown by students in a program. The project's impact is the observed post-treatment performance minus the expected no-treatment performance (Tallmadge, 1976).

Normal Curve Equivalent (NCE). The Normal Curve Equivalent is a normalized standard score that has been linearly transformed to match the percentile distribution at values of 1, 50, and 99. The scale has a mean of 50 and a standard deviation of 21.06. Because an NCE metric is an equal-interval scale, it is legitimate to add, subtract, multiply, and divide NCEs (Tallmadge, 1976).

Project. A Title I project is defined as a set of methods, materials, personnel, and activities that define an instructional treatment which is judged to be uniform for all those it serves. Project characteristics include: hours per week of student exposure to the project, total project hours, instructor-to-pupil ratio, cost per student, and impact (Tallmadge, 1976).

Reading Growth. Reading growth is definded as the amount of gain that a student shows as measured by the posttest minus the pretest score (Gay, 1980).

Title I student. A Title I student is any student who falls below the 40th percentile (based on Iowa norms used by the Cedar Falls School System) on either a needs assessment test or the pretest given for the project (Leinen, 1980).

Title I participant. A Title I participant is any Title I student who is involved in a Title I intervention program.

Treatment effect. The treatment effect is definded as the gain attributed to the treatment. It is the difference between the treatment group's performance on a posttreatment test and an estimate of their performance on the same test had the group not received the treatment

(ESEA Title I Evaluation and Reporting System).

Diagnostic and Instructional Materials and Procedures for Improved
Instruction in the Area of Reading Comprehension (DMPRC). The DMPRC
is a set of diagnostic and instructional comprehension materials
developed for reading levels preprimer through grade level four.
Included in the set are diagnostic instruments for each step in a
classification of comprehension skills and examples of instructional
materials, both teacher-made and commercial, to be used (Leinen,
1978).

Bottom-up model of reading acquisition. The bottom-up model
of reading acquisition sees reading as processing each small part
of content successively and accurately to get to the larger unit
(Gough, 1976; Samuels, Dahl, & Archwamety, 1974).

Interactive model of reading acquisition. The interactive model
of reading acquisition views reading as processing which is simul-
taneous at many levels, all interacting with each other. The reader's
linguistic knowledge and decoding background interact with the reader's
predictive strategies (Gibson & Levin, 1975; Rummelhart, 1977).

Top-down model of reading acquisition. The top-down model of
reading acquisition foresees the primary characteristic of reading as
tentative information processing. The reader uses the author's text
to make "predictions" without the aid of decoding strategies (Goodman,
1967; Smith & Goodman, 1971).

CHAPTER II

REVIEW OF RELATED LITERATURE

The central question asked in Title I evaluative research is "How much more did students learn because of the Title I intervention program than would have been expected without it?" Title I is a compensatory education program aimed at the improvement of educational levels of children in low socioeconomic areas. Relating to the first question is the question "What type of intervention programs produce the most significant achievement gains among Title I participants?" This chapter will address itself to these two questions. The first section will deal directly with the Title I experience, examining the historical perspectives that underlie intervention programs in an attempt to understand the most effective way to eliminate reading failure.

Elementary and Secondary Education Act: Title I

The Elementary and Secondary Education Act of 1965 (ESEA) represented the largest single commitment by the federal government to improve educational quality and opportunities. The first five titles of ESEA were designed to meet the needs of educationally deprived children; to provide school library resources, textbooks, and other instructional materials for the use of children and teachers; to encourage innovative and exemplary educational practices through the support of supplementary centers and services; to extend educational research and development; and to strengthen state departments of education. The ESEA was signed into law in April, 1965 by President Lyndon Johnson (Hill, 1976).

Because Congress recognized the fact that children from impover-
ished homes may suffer physical, intellectual, and cultural handicaps
which can impede their academic achievement and perpetuate the poverty
cycle, Title I was designed to meet the needs of educationally deprived
children in low-income areas. Title I has offered yearly grants to
public educational agencies to meet the special educational needs of
disadvantaged children in low-income areas, children in institutions
for the handicapped, neglected or delinquent children, children of
migratory agricultural workers, and American Indian children (ESEA
Title I).

Since the inception of the program, the U. S. Commissioner of
Education through the United States Office of Education (USOE) has
allocated the funds for Title I projects based on the best available
data concerning areas of low-income families. The data may have included
census information, AFDC records, and health or employment statistics;
currently, most schools use free and reduced lunch count numbers for
determining school eligibility. The local education agency (LEA) submits
an application to the state education agency (SEA) that includes infor-
mation such as a description of the project, needs assessment data,
assurances that federal requirements are being met, and the inclusion
of the performance criteria that will be used to evaluate the program.
The USOE allocates funds on a formula basis to each state by county.
The state distributes the funds to the local education agencies in each
of the counties (Title I Funds Allocation: The Current Formula).

Within the designated Title I schools, any student who falls below the established guideline, commonly the 40th percentile on a standardized needs assessment test, is eligible for participation in the programs offering remedial instruction in reading, language arts, and mathematics; additional teachers and teacher aides to provide individualized instruction for Title I students; summer programs to enable students to improve or reinforce material taught during the regular school year; and inservice training for teachers, aides, and parents.

Because some school districts did not utilize all of the Title I monies that have been appropriated to them by the USOE, unused funds have reverted back to the state. Within the past few years, the State of Iowa has been using these funds to provide special fundings for individual projects throughout the state.

This reallocation money has allowed school districts to obtain funding for such activities as the development of instructional materials, strategies, and individualized educational plans. The grants stipulate that these materials be disseminated to interested Title I programs. State conferences have been scheduled where individual school districts have presented the culmination of their special funding (Leinen, Note 2).

Title I Evaluation and Reporting System (TIERS)

Title I was the first piece of major federal legislation to require an annual evaluation. The programs did not fit into an easy evaluation mold because traditionally the programs have not been research studies in the strictest sense but rather programs designed to meet one or more needs

determined by the LEA. There was considerable latitude for each project to conduct evaluations in its own way. There were several consequences from this. First, many evaluations were of poor technical quality, i.e., results were not reliable. Second, it was impossible to aggregate the results of local projects at the state and national level to determine impact. Third, especially commissioned evaluations at the state and national level generally found modest levels of success, if any (Hubert, 1978).

In 1973, when Congress began to hold hearings on the renewal of Title I of the ESEA, the program was eight years old and had cost $10 billion. Frustrated by the uncertainty about the program's success, Congress responded, in the Educational Amendments of 1974, with an unprecedented set of evaluation requirements. Section 151 of Title I Amendment of P.L. 93-380 directed the Commissioner of Education to begin preliminary evaluation research (Anderson, 1979).

In November, 1978, Congress amended ESEA with Section 183 of P.L. 95-561 replacing Section 151. The resultant legislation included directives to the Commissioner of Education to:

1. Provide to state educational agencies models for evaluations of all programs conducted under this Title .

2. Provide such technical and other assistance as may be necessary to state educational agencies to enable them to assist local educational agencies .

3. Make a report to the respective committees of Congress no later than February 1, 1980, 1982, and 1984 concerning the results of the evaluations .

4. Develop a system for the gathering and disseminating
   the results of evaluations and for the identification
   of exemplary programs (Public Law 95-561) .

To carry out this legislative mandate, the USOE contracted

with the RMC Research Corporation to develop models for evaluating

gains in basic skills achieved by local Title I projects. The report-

ing system is designed to provide information on six project charac-

teristics of importance to evaluation: the average duration of Title I

services per week, pupil-teacher ratios, expenditures per child,

total number of participants, average achievement levels at the

start of the treatment level, and the impact, defined as the achieve-

ment level gains. Not only is the intent of the program to measure

program impact but also to evaluate programs on the relationships of

such factors as impact to cost expenditures and teacher-pupil ratios

(Tallmadge, 1976).

Three evaluation models were developed to enable LEAs to imple-

ment an evaluation model of their own choosing. The three evaluation

models are Model A: a norm-referenced deisign, Model B: a control

group design, and Model C: a special regression design. They are

detailed in User's Guide: ESEA Title I Evaluating and Reporting System.

Model A: norm-referenced design. Model A is an evaluation design

using either a normed test (Model A1)or a non-normed test (Model A2).

The Title I treatment group is both pre- and posttested with either a

nationally or locally normed test within the empirical norming dates.

The no-treatment expectation is the NCE rank of the treament group at

the time of the pretest. The assumption underlying Model A is that the

status of the group would remain the same without the Title intervention. According to Tallmadge, "If the group's posttest status is higher than the no-treatment expectation, the assumption is made that the improvement resulted from participation in the Title I project" (Tallmadge & Wood, 1976, p. 5).

Model B: control group design. Model B is an evaluation design using a control group comparison to a Title I treatment group. The control group and the treatment group should be similar in such factors as socioeconomic status, race, and sex. While small initial differences in groups can be handled through appropriate statistical adjustments, Tallmadge did state that "If, on the pretest, the treatment and control groups are found to differ by more than four NCE's, then use of Model C or Model A might be preferable" (Tallmadge & Wood, 1976, p. 25). Educational experiences for both groups should be similar between pre- and posttesting. The no-treatment expectation is the control group's posttest score. The treatment group's score is compared to the control group's scores with appropriate adjustments made as necessary. If the treatment group's score is higher than the control group, the assumption is made that the project was effective (Tallmadge & Wood, 1976).

Model C: special regression design. Model C is a regression-based evaluation design. Model C selects a treatment group exclusively on a pretest measure and all students above a specified score are assigned to a comparison group while all students below the specified score become the treatment group. All students are both pre- and post-tested, using either a normed (Model C1) or non-normed (Model C2) test.

According to the guidelines, "Post-on-pretest regression lines are calculated separately for the treatment and comparison groups. The treatment group's regression line represents the observed mean posttest performance corresponding to various pretest scores. The comparison group's regression line, when projected across the cutoff score, provides no-treatment estimates for the same pretest scores" Tallmadge & Wood, 1976, p. 7).

