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ABSTRACT

A summary of the information acquired during a 1968-69 study by the Southwest Regional Laboratory to determine requirements for the installation of the First-Year Communication Skills Program, an objective-based kindergarten reading program, is presented. The 32-week program was organized into 10 equal units of instruction, whose general instructional procedures were (1) to introduce the sequential activities in each unit, (2) to administer a criterion exercise or test, and (3) to provide practice exercises for those who fail to achieve mastery. Subjects were 2,100 children from 26 schools in five urban districts in three states. The training procedure, materials used, data acquisition, and instrumentation are described in detail. The tryout program is evaluated in terms of the effectiveness of the training and management procedures and the overall program effectiveness in classroom settings. Pupil performance is analyzed on an overall basis and in relation to pupil characteristics. Open-ended questionnaires were developed to receive response from users. The management, training, instructional procedures, and evaluation systems related to the installation of the program were also specified and defined. Tables and figures are included. (AW)

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SWRL

SOUTHWEST REGIONAL LABORATORY FOR EDUCATIONAL RESEARCH & DEVELOPMENT

Installation Requirements for the SWRL First-Year Communication Skills Program: Evaluation Data, 1968-69

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JUNE 1971

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INSTALLATION REQUIREMENTS FOR THE SWRL FIRST-YEAR COMMUNICATION SKILLS PROGRAM: EVALUATION DATA, 1968-69

Paul E. Resta and Ralph A. Hanson

ABSTRACT

During the 1968-69 school year, the Southwest Regional Laboratory carried out a study to determine requirements for the installation of the First-Year Communication Skills Program, an objectives-based kindergarten reading program. The purpose of the study was to identify the elements necessary for a full-scale installation of the Program during the 1969-70 school year. This report presents a summary of the information acquired during the study. Included is a description of the objectives, materials, procedures, sample, and results. The management, training, and evaluation systems related to the installation of the Program are also specified and defined.

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INSTALLATION REQUIREMENTS FOR THE SWRL FIRST-YEAR COMMUNICATION SKILLS PROGRAM: EVALUATION DATA, 1968-69

Paul E. Resta and Ralph A. Hanson

Program installation as a specific task and focus of research in the developmental cycle of instructional programs is a process which has received little attention in the past. The responsibility of the curriculum developer has traditionally ended with the production of the educational materials and instructional guides for the teacher. As a result, many curriculum projects which proved quite successful in controlled developmental contexts have failed to achieve these same high levels of performance when in the natural classroom environment. Aware of the possible pitfalls of such a limited developmental procedure, the Southwest Regional Laboratory for Educational Research and Development (SWRL) undertook the task of extending the research and development effort beyond the production facilities and directly into the schools.

During the 1968-69 school year, SWRL carried out a study to determine requirements for the installation of the First-Year Communication Skills Program (FYCSP)--an objectives-based kindergarten reading program. The study was to (1) describe the levels of program performance and acceptance obtained using the limited installation procedures devised prior to the study and (2) identify the elements necessary for a full-scale installation of the Program during the 1969-70 school year. This report presents a summary of the procedures followed and information acquired during the study. Included is a description of the study objectives, materials, procedures, sample, and results.

First-Year Communication Skills Program. The FYCSP includes a series of research-based instructional materials and procedures for teacher use in developing reading competencies in kindergarten children. It underwent extensive classroom testing before being used in the schools, including a product tryout involving 18 kindergarten classes from 10 school districts in the Pacific Southwest during the 1967-68 academic year.

The Program is organized into 10 relatively equal units of instruction (32 weeks). Upon completion of the Program, children should be able to:

1. read all 100 Program words;
2. read initial and ending word sounds;
3. blend initial and ending sounds to form new words;
4. name all letters of the alphabet.

The general instructional procedures employed by the teacher are (a) to introduce the sequential activities in a given unit, usually covering a 3-week period; (b) to administer a Criterion Exercise (or test) covering each unit; and (c) to provide practice exercises for those who do not achieve mastery (a score of 16 or better on the 20-item Criterion Exercise). This procedure is followed for each of the 10 units. The entire Program is designed to operate within a 30-week instructional period, requiring approximately 30 minutes of daily instruction.

Study Objectives

Prior to conducting the study, an attempt was made to define the major tasks and initial procedures for program installation. Three major areas were identified for the installation of an instructional program, including: management, training, and evaluation. The specific functions and study objectives in each of these areas are defined as follows.

Management

The management procedures of a program include the functions, personnel, and materials required to manage the prescribed pupil instruction in the classroom and to monitor performance across classrooms and schools within a district. Prior to the installation of an instructional program, identification and implementation of initial procedures and personnel resources to be used with the instructional program must be made. Also, provisions for the subsequent modification or deletion of ineffective procedures should be considered.

Training

The instructional program and accompanying management procedures require that school personnel carry out specified tasks. The training procedures provide these personnel with the requisite skills necessary for executing these tasks. To develop these training procedures initial specifications must be obtained on the:

1. personnel skills and tasks necessary to install the instructional product;

2. training requirements for teachers and other school personnel responsible for implementation of the program;

3. installation techniques and materials that will produce reliable training effects in the natural classroom environment without the supervision or assistance of external (e.g., SWRL) personnel.

Evaluation

The evaluation procedures serve two major functions in program installation. The first is to provide information on the effectiveness of the training and management procedures devised for use with the program. These data will be used in a formative evaluation context to aid in the revision and development of procedures for future installation. To fulfill this function, it is necessary to:

1. obtain a clear definition of the objectives specified for each of the training and management procedures;

2. specify the sources of available data relevant to each procedure;

3. develop adequate instrumentation and data gathering procedures to obtain the data;

4. devise a system of storage and analysis for quickly and accurately summarizing the data gathered.

The second function of evaluation is to provide estimates of the overall program effectiveness in the classroom settings where the program may eventually be used. The summative evaluation data provide baseline information on the level of performance to be expected for an installed program.

Study Procedures

The basic study strategy was to prepare an initial set of training, management, and evaluation procedures for the FYCS Program. These procedures, along with the instructional program, would provide a vehicle for gathering tryout data on the problems of program installation.

Training Procedures and Materials

The tryout of the FYCS Program required that some training be provided to personnel who were to install and implement the instructional program. To develop training procedures, minimum personnel skills and tasks necessary to use and manage the instructional program were identified. Based on this analysis, training materials and informal training sessions were planned. Primary reliance for effective use of the FYCS Program was placed on the SWRL Teacher's Manual and brief meetings with selected district personnel.

Teacher's Manual

A Teacher's Manual (1969) containing the rationale, content, organization and procedures of the FYCS Program was developed by the SWRL staff. A copy of this manual is included in the Instructional Program materials.

Supervisor Orientation Session

A one-day orientation session was planned for district personnel assigned responsibility for implementing the program within their respective districts. The SWRL staff presented five supervisors, one from each district, with the rationale, content, organization, procedures and monitoring requirements of the program.

These training procedures allowed the Laboratory to assess the validity of two commonly-held assumptions made in relation to school use of instructional programs. The first assumption was that the only requirement for effective teacher use of an instructional program is a comprehensive Teacher's Manual. Consistent with this assumption, many publishers consider all training requirements fulfilled with the delivery of a Teacher's Manual.

The second assumption was that additional teacher training requirements (e.g., in a complex instructional system) can best be satisfied by providing a few district personnel with a verbal "walk-through" that gives the rationale of the program. It is assumed that these "trained" personnel will, in turn, be able to adequately train the teachers in their districts.

Management Procedures and Materials

Preparations for the tryout included specifying simple procedures by which the districts and schools involved could monitor its use. These began with district personnel conducting training sessions for all teachers. Further, district personnel were asked to contact teachers using the program within their districts on a regular basis throughout the school year. Finally, district personnel were asked to act as a liaison in monitoring the collection of data on the program.

The procedures developed all relate to program management within a district rather than instructional management in the classroom. Procedures for the teacher to follow in managing instruction were available as part of the regular instructional sequence. These procedures had been verified as effective in previous small-scale tryouts and all were specified in the training materials for teachers.

Evaluation Procedures and Sources

Provisions were made to collect information for both formative and summative evaluation purposes. The data for formative evaluation were collected on the management and training procedures, and data for summative evaluation were collected on program performance and acceptance.

The nature of the data collected from persons involved in the tryout is described below. Groups involved include district supervisors, classroom teachers, pupils, their parents, and the school principals.

1. District Supervisors:

   a. amount of orientation and training provided teachers on the FYCSP

   b. use and value of training materials provided

   c. amount of contact and interaction with teachers

   d. dissemination of information about the Program to district personnel and parents

   e. amount of time required to implement the Program

   f. specific problems with the Program which were brought to their attention

   g. suggested additions and revisions to Program training materials or procedures

2. Classroom Teachers:

   a. amount of time spent on each instructional activity and record keeping

   b. use of the instructional methods

   c. demographic characteristics of pupils

   d. Program acceptance and suggested revision to procedures

   e. amount and sources of assistance given regarding the Program

   f. expected levels of pupil performance

   g. reporting of pupil progress on Criterion Exercises

3. Participating Pupils:

   a. performance information on the Criterion Exercises

   b. extent of pupil acceptance of activities

4. Parents of Pupils:

   a. information on parental acceptance of the Program

   b. parental participation in the Program with the child outside the classroom

5. School Principals:

   a. Program evaluation

   b. distribution of materials

   c. information provided parent, other schools, about the Program

Data Acquisition and Instrumentation

A number of data gathering procedures and instruments were developed to obtain Program information from the data sources. A special effort was made to minimize the record-keeping and data-acquisition tasks of the teachers. The following instruments were used to acquire the data:

The Pupil Data Form. A class roster containing the name, sex, age, Entry Skills Test score, language statistics, previous education, hearing, vision, and speech problems of each student in a given class. The form was completed by each teacher and submitted to SWRL.

The Weekly Activity Log. The Log was designed to monitor class progress in the Program by reporting the number of minutes per day spent on Program-related activities, the current unit and activity numbers, and the number of children individually assessed. Each copy of the form was printed in triplicate. Teachers completed the form weekly, retained one copy, and submitted the others to their Program supervisors and SWRL. SWRL was notified of new students entering the Program by the teacher's notation at the bottom of the Weekly Log.

The Class Record Sheet. The record sheet was designed to be used by the teacher for recording pupil scores following a Criterion Exercise. On this form the teacher entered each pupil's name, his scores on each of the four Program outcomes and his total score. Using this form, the teacher was able to easily identify pupils requiring additional practice on specific Program outcomes. This form was also prepared in triplicate with copies to the teacher, the supervisor, and SWRL.

Questionnaires. Questionnaires were developed primarily for Program evaluation and revision as well as to provide additional data on school, classroom, and pupil characteristics. They were sent to teachers, principals, and supervisors after completion of the first unit of the Program and again at the end of the Program.

