The inclusion in the audio-visual programs, progress checks, and laminated panels of actual or closely related test items and the utilization of these materials in a concentrated manner just prior to an exit testing period are a gross violation of the rationale underlying the normative concept of grade level achievement.

To see if there were some method of analyzing the effects of teaching test items or closely related test items on the test results, consultant help was requested from the Educational Testing Service, Princeton, New Jersey. Dr. Henry Dyer and Mr. William Angoff came to Texarkana, to review the situation. They suggested the following statistical procedures:*

a. The first step in the procedure is to make some judgments about the "sameness" of items that appeared in both the instructional materials and in the exit tests. These we shall call the "exposed" items.

b. The second step is to verify the foregoing judgments by making a statistical analysis to determine how the items identified as "exposed" behave in comparison with items not so identified. If it is found that the exposed items had become easier, then the exit answer sheet for those students will be rescored using only non-exposed items to determine an increment attributable to growth equivalent to the increment that would have been obtained from the full-length test had no items become exposed.

* See Education Testing Service memorandum in Appendix

c. The third step is to establish the magnitude of the real gains earned by students on the non-exposed items. The consultants agreed to provide any assistance needed in analyzing the test results.

The first step in determing the effects for teaching test items or closely related test items was to see how many test items or closely related test items were being taught. Dr. Dyer suggested some rules for judging whether items included in the instructional program and items from the test are to be considered the same. These rules were adopted and used in analyzing the instructional materials. The rules are given below.

Rules for Judging Whether Two Items Are To Be Considered the Same

Two items are to be considered the same if:

1. Their wording is identical in all respects.

   Example: A. Which of these is a way to find the circumference in inches of a circle with a 6-inch diameter?

   (1) 3 X 3.14 (3) 3 X 3 X 3.14
   (2) 6 X 3.14 (4) ? X 6 X 3.14

   B. Which of these is a way to find the circumference in inches of a circle with a 6-inch diameter?

   (1) 3 X 3.14 (2) 6 X 3.14 (3) 3 X 3 X 3.14
   (4) ? X 6 X 3.14

   (Note change in arrangement of options.)

2. The wording of the stem and the wording of the correct response are identical; the other responses have been changed.

A. Same as above.

B. Which of these is a way to find the circumference of a circle with a 6-inch diameter?

(1) 3.14 X 3 (3) 3 X 2.17
(2) 6 X 3.14 (4) 2 X 6 X 2.1416

3. The correct response is identical and the main sense of the stem has been retained despite a minor change in wording.

A. Same as above.

B. The number of inches in the circumference of a circle with a diameter of 6 inches is:

(1) 6 X 3.14 (3) 3 X 3 X 3.14
(2) 3 X 3.14 (4) 6 X 6 X 3.14

4. The main sense of the whole item has been retained despite the fact t it has been re-stated in the negative.

A. Same as above.

B. The number of inches in the circumference of a circle with a diameter of 6 inches is not:

(1) 6 X 3.1416 (3) 3 X 3 X 3.14
(2) 6 X $\frac{22}{7}$ (4) 2 X 3 X $\frac{22}{7}$

5. The main sense of the stem has been retained despite a minor change in wording; the correct response is identical, but any incorrect option has been changed or omitted.

A. Same as above.

B. The number of inches in the circumference of a circle having a 6-inch diameter can be found by which one of these?

(1) 3 X $\frac{22}{7}$ (2) 6 X 3.14 (3) 3 X 3 X 3.14

6. The item has been changed from a multiple-choice to a true-false format by retaining the stem of the multiple-choice item and incorporating in the stem one of the options (correct or incorrect).