Guidelines further state that, "The treatment effect is defined as the distance between the regression lines and is measured separately at two points: at the treatment group's mean pretest score and at the cutoff score. For both measures it is assumed that the project had a positive impact if the observed score is higher than the expected score" (Tallmadge & Wood, 1976, p. 7).

Studies Utilizing Evaluation Models

The RMC Research Corporation based the evaluation models on previous studies and current knowledge about evaluation. In 1976 Tallmadge stated that, as a measure of program impact, "any NCE gain greater than zero is good" (ESEA Title I, p. 28). Because no field testing was conducted and only limited studies are available that have utilized the evaluation model guidelines, no aggregated information is presently available on either the usability of the evaluation models or the gain score expectations. Included in Public Law 95-561 Amendments to Title I of ESEA of 1965 is a directive for the first report to be presented to to the Committees on Appropriations on the evaluation results in February 1980. This report is not currently available.

The User's Guide (Tallmadge & Wood, 1976) asserts that if evaluation models are properly used, comparable results will be yielded. This has been interpreted to mean that implementing all three models for a program should yield the same measures of program impact. This has been tested in a limited amount of research studies.

The assumption that the results of Model A1 and Model A2 would yield nearly the same measures of program impact has been tested in a research study by Fish (1979). The research study was conducted in the Madison County Schools in North Carolina, where 560 Title I students were tested using both a nationally normed test (Model A1) and a locally normed test (Model A2). The NCE gains for the grades three through eight ranged from + 1.5 to + 9.0 within both evaluation models. It was further found that the mean gain scores between Model A1 and Model A2 within each grade level were within one or two NCEs of each other with a distribution around a mean of zero. These slight differences would not lead to significantly different educational decisions. Second-grade students tested in this study demonstrated a variation of + 12.0 NCEs between Model A1 and Model A2. The author determined that this difference strongly indicates the importance of using a standardized test that closely measures the same reading skills as a locally normed test, particularly at the primary level.

A study (Faddis, Arter, & Zwertchek, 1979) was conducted to evaluate the compatability of results achieved using evaluation Models B, A1, and A2. The impact of a ninth-grade Title I program in a large metropolitan school district was examined. Model B was the evaluation design used for

federal purposes but the availability of the local norms and the published national norms allowed for additional comparisons on the basis of Model A guidelines. The Model B design used students from two non-Title I schools as the control for the students from the four Title I schools with the testing instrument the Comprehensive Test of Basic Skills (CTBS), Total Reading and Total Language Subtest. The students were pretested out-of-level with Level 3 in fall 1977 and posttested in-level with Level 4 in fall 1978. The results of the analysis of the data indicated that the project impact differed across the three models. All groups experienced NCE losses, with Model B showing the smallest losses. The Model B control group and the Title I group both lost with respect to the norming population. The Title I students lost only slightly more than the control groups (-0.5) which resulted in a smaller negative impact with Model B. The negative impact of Model A1 was - 1.8 units while Model A2 using local norms showed the greatest losses of nearly - 5.4 units. Results from this study suggested that the validity of evaluation data analyzed may be reflective of the appropriateness of the evaluation model for the particular project. In a similar study conducted at the lower primary level (Crane & Cech, 1979) significant differences ($p < .05$) were found between the treatment group and the control group using Model B1. Additionally, the adjusted Model B1 NCE gains were greater than the Model A1 gains.

The St. Louis School System (House, 1979) undertook a study to determine the applicability of using Model C1 within approximately 80 Title I

schools by comparing the results of Model C1 as opposed to those of Model A1, the model currently being used for evaluation purposes. This study was limited to grades four, six, and eight because of time limitations and the wide variety of testing instruments employed in grades 1-3. The testing instrument used was the Iowa Test of Basic Skills, Reading Comprehension Subtest. Both Model A1 and C1 were utilized in accordance with federal guidelines. The results were mixed. Model C1 produced a slightly higher estimate of the reading treatment effect at grade four than did Model A1. At grades six and eight, the reverse was true. The differences in the treatment effect scores were 6.9 units at grade four, 0.1 units at grade six, and 1.0 units at grade eight. Further analysis of the data led the author to question the validity of the Model C1's assumption of homogenity of regression for comparison versus treatment population. The comparison groups' differences in mean pretest score between selection and the posttest showed dramatic negative shifts while the treatment groups' changes were minor. The author's conclusion from the study was to urge that more empirical evidence on model equivalency be obtained.

As noted in the studies cited above, the equivalency of the evaluation models has not been thoroughly investigated. It would appear that different evaluation models may yield different measures of pro-gram impact.

Of additional interest to evaluators is the measurement of impact. While initial reports indicate that individual programs and stage aggregations of these programs often show NCE growth beyond

no-treatment expectation, the measured reading growth appears to vary widely. Variation between grade levels has been so widespread that many evaluators have stated that no attempt to aggregate scores across grade levels should occur (Estes, 1979; Stenner, et al, 1978; Tallmadge & Fagan, 1977). The Ohio State Department of Education has published the aggregated results of their 1977-79 state evaluations. Based on the composite data from the LEAs that had properly implemented one of three evaluation models, an average gain of + 12.00 NCEs was reported overall in grades two through twelve (Title I in Ohio, 1978). In another analysis of aggregated data compiled by the Washington, D.C. School System, gains of + 10.71 NCEs for second grade and + 4.04 NCEs for third grade were reported. Scores were not reported for other elementary grades. The data from these schools conformed to the Model A1 guidelines except that the testing was not within empirical norming dates (Evaluation of ESEA Title I, 1980). The range of gain scores within the individual studies reported (Faddis, Arter, & Zwertchek, 1979; Fish, 1979; House, 1979) was often as much as ten NCEs with no discernable trends observable in many cases.

Until there is widespread consensus about the evaluation models, it will be difficult to determine what constitutes a significant gain. Some researchers have used seven NCEs as a significant level, deriving the seven from one-third of the standard deviation (Stonehill, 1979). Other researchers have suggested that beyond determining whether a program is producing gain, the gain must be considered in relation to other factors, e.g. an NCE gain of 4 overall for 200 children may be

considered as significant as an NCE gain of 8 for 100 children
(Horst, Tallmadge, & Wood, 1975).

Local Implementing and Use of Evaluation Data

One of the articles in Section 183 stated that USOE would provide
technical assistance to the SEAs and LEAs to carry out the evaluation
process. To that end, in October of 1976 contracts were awarded to
Technical Assistance Centers (TACs) in each of the ten DHEW regions
(Coles, 1979).

The training model of the TACs provides step-by-step forms and
instructions through workshops and consultation services that are designed
to enable LEAs to implement proper evaluation procedures, collect and
compile valid data, and report findings to the SEA who, in turn,
receives technical assistance in aggregating the data into a high-
quality report.

As the first goal of mandated evaluation to meet Congressional
requirements has begun to be implemented, a larger portion of the
activity will be targeted toward local use of evaluation data. One of
the prime considerations in the implementation of the TIERS was that
with better evaluative data schools will be able to improve their instruc-
tional programs, leading to improved growth scores.

As stated earlier, a directive included in the guidelines for
Section 183 is the identification of and validation of exemplary pro-
grams worthy of dissemination. Activities to support local evaluation
use are underway. Included among the activities are the services provided
by the TACs, the funding of 14 SEA-initiated "State Refinements to the

USOE Title I Evaluation System," and the Evaluation Use Committee which is charged with the task of investigating increased local use of the Title I evaluation data. The Evaluation Use Committee, in operation since the fall of 1978, will produce for local LEA use an integrated report, including instructional materials.

Workshops are to be held on the various topics, including the area of effective use of evaluation data for local decision making. One segment considers various definitions and perceptions of evaluation, while another shows the relationship between program planning and evaluation planning, program implementation and evaluation implementation, and the ultimate role of evaluation in program modification as well as how to report these findings to various audiences. Materials also contain case studies showing evaluation (Anderson, 1979).

Iowa and Region VIII TAC have made an effort to improve regular feedback to the individual districts so that they can judge the relative effectiveness of their programs in relationship to other state programs. They are also developing a broad evaluation program. After ensuring that the data generated were of good quality, they have attempted to identify specific program variables that seemed to be associated with student achievement. These successful practices are then to be disseminated to LEAs for incorporation into plans and program improvement. The State will also have a detailed description of instructional practices, methods, and materials used throughout Iowa (Coles, 1979).

The utilization of the TIERs data for local program evaluation has been examined by Forgione, Kapland, and Orland (1979). They concluded

that " . . . both the creation of the models and the TACs have put

forces into motion which may lead to increased utilization of evalu-

ation information for state and local decision making" (p. 23).

Guidelines for evaluating local educational programs are used by the

Joint Dissemination Review Panel (JDRP). Although these criteria

were developed to validate local educational programs that may be

worthy of dissemination, local education agencies are encouraged to

use similar criteria for their own evaluations. These criteria are

as follows:

Criteria 1: Did a change occur?

Criteria 2: Was the effect consistent enough and observed often
enough to be statistically significant?

Criteria 3: Was the effect educationally significant?

Criteria 4: Can the intervention be implemented in another
location with a reasonable expectation of
comparable impact?

Criteria 5: How likely is it that the observed effect results
from the intervention?

Criteria 6: Is the presented evidence believable and interpretable?
(Tallmadge, 1977)

Cedar Falls Title I Program

As presented in Chapter 1, Cedar Falls, Iowa, has a Title I program

in full compliance with federal regulations. The Cedar Falls Title I

Program was established to meet the needs of educationally deprived chil-

dren in low-income areas. The eligibility for Title I funds is determined

by free and reduced lunch with five elementary schools, one junior high,

and the senior high qualifying according to established guidelines. All

eligible schools are currently receiving Title I services.