Teacher Observation Scale. A classroom observational study was conducted to determine the extent to which participating teachers demonstrate desired instructional behavior. Teachers' instructional behavior in the classroom environment was observed, recorded, and analyzed. The results of the study were then used for deriving teacher training objectives and developing classroom monitoring instruments to be used by Program supervisors. Two observation scales were used for recording the instructional interaction between the teacher and the pupils: the Instructional Stimulus-Response Observation Scale and the Response Content and Dispersion Observation Form. The first scale was to provide data for a stimulus-response analysis of the instructional transactions between the teacher and a group of pupils. The Response Content and Dispersion Observation Form was to provide a measure of the patterning and dispersion of pupil responses and the extent to which pupils are presented stimuli appropriate to the Program outcomes.

Activity Preference Form. The Form was developed to determine differences in pupil attitudes toward Program and non-Program instruction. The Form consisted of one practice picture and five stimulus pictures (depicting different Program and non-Program activities) paired in all possible ways to make a total of 10 pairs. Upon presentation of each pair of pictures (accompanied by a verbal description by the examiner) the pupil was required to mark the bubble by the picture "he would like to be in most." The Form was individually administered to a sample of pupils by SWRL staff members.

Parent Questionnaire. This questionnaire was designed to measure the attitudes of participating parents toward the Program and kindergarten reading in general. It was sent to a sample of parents in one district.

Each of these measures was thoroughly reviewed and pilot tested on small groups at SWRL before being used to gather information in the study.

Test Administration. Administration of tests to kindergarten pupils by SWRL personnel required careful coordination with the schools. Back-up plans were developed in the event of nonavailability of a specific sample of class pupils on the prearranged day. Schools and classes were contacted well in advance of the testing day and were informed of the purpose of each testing session.

Data Retrieval, Processing, and Storage

Static Pupil Data. As each teacher returned her list of pupils on the Pupil Data Form, SWRL compiled a Master List, on which each pupil was assigned a permanent class and pupil identification number. The pupil information was then prepared for computer input. Retrieval letters were sent to teachers who did not meet the October 25 deadline.

Weekly Activity Log. As each teacher's Weekly Log was received, it was checked off on a Master Chart. The data were then precoded and prepared for computer input. When logs were not received, retrieval letters were sent to the district supervisors.

Class Record Sheets. As the Class Record Sheets were received, they were recorded on a Master Check-off list. The data were precoded and prepared for computer input. If a student's scores were missing due to absence, a retrieval letter was sent to the teacher.

Program Evaluations. Received Program Evaluations were recorded on a Master Check-off list and tabulated by hand.

A master schedule for the collection of all data was developed detailing the interrelationships between samples, instruments, and dates for the collection of information.

The computer was utilized to handle all the data collected with the exception of the data provided by questionnaires. Manual forms designed to facilitate direct transcription to punched cards were used; however, coding sheets were required for some forms to minimize errors and reduce keypunch time. All forms received were screened; those containing poor handwriting, confusing sentences, etc., were precoded. After the cards were punched and verified, they were loaded onto the computer in the appropriate data base.

Two data bases were developed to monitor pupil and class performance during the tryout. The first stored performance and pupil demographic information while the second stored weekly log information.

The data bases were updated when a new "batch" of approximately 3000 cards was ready to be merged or added to data already entered on the computer. The Weekly Log form required four data cards per form sheet while the Criterion Exercises required five data cards per form sheet.

The steps followed in processing manually collected data were to:

1. precode raw data
2. enter data on code sheets
3. rough-check code sheets

4. keypunch and verify cards
5. generate printout
6. proof printout; correcting keypunch errors
7. merge into the appropriate data base
8. generate printout; proof and correct
9. generate storage tape
10. enter data on computer
11. utilize data base for specific analyses

The Study Sample

Selection Criteria

The sample included approximately 2,100 children from 26 schools in five urban districts in three states.

The criteria for sample selection were: (1) that the Program be used on a district-wide basis, (i.e., at least two or more schools), (2) districts be distributed across the region, and (3) each district provide a coordinator to carry out the orientation and training of teachers, materials acquisition and monitoring of the program.

Schools Included

A sample of schools was selected from each of the five school districts. The selection was made by the district office staff in each case and was based on factors such as:

1. principal and teacher interest in Program
2. number and type of existing experimental programs in the school
3. teacher work load
4. session length

All kindergarten classes in the selected schools participated in the Program. The total number of schools, classes, teachers, and pupils from each district is shown in Table 1.

Table 1

Number of Schools, Teachers, Classes, and Pupils Per School District

District	Schools	Teachers	Classes	Pupils
1	4	10	19	553
2	2	3	6	135
3	8	12	17	509
4	5	18	16	375
5	8	20	20	599
Total	27	63	78	2171

Pupil Characteristics

The characteristics noted for analysis were:

1. age: in years at the time of Program tryout
2. sex: male or female
3. preschool education: experience in any formal instruction or education (e.g., Head Start, nursery school, church program)
4. languages spoken: ability to speak more than one language was described as multilingual
5. sensory and speech impairment: the presence of visual, hearing, or speech impairment
6. prior education: kindergarten repeats
7. entry skills: based on performance of students on the SWRL Entry Skills Test

Classification of children in characteristic 5 was based on either physical examinations by school medical personnel or teacher judgments.

The distribution of the children in the various categories at the beginning of the Program is shown by district in Table 2.

The pupils tended to be quite similar with respect to the age and sex distributions in all participating districts. There was some variability from district to district in the number with previous education, the number who spoke more than one language, and in the incidence of visual, hearing, or speech impairment.

Table 2

Descriptive Data in Percentage for Pupils from Participating Districts

Data	District 1	District 2	District 3	District 4	District 5
Boys	55.9	48.9	49.1	46.1	49.4
Bilingual	4.3	7.4	2.8	4.0	7.7
Having Sensory Problems	2.5	3.0	3.5	1.3	5.3
Having Speech Problems	5.1	7.4	2.8	4.0	6.2
Involved in Previous Education	9.0	23.7	16.9	24.5	30.9
Born Prior to 1963 (the older pupils)	12.0	11.9	11.2	17.1	12.9
Mean Age in Years	5.3	5.4	5.3	5.4	5.3
Mode Age in Years	5.0	5.3	5.2	5.1	5.2
Total Number of Pupils	553	135	509	375	599

A chi-square technique was used to test the hypothesis that the proportion of pupils in each category was the same for all districts. The results of this analysis are summarized in Table 3. The chi-square values for previous educational experience and bilingualism were significant at the one percent level, indicating that the hypothesis of equal proportions could not be accepted. In summary, the samples

Table 3

Chi-Square for the Distribution of Pupils
Having the Characteristics

	Problems		Previous Education							
Statistic	Sensory	Speech	Nursery School	Headstart Program	Church Program	Kindergarten Repeat	All Prev. Education	Sex	Age	Bilin-gualist
2	13.2	9.8	65.9*	23.2*	25.3*	16.8*	92.8*	10.1	7.7	17.4*
df	4	4	4	4	4	3	4	4	4	4

*significant $p < .01$

from the five districts appear to represent the same population with respect to age, sex, and sensory and speech problems, but not with respect to bilingualism or previous educational experiences.

Pupils' Entry Behavior

Participating pupils were further described in terms of specific pertinent skills before beginning the Program. The skills were measured by a 20-item "Entry Skills Test" administered to pupils in the five districts just before the Program was introduced. A score of 18 or more correct was established as the minimum level required for Program participation. Mean scores of pupils in each district and percentage scoring 18 or more are given in Table 4. Over 94 percent of the pupils in all districts obtained scores of 18 or greater on this 20-item test.

Program Performance

Overall Performance Characteristics of the Program

The primary measures used to assess pupil performance were (1) the Criterion Exercises (administered by the teacher to all students at the end of each unit); and (2) the final Program test (given to a sample of students from classes in two of the participating districts). The correlations between the Criterion Exercises and the final test scores were very high (r=.80) despite their restricted variance. Therefore, the results of the Criterion Exercises are emphasized in this section since these data are available for all pupils in the Program.

Table 5 gives the means, standard deviations, and the percentage of pupils scoring 16 or greater on each of the Criterion Exercises. A graphic representation of the percentage of pupils scoring 16 or greater over the 10 units is given in Figure 1. The means for all 10 units are above 16, with the lowest performance levels attained on Units 3 and 4.

Table 5 shows that the number of pupils taking each unit declines progressively from Unit 1 through 10. To determine performance characteristics of pupils who completed the entire Program, a separate table was prepared. The data on this subgroup are given in Table 6.

Students who progress through all 10 units performed at a slightly higher mean level with a greater percentage scoring above 16 than the total group. This is illustrated graphically in Figure 2 where the mean scores for the two groups are plotted.

Across all 10 units, the composite percentage reaching criterion (16 or greater) was 84.1, clearly exceeding the prespecified Program objective.

Table 4

Mean Score on Entry Skills Test
Per District

District	Number of Pupils Taking Test	Mean Score	Percentage of Pupil Scores Greater Than 18
1	301	19.399	93.5
2	131	19.310	96.1
3	443	19.413	93.1
4	328	19.643	96.8
5	501	19.396	92.3
Total	1704	19.432	94.4

Table 5

Criterion Exercise Descriptive Statistics

Statistic	Criterion Exercise									
	1	2	3	4	5	6	7	8	9	10
Mean	17.11	17.72	16.64	16.89	17.06	18.06	17.33	17.46	17.82	18.06
Standard Deviation	3.31	3.03	3.23	3.45	3.22	3.09	3.57	3.35	2.97	2.94
Number of Pupils	2010	2000	1964	1892	1734	1784	1599	1428	1097	746
Percentage $\geq$ 16 (Criterion level)	77.7	84.3	71.2	72.0	73.9	85.3	77.9	79.3	82.0	83.9