Each year the Cedar Falls School System submits an application to the SEA that includes needs assessment data, a description of the project, and criteria for evaluating the program. The Iowa Test of Basic Skills (ITBS) given system-wide serves as the needs assessment test with eligibility groups formed from students scoring below the 40th percentile, excluding those students served in other compensatory education programs. With a description of the project and evaluation criteria that have been formulated by the Title I staff, an application is submitted.

The Cedar Falls School System is informed annually by the SEA of the amount of money it is eligible to receive. These funds are then used to implement a remedial reading project that operates supplemental to the classroom instruction during the school year. When the federal government, through all of its Title I agencies, made its strong commitment to the TIERs evaluation models, Cedar Falls complied with the new guidelines.

The Cedar Falls Public School System was informed by workshops held throughout the state about the various models and their implementation procedures. Because Model Al was quite similar to the evaluation procedures currently used, this evaluation model became the one selected for implementation. Cedar Falls uses the norm-referenced test, the Gates-MacGinitie Reading Test, Comprehension Subtest (G-M) for evaluation purposes. This test adheres to federal guidelines, with testing dates corresponding to the empirical norming dates. The data are forwarded to the state in raw score form according to the state regulations. The

data generated to the state are then compiled into a composite form to be reported to USOE. Recently the state has begun reporting aggregated scores in the form of a state report back to the LEAs. The data are put into a state report which gives the LEA a perception of their individual program in relationship to state programs.

Cedar Falls, having been in compliance with the Model A1 guidelines, decided on an in depth examination of their Title I program as it operates in grades two, three, and four. Therefore this study examines the evaluation results within the three Title I schools where students have been program participants for the last five years. The central question asked by this study, in relation to the program operating in the Cedar Falls School System is "How much more did Cedar Falls Title I students learn because of the Title intervention than would have been expected without it?"

Reading Acquisition: Measurable Program Impact

Title I is a compensatory program providing funding for remedial program in low socioeconomic areas. In addition to measuring whether Title I participants did learn more than the no-treatment expectation, the Title I Evaluation and Reporting System (TIERS) is interested in determining what educational practices implemented in Title I intervention programs produce significant results. While the normally developing reader moves quickly through the initial decoding phrases into passages where meaningful content is stressed, a disabled reader often experiences difficulty at the first developmental stage.

Title I teachers have long recognized that some students have
difficulty in moving through the stage of learning to read to the
stage of reading to learn. Over the years the assumption has been
fostered in remedial programs that if the child can decode the printed
page he will perceive the author's meaning and, intuitively, extend
this meaning into his cognitive domain. The prevailing remedial pro-
grams such as Distar, Orton-Gillingham, Fernald Method, and Hegge-Kirk-
Hegge Method, deal with a decoding focus and move from the small part,
letter-by-letter, to the larger whole, passage comprehension. The key
element in many of these remedial programs is a slow orderly movement
through learning sound and symbol relationships with repeated practice.
An example of such a program is described by Kaluger and Kolson (1978)
as follows:

> Overlearning is the rule. The child begins with the
> short a sound and proceeds to blend orally long lists
> of three-letter words containing no other vowel sounds.
> As the child runs through the drills, fatigue is avoided
> through a visual-auditory-kinesthetic-tactile approach. (p. 338)

Because of the necessity of limiting the word-analysis skills
to small fragments, content of the readers may tend to be dull. The
emphasis is on decoding each word correctly, even at the third and
fourth grade levels as evidenced by the Corrective Reading Program
(SRA). In this program the students alternate orally reading, sentence-
by-sentence, a passage developed to include words for a specific phonemic
practice. Points are received for reading a passage with no oral
errors in the group with additional points achieved by a student's
reading, and rereading several times if necessary, a 100-word passage
with no errors (Engelman, Becker, Hanner, & Johnson, 1978).

Comprehension has come to be recognized as an important and teachable component of reading programs. Increased demands for interpretive, evaluative readers who will have the necessary skills for the insightful reading required of individuals going into the 21st century, have brought comprehension to the forefront of research. Goodman and Page (1978) conducted an in depth examination of comprehension as taught in elementary classrooms by basal reader programs, primarily because of the importance of basal readers in classroom reading instruction. Expecting to find that these series differed in philosophy, theoretical bases, and instructional procedures, they were shocked to determine that, by the middle grades, comprehension was similar among programs and was disjointed and unsystematic. They concluded:

> Partly this condition results from preoccupation of text developers with beginning reading. Partly it's the results of assuming that building relationships between print and speech, either at the letter or word level is the main business of reading instruction. Reading is reduced to matching and it is assumed comprehension automatically follows. Partly also too little use has been made of theory and knowledge about comprehension. (Goodman & Page, 1978, p. 100)

Basic to effective reading instruction, including remediation, is an understanding of the theoretical models of how children acquire comprehension skills. It is not sufficient merely to follow a prescribed scope and sequence outline or individually prescribed education plan without a firm knowledge of why.

In an in-depth examination of six of the major published reading programs, Goodman and Page (1978) found that "The clearest conclusion of this study is that published reading programs are instructional

packages which have been assembled without theoretically based designs"
(p. 99). Additionally, P. Kenneth Komoski, President of the Education
Products Information Exchange Institute found that, as of 1971, well
over 200,000 materials were being marketed to schools, yet less than
10% of these educational materials on the market had been field tested
or empirically validated (Goodman & Page, p. 9).

The burden then of determining the theoretical assumptions under-
lying classroom instruction must be gained from outside sources. Each
individual educator must be aware of the influences of cognitive psy-
chologists, behavioral scientists, linguists, and educational researchers
on day-today classroom operation. An explanation of three of the most
predominant theoretical models of reading comprehension will be presented.

Bottom-Up Model of Reading Acquisition

The bottom-up model of reading acquisition views reading as strictly
a serial process, beginning with letter-by-letter visual analysis and
phonemic encoding; higher processes (semantic and syntactical analysis)
do not influence lower processes (orthographic and phonemic analysis).
Only after the individual has proceeded through these processes can
meanings be assigned to a passage (Gough, 1976; Samuels, et al, 1974).

The bottom-up model would lead teachers to believe that we must
begin our teaching with an emphasis on this letter-by-letter decoding.
Several authors including LaBerge and Samuels (1974) and Perfetti (1975)
have proposed the idea that individuals possess a limited amount of
processing space within the short-term memory and that the more space
consumed by decoding, the less time there is for meaning derivation.

Therefore continued rapid training on decoding and sight vocabulary should enhance comprehension. This has been the premise for several studies.

In a study, Fleisher, Jenkins, and Pany (1979) provided poor readers at the fourth-, fifth-, and sixth-grade level with rapid training on all vocabulary to be presented in a passage. Seven fourth- and fifth-grade good readers and eleven fourth- and fifth-grade poor readers as identified by the Metropolitan Achievement Test and teacher judgment were used for the study. Two passages were used with instruction provided on the vocabulary prior to reading. The training did bring poor readers' speed of single word decoding to a level comparable to that of good readers; however, it did not similarly affect literal and inferential comprehension. Therefore, the authors reached the conclusion that students can be taught to decode words faster but that this does not necessarily lead to increased comprehension and there is no direct relationship. In a similar study, Samuels, Begy, and Chen (1975) identified that fourth-grade good readers were able to do a faster job of decoding although both of the groups knew the words in isolation.

Samuels, Dahl, and Archwamety (1974) tested the extent that accuracy and speed of word recognition testing would account for increassed comprehension. Thirty-six of the poorest readers from the third-grade students in a middle-class suburban elementary school were the subjects. After training in tachistoscopic word recognition, the third graders were able to decode faster than the control group; however,

the third-grade experimental group with hypothesis testing (using auditory, visual, and graphic clues to predict words quickly and accurately) were able to decode faster with increased comprehension indicating that decoding skills alone were not sufficient to increase comprehension.

If comprehension does not result from increased mastery of decoding strategies and improved sight vocabulary, the conclusion must be reached that comprehension involves more than identification processes, and it would further appear that the bottom-up model does not explain all the behaviors observed in the reading process.

Top-Down Model of Reading Acquisition

A second approach to reading is the top-down model of reading acquisition that involves tentative informational processing. Guessing on the basis of minimal actual information is the primary characteristic of this reading theory. Based on the reader's knowledge of the world, his/her grasp of the content up to a given point, and his/her use of grammatical relationships with minimal sensory cues culled from the periphery, the reader determines a specific guess about the identity of the word about to be perceived. This theory allows the reader to use only minimal decoding strategies while he/she is predicting content (Goodman, 1967; Smith & Goodman, 1971).

Linguistics, as an important part of reading, has had profound impact on comprehension. Extending and emphasizing the "reading for meaning" concept, linguists have focused on the complex interactions between such aspects as semantics, syntax, and lexicon. Linguists have called educators' attention to the fact that children come to

school already knowing a great deal about language and that our instructional practices should reflect this knowledge. The top-down model of reading acquisition is, in part, a reflection of these influences. The top-down theoretical model of reading comprehension has, as a basis, the assumption that speech and print are two inroads to the same language processor.

Therefore, it may follow that children who have deficiencies in reading may have similar deficiencies in spoken language and that the deficiencies are more pronounced for semantic or syntactic processing of sentences. Guthrie and Tyler (1976) examined good and poor readers in two modalities, reading and listening, using three sentence types, meaningful, anomalous, and random. Of the 36 children in the study, 18 average fourth graders were from a middle-class school and were matched with 18 learning disabled children who were from a special school; all children were reading at the fourth-grade level. Meaningful sentences contained normal syntax and normal semantic meanings. Anomalous sentences contained normal syntax but did not carry conventional meanings. Finally random "word strings" contained neither normal syntax nor sentence meaning. It was determined that, although the poor readers were significantly lower than good readers in reading, the groups were not significantly different in listening. Further examination of the sentence types revealed no evidence that poor comprehension is a result of deficiency in processing semantic or syntactic information. *Further examination of research (Athey, 1971; Carver, 1973; Sticht, Beck & Hauke, 1974) reveals that psycholinguistic processing also does not*

account adequately for comprehension acquisition in reading.

Interactive Model of Reading Acquisition

The third model of reading acquisition is the interactive model of reading which draws from both the reader's linguistic knowledge and his/her decoding skills. It begins with the requirement that words be read in part, but uses anticipation as a strategy to reduce letter-by-letter analysis. As the reader is utilizing decoding strategies, semantic and syntactic information are interacting to define and refine particular words that will fit a passage. Current hypotheses, derived independently by several levels of knowledge sources (for example, lexical, semantic, and orthographic) about words are placed, assessed, and evaluated (Gibson & Levin, 1975; Rumelhart, 1977).

Examination of the interactive model would indicate that students must develop comprehension, semantic, and syntactic structure skills while developing decoding skills for optimum comprehension. In an examination of the top-down and interactive comprehension models of reading research, a clear delineation between the two cannot be made because most children involved in research studies are presently reading, and the effects of prior instruction on training cannot be isolated; however, the importance of teaching comprehension skills along with decoding skills can be examined.

Organization, or syntactic skills are recognized as important components of reading comprehension (Cromer, 1970; Cromer & Wiener, 1966; Denner, 1979). In a study (Weinstein & Rabinovitch, 1971) fourth-grade good and poor readers, as determined by the Gates Reading Test,

were matched by age and IQ. The children were asked to learn sentences,
structured and unstructured. The structured sentences were constructed
from a third-grade reader while the unstructured sentences were prepared
by rearranging sentences from the readers. For the good readers, syn-
tactic cues facilitated recall while for the poor readers there was
no significant difference between structured recall and unstructured
recall of the sentences. Prior to the sentence testing, each child
completed a paired-association task at which both good and poor readers
achieved at the same levels. The authors speculate that this may
suggest that poor readers can learn to utilize syntactic cues as aids
to recall and that further testing should be done in this area. Results
of this study suggest the value of a direct approach in comprehension
training.

Weaver (1979) studied the effect of training in sentence organi-
zational skills. Sentence organizational skills were defined as the
skills that enable a reader to encode information into meaningful units
larger than the single word, as measured by performance on a sentence
anagram test. Thirty-one third graders in a middle-class suburban school
were divided into two groups, average and above average readers. In
addition to sentence anagram training, all students were administered a
pre- and posttest in each of the following areas: sentence anagram,
cloze comprehension, prompted sentence recall, passage-question compre-
hension, and follow-the-dots tests. The purpose of the sentence anagram
training was to teach children to increase syntactical skills by "chunking"
words into higher order units. Significant differences between experi-
mental and control groups were evident, therefore, the author concluded

that sentence organizational skills are trainable. Additional
studies confirm the positive relationship between sentence organi-
zational skills and comprehension (Gibson & Levin, 1975; Resnick,
1970).

The review of research within the framework of all the theoretical
models has given support to the position that the interactive model
of reading acquisition is best supported by research and explains mature
reading strategies. Believing that the end product of all reading is
comprehension, the interactive model of research clearly demonstrates
that readers can simultaneously be taught to utilize syntactic and
semantic knowledge while learning decoding strategies. What may be
speculated is that most reading approaches are operating primarily
from the bottom-up model, focusing on teaching decoding skills and
do not give sufficient time to moving from the top-down and building
comprehension strategies at the same time.

Using Title I Data to Evaluate: Theory into Practice

In the spring of 1978, the Cedar Falls Title I staff began an
examination of their educational commitment to students. The educa-
tional plan used in their reading programs was felt to be based too
strongly on word analysis techniques which did not seem to be meeting
the needs of all the students involved in the program. A special
funding grant, made available by state reallocation funds, led teach-
ers to begin a search for an improved remedial instruction plan.

The Cedar Falls teachers perceived that some of their Title I
students were not achieving increased comprehension levels; however,

the prevailing remediation techniques centered on developing faster
and more accurate decoding as an aid to comprehension. The teachers
speculated that their reading approach was operating primarily from
the bottom-up model of reading acquisition and that this model was
not meeting the needs of all the students.

Recent research has shown that increased decoding speed and
comprehension are not conclusively related (Fleisher, Jenkins, & Pany,
1979; Perfetti, 1976; Samuels, Begy, and Chen, 1976; Samuels, Dahl,
and Archwamety, 1974).

The Cedar Falls teachers felt that while good readers may be able
to progress from the decoding process to the larger unit intuitively
or with only limited instruction, the poor reader continues to stumble
along word-by-word, becoming over reliant on letter-by-letter decoding.
As stated by Goodman (1979), "they become victims of overskill, trying
to remember skill strategies they have been taught" (p.662) while they
struggle to make sense from a passage. Goodman has labeled this the
"next-word syndrome", the ingrained belief that every word must be accu-
rately read, with each failure a defeat and further proof to them that
they will never succeed. In most cases, these remedial readers have
natural language strengths they can draw upon, comprehension strategies
to be developed, but they may regard them as cheating because they have
not been developed in actual reading instruction. The top-down model
of reading acquisition builds from these natural language strengths and
involves using anticipation, along with the reader's background knowledge,
his use of grammatical relationships and his grasp of the content (Goodman,

1967; Athey, 1971). The Cedar Falls Title I Staff felt that for optimum learning to take place that a combination of these two theories, the interactive model (Gibson & Levin, 1975; Rumelhart, 1977) provided the best frameword for instruction.

Utilizing instruction based upon this interactive reading model can have many benefits for the reader experiencing difficulties. While a normal reader progresses quickly through the beginning decoding skills and moves into comprehension areas, the remedial reader is often forced to use only the decoding modality for a longer period of time. In an attempt to implement a remedial reading program that would be more reflective of this interactive reading theory, the Cedar Falls Title I teachers developed the <u>Diagnostic and Instrucctional Materials and Procedures for Improved Instruction in the Area of Reading Comprehension</u> (DMPRC) based on research indicating that comprhension abilities can be developed within an instructional framework (Cromer, 1970; Weaver, 1979).

After the DMPRC materials had been utilized for two years, the teachers wanted to determine whether the program had really produced significant differences in the comprehension level gain of the Title I students. Hence this comprehensive evaluation of the Title I program was undertaken in the spring of 1980, utilizing evaluative data from the TIERS.

Summary

The objective of the Title I evaluation is to provide meaningful, comparable information about Title I projects at the local, state, and federal levels. This massive undertaking is still in its inception.

As all states fully utilize the evaluation models the question that has puzzled evaluators for fifteen years may finally be answered, "How much more do students learn by participating in the Title I program than they would have learned without it?"

Additionally, programs of exemplary nature may be identified from the question, "What intervention practices produce the most significant gains among Title I participants?" The interactive model would seem to suggest some of the possible instructional procedures for intervention programs. Furthermore, research has shown that comprehension processes can be developed in readers and enable them to mature into efficient, systematic readers. Further research into reading instruction reflecting this theoretical assumption would be helpful.

CHAPTER III

METHODS AND PROCEDURES

This chapter includes a description of the following steps used in the evaluation study: a) identification of the population, b) descriptions of the instruments used, c) procedures used in the collection of the data, and d) the data analysis procedures.

Population

The population for this evaluation study consists of all second-, third-, and fourth-grade students eligible for Title I participation in the school years between 1976 and 1980 in three elementary schools within the Cedar Falls Community School District (North Cedar, Southdale, and Lincoln). The Cedar Falls Community School District is composed of students from a primarily white, middle-class community of about 30,000. The target population included 432 students over the four-year period. The Cedar Falls School System's Title I program was selected for the research study because it utilizes instructional strategies reflective of the interactive model of reading acquisition. All test scores were obtained from the Title I records maintained by the Cedar Falls School System. Confidentiality was ensured by the assignment of code numbers to individual students. This study was undertaken with the knowledge and support of the Cedar Falls School Administration, the Area Education Agency 7, and the Title I Division of the Iowa State Department of Education.

Instruments

The following test instruments were used in the study: the

Gates-MacGinitie Reading Test, Comprehension subtest, (G-M) which
is administered twice a year in October and May to students in the
Title I program, and the Iowa Test of Basic Skills, Reading Subtest,
(ITBS), which is administered yearly in November to all students in
grades two through six. The ITBS serves as a selection instrument
for Title I eligibility based on Iowa norms. The G-M serves as the
pre- and posttesting instrument, in compliance with federal Title I
guidelines.

    1. Gates-MacGinitie Reading Test, First Edition: The Gates-
MacGinitie Reading Tests were developed in 1965. The alternate form
reliability coefficients range from .81 to .85 on the levels of tests
utilized for this study. Concurrent validity coefficients for the
correlation of Primary C at grade three with four other standardized
tests were obtained in a study by Davis (Gates-MacGinitie, 1972). The
median coefficients were .79 for the comprehension subtest (Gates-Mac-
Ginitie, 1972).

    2. Gates-MacGinitie Reading Test, Second Edition: The Gates-
MacGinitie Reading Tests were revised in 1978. Kuder-Richardson
Formula 10 reliability coefficients were computed from the standardized
sample for each level of the test, the range being from .92 to .95
on the test levels used in this study (Gates-MacGinitie, 1978).

    3. Iowa Test of Basic Skills, Forms 5 and 6: The Iowa Test of Basic
Skills has split half reliability coefficients ranging from .91 to .93
on the reading section based on the sample from the national standardized
program, adjusted to reflect differences in variability in Iowa midyear
performance (Hieronymus & Lindquist, 1974).

4. Iowa Test of Basic Skills, Forms 7 and 8: The Iowa Test of Basic Skills was revised in 1978. Kuder-Richardson Formula 10 reliability coefficients on the test were .91 and .90 based on the national standardization program. No reliability coefficients were available for grade two.