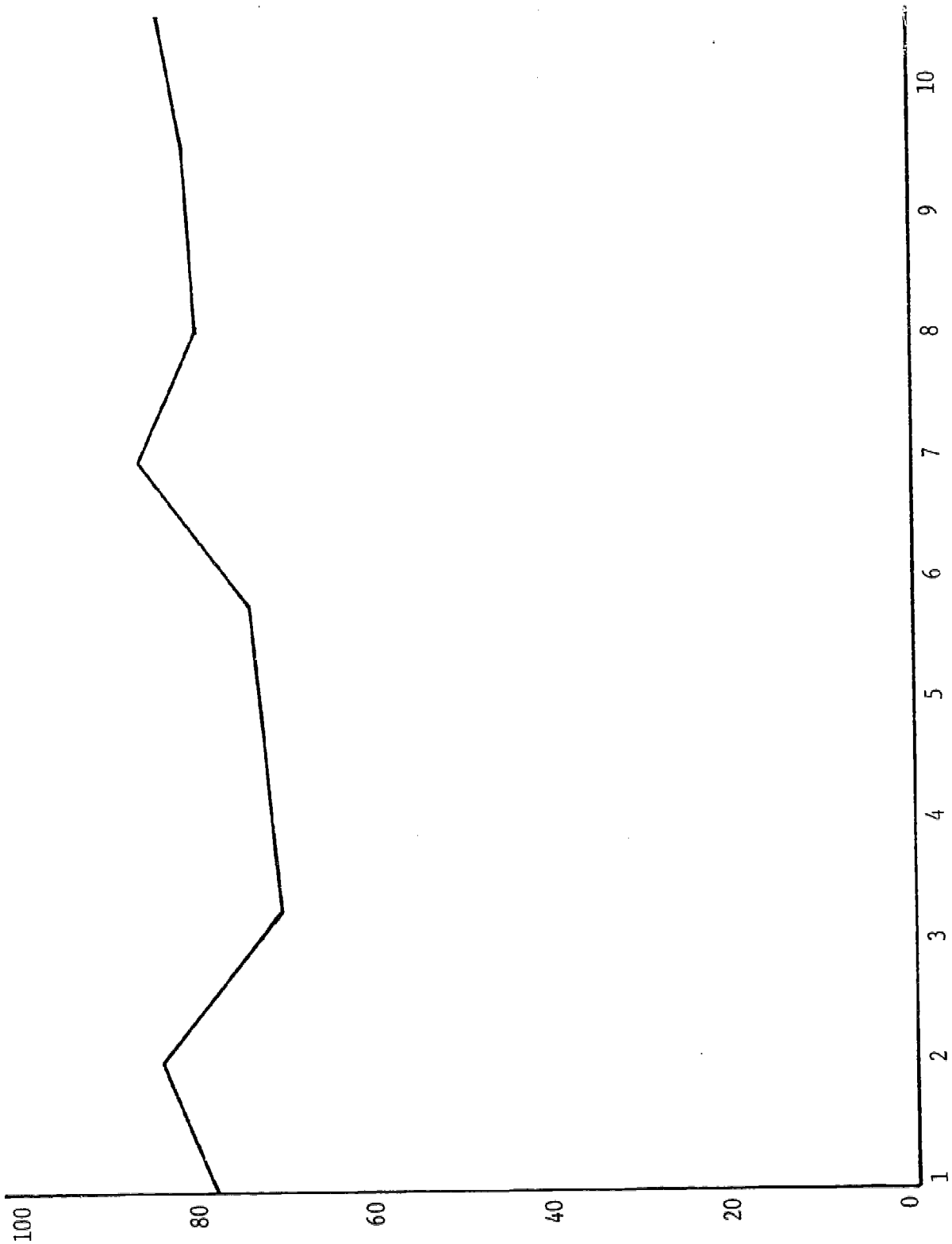


Fig. 1. Percentage of pupils reaching 80% level on Criterion Exercises.

Table 6

Mean, Standard Deviation, and Percentage of Pupils Reaching Criterion (Score of 16 or More) on Each of the 10 Criterion Exercises for the 611 Pupils Who Completed All Units of the Program

Statistic	Criterion Exercise									
	1	2	3	4	5	6	7	8	9	10
M	17.37	18.15	17.23	17.48	17.55	18.62	18.13	18.17	18.39	18.33
SD	2.98	2.47	2.87	3.11	2.94	2.70	2.83	2.81	2.56	2.66
Percentage ≥ 16 (Criterion level)	.805	.889	.784	.777	.797	.902	.858	.866	.872	.864

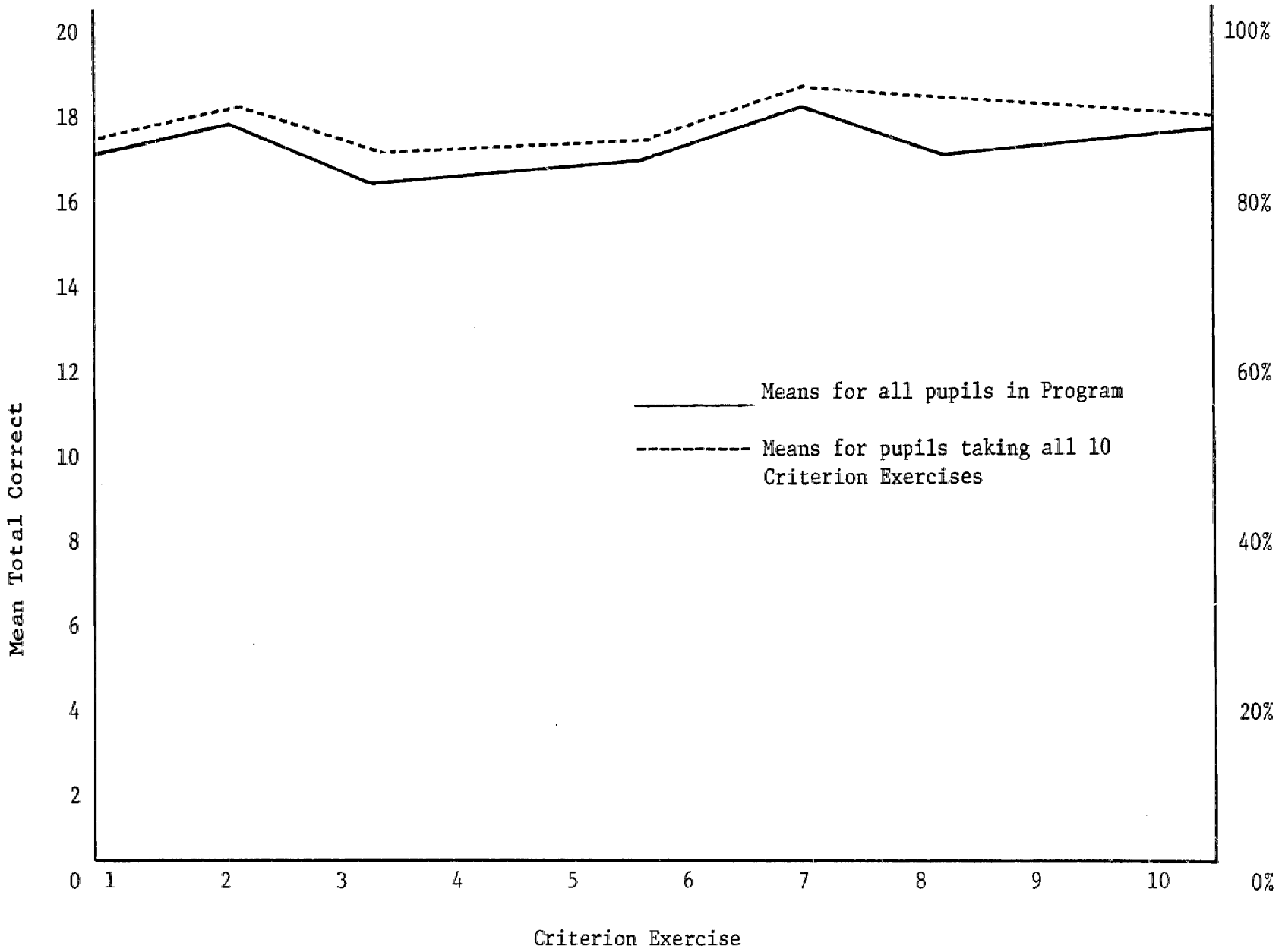


Fig. 2. Criterion Exercise mean scores.

Summary data on pupil performance on each of the Program outcomes are given in Table 7. In addition, the table gives the mean total score for each of the 10 criterion tests. These data indicate that the lower mean performance on Criterion Exercises 3 and 4 is largely attributable to the lower pupil performance on Outcomes 3 (ending sounds) and 4 (blending) for these two units.

Program Performance by District

The summary performance information for each of the five participating districts is given in Table 8. Differences in performance between districts are due, largely, to the mean difference attained on the ending sounds and blending outcomes (3 and 4). This can be seen clearly in Tables 8 through 13, which give the performance data by units for each district.

A partial explanation for this performance differential is suggested by the time data provided. Districts 4 and 5 spent more total time on the first five instructional units and did not proceed into the next unit until high levels of mastery had been obtained. This suggests that spending more time at the outset of the Program may facilitate mastery of skills in later instructional units. For the 1969-70 tryout, assessment procedures have been developed which provide the teacher with feedback on pupil performance each activity. Through use of these procedures, instruction will be paced to provide performance levels which are consistently high across all units and outcomes.

Evaluation of Mid- and End-of-Program Test Results

Mid-program and final tests were designed to measure pupil performance on the Program outcomes covered in units 1-4 and 1-10, respectively. These tests included both constructed and selected response items and were individually administered to pupils by SWRL personnel. The mid-program test was given after completion of unit 4 to a sample of pupils in District 5. The final test was given after unit 10 to pupils in Districts 5 and 2.

These data provided information on two important questions:

1. What is the relationship between pupil performance on the mid-program and final tests and achievement on the Criterion Exercises?

2. What level of performance on the unit Criterion Exercises (selected responses) is required for attainment of the 80% level of mastery on the constructed response items of the mid-program and/or final test?

Table 14 gives the performance of pupils on the mid-program and final tests compared to their average Criterion Exercise Scores.