Procedures

Using the Model A1 guidelines as prescribed in User's Guide: ESEA Title I Evaluation and Reporting System, the Gates-MacGinitie Reading Test scores of students in the three Title I schools were examined for the last four years. According to Model A1, the no-treatment expectation was found by determining the NCE status of the treatment group at pretest time. The assumption underlying Model A1 is that, without the Title I treatment, the status of the group at posttest time will be the same as it was at pretest time. The observed posttreatment performance was the NCE score corresponding to the group's mean posttest score. If the group's posttest status is higher than the no-treatment expectation, the assumption is made that the improvement resulted from participation in the Title I project.

Model B1 guidelines were also modified for use in the study. Those students participating in Title I, the treatment group, were compared to a control group, those students eligible for Title I within the three schools but not served. Scores of the groups were compared using the reading section of the Iowa Test of Basic Skills. Pretest scores were used to verify comparability with equalizing adjustments made as prescribed. The control group's posttest score served as the no-treatment expectation to be compared to the treatment group's score. According to

Model B1, if the treatment group's performance is superior to the control group's, it is assumed that the project was effective.

The study also evaluated the effect of the implementation of the DMPRC instructional materials in the fall of 1978. The NCE gains as measured by the scores on the Gates-MacGinitie were examined prior to and after implementation of the DMPRC. The composite Title I NCE gain score for the school years 1976-77 and 1977-78 served as the no-treatment expectation. A comparison was made to the composite NCE gain score for the two school years 1978-79 and 1979-80 after the implementation of the DMPRC materials. If the treatment group's performance was superior to the no-treatment expectation, it was assumed that the project was effective. Additionally, the comparison was made by grade level.

Analysis of Data

Test scores for all study participants were converted to NCEs using appropriate conversion tables. In determining the effect of the Title I Program using Model A1, the norm-referenced design, an analysis of variance (ANOVA) was used to test for treatment effect. In addition, t-tests for each grade level were used to test for statistically significant differences. Using Model B1, the control group design, an analysis of covariance (COVAR) was used to determine treatment effect by adjusting for any pretest inequalities. The effectiveness of the DMPRC materials was statistically analyzed using an analysis of variance (ANOVA). All treatment effects were tested for significance at the .05 level. While statistical procedures were employed in this study, it must be noted that

any educational gain can be considered significant, even though the

gain may not be significant at a statistical level.

CHAPTER IV

RESULTS

This chapter presents the results of the data analyses. The
first section is concerned with the reading growth of Title I partici-
pants as compared to a norm-referenced test, the second section is
concerned with reading growth of Title I participants as compared to
similarly qualifying students who were not Title I participants, and
the third section of this chapter is concerned with the data analysis
related to the implementation of the specific comprehension program.

Title I Reading Growth

Question 1: Did second-, third-, and fourth-grade students
involved in the Title 1 reading program experience reading growth
greater than would have been expected without Title I
assistance?

Ho: There is no significant difference in reading scores
between the no-treatment expectation and the observed
reading performance for Title I students.

The no-treatment expectation, the posttreatment performance, and
the gain scores for the total group and by grade level of the Title I
participants for each of the four school years are presented in Tables
1, 2, 3, and 4 respectively. As explained in Chapter III, the treat-
ment effect is the amount of gain determined by subtracting the no-
treatment expectation score from the observed posttreatment score.
The results of the t-tests indicate that the treatment effect gain
scores were statistically significant; i.e., Title I students showed
significantly greater gain scores than would have been expected without
the Title I intervention. The null hypothesis is rejected. Based on
the Title I guidelines stating that any gain beyond zero should be

Table 1

1976-77 Gates-MacGinitie Reading Test Scores

By Grade Level in NCE Units

Grade	Expected No-Treatment Score	Observed Post-Treatment Score	Treatment Effect	t value	
2 (N=21)	25.74	37.16	+11.42	2.36	*
3 (N=22)	28.48	42.86	+14.38	3.04	**
4 (N=15)	36.37	45.41	+ 9.04	3.42	**
Total (N=58)	29.53	41.46	+11.93	4.09	***

* $p < .05$

** $p < .01$

*** $p < .001$

Table 2

1977-78 Gates-MacGinitie Reading Test Scores

By Grade Level in NCE Units

Grade	Expected No-Treatment Score	Observed Post-Treatment Score	Treatment Effect	t value	
2 (N=36)	44.03	49.49	+5.46	2.09	*
3 (N=24)	39.45	42.44	+2.98	.66	
4 (N=22)	37.51	45.76	+8.25	3.44	**
Total (N=82)	40.94	46.43	+5.48	2.54	*

* $p < .05$

** $p < .01$

Table 3

1978-79 Gates-MacGinitie Reading Test Scores

By Grade Level in NCE Units

Grade	Expected No-Treatment Score	Observed Post-Treatment Score	Treatment Effect	t value	
2 (N=22)	26.14	48.14	+22.00	4.77	***
3 (N=34)	35.04	37.71	+ 2.67	.65	
4 (N=18)	31.78	40.72	+ 8.94	1.40	
Total (N=74)	31.60	41.54	+ 9.94	3.51	***

*** $p < .001$

Table 4

1979-80 Gates-MacGinitie Reading Test Scores

By Grade Level in NCE Units

Grade	Expected No-Treatment Score	Observed Post-Treatment Score	Treatment Effect	t value	
2 (N=31)	27.97	46.39	+18.42	4.75	***
3 (N=17)	43.35	46.88	+ 3.53	.59	
4 (N=22)	32.97	40.46	+ 7.49	3.38	**
Total (N=70)	33.26	44.64	+11.39	4.10	***

** $p < .01$

*** $p < .001$

considered educationally significant, the results also indicate that Cedar Falls has a highly effective Title I program in terms of educational gain at all grade levels within each year.

For the last four years, the mean gains of the Cedar Falls Title I program participants have exceeded the no-treatment score expectation. In three of the last four years, participants' mean gains reflect a change greater than + 9.0 NCEs.

Table 5 presents a summary of all the means of the no-treatment expectations, observed posttreatment scores and treatment effects by years for the combined grade levels. It can be seen from the F test results reported that, for the years 1978-79 and 1979-80, there were statistically significant differences in gain scores between grade levels. To answer the question of which grade levels were contributing to the significance, t-tests were done by grade level.

Tables 6, 7, and 8 present information concerning the average gain across years by grade level. The tables demonstrate that, while all grades achieved gains, second graders demonstrated the greatest treatment effect. The eight tables in this section exhibit evidence of the success of the Cedar Falls Title I program in promoting reading growth beyond what would have been expected of students without the Title I intervention.

Title I and Non-Title I Reading Growth

Question 2: Did second-, third-, and fourth-grade students involved in the Title I program experience greater gains than similarly qualifying students who were not selected for participation?

Ho: There is no significant difference in reading scores between Title I students and non-Title I students.

Table 5

Summary of Composite Yearly Gain

Gates–MacGinitie Reading Test Scores

Year	Expected No-Treatment Mean Scores	Observed Post-Treatment Mean Scores	Treatment	F value	
1976-77 (N=58)	29.53	41.456	+11.925	.49	
1977-78 (N=82)	40.943	46.42	+ 5.481	1.09	
1978-79 (N=74)	31.598	41.540	+ 9.94	9.12	***
1979-80 (N=70)	33.257	44.462	+11.385	5.20	**

** p < .01

*** p < .001

Table 6

Summary of the Second-Grade Treatment Effect

Gates–MacGinitie Reading Test

Year	Expected No-Treatment Score	Observed Post-Treatment Score	Treatment Effect	t value	
1976-77 (N=21)	25.74	37.16	+11.42	2.36	*
1977-78 (N=36)	44.03	49.49	+ 5.46	2.09	*
1978-79 (N=22)	26.14	48.14	+22.00	4.77	***
1979-80 (N=31)	27.97	46.39	+18.42	4.75	***
Total (N=110)	32.46	45.99	+13.56		

* p < .05

*** p < .001

Table 7

Summary of the Third-Grade Treatment Effect

Gates-MacGinitie Reading Test

Year	Expected No-Treatment Score	Observed Post-Treatment Score	Treatment Effect	t value
1976–77 (N=22)	28.48	42.86	+14.38	3.04 **
1977–78 (N=24)	39.45	42.44	+ 2.98	.66
1978–79 (N=34)	35.04	37.71	+ 2.67	.65
1979–80 (N=17)	43.35	46.88	+ 3.53	.59
Total (N=97)	36.10	41.66	+ 5.55	

** p < .01

Table 8

Summary of the Fourth-Grade Treatment Effect

Gates-MacGinitie Reading Test

Year	Expected No-Treatment Score	Observed Post-Treatment Score	Treatment Effect	t value
1976–77 (N=15)	36.37	45.41	+9.04	3.42 **
1977–78 (N=22)	37.51	45.76	+8.25	3.44 **
1978–79 (N=18)	31.78	40.72	+8.94	1.40
1979–80 (N=22)	32.97	40.46	+7.49	3.38 **
Total (N=77)	34.63	43.00	+8.37	

** p < .01

According to Model B1 guidelines (User's Guide), the applicability of Model B for evaluative purposes is dependent on the equivalence of the control group with the Title I group on the basis of pretest scores. Table 9 presents the pretest scores of the two groups. As presented in Table 9, five of the nine groups differed by more than the recommended four NCEs (User's Guide); hence, the interpretive value of these data by Model B1 is restricted.

In order to compare the Title I participants and the non-Title I students' test scores at posttreatment time, as prescribed in the Title I guidelines, a covariance analysis was used to adjust for the initial differences. Tables 10, 11, and 12 present summaries of the pretest and posttest scores for the treatment and control groups for 1976-77, 1977-78, and 1978-79 respectively. The main effect, Title I participation, was tested at the .05 level. It cannot be demonstrated statistically that the Title I groups made more significant gains than did the control groups. Therefore, the null hypothesis cannot be rejected. However, it must be noted that the control group showed reading growth exceeding the pretest expectation.