Table 7

Summary Data on Pupil Performance

Unit Number	Average Correct for Each Outcome				Average Total Correct	Standard Deviations
	Outcome 1 (Words)	Outcome 2 (Initial Sounds)	Outcome 3 (Ending Sounds)	Outcome 4 (Blends)		
1	4.64	4.54	4.49	3.46	17.11	3.31
2	4.65	4.77	4.19	4.11	17.72	3.03
3	4.23	4.72	3.79	3.90	16.64	3.23
4	4.21	4.47	3.99	4.23	16.89	3.45
5	4.57	4.62	3.86	4.02	17.06	3.22
6	4.53	4.70	4.58	4.29	18.06	3.09
7	4.38	4.53	4.33	4.10	17.33	3.57
8	4.50	4.63	4.26	4.06	17.46	3.35
9	4.57	4.67	4.48	4.11	17.83	2.97
10	4.58	4.77	4.56	4.25	18.06	2.94

Table 8

Summary Performance Data for All Districts

District	Mean of Average Correct Overall Units for Each Outcome				Mean of Average Total Correct for all Units	Mean of % Reaching Criterion	Mean of Average Days Spent	Mean of Average Session Length (Minutes)
	Outcome 1	Outcome 2	Outcome 3	Outcome 4				
1	4.3	4.4	4.0	3.8	16.6	70.0	14	26
2	4.3	4.5	4.0	3.8	16.6	70.7	17	30
3	4.5	4.6	4.2	4.0	17.2	77.0	16	24
4	4.7	4.8	4.4	4.3	18.2	86.5	14	27
5	4.5	4.7	4.3	4.0	17.6	81.2	16	27

Table 9

Summary Performance Data for District 1

Unit Number	Average Correct for Each Outcome				Average Total Correct	Standard Deviations	Percentage Reaching 80% Level	Average Days Spent	Average Session Length (Minutes)	N
	Outcome 1 (Words)	Outcome 2 (Initial Sounds)	Outcome 3 (Ending Sounds)	Outcome 4 (Blends)						
1	4.6	4.3	4.3	3.6	16.8	3.7	73.3	27	22	487
2	4.6	4.6	4.1	4.0	17.4	3.6	81.6	19	23	490
3	4.1	4.6	3.7	3.7	16.1	3.6	64.7	17	26	487
4	4.1	4.4	4.0	4.3	16.8	3.4	69.2	14	28	438
5	4.5	4.5	3.8	3.9	16.6	3.5	70.1	21	27	341
6	4.4	4.6	4.4	4.1	17.4	3.4	79.4	9	27	384
7	4.0	4.1	4.0	3.7	15.8	4.3	64.0	8	26	242
8	4.3	4.3	4.0	3.7	16.2	3.9	65.9	11	26	211
9	4.3	4.0	4.0	3.3	15.6	4.1	62.8	15	25	43
10	4.4	4.4	4.1	3.9	16.8	3.3	66.7	3	31	24

Table 10

Summary Performance Data for District 2

Unit Number	Average Correct for Each Outcome				Average Total Correct	Standard Deviations	Percentage Reaching 80% Level	Average Days Spent	Average Session Length (Minutes)	N
	Outcome 1 (Words)	Outcome 2 (Initial Sounds)	Outcome 3 (Ending Sounds)	Outcome 4 (Blends)						
1	4.5	4.3	4.2	3.1	16.2	3.7	68.2	22	30	129
2	4.6	4.7	4.0	4.0	17.3	2.8	77.0	15	31	126
3	4.3	4.7	3.4	3.8	16.3	2.7	65.6	19	25	125
4	4.0	4.4	3.8	3.9	16.1	3.2	62.7	15	29	126
5	4.5	4.6	3.8	4.0	16.9	3.2	73.6	16	34	125
6	4.3	4.6	4.5	4.1	17.5	3.3	81.7	12	33	126
7	4.1	4.2	4.0	3.7	16.0	3.9	63.4	15	28	123
8	4.2	4.3	3.9	3.8	16.3	3.8	68.1	19	27	119
9	4.3	4.5	4.4	4.0	17.2	3.2	76.6	23	31	115
10										

Table 11

Summary Performance Data for District 3

Unit Number	Average Correct for Each Outcome				Average Total Correct	Standard Deviations	Percentage Reaching 80% Level	Average Days Spent	Average Session Length (Minutes)	N
	Outcome 1 (Words)	Outcome 2 (Initial Sounds)	Outcome 3 (Ending Sounds)	Outcome 4 (Blends)						
1	4.6	4.4	4.4	3.1	16.6	3.3	73.2	23	25	451
2	4.6	4.8	4.1	3.9	17.3	3.1	82.0	14	22	451
3	4.1	4.7	3.7	3.7	16.2	3.3	64.1	15	23	454
4	4.0	4.3	3.8	4.1	16.2	3.8	64.7	14	24	451
5	4.5	4.6	3.8	4.0	16.8	3.4	71.6	15	25	461
6	4.6	4.7	4.6	4.3	18.2	3.0	86.0	12	25	465
7	4.5	4.6	4.4	4.1	17.7	3.1	82.1	15	21	463
8	4.5	4.7	4.3	4.1	17.6	3.3	80.4	15	24	453
9	4.6	4.7	4.5	4.1	17.9	3.0	83.0	18	26	452
10	4.5	4.7	4.4	4.2	17.9	3.1	82.6	14	25	407

Table 12

Summary Performance Data for District 4

Unit Number	Average Correct for Each Outcome				Average Total Correct	Standard Deviations	Percentage Reaching 80% Level	Average Days Spent	Average Session Length (Minutes)	N
	Outcome 1 (Words)	Outcome 2 (Initial Sounds)	Outcome 3 (Ending Sounds)	Outcome 4 (Blends)						
1	4.8	4.8	4.8	4.1	18.5	2.3	90.6	36	22	382
2	4.8	4.9	4.5	4.5	18.7	2.0	93.3	22	25	373
3	4.6	4.9	4.2	4.3	18.0	2.5	85.9	20	26	347
4	4.5	4.8	4.2	4.5	18.0	2.7	85.1	14	28	323
5	4.7	4.8	4.1	4.3	18.0	2.5	82.5	13	29	263
6	4.7	4.8	4.7	4.5	18.8	2.2	92.2	8	30	257
7	4.6	4.7	4.6	4.4	18.2	3.1	88.1	6	27	243
8	4.7	4.7	4.4	4.3	18.1	3.0	84.3	6	26	191
9	4.6	4.7	4.5	4.3	18.0	2.9	82.9	6	28	105
10	4.5	4.7	4.3	4.2	17.8	3.2	80.0	9	29	100

Table 13

Summary Performance Data for District 5

Unit Number	Average Correct for Each Outcome				Average Total Correct	Standard Deviations	Percentage Reaching 80% Level	Average Days Spent	Average Session Length (Minutes)	N
	Outcome 1 (Words)	Outcome 2 (Initial Sounds)	Outcome 3 (Ending Sounds)	Outcome 4 (Blends)						
1	4.6	4.6	4.5	3.3	17.0	3.2	78.4	22	24	561
2	4.7	4.8	4.2	4.1	17.7	2.8	84.1	15	24	560
3	4.2	4.7	3.8	4.0	16.8	3.1	75.0	15	24	551
4	4.2	4.5	4.1	4.2	17.0	3.4	74.7	14	25	554
5	4.6	4.7	3.9	4.0	17.2	3.1	74.3	16	26	544
6	4.6	4.7	4.6	4.3	18.2	3.2	86.2	11	27	552
7	4.4	4.6	4.4	4.2	17.6	3.4	79.2	13	27	528
8	4.6	4.8	4.4	4.2	17.9	2.9	85.2	15	29	454
9	4.6	4.8	4.5	4.1	18.0	2.6	84.5	19	30	387
10	4.7	4.9	4.6	4.3	18.6	2.3	90.2	17	30	215

Table 14

Tests Compared to Their Average Criterion Exercise Scores

Test		No. of Students	Percentage of Students Reaching Criterion	Correlation Between the Two Tests
Final	Average C.E. Scores Units 1-10	159	87%	.80
	Final Test Scores	159	36%	
Mid-Program	Average C.E. Scores Units 1-4	160	81%	—
	Mid-Program Test Scores	160	26%	

Table 14 shows a high correlation between test scores (r=.80). The percentage of pupils reaching an 80% criterion level on the constructed response portion of the mid-program and final tests, however, was markedly less than pupils' corresponding performance on the Unit Criterion Exercises. The constructed response items were more difficult than the selected response items.

In order to see what performance level on the Criterion Exercises would be needed to reach an 80% criterion level on the mid-program and final tests, scatterplots of the two score sets were constructed. These scatterplots are given in Figures 3 and 4.

Inspection of the data reveals that:

1. Within each column representing an average Criterion Exercise score, there is much variance, e.g., some pupils averaging 20 on the Criterion Exercises scored less than 70% on the mid-program test.

2. Until an average Criterion Exercise score of 18 was attained, there was almost no chance that a pupil would score above 80% on the constructed response test.

3. More than half of those pupils whose average Criterion Exercise score was 18 or 19, scored less than 80% on the mid-program test.

Based on these results, it was suggested that the Program Criterion level on Criterion Exercises be raised from the 80% (16 correct) to the 90% (18 correct) level of performance. This suggestion has been adopted for the 1969-70 tryout.

Comparison of Morning and Afternoon Classes

An approximately equal number of pupils were in the morning and afternoon groups. The performance of pupils in morning versus afternoon sessions is given in Table 15. A slight difference favoring the children attending the afternoon session can be noted across all units. Once again, the differences seem to diminish as one moves from unit 1 through unit 10. Part of this difference may be due to improved instruction given to the afternoon group due to the teacher's increased familiarity with the materials and procedures after teaching the morning session.

Pupil Characteristics and Performance

Information was obtained on a variety of pupil characteristics. The relationship between their characteristics and performance on the unit Criterion Exercises is presented in this section of the report.

Fig. 3. Correlation and regression analysis of relationship between average criterion exercise scores and scores on constructed response items on mid-program examination.

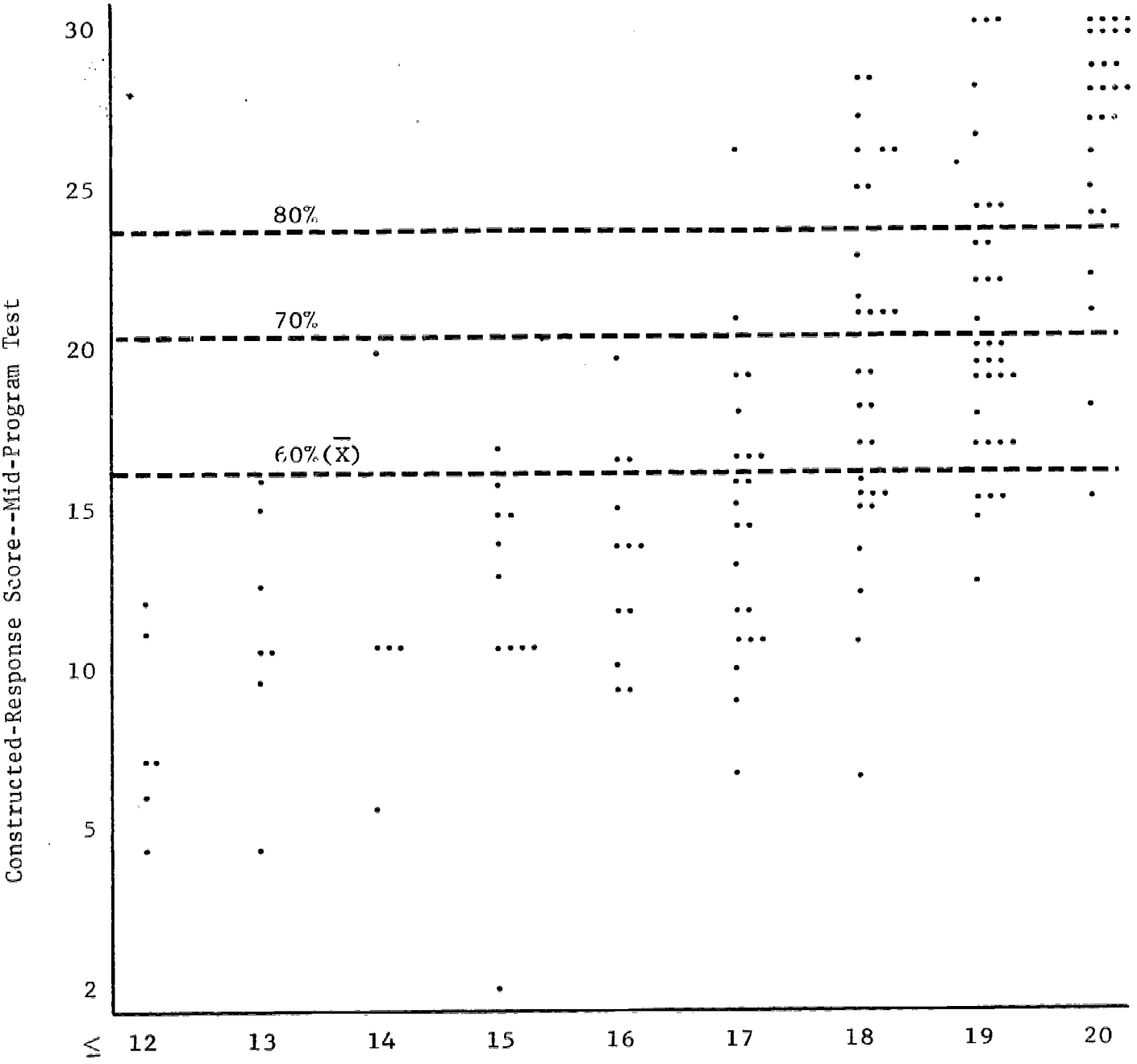
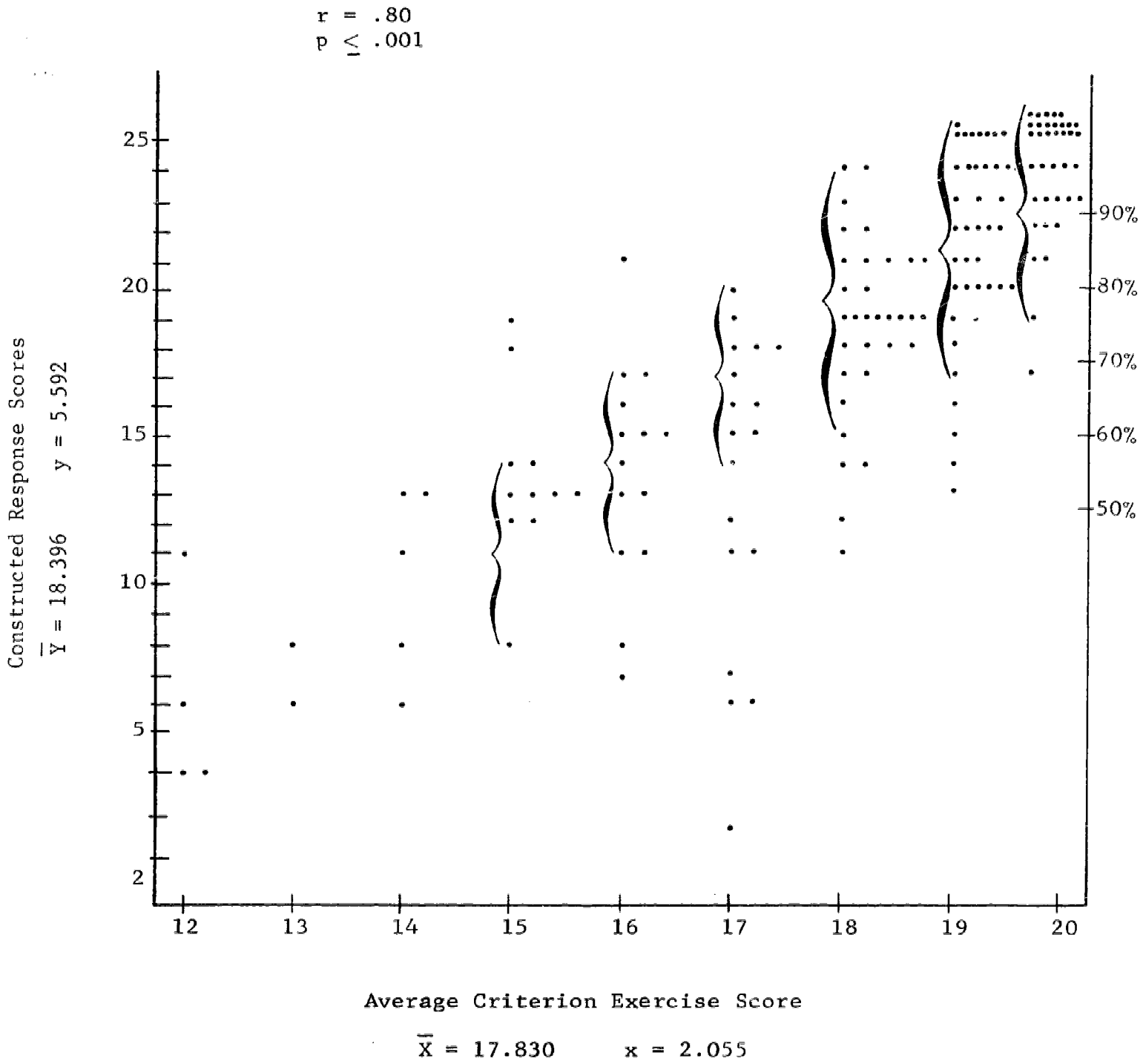


Fig. 4. Correlation and regression analysis of relationship between average criterion exercise scores and scores on constructed response items on final examination.

(for 159 District 5 pupils)



Pupils in Morning and Afternoon Kindergarten Sessions Reaching Criterion
Across All 10 Units of the Program

Morning										
$\bar{X}$	16.91	17.51	16.28	16.56	16.83	17.91	17.09	17.24	17.67	17.98
N	1077	1069	1035	983	912	943	838	751	618	392
% scoring 16 or above	76.2	82.6	68.0	68.8	71.9	83.6	76.4	77.5	80.3	83.6
Afternoon										
$\bar{X}$	17.34	17.95	17.04	17.23	17.31	18.24	17.58	17.70	18.03	18.14
N	993	931	929	909	822	841	761	677	480	354
% scoring 16 or above	79.4	86.4	74.8	75.6	76.3	87.3	79.6	81.2	84.4	84.2

Entry Skills. One criterion established to determine readiness to participate in the SWRL Program was the Entry Skills Test. Pupils scoring 18 or above were considered ready to participate in the Program. Only 6% of the participating pupils scored less than 18. Table 16 gives the mean score and percentage of pupils scoring 16 or better on the unit tests for those pupils above and below the criterion of 16 on the Entry Skills Test. The data indicate that the Entry Skills Test is a valid indicator of pupils who will not reach criterion on the unit Criterion Exercises, especially on the early units in the Program. Note that the difference between the two groups on criterion performance diminishes across the 10 units.

To illustrate, of those pupils who progress through unit 10, 80% who had scored below criterion on the Entry Skills Test reached criterion on unit 10. Only 48% of these same pupils reached criterion on unit 1.

Bilingual-Monolingual. Approximately 5% of the total tryout sample was bilingual. The pupils were classified bilingual if their primary language was other than English. Spanish was the first language for the majority of these children. Their performance is compared with that of the monolingual children in Table 17. The results indicate that monolingual children (English only) performed at a higher level on the criterion tests across all ten units. Further, the relative difference appears to remain approximately the same through all phases of instruction.

Sex Differences in Performance. Table 18 indicates that females exceeded males across all ten units on mean score performance as well as in percentage above criterion.

Age. Table 19 shows the differences in criterion test performance for younger and older children. Younger children were defined as less than 5 years and 3 months of age as of September, 1968. The performance of the younger group lags behind that of the older throughout, although the difference tends to decrease across the units. Indeed, for unit 10, the percentage reaching criterion for the younger group actually exceeds that of the older group and mean score differences are negligible.

Sensory and Speech Impairment. Children with visual, hearing, and speech impairments were identified by teachers and school personnel at the outset of the Program. These children represented a very small percentage of the total tryout population. Interestingly enough, comparison of the performance data indicates that children with visual and hearing deficiencies performed better than children without such deficiencies, with the differential increasing from unit one throughout ten (Table 20). Children with some speech impairment scored slightly below the children without impairment on the early units, but they scored evenly with the unimpaired group on later units.

Table 16

Pupils Scoring Above Criterion (16 or More) on All Units
Who Scored Above and Below 18 on the Entry Skills Test

	ENTRY SKILLS TEST: Pupils Scoring 18 or Better. 1	2	3	4	5	6	7	8	9	10
$\bar{X}$	17.28	17.86	16.78	17.04	17.18	18.14	17.44	17.58	17.95	18.10
% scoring 16 or above	79.5	86.0	73.1	73.8	75.0	86.2	79.2	80.4	83.2	84.1
N	1896	1889	1857	1792	1641	1698	1515	1349	1032	716

	Pupils Scoring Less Than 18. 1	2	3	4	5	6	7	8	9	10
$\bar{X}$	14.35	15.19	14.20	14.98	14.85	16.56	15.24	15.38	15 97	16.97
% scoring 16 or above	48.2	55.9	38.3	41.0	57.0	68.6	54.8	60.8	63.6	80.0
N	114	111	107	100	93	86	84	79	66	30

Table 17

Bilingual and Monolingual Pupils Scoring Above Criterion (16 or More) on All Units

Bilingual Children	Unit									
	1	2	3	4	5	6	7	8	9	10
$\bar{X}$	15.70	16.62	15.74	15.70	15.68	17.23	16.09	16.70	17.00	16.64
N	96	91	88	88	79	78	75	57	50	28
% scoring 16 or above	64.6	69.2	61.4	59.1	62.0	73.1	69.3	75.4	64.0	67.9

Monolingual Children	Unit									
	1	2	3	4	5	6	7	8	9	10
$\bar{X}$	17.18	17.77	16.68	16.94	17.13	18.10	17.39	17.49	17.87	18.11
N	1914	1909	1876	1811	1655	1706	1524	1371	1048	718
% scoring 16 or above	78.4	85.1	71.7	72.4	74.6	85.9	78.3	79.4	82.9	84.5