Presented in Tables 13, 14, and 15 are summaries of the NCE gains of the Title I participants compared with non-Title I students for second-, third-, and fourth-grade levels respectively. It can be observed that at the second- and third-grade levels both groups experienced growth greater than the no-treatment expectation. Fourth graders, in general, failed to maintain their pretest NCE rank.

Table 9

Comparison of Students' Pretest Scores

Iowa Test of Basic Skills Comprehension Subtest

Year	Second Grade			Third Grade			Fourth Grade		
	Title I	Control	Difference	Title I	Control	Difference	Title I	Control	Difference
1976–77	18.918	29.352 (N=44)	−10.434	28.253	33.845 (N=46)	−5.592	30.982	28.231 (N=40)	+2.751
1977–78	27.504	33.200 (N=43)	− 5.696	25.238	35.013 (N=54)	−9.685	34.262	35.382 (N=66)	−1.120
1978–79	33.339	32.679 (N=37)	+ .660	32.715	35.280 (N=72)	−2.565	30.947	39.323 (N=61)	−8.37

Table 10

Summary of the 1976-77 Reading Scores

Iowa Test Basic Skills in NCE Units

	Title I		Non-Title I		F value
	Pretest	Posttest	Pretest	Posttest	
Second Grade (N=54)	18.918	32.786	29.352	32.067	1.20
Third Grade (N=53)	28.253	33.618	33.845	35.900	.04
Fourth Grade (N=44)	30.982	29.462	28.231	35.086	1.63

Table 11

Summary of the 1977-78 Reading Scores

Iowa Test Basic Skills in NCE Units

	Title I		Non-Title I		F value
	Pretest	Posttest	Pretest	Posttest	
Second Grade (N=50)	27.504	32.211	33.200	35.236	.04
Third Grade (N=70)	25.328	30.557	35.013	40.457	4.31 *
Fourth Grade (N=66)	34.262	32.400	35.282	31.920	.04 *

* $p < .05$

Table 12

Summary of the 1978-79 Reading Scores

Iowa Test Basic Skills in NCE Units

	Title I		Non-Title I			
	Pretest	Posttest	Pretest	Posttest	F value	
Second Grade (N=41)	33.339	38.629	32.679	46.416	4.27	***
Third Grade (N=79)	32.715	34.943	35.280	41.108	2.98	***
Fourth Grade (N=62)	30.947	28.531	39.323	32.764	.15	*

* $p < .05$

*** $p < .001$

Table 13

Difference Between Observed Posttest Scores

and Expected No-Treatment Scores

Based on Pretest Score Level

for Second Grade

Year	Title I	Non-Title I
1976-77	+13.868	+ 2.715
1977-78	+ 4.707	+ 2.036
1978-79	+ 5.290	+13.737

Table 14

Difference Between Observed Posttest Scores

and Expected No-Treatment Scores

Based on Pretest Score Level

for Third Grade

Year	Title I	Non-Title I
1976-77	+5.65	+2.055
1977-78	+5.229	+5.534
1978-79	+2.228	+5.828

Table 15

Difference Between Observed Posttest Scores

and Expected No-Treatment Scores

Based on Pretest Score Level

for Fourth Grade

Year	Title I	Non-Title I
1976-77	-1.520	+6.855
1977-78	-1.862	-3.462
1978-79	-2.416	-6.559

Evaluation of the DMPRC Comprehension Materials

Question 3: Did second-, third-, and fourth-grade
Title I students after the fall of 1978 demonstrate
greater comprehension growth than Title I students
prior to that date as a result of instruction with
a specifically designed comprehension program?

Ho: There is no significant difference in reading growth of
Title I students prior to and after instruction with
a specific comprehension program.

Table 16 presents the analysis of variance for grade and year
when the scores are combined for years 1976–78 and 1978–80. Table
17 presents the analysis of variance for grade for the same combined
years. In Tables 18, 19, 20, and 21 the no-treatment score (the no-
treatment score was based on the treatment effect prior to the imple-
mentation of the DMPRC materials), the observed posttreatment score
(the posttreatment score was based on the treatment effect after the
implementation of the DMPRC), the treatment effect gain, and the t-test
score are shown. Table 18 has compiled composite scores while Tables
19, 20, and 21 are distributed as second, third, and fourth grade
respectively.   Results of the t-tests demonstrate the significance
of the Diagnostic and Instructional Materials and Procedures for Improved
Instruction in the Area of Reading Comprehension at the second grade level.
While all groups continue to show educational gain, second graders demon-
strate the greatest amount of gain.

Table 16

Analysis of Gates-MacGinitie Reading Test Scores

Relative to Gain by Year by Grade Level

Source	SS	d.f.	MS	F	
Year	644.47	1	544.45	2.23	
Grade	3521.11	2	1760.552	7.20	***
Year x Grade Interaction	4308.71	2	2154.36	8.81	***
Residual	67957.31	278	244.45		
N=284					

*** p < .001

Table 17

Analysis of Gates–MacGinitie Reading Test Scores

Relative to Gain by Grade Level

Source	SS	d.f.	MS	F	
Grade	3567.68	2	1783.84	6.93	***
Residual	71819.44	279	257.42		
N=282					

*** $p < .001$

Table 18

Compiled   Composite Scores

Gates-MacGinitie Reading Test in NCE Units

Years	Expected No-Treatment Score	Observed Post-Treatment Score	Treatment Effect
1976-78 (N=140)	36.22	44.37	+ 8.15
1978-80 (N=144)	32.40	43.05	+10.65

Table 19

Compiled Second-Grade Scores

Gates-MacGinitie Reading Test in NCE Units

Years	Expected No-Treatment Score	Observed Post-Treatment Score	Treatment Effect	t	
1976-78 (N=57)	37.30	44.95	+ 7.65	3.65	***
1978-80 (N=54)	37.21	47.11	+19.91		

*** $p < .001$

Table 20

Compiled Third-Grade Scores

Gates-MacGinitie Reading Test in NCE Units

Years	Expected No-Treatment Score	Observed Post-Treatment Score	Treatment Effect	t
1976-78 (N=46)	34.21	42.64	+8.43	1.80
1978-80 (N=51)	37.81	40.77	+3.00	

Table 21

Compiled Fourth Grade Scores

Gates-MacGinitie Reading Test in NCE Units

Years	Expected No-Treatment Score	Observed Post-Treatment Score	Treatment Effect	t
1976-78 (N=37)	37.05	45.62	+8.57	.13
1978-80 (N=40)	32.40	40.58	+8.18	

CHAPTER V

DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS

The discussion, conclusions, and recommendations of the results

from this study are presented in this chapter. The purpose of this

sutdy was to examine some dimensions of the two basic Title I evalu-

ation questions concerning how much more students learn because of

the Title I intervention than would be expected without it and what

types of intervention programs produce the most significant gains among

Title I participants.

The first part of this chapter discusses the results of this study.

Conclusions are then presented based on these results, and finally,

recommendations are proposed.

Title I Reading Growth

How much more did students learn because of the Title I inter-
intervention than would have been expected without it?

Question 1:   Did second-, third-, and fourth-grade students involved
              in the Title I reading program experience reading growth
              greater than would have been expected without Title I
              assistance?

For the first section of this study sets of tests score data for

second-, third-, and fourth-grade students in Cedar Falls, Iowa were

examined. Scores from the four schoolyears from 1976 through 1980 were

utilized. Based on the information analyzed according to Model A1

guidelines, Cedar Falls can be judged as having a highly effective Title I

project operating in grades two through four. Generally, this program

has confirmed its educational significance over the last four years as

the results from all grades in all years exceeded the no-treatment expecta-

tion. In three of the four years, the results exceeded the most stringent

guidelines suggested for the evaluation of a project, 7 NCEs. Through

the annual grant offered under the Elementary and Secondary Education

Act, this eligible school system is exhibiting evidence that Title I

is promoting greater reading growth than would have been expected

without a Title I intervention.

The implementation of Model Al has been according to the

federal guidelines developed in 1975. The Title I findings reported

in this study are consistent with the other limited number of studies

(Fish, 1979; House, 1979) in that they indicate that Title I inter-

vention can produce reading growth beyond expectation. Based on the

normative population of the Gates-MacGinitie Reading Test, Comprehen-

sion Subtest (G-M), the growth within the Cedar Falls Title I program

is beyond that observed and reported in most previous Title I evaluation

studies using the evaluation models (Evaluation of ESEA Title I, 1980;

Fish, 1979; House, 1979). The variation in gain score means between

individual years and within grade levels seems to be reflective of the

Tilte I research to this point (Evaluation of ESEA Title I, 1980; Title

I in Ohio, 1978), demonstrating that, at this time, there are no gener-

alized gain scores to be anticipated. While the original intent of the

1975 Title I legislative mandate was to provide data that could be

aggregated at the federal level from all the 14,000 school districts,

to date these data have not been published; therefore, a comparison

cannot be made conclusively between this program and national results.

Further analysis of the data reveals that, while all grade levels

in all four years exhibited gain scores beyond the no-treatment expectation

of Model A1, second-grade Title I students' mean gain scores

exemplified the greatest growth of 13.55 NCE units, in contrast

to an average mean gain of + 5.55 NCE units for third graders

and of + 8.36 NCE units for fourth graders. These findings are

consistent with other research that indicates that the younger the

child, the greater chance of success in remediation (Schiffman, 1962).

Three related factors may explain this result: early intervention,

first intervention program, and the learning growth curve rate.

Early identification and intervention for students experiencing

reading difficulties may be one contributing factor to the higher

mean gain scores of second-grade students. Goodman (1979) has stated

that this early gain may result because the students have not become

conditioned to the "failure syndrome" and that instruction may rectify

specific weaknesses before they become habitual and inhibit further

learning. It may be speculated that some of these students may be

developmentally-delayed readers whose reading difficulties have not

progressed to the severe remedial stage. Thus early intervention may

prevent later severe disabilities in some students.