Table 18

Pupils Scoring Above Criterion (16 or More) on All Units for Males and Females

Males	Unit									
	1	2	3	4	5	6	7	8	9	10
$\bar{X}$	16.92	17.55	16.39	16.59	16.81	17.75	16.92	17.16	17.44	17.70
N	1001	992	971	928	850	874	789	708	545	378
% scoring 16 or above	75.4	82.2	68.8	69.0	71.6	82.3	74.3	76.1	77.2	81.2

Females	Unit									
	1	2	3	4	5	6	7	8	9	10
$\bar{X}$	17.30	17.88	16.89	17.17	17.30	18.37	17.72	17.75	81.21	18.42
N	1009	1008	993	964	884	910	810	720	553	368
% scoring 16 or above	80.0	86.5	73.6	75.0	76.2	88.2	81.5	82.4	86.8	86.7

Table 19

Pupils Scoring Above Criterion (16 or More) on All Units for Younger and Older Children

Younger Group	Unit									
	1	2	3	4	5	6	7	8	9	10
$\bar{X}$	16.61	17.35	16.28	16.56	16.72	17.88	17.04	17.16	17.65	18.00
N	1028	1016	991	957	860	912	818	721	558	387
% scoring 16 or above	72.3	80.4	67.4	69.2	70.3	82.9	76.0	77.0	80.6	85.0

Older Group	Unit									
	1	2	3	4	5	6	7	8	9	10
$\bar{X}$	17.64	18.09	17.01	17.21	17.39	18.26	17.63	17.75	18.01	18.12
N	983	985	974	936	875	873	782	708	540	359
% scoring 16 or above	83.3	88.3	75.1	74.9	77.5	87.7	80.0	81.5	83.5	82.7

Table 20

Pupils with Visual, Hearing, and Speech Impairments
Scoring Above Criterion (16 or More) for All Units

No Physical Impairment	Unit									
	1	2	3	4	5	6	7	8	9	10
$\bar{X}$	17.11	17.72	16.64	16.89	17.06	18.06	17.33	17.46	17.82	18.06
N	2010	2000	1964	1892	1734	1784	1599	1428	1097	746
% scoring 16 or above	78.0	84.0	71.0	72.0	74.0	85.0	78.0	79.0	82.0	83.0

Some Visual Impairment	Unit									
	1	2	3	4	5	6	7	8	9	10
$\bar{X}$	16.93	17.58	16.82	17.10	17.05	18.71	17.74	17.94	18.23	18.41
N	43	45	45	41	38	38	34	31	31	22
% scoring 16 or above	76.7	77.8	75.6	75.6	76.3	94.7	82.4	83.9	90.3	90.9

Table 20 (continued)

Some Hearing Impairment	Unit									
	1	2	3	4	5	6	7	8	9	10
$\bar{X}$	17.67	18.29	17.16	17.53	17.76	19.22	18.28	18.24	18.24	18.67
N	36	33	31	30	25	27	25	25	25	21
% scoring 16 or above	91.7	90.9	77.4	76.7	80.0	96.3	88.0	92.0	84.0	85.7

Some Speech Impairment	Unit									
	1	2	3	4	5	6	7	8	9	10
$\bar{X}$	16.75	17.32	16.37	16.53	15.67	17.60	16.70	17.26	16.25	18.28
N	97	96	89	79	75	77	66	57	51	25
% scoring 16 or above	74.2	77.1	66.3	70.9	60.0	80.5	68.2	75.4	72.5	88.0

Kindergarten Repeaters. A small proportion of the participating pupils (3%) were kindergarten repeaters. The results of their performance on the Program Criterion Exercises is given in Table 21, along with the overall performance of Program participants. Their performance was slightly above that of the other pupils at the outset but fell behind on later units.

Preschool Education. Approximately 19% of the students participating in the tryout entered with some form of preschool education. These children were placed in one of three categories, i.e., nursery, Head Start, or church school. The majority of the children (11% of the total population) with prior education received it in some form of nursery school. Throughout they performed at a higher level than pupils with other forms of previous education or no previous education. Similarly, children who had church school experience exceeded the children with a Head Start education or no previous education. Head Start pupils performed at a lower level across all units than pupils in any of the other categories. These data are presented in Table 22.

Program Acceptance

A critical aspect in the evaluation of any research-based instructional program is that of user acceptance. Regardless of the demonstrated effectiveness of the Program, it may not be accepted by the user population. To obtain information on the degree of user acceptance of the Program, the following questionnaires were developed by SWRL, using scaled and open-ended items:

Teacher Evaluation Form
Teacher Final Questionnaire
Principal Evaluation Form
Principal Final Questionnaire
Supervisor Evaluation Form
Supervisor Final Questionnaire
Parent Questionnaire
Field Visits
Parent-Assisted Learning Questionnaire
Non-Participant Form
Pupil Activity Preference Form

An analysis of the questionnaire attitudinal data revealed a favorable user response to the Program.

Table 21

Kindergarten Repeaters and Entering Kindergarten Pupils Scoring Above Criterion (16 or More) on All Units

Kindergarten Repeaters	Unit									
	1	2	3	4	5	6	7	8	9	10
$\bar{X}$	16.98	17.56	16.16	16.37	16.48	17.24	15.89	16.77	16.70	17.30
N	63	64	63	60	56	58	57	43	40	27
% scoring 16 or above	79.4	85.9	66.7	65.0	66.1	74.1	61.4	67.4	70.0	74.1

Entering Kindergarten Pupils	Unit									
	1	2	3	4	5	6	7	8	9	10
M	17.11	17.72	16.64	16.89	17.06	18.06	17.33	17.46	17.82	18.06
N	2010	2000	1964	1892	1734	1784	1599	1428	1097	746
% scoring 16 or above	77.7	84.3	71.2	72.0	73.9	85.3	77.9	79.3	82.0	83.9

Table 22

Pupils Reaching Criterion (16 or More) According to Previous Education

No Previous Education	Unit									
	1	2	3	4	5	6	7	8	9	10
$\bar{X}$	17.14	16.68	16.59	16.85	17.07	18.04	17.33	17.46	17.86	18.00
N	1588	1584	1566	1520	1390	1442	1265	1156	840	584
% Scoring 16 or above	77.6	83.9	70.2	71.3	74.4	85.4	78.2	79.5	82.4	83.2

Nursery School	Unit									
	1	2	3	4	5	6	7	8	9	10
$\bar{X}$	17.30	18.06	17.19	17.46	17.39	18.61	17.98	18.02	18.22	18.69
N	236	232	224	214	186	183	181	157	150	101
% scoring 16 or above	80.5	87.1	79.5	81.8	75.8	89.1	84.5	84.1	86.0	91.1

Table 22 (continued)

Head Start Program	Unit									
	1	2	3	4	5	6	7	8	9	10
$\bar{X}$	15.53	17.21	15.73	15.34	15.50	16.39	14.91	16.12	16.65	16.06
N	59	56	52	47	46	46	45	41	40	16
% scoring 16 or above	66.1	78.6	61.5	53.2	58.7	71.7	51.1	68.3	67.5	62.5

Church Program	Unit									
	1	2	3	4	5	6	7	8	9	10
$\bar{X}$	17.33	17.84	17.35	17.42	17.27	18.97	18.32	17.23	17.73	18.89
N	90	90	84	72	67	66	63	40	37	19
% scoring 16 or above	81.1	85.6	82.1	79.2	74.6	93.9	87.3	75.0	83.8	94.7

Teachers

The teacher responses and comments were very favorable. Most teachers indicated that the Program should continue without any major changes.

An indirect source of information on teacher acceptance can be found in the change in estimates or expectations of teachers about pupil performance based on responses made before and after using the SWRL Program.

At the beginning of the Program, each of the 56 participating teachers was requested to estimate the percentage of pupils who will be able to achieve each of the five outcomes. At the end of the Program, the teacher was requested to estimate the percentage of children who are able to achieve each of the outcomes.

Table 23 gives the teacher estimates of pupil performance before and after using the FYCSP on all Program outcomes. As the data show, the post-estimates were higher than the pre-estimates in all five outcomes, indicating that teacher perception of what children would be able to master had changed after use of the SWRL materials.

Table 23

Means of Pre- and Post-Estimates for Each Outcome

OUTCOME	PRE-ESTIMATE	POST-ESTIMATE	DIFFERENCE
I	69.4	82.7	13.3
II	78.2	80.3	2.1
III	71.0	74.2	3.2
IV	67.6	70.3	2.7
V	51.9	62.5	10.6

Principals and Supervisors

The responses of the principals and supervisors were generally positive and provided a number of suggestions about changes in training

and monitoring procedures. The principals and supervisors also indicated that the vast majority of the teachers with whom they had contact responded favorably to the Program.

Parent Acceptance

Two surveys were taken of parental attitudes toward the SWRL Program. One questionnaire was directed specifically at parents of participating children in District 5. The second questionnaire was sent only to parents participating in the Parent-Assisted Learning Program. An analysis of the parent responses provided the following information:

- Over 90% indicated that reading should be taught at the kindergarten level.
- Over 80% indicated a willingness to supplement school learning by working at home.
- More than 90% felt that teaching reading in kindergarten did not place undue pressure on their children.
- Virtually all parents praised the Program procedures and materials.

Anecdotal information from the teachers and principals further substantiated parental acceptance.

Pupil Acceptance

The Pupil Activity Preference Form was designed to give an indication of pupil attitudes toward the Program activities as compared with other kindergarten activities. The forms administered consisted of three pictures showing Program activities and two showing non-Program activities. Non-Program activities pictured are those that are typically found in kindergarten class. The test booklets provided all possible combinations (two at a time) of five pictured activities. Two additional pictures were used for practice. Pictures were assigned randomly to the top and bottom of the page and the pages were randomly sequenced.

The Activity Preference Form was presented to 160 kindergarten children in 20 classes in District 5. Four boys and four girls were selected at random from each class for testing. Children were shown all pairs of pictures and asked to select the activity they would most like to do. Forms were hand scored and results were recorded on pupil response sheets. Rank order of preference was determined and results reported in Table 24.

Table 24

Rank Order of Picture Preferences for Girls, Boys, and Total Sample

	Girls		
	Parent-SWRL Storybook	59.06%	
	Sharing	54.69%	
	Teacher-SWRL Storybook	50.00%	N = 80
	Teacher-SWRL Flashcard	47.19%	
	Teacher-Number Flashcard	39.38%	
	Boys		
	Sharing	59.69%	
	Teacher-SWRL Flashcard	52.50%	
Reliability = .68 (R 21)	Teacher-SWRL Storybook	52.19%	N = 80
	Parent-SWRL Storybook	49.38%	
	Teacher-Number Flashcard	35.00%	
	Total Group		
	Sharing	58.75%	
	Parent-SWRL Storybook	54.22%	
	Teacher-SWRL Storybook	51.06%	N = 160
	Teacher-SWRL Flashcard	50.47%	
	Teacher-Number Flashcard	35.47%	

Clearly the children preferred SWRL Program activities over other typical kindergarten instructional activities. Non-instructional activities were only slightly preferred over Program activities. There was no evidence that reading activities were disliked by the participants. These findings are consistent with the comments of teachers and SWRL observers noted in the Field Visit Logs.

Specification of Installation Requirements

Management Requirements

A major objective of the installation study was the identification of the procedural and management requirements for effective use of the First-Year Communication Skills Program. During the tryout, the instructional management system of the Program was analyzed, including the instructional procedures, the instructional sequence, and performance requirements.

Instructional Management

Precise information was required regarding the SWRL-prescribed procedures actually followed by teachers throughout the Program. Primary data sources for obtaining this information were the teacher questionnaires, Weekly Logs, and procedural observation scales. Based on the analysis of data, the following instructional procedure requirements were identified:

Daily assessment. Of particular concern to many teachers were the logistical problems encountered in pacing instruction for both fast and slow learners. Despite a recommendation to do so, few teachers were observed to assess pupil performance on a regular basis. In those instances in which individual pupils were assessed daily, teachers seldom called on a representative group of pupils in the class. In order for daily assessment to be used by all program teachers, a procedure for sampling pupils was required. The method had to be brief, simple, and convenient for the teacher to use. Based on these requirements, special Daily Assessment Pads were designed for use during the 1969-70 tryout using a simple random sampling procedure. The pads required only that a teacher list the names of her pupils once. She then would assess those pupils having a blank space by their name.

Procedural aids. It was observed that some teachers either failed to use the suggested instructional procedures or reported difficulty in learning them in the initial stages of the Program. Based on the results of the instructional task analysis, it was determined that the Teacher's Manual was too bulky to use conveniently as a reference aid during instruction. Cards, on the other hand, were found to be easy to use (e.g., the teacher could set them on her lap or by her side during instruction). In addition, they could be stored with the flashcards and coded for easy filing. Based on these requirements, procedural cards were developed for all basic instructional and clerical tasks for the 1969-70 tryout.

Reinforcement procedures. A number of teachers were observed who seldom reinforced pupils for their performance in the Program. Additional training requirements for reinforcement needed definition and implementation. The use of different reinforcers was studied, such as the highly effective "Good Work Badges." The badges were originally used in the SWRL Tutorial Program, but teachers also indicated their interest in using them as reinforcers for all pupils in the Program. Based on this information, the badges were included as a part of the Program, during the 1969-70 tryout.

Instructional sequence. Analysis of pupil performance data and instructional procedures indicated that many of the pupils who failed to reach criterion on the Unit Criterion Exercise were not given remedial instruction by the teacher. It was also found that in those instances where remedial practice was provided, teachers were interested

in observing the effects of such instruction. Based on this information, the unit instructional sequence was redesigned to build in second instruction and retesting as part of the basic instructional system. The revised instructional sequence consisted of the following steps:

1. Initial Instruction
   a. Determine skill to be taught
   b. Find Procedure Card and materials
   c. Provide group instruction
   d. Conduct daily assessment
   e. Provide additional practice, if needed
   f. Complete steps a-e for all unit skills
2. Initial Criterion Exercise
   a. Administer Criterion Exercise
   b. Score Criterion Exercise
   c. Record scores on Class Record Sheet
   d. Award Good Work Badges to those scoring 18 or above
   e. Determine whether more than half the class scored 18 or above
3. Second-Instruction
   a. Check scores for each Outcome
   b. Administer Practice Exercises to all pupils with scores less than 5
4. Criterion Exercise Retest
   a. Readminister Criterion Exercise to pupils who scored less than 18 on the initial Criterion Exercise
   b. Score Criterion Exercise
   c. Record score on Class Record Sheet
   d. Award Good Work Badges to pupils who scored 18 or above, or who had a point gain of 3 or more

Program Management

Supervisor Procedural Manuals. The major tasks of supervisors included that of coordinating the ordering and shipment of materials, orienting district office personnel, observing classroom performance, and consulting with teachers and SWRL staff regarding any problems. Data acquired through questionnaires and interviews indicated that the supervisors required more detailed procedural information than that provided during the installation study. Based on the analysis of supervisor tasks, specifications were developed for a Procedural Manual, Log, and Monitoring Chart. The following major tasks were used as a basis for organizing the content of the Procedural Manual:

1. District Staff Orientation
2. Teacher Training
3. Ordering and Distributing Program Materials
4. Acquiring Program Performance Data
5. Monitoring Classroom Performance and Pacing

A Program Monitoring Chart was developed to help the supervisor keep track of the Teacher Weekly Log submissions and classroom pacing. A special log was also developed to help the supervisor attend to relevant teacher behavior during classroom observations.

Training Requirements

In order to determine specific teacher training requirements, a behavioral analysis of teacher-administered instruction was performed by SWRL staff (Resta & Niedermeyer, 1969). A sample of teachers using the Program was observed. The data acquired in this study are presented in Table 25 and may be summarized as follows:

Pupil Response

a. Pupil Response Rate. The number of pupil responses made per minute in each class (Item 4) ranged from a low of 2.04 (Teacher O) to a high of 6.92 (Teacher E). The average response rate for the nine observed classes was 4.16, which is only about one response every 15 seconds. The low overt response rates are somewhat surprising when considering the fact that the teachers, cognizant of being observed, were presumably demonstrating their best instructional behaviors.

b. Proportion of Choral vs. Individual Responses. Items 6 and 8 separate the observed responses into choral and individual

Table 25

Scores on Various Teacher-Pupil Interaction Items for Ten Teachers Using the SWRL First-Year Communication Skills Program

Items	Teachers A	B	C	D	E	M	N	O	P	Q*	$\bar{X}$	(Criterion Where Appropriate)
1. Class average on Midyear Test (%) two months before observation	93	90	82	79	77	65	64	62	60	57	73	80
2. Class rank on Midyear Test (out of 17 classes)	1	2	3	4	5	13	14	15	16	17	--	
3. Instructional time (minutes)	16	13	11	8	13	20 ÷	12	25	15		14.78	
4. Total response rate (responses per minute during lesson)	3.25	3.55	2.55	4.72	6.92	4.25	6.08	2.04	4.06		4.16	6.00
5. Proportion of responses dealing with stimuli defined for lesson in Outcomes and Materials Guide	.33	.12	.26	.29	.98	.49	.50	.57	.68		.45	.80
6. Proportion of responses which were choral	.44	.22	.14	.51	.39	.53	1.00	.30	.36		.43	.33 or less
7. Proportion of choral responses after which teacher verbalized the correct response	.13	.20	.00	.44	.14	.16	.11	.27	.00		.16	.90
8. Proportion of responses which were made by individuals	.56	.78	.86	.49	.61	.47	.00	.70	.64		.57	.67 or more
9. Proportion of individual responses which were correct	.79	.97	.79	.84	.91	.60	.10	.83	.79		.82	
10. Proportion of individual responses which were incorrect (wrong answer or no response)	.21	.03	.21	.16	.09	.40	.90	.17	.21		.18	
11. Proportion of incorrect responses for which teacher elicited correct response from same pupil	.67	1.00	.60	.67	.60	.50	.00	.33	.12		.56	.90
12. Proportion of correct individual responses which were confirmed by the teacher	.39	.56	.32	.60	.74	.67	.00	.83	.19		.50	.90
13. Number of times teacher praised individuals or group during the lesson	0	3	2	4	4	0	1	5	2		2.33	
14. Number of successful prompts/total number of prompts	$\frac{0}{2}$	$\frac{0}{3}$	$\frac{1}{2}$	$\frac{0}{3}$	$\frac{1}{5}$	$\frac{3}{10}$	--	$\frac{0}{0}$	$\frac{1}{2}$		$\frac{.75}{4.25}$	
15. Proportion of individual responses by boys/Proportion of total who are boys	$\frac{.43}{.50}$	$\frac{.49}{.55}$	$\frac{.68}{.64}$	$\frac{.69}{.44}$	No Data	$\frac{.55}{.50}$	--	$\frac{.31}{.39}$	$\frac{.41}{.52}$		$\frac{.50}{.51}$	equal proportions
16. Class average on Final Test about one month after observation	90	98	96	78	85	77	56	74	82	60	79	80
17. Class rank on Final Test (out of 17 classes)	3	1	2	10	6	11	17	12	7	16		

* Scheduled observation never took place

÷ Two groups observed - ten minutes each

responses. A criterion of at least two individual responses to every choral response was established, and it can be seen that only three of the nine teachers met this criterion (Teachers B, C, and O). One teacher (Teacher N) did not elicit a single individual response during the instructional session.

c. Proportion of Individual Responses. Table 26 contains the distribution of the number of individual responses by pupils in the nine observed classes. There were no classes in which every child responded individually at least once. The proportion of students in each class not called upon for individual responses ranged from a high of 1.00 to a low of .05. Averaging across classes, it can be seen that 40% of the pupils were never called upon to respond individually during the observed instructional sessions.

d. Proportion of Boy vs. Girl Responses. Item 15 of Table 26 shows that teachers called on boys in proportions that closely matched the proportions of boys in the classes. In the seven classes from which these data were obtained, boys comprised 51% of the pupils and were called on 50% of the time.

Response Consequence

a. Verbal Reinforcement. During the observed lessons, the teachers praised either individual pupils or the class as a whole an average of 2.53 times (Item 13). When divided by the average instructional time (Item 3), this comes out to about one praising statement every six minutes.

b. Teacher Confirmation. After eliciting a choral response, it was desirable that the teacher verbalize the correct response again for those pupils who may have been incorrect and could not distinguish what the rest of the class was saying. The scores on Item 7 show that teachers displayed this behavior only 16% of the time. From the scores on Item 12, it can be seen that only one teacher (Teacher O) confirmed correct pupil responses more than 80% of the time. While Teachers A, B, and C (high-scoring pupils) had particularly low scores on this item, one could argue that their pupils needed less confirmation (see Items 1 and 17) than did the pupils of, for instance, Teacher P (low-scoring pupils).

c. Prompting. Item 14 data indicate that all but two of the teachers attempted to prompt incorrect pupils. Teacher M prompted 20 times. Out of a total of 34 prompts attempted by six teachers, only six elicited the correct response.