Additionally, within the Cedar Falls Title I program, second grade

is the first year that students may participate in the intervention

program. It may be speculated that students shown greater gain the

first year in a program. Additional research on this topic may indicate

that not only is early intervention desirable but also that "first"

intervention is a critical period.

A third factor that may contribute to our understanding of the

greater second grade mean gain scores is the learning growth curves.

Studies have demonstrated greater fluctuation among learning growth curves at the earlier grades (Horst & Tallmadge, 1975). This fluctuation may be partially responsible for the greater gain scores at second grade. As students progress through the grades, the learning growth curve rates among students change and the gap widens.

Third-grade mean gain scores, while exceeding the no-treatment expectation, exhibited the least amount of growth in three of the four years reported. This may be a reflection of two factors: inability as a group to maintain the initial mean gain score and the appropriateness of the testing instrument for the third-grade Title I students in Cedar Falls.

Third-grade mean gain scores may not exhibit as much growth because the third-grade students are unable to match or to exceed the initial gains made by either the early intervention or the first intervention of second grade. Perhaps developmentally delayed readers who had made the larger gains after the first intervention were no longer eligible for the Title I program. Hence, those students remaining in the Title I program may have more severe remedial problems.

An examination of the G-M Comprehension Subtest may provide some additional evidence regarding the decline of third-grade scores from the second grade. Test Level B used at the second-grade level has a percentage of 80% literal questions to the 20% inferential questions while Level C, used at the third-grade level, converts to a percentage of 65% literal and 35% inferential questions. The number of inferential questions changes from 8 to 14, and it may be possible that some Title I

readers experience difficulty with these inferential questions because
of lack of instruction and experience due to their below grade level
reading placement.

Fourth-grade mean gain scores were the most stable over the four-
year period. The mean gain scores clustered around + 8.00 NCE units.
A variety of factors such as the validity of the test with the instruc-
tional program and the stabilizing of the learning rate curves may
account for this stability.

The Cedar Falls Title I program has demonstrated its success for
grades two, three, and four over a four-year program when the no-
treatment test population serves as a comparison group. The second
part of this section of this evaluative study examined the Title I
participants in relation to the control group of eligible but not
participating students within the same school setting.

Question 2:   Did second-, third-, and fourth-grade students
              involved in the Title I program experience greater
              gains than similarly qualifying students who were
              not selected for participation?

Comparable data over the three-year period were obtained for Title
I and non-Title I students from the Iowa Test of Basic Skills (ITBS)
administered systemwide in November. The second question in this research
study utilized students who were eligible for Title I services in the
same schools as the Title I students but were not participants. These
students formed a control group for comparison. These control groups
were assumed to be similar in such factors as educational background and
socio-economic level. The intent of this part of the study was to judge
the applicability of Model B1 guidelines for providing a basis of comparison

between Non-Title I and Title I students. It was not the intent of
the study to validate this program for Title I purposes.

While the application of Model B1 guidelines has precluded some
of the interpretive value of this data, some generalizations do become
apparent. Even though no statistically significant differences were
found for Title I participants, both groups of students exceeded their
initial NCE rank, a violation of one basic assumption for both Models
A and B. In an examination of the second- and third-grade mean gain
scores reported, it is important to note that in order to demonstrate
significance for the Title I program, these students would have had to
produce reading growth dependent on the Title I intervention in addition
to the growth of the control group. The results show that the Cedar
Falls School System is meeting the needs of students below the 40th
percentile in beginning reading; however, attention should be focused
on the decline of five of the six fourth grade control and Title I
groups.

While these findings appear to be contradictory to the findings
from the Model A1 results, several differences must be noted, including
the content differences in the two testing instruments utilized and the
testing date difference. The testing dates for the ITBS and G-M may
yield different information regarding mean gain scores. The G-M test
is administered in the fall and spring providing measurable program
impact within the school year. The ITBS is administered once a year in
November providing measurable program impact on a yearly basis. The
content of the ITBS and the G-M may vary producing different types of
mean reading gain scores.

The interpretive value of the data according to Model Bl guidelines is limited by several factors: the initial differences in the two groups, the fact that the testing dates did not correspond to the spring and fall dates of the Title I directives, and the applicability of the "random-assignment-in-effect" for the purposes of this study.

The directive included in the Title I guidelines states that the initial groups may be no more than four NCEs apart on the initial testing. If this is not the case, then the guidelines suggest that analysis of covariance is not appropriate. In this study, seven of the nine groups of students' mean pretest scores were more than the recommended differences.

Secondly, the interpretive value of these data according to Model Bl guidelines is limited because the ITBS test is administered at the November norming dates and does not correspond to the Title I intervention program within a school year. Because of this testing date, two problems may be noted: 1) The pretest score was given after a student had been in school and very possibly had participated in a Title I program for up to twelve weeks or nearly one-third of a school year. Learning that had taken place in the initial weeks of instruction would not be evidenced. 2) Additionally, it must be noted that observed posttreatment score was not obtained until the following November. For a student no longer in the Title I project, this test administration occurred nearly six months after Title I intervention had terminated.

Another consideration in this study is that assignment to the non-Title I control group or the treatment groups was assumed to be random in effect; however, this is not easily implemented under Title I guidelines.

In this study the control groups were all students within the Title I school eligible but not participating in the program. Although students were assumed to be random in effect, there is a judgment variable involved between the individual student, classroom teacher, and the Title I teacher that cannot be discounted. The Cedar Falls Title I guidleines indicate that the individual needs of each student are considered before a Title I placement is made. This study is concerned with the total aggregated data that will provide an evaluation of a program, not with the evaluation of individual students within the program. Yet, it cannot be discounted that there were some decisions made as to which students would best benefit from the Title I intervention. The extent to which this variable enters into the realm of evaluation research in this study cannot be fully known without further study.

An examination of Title I in regard to the findings of this research question provides unanswered questions dealing with control groups, the data analysis, and the Title I evaluation models. In accordance with the guidelines for Model B1 two comparison groups must be established that are extremely close in pretest scores. Yet Title I guidelines currently state that the most needy students must be served first which would indicate that the Title I participants would be at the lower end of the group below the 40th percentile. Perhaps it is not possible to establish two such groups within the same school setting. In utilizing students in other schools, the researcher must carefully place groups on the basis of such factors as sex, socio-economic level, and race.

Secondly, the evaluation Model B1 may present mathematical problems. The guidelines suggest that the adjusted no-treatment expectation should be listed as one score. For the purposes of this study a computerized system at the University of Northern Iowa was used and this score was obtained with great time and difficulty. Many school systems may not be able to calculate the necessary work mathematically.

A final question may be asked concerning the applicability of using a norming population of a standardized test for a comparison as suggested by Model A1. Although it is extremely hard to generalize across different tests, some comparisons might be made from the two tests used for this study. The comparison on the G-M Reading Test would make it appear that while the Title I students are exceeding the no-treatment expectation based on initial pretest score, that this may not be entirely due to the Title I project. The results of the ITBS scores suggest that all second- and third-grade students are exceeding the intial NCE rank thus it is questionable that the increased G-M scores are entirely the result of Title I. Only when Model B1 or Model C1 are implemented can the results be known. Perhaps by pre- and posttesting all Title I students in the spring and fall with the G-M a clearer picture will be provided as to the amount of gain that is the direct result of the intervention.

Implementation of the DMPRC Comprehension Materials

What types of intervention programs produce the most significant gains among Title I participants?

Question 3:   Did second-, third-, and fourth-grade Title I
              students, after the fall of 1978, demonstrate
              greater comprehension growth than Title I
              students prior to that date as a result of
              instruction with a specifically designed
              comprehension program?

Related to the first question asked in this study regarding the
effectiveness of Title I programs in producing reading growth beyond
a no-treatment expectation is the question of determining what pro-
grams are the most effective in producing reading growth. The third
research question asked in this study is discussed in this section of
the discussion. It deals with the implementation of a diagnostic and
prescriptive comprehension program developed by the Cedar Falls Title
I staff with a grant from the Title I Office, State Department of
Education, and implemented in 1978. The teachers incorporated a
management system into the DMPRC. While the teachers had established
that students were demonstrating increased knowledge of specific areas
covered in the DMPRC (see Appendix for a listing of the skill areas)
by proficiency on the mastery tests given at the end of each unit, it
was not know whether these individual skills would demonstrate overall
comprehension growth as measured by a reading survey test.

Using guidelines developed at the federal level for Title I pro-
grams, this comprehension program was evaluated. One of the objectives
for the TIERS has been to enable LEAs to use the federal evaluation
data in local decision making; these guidelines were presented in Chap-
ter II. The theory behind the use of the data at the local level is to
enable local school systems to examine their programs in depth and, in
so doing, to improve the quality of Title I programs.

By combining test score data for the two years prior to the date

the DMPRC materials were implemented, a no-treatment expectation was

established. The combined score after the implementation formed the

treatment comparison. While overall the students demonstrated greater

gain scores after implementation of the DMPRC, the main effect was

at the second-grade level. The results of this research study have

established the effectiveness of the DMPRC components for increasing

total reading growth. Second-grade mean test scores were statistically

significant at the .001 level. While most research studies have concen-

trated on third and fourth graders with regard to comprehension develop-

ment, this study was one of the first to analyze the implementation of

comprehension development at the earlier stages of reading. The second-

grade test score gain after the implementation of the DMPRC instructional

materials and procedures supports the philosophy of building upon a

child's language strengths, the top-down model of reading acquisition,

and may indicate the importance of developing these strategies simul-

taneously with decoding principles. Furthermore the results of this

research study may suggest that, unless these skills are developing during

the initial phases of instruction, remedial readers may become over-reliant

on decoding techniques and unable to incorporate other strategies into

their personal reading strategy.