Table 26

Distribution of Number of Pupils Making Individual Responses

Individual Response Breakdown		Teacher										Total
		A	B	C	D	E*	M	N	O	P	Q†	
Number of pupils making:	4 or more individual responses	0	2	0	1		0	0	3	1		7
	3 individual responses	1	5	1	1		1	0	1	1		11
	2 individual responses	5	4	3	2		10	0	4	4		32
	1 individual response	9	8	13	11		4	0	10	14		69
	0 individual responses	15	1	11	3		1	28	11	8		78
Total Number of Pupils in Class		30	20	28	18		16	28	29	28		197
Proportion of Class not called on for individual response		.50	.05	.39	.17		.06	1.00	.38	.29		.40

* Data not available

† Scheduled observation never took place

Teacher Training Objectives

Several teacher training objectives were derived as a result of the data in Table 25. The objectives are classified below by type of activity and in relation to the items in Table 25:

- Appropriate Instructional Stimulus-Response Sequence (Item 5). To distinguish between appropriate and inappropriate stimulus materials and response practice for skill development, given examples of lessons for each skill.

- Individual Practice (Items 6 and 8). To identify practice situations conforming to individual practice requirements, given examples.

- Confirmation and Praise (Items 7, 12, and 13). To identify appropriate confirmation and praise statements, given examples.

- Correction (Items 10 and 11). To identify appropriate procedures for dealing with wrong responses and non-responses, given examples.

- Prompting (Item 14). To distinguish between desirable and undesirable prompts, given examples of each type.

- Response Frequency (Item 4). To distinguish between instructional activities which are likely or unlikely to generate a response rate of at least six responses per minute.

Data provided in field visit logs, teacher questionnaires, and interviews, indicated that the following additional teacher training objectives should be established.

Given specific practice materials, the teacher should be able to:

1. specify the appropriate instructional activities and materials to be used for the next day

2. pronounce beginning sounds, ending sounds and blends

3. present the visual and auditory stimuli for words, initial and ending sounds, letter names, and blending

4. identify procedures for presentation of storybooks, use of Animal Cards, Letter-Naming Exercises, and Entry Skills Tests

5. prepare Class Record Sheets and specify children requiring remediation

6. prescribe remedial activities for specified pupils. If tutors are used, the teacher will be able to correctly fill out a Tutor Assignment Sheet

7. fill out the Weekly Log and other data forms

The teacher should also be able to broadly describe specific features of the Program.

Identification of Supervisor Training Requirements

Because of the number and complexity of teacher training objectives, district personnel new to the Program could not be expected to carry heavy instructional burdens in training teachers unless far more lengthy and intensive training was provided for them. Such training would be expensive and would not guarantee high-quality teacher training. A safer strategy appeared to be that of developing "self-contained" training materials that would enable district supervisors to manage the teacher training without having to assume major instructional responsibilities.

In addition to the teacher training responsibility, the supervisors have to be familiar with Program management requirements. The following objectives were derived for the training of supervisors:

1. Using SWRL materials, the supervisor will be able to plan and conduct both teacher training and district orientation programs.

2. Given sample practice materials the supervisor will be able to:

   a. identify all Program materials and describe the process of acquiring and distributing them

   b. outline major Program events in sequence of occurrence

   c. specify methods of collecting, storing, and transmitting Program data forms

   d. order and control distribution of Program materials

   e. effectively monitor data acquisition process and retrieve missing data forms

3. Upon completion of the Program, the supervisor should be able to describe the specific logistical and monitoring tasks for effective installation of the Program.

Evaluation Requirements

The data recording tasks in this study were heaviest for teachers, although efforts were made during the tryout to reduce their clerical tasks. Data specification and form revision requirements were identified based on information provided by participants and changes which were specified for the total data management system. A summary of the proposed changes to the system of data collection, processing, and analysis is given below.

Evaluation Sources

The sources of data used in the study were considered quite adequate. Results indicated, however, that some of the data gathered were not particularly valuable for Program revision and evaluation. Also, based on the suggested revisions to the training and management procedures some additional categories of information were suggested for inclusion in the full-scale installation of the FYCSP. The following changes in the information requirements were suggested:

Teachers. Additional data on pupil characteristics, including ethnic background, previous education and other related demographic information were needed from the teachers, as was more precise information on instructional procedures, particularly the time spent teaching each activity and unit in one school day. Also, based on the results of the instructional techniques, data were needed on the use of daily assessment and second instruction along with estimates of the class time these procedures consumed. Finally, data on pupil performance after second instruction were needed.

Program Supervisor. Data need to be gathered on suggested revisions to monitoring procedures by the supervisor. Specifically, a record of their classroom observation and teacher contacts is required.

Parents. Data are required describing the use of Program materials outside the classroom and the possibility of utilizing such learning in a systematic way. More complete information on Program acceptance by parents is also needed.

Instrument Evaluation

The data indicated that extensive revisions would be required on the forms and measures used to collect and evaluate data in an installation tryout. The additional data requirements outlined in the preceding sections pointed to the necessary revisions. On the basis of these specifications, the following changes in instrumentation requirements were suggested:

Class Record Sheet. The additional categories of retest information, selection for second instruction and pupil statistics should be added to the Class Record Sheet.

Pupil Data Form. The coding for ethnic background, physical handicaps, and so on should be specified with relevant categories identified.

Teacher Observation Form. Minor revisions to the form measuring response dispersion should be made in order to simplify the coding process. Revisions of the content of the Instructional Sequence Observation form and a simplification of rating procedures should be made.

Weekly Log. Major revisions should be made to provide specific time information on initial instruction activities and second instruction.

Supervisor Log. A form should be developed providing information on (1) problems and comments made to supervisions about the Program by teachers and (2) a record of the supervisor's classroom observation of teacher instructional procedures.

Supervisor Monitoring Chart. A form should be developed which would let the supervisor know at all time, the unit and activity on which each class is currently receiving instruction.

Data Management and Processing Requirements

A task directly related to instrumentation is the management of data collected. The study revealed a need for extensive revisions of the data management system in order to:

1. reduce the time expended by teachers in preparing data forms
2. reduce the time expended by SWRL personnel in preparing the data for analysis and storage
3. provide more flexible storage of the data to facilitate retrieval for analytic purposes

In order to reduce the time requirements for both teachers and SWRL personnel in recording and preparing data for storage and analysis, the following revisions were made.

Revisions to Data Management Systems

The Class Record Sheet and Weekly Log data management systems forms were revised to optical scanner format so that both teachers and SWRL staff need perform only a minimum of clerical tasks.

The transcription procedures, described earlier, were eliminated by adopting scanner forms. Precoding, coding, and keypunching operations of these forms are no longer necessary. Using the revised systems, the forms were read directly by the scanner equipment and the information was recorded on magnetic tape. Retrieval requests, as well as Class Record Sheets for the next unit Criterion Exercises, were generated by the computer. A further advantage of the system was that class rosters and the district, school, class, and teacher identification were all computer printed. The clerical time for completing forms was reduced and teachers are now only required to make a black mark in the most appropriate category. Also, errors in the transcription of data from manual forms to keypunched cards were eliminated.

User evaluation forms and questionnaires, while not revised to scanner format, are now compatible with computer processing procedures. These forms have also been revised to gather data on current Program revisions and additions.

At the same time, extensive revisions were made to the data retrieval and analysis system. As indicated, much of the analysis and storage of information was provided manually for the data management and processing requirements study. Further, the data were eventually stored on a time sharing system in three data bases. While the time sharing aspect of the system was valuable in providing immediate access to stored information, the particular system used had rather limited analytic capabilities. It was not possible, for example, to use information from more than one data base at a time. Moreover, the capacity to look at information within one data base was limited and precluded certain types of analysis.

As a result, a revised data storage and analysis system was developed for the 1969-70 tryout. This system retains the advantage of a time sharing system but also provides for batch compiling of the information from several tape files. Such a system greatly increases the possibilities for analysis.

Recommendations for Additional Installation Research

The results of the installation requirements study provided information for planning and developing procedures for the subsequent First-Year Communication Skills Program tryout. But important questions needing further study were also raised related to the areas of training, management, and data acquisition.

Training

Further development is required to handle remote training of teachers. The following strategy was suggested for development of teacher training programs for the 1969-70 installation tryout:

1. analyze FYCSP instructional and management tasks
2. specify teacher and supervisor training objectives
3. establish task performance criteria
4. develop performance measures
5. select media and develop teacher training program components
6. try out program components (in-house)
7. revise program components
8. try out program in field (as part of Fall 1969 Program Tryout)

New training concepts should also be investigated and empirical determination should be made of such factors as: (1) the amount of training required for mastery of specific procedures; (2) the different options for introducing training within districts; and (3) the degree to which the training equipment can be operated manually without loss of effectiveness.

Management

The effectiveness of different instructional and Program management strategies also needs investigating. Procedures for district monitoring of the Program and class performance must be identified and tested if the Program is to be used successfully without even indirect monitoring by SWRL. One method of identifying these procedures is to work with a small group of supervisors in reviewing class pacing and performance and developing strategies for assisting teachers with low performing classes.

Although all prototype SWRL programs have a built-in management system, other types of external management systems that may be used to increase effectiveness deserve consideration.

Another important instructional management problem is that of providing pupils with appropriate levels of practice related to the specific Program objectives and sub-objectives. The present instructional system has a single set of fixed-length practice materials keyed to outcomes. Analysis of Criterion Exercise data showed that the fixed

remedial treatment enabled most pupils scoring near criterion (14-17) to reach criterion after completing the practice exercises. Few pupils scoring far below criterion (0-11), however, were able to reach criterion after the remedial sequence. Thus, research is needed related both to the type and amount of practice required to facilitate acquisition of Program skills by pupils at the different performance levels. This area of investigation should be given high priority during subsequent try-outs.

Data Acquisition

Of particular importance in data acquisition is the need for defining and gathering longitudinal data on the Program participants. Such information is of special import in establishing an empirical basis for the Program criterion level. By looking at the performance levels of SWRL pupils on subsequent measures of reading and language arts and relating these to their earlier performance on the SWRL FYCSP, the necessary criterion level of SWRL performance needed to reach acceptable levels of later performance can be established empirically. It is also conceivable that longitudinal data on other Program objectives such as pupil acceptance of reading could be gathered and used to determine the long-term effect on such behavior.

Another important topic in this area is item and pupil sampling. With the increasing size of both the tryout populations and the amount of information required, such sampling schemes will be necessary means of keeping the quantity of information gathered at reasonable levels while providing data on all Program objectives. Student sampling was used on a limited basis during the current requirements study primarily to estimate class performance on the midterm final tests. Additional research on the utility of various sampling procedures should provide the information needed to apply sampling methods to other aspects of data gathering.

A third area of data acquisition requiring investigation deals with the effectiveness of the teacher and supervisor training. For the requirements study the only information obtained on training effectiveness was through teacher and supervisor questionnaires and classroom observations of teachers. While this information provides gross indicators of the requirements, more precise data will be needed in the future on specific training objectives. One means by which such data might be gathered is through a series of in-house training sessions followed by specific evaluation procedures. Such studies should provide more precise information on each of the training objectives as well as on general strategies to follow in teacher training.