The results of this study lend support to the position that there

is an alternative to teaching reading from the bottom-up model of reading

acquisition which so heavily emphasizes decoding every single word. As

Goodman (1979) has stated, "they (readers) have strengths they can draw

upon, natural comprehension strategies, but they think of them as cheating since they have been developed independent of instruction" (p. 62).

An examination of the influence of using materials that stress comprehension strategies indicates that students can develop these strategies and that the influence of this instruction does exhibit itself in a standardized reading survey test score gain. This finding is consistent with other research which deals with semantic/syntactic clues as facilitators of comprehension.

An important aspect of the DMPRC materials is that they are a systematic approach including all the following elements: diagnostic pretests, instructional materials, procedures, mastery posttests, and a record-keeping system. Evidence of the value of this to individual classroom teachers has been the overwhelming response and interest generated when the materials are presented. There are only limited supplemental materials for use in developing comprehension strategies with disabled readers (Kaluger & Kolson, 1978). Evidence of the lack of comprehensive comprehension materials for disabled readers is a comparison of word analysis materials chapters to comprehension materials chapters in their text, Reading and Learning Disabilities. While 89 pages in the text deal with word analysis skills, covering many methods and listing numerous commercial materials with accompanying philosophical bases, only 23 pages deal with comprehension. Of these 23 pages most are comprised of teacher-made materials, self-selection ideas, or language experience. There is a brief listing of commercial

materials at the end of the chapter with no mention of the sequential

and systematic development or of the philisophical basis underlying

the materials. The DMPRC materials, in addition to demonstrating that

their use can increase reading growth scores, provide the methodology

and materials to do so.

Conclusions

This study examined the measurable program impact of the Title I

reading project as it operates in Cedar Falls, Iowa. The Title I

intervention impact was compared using a norm-referenced test popula-

tion and a control group of non-Title I students. Additionally,

the introduction of the interactive model of reading acquisition as

exemplified by the DMPRC comprehension materials was evaluated. Based

upon the analyses undertaken and the findings of this study the follow-

ing conclusions are warranted:

1) The mean gain scores of the Cedar Falls Title I students in

grades two, three, and four indicate that they are making reading pro-

gress greater than would have been expected without the Title I inter-

vention, based on a comparison with a norm-referenced test population.

Significant differences were found between the pre- and posttesting for

second- and fourth-grade students, and educational significance was estab-

lished for all grades in all years. In general, second-grade students

experienced the greatest amount of growth. It would further appear that ,

while mean gain scores for all students demonstrated growth, there was

a great deal of variation between the different grade levels.

2) The findings of this study provide evidence to suggest that

the implementation of evaluation Models A1 and B1 pose different evaluation

research problems. The results of Model A1 provide evidence to suggest that the Title I students are exceeding the no-treatment expectation by an educationally significant amount. While Model A1 was easier to implement, it may not accurately project the amount of gain produced by the Title I intervention. The applicability of Model B1 to most school settings, as evidenced by results from this study, must be seriously questioned.

3) The data analyzed in this research study indicate that the second-grade Title I students in Cedar Falls, Iowa are benefiting from instruction based on an interactive theory of reading acquisition. While prior research examined (Weaver, 1979; Weinstein & Rabinovitch, 1971) has given evidence to suggest that third- and fourth-grade students may benefit from the instruction in the top-down elements of semantic and syntactic skills, this is one of the first studies to lend support to utilizing these elements as an aid to comprehension in beginning reading, particularly beginning reading for students experiencing difficulty. The results of this research study lend support to the idea that there is an alternative to teaching reading from the bottom-up model which so heavily emphasizes decoding skills. This interactive theory would have beginning readers build upon their natural comprehension strengths and incorporate these into reading strategies to be used in conjunction with decoding strategies.

Recommendations

The information from this research study and the conclusions lead to these recommendations:

1) The Cedar Falls Title I project as it operates should continue to evaluate the components of the project. Based on the evidence presented in this study, several aspects of the program may warrant further analysis, such as the variability in gain scores across grade levels and individual characteristics of Title I participants that might affect intervention impact.

Research should be conducted regarding the variation in grade level mean gain scores. For example, second graders' mean gain scores appeared to be the most educationally significant. A study should be implemented to determine the optimum time for both early intervention and first intervention; an analysis should be made as to the feasibility of extending Title I services to first-grade students. An analysis of the third-grade mean gain scores should be made with the appropriateness of the G-M test for the Title I third graders examined by out-of-level testing results compared to in-level testing. Additionally an examination of the test with the content of the basal reading program and Title I instruction is recommended.

Individual characteristics of the Title I group participants should be investigated. The nature and type of Title I students who remain in the program versus those who no longer need the Title I program should be studied. Teachers should be aware of the possibility that some students may not be eligible for Title I at the third grade but need the support services again at fourth grade. The role of the failure syndrome should be examined to determine how the Title I students perceive themselves at the different grade levels and the subsequent effect on performance.

2) The implementation of both Model A1 and B1 should be attempted to determine the comparability of the two evaluation models in measuring program impact. An attempt should be made to determine the feasibility of establishing a suitable control group for a comparison to Title I students. Both groups should be evaluated with Model A1 and B1 in full compliance with the guidelines.

If the control group and the Title I group are not comparable becuase of initial testing differences, the control group would be useful in establishing the appropriateness of the norming population as a suitable comparison for Cedar Falls Title I students. If the control groups maintain the same NCE rank on the basis of fall to spring testing then it can be assumed that the Title I students would also maintain the same NCE rank without Title I intervention. Therefore, the amount of gain experienced by Title I students could be fully attributed to the Title I intervention project.

3) The results of this study lend evidence to suggest the advantages of instruction with the interactive model of reading acquisition. It is recommended that additional research be undertaken to determine whether optimal advantage is being made of the interactive approach.

Coordination and correlation between the regular classroom basal reading instruction and the supplemental Title I intervention program should be examined. All teachers working with the Title I students should be made aware of the theories underlying reading acquisition and research supportive of the interactive model of reading acquisition. Implications for instruction can be formulated. Unobtrusive classroom

observation of the Title I students should also be conducted to determine whether these strategies are being integrated into the students' total reading approach.

The growth demonstrated by the second grade strongly indicates the importance of developing these comprehension strategies while developing decoding strategies. A study could be conducted wherein these materials are used in conjunction with the basic reading program for a group of first-grade beginning readers identified as having potential problems. The results of this study may indicate that these comprehension strategies must be developed during initial instruction and that waiting until decoding strategies are established may be too late.

In summary, this paper has presented evidence to support previous research that Title I as a federally funded compensatory education program is producing reading growth beyond that that would have been expected without the Title I intervention. Additionally, this paper has presented evidence to support the interactive theory of reading acquisition as exemplified by the addition of the DMPRC comprehension materials to the Cedar Falls Title I program. Further questions have been raised by this study concerning Title I and remedial reading instruction.

REFERENCE NOTES

Reference Notes

1. Leinen, G. Personal communication, May 14, 1980.

2. Leinen, G. Personal communication, May 16, 1980.

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APPENDIX

Appendix

BACKGROUND OF PROJECT DEVELOPMENT

It is not uncommon for remedial reading teachers to work with children exhibiting comprehension deficiencies. Many reasons exist for these deficiencies.

Research findings from an IRA award winning doctoral dissertation by Carita A. Chapman[1] reveal that "children's comprehension abilities do improve when they receive direct instruction in reading comprehension. Learning a simpler comprehension skill transfers to increased performance in a more complex comprehension skill not taught. Acquisition of the simpler task seems prerequisite to proficiency in the more complex, but not the opposite. That is, there is a hierarchical relationship between the learning of the simple and the complex comprehension skills on which instruction is given."

The handbook of material presented here was developed from a real need to select a core of reading comprehension skills around which evaluation and remedial instruction could be centered.

Miles Zintz's[2] hierarchy of reading comprehension skills was selected as a model for development of the reading comprehension materials. Our classification of comprehension skills is as follows:

A CLASSIFICATION OF COMPREHENSION SKILLS

I. Literal Comprehension

    A. Foundation Skills

        1. Expanding vocabulary concepts

[1] Chapman, Carita A. "A Test of a Hierarchical Theory of Reading Comprehension," (unpublished doctoral dissertation, University of Chicago, 1971), page 273.

[2] Zintz, Miles, The Reading Process. Dubuque, IA: Wm. C. Brown Publishers, 1975, page 270.

        a. Using the rest of the sentence to determine word meaning.

        b. Understanding vocabulary

           1. synonyms

           2. antonyms

           3. multiple meanings

        c. Putting words into ideas in categories

        d. Recognize sentence sense

        e. Determining if words and sentences explain who, when, where, what, how

        f. Understanding antecedents of pronoun referents

  B. Getting Meaning from Context

      1. Reading to find answers (reconstructing the story content)

      2. Finding the main idea in a paragraph or in a story

      3. Putting ideas in proper sequence in a story

II. Interpretive Skills

  A. Learning to Anticipate Meanings

      1. Understanding relationships of ideas in paragraphs (close procedure)

      2. Predicting what will happen next

  B. Drawing Inferences and Generalizations to Reach a Conclusion

      1. cause/effect

      2. compare/contrast

      3. implied details

  C. Selecting and Evaluating

      1. Discriminating fact versus non-fact

      2. Interpreting figurative language

3. Selecting material pertinent to a given topic

4. Judging emotional response

Diagnostic and instructional comprehension materials were developed for reading levels preprimer through grade four level. The Fry Readability Formula[3], with the correction list, was used to validate the reading levels. Diagnostic instruments were developed for each step in the classification of comprehension skills. Several examples of instructional material were also included at each step. Some of the instructional materials were teacher-made. Others were patterned after commercial materials suited to the particular skill. A list of additional commercial materials for instruction was included for most of the skill steps.

[3]Kretschmer, Joseph E., "Updating the Fry Readability Formula," Reading Teacher, March 1976, page 555.