A. Same as above.

B. The number of inches in the circumference of a circle with a 6-inch diameter is 3 X 3 X 3.14:

___TRUE ___ FALSE

The consultants from Educational Testing Service also provided a formula for calculating the percentage of unexposed items that were needed to have a minimum reliability coefficient of .80 for that group of items.* From this percentage figure, the evaluators calculated the minimum number of unexposed items that must be available to be able to develop a possible procedure to use such items as a means of determining achievement gains for the students. The minimum number of unexposed items was calculated for each form and for each grade level of all tests used in the dropout prevention program. The formula is as follows:

FORMULA

$$C = \frac{r_s\,(1 - r_t)}{r_t\,(1 - r_s)}$$

C = Percentage of unexposed items

r_s = Reliability coefficient of shortened version of test or sub-test (minimum acceptable is .80).

r_t = Reliability coefficient of full length test or sub-test.

Tables 2 and 3 provide information showing the results of the analysis made of the instructional materials to determine the extent test items had been exposed to students in the teaching process.

* This formula was derived from the Spearman-Brown Formula.

Table 2. THE EXTENT THAT THE ITEMS ON THE IOWA TESTS OF BASIC SKILLS HAD BEEN EXPOSED TO TEACHING AS INDICATED BY AN ANALYSIS OF THE INSTRUCTIONAL MATERIALS

Iowa Tests of Basic Skills Sub-tests:	Grade Level	Number of Items in Test	Reliability Coefficient	Percent of Unexposed Items Needed	Number of Exposed Items Found in Audiovisual Programs Only	Number of Exposed Items Found in Laminated Panels Only	Number of Exposed Items Found in Progress Checks Only	TOTAL EXPOSED ITEMS	Number of Unexposed Items Needed	Actual Number of Unexposed Items Available	Can Use To Plot Scores On Items
Vocabulary											
Form 1	7	48	.91	40	48	-	-	48	19	0	No
Form 2	7	48	.91	40	48	-	-	48	19	0	No
Form 3	7	48	.91	40	48	-	-	48	19	0	No
Form 4	7	48	.91	40	48	-	-	48	19	0	No
Reading Comprehension											
Form 1	7	78	.93	30	0	0	0	0	23	78	Yes
Form 2	7	78	.93	30	33	0	0	33	23	45	Yes
Form 3	7	78	.93	30	35	0	0	35	23	43	Yes
Form 4	7	78	.93	30	50	0	0	50	23	28	Yes
Arithmetic Concepts											
Form 1	7	48	.88	55	17	0	0	17	26	31	Yes
Form 2	7	48	.88	55	22	0	0	22	26	26	Yes
Form 3	7	48	.88	55	23	0	0	23	26	25	No
Form 4	7	48	.88	55	22	0	0	22	26	26	Yes
Arithmetic Problem Solving											
Form 1	7	32	.79	100	19	0	0	19	32	13	No
Form 2	7	32	.79	100	17	0	0	17	32	15	No
Form 3	7	32	.79	100	19	0	0	19	32	13	No
Form 4	7	32	.79	100	32	0	0	32	32	0	No

Table 2 Continued

Iowa Tests of Basic Skills Sub-tests:	Grade Level	Number of Items In Test	Reliability Coefficient	Percent of Unexposed Items Needed	Number of Exposed Items Found In Audiovisual Programs Only	Number of Exposed Items Found In Laminated Panels Only	Number of Exposed Items Found in Progress Checks Only	Total Exposed Items	Number of Unexposed Items Needed	Actual Number Of Unexposed Items Available	Can Use To Plot Scores On Items
Vocabulary											
Form 1	8-9	48	.90	44	48	- -	- -	48	21	0	No
Form 2	8-9	48	.90	44	48	- -	- -	48	21	0	No
Form 3	8-9	48	.90	44	48	- -	- -	48	21	0	No
Form 4	8-9	48	.90	44	48	- -	- -	48	21	0	No
Reading Comprehension											
Form 1	8-9	80	.93	30	0	- -	- -	0	24	80	Yes
Form 2	8-9	80	.93	30	33	- -	- -	33	24	47	Yes
Form 3	8-9	80	.93	30	35	- -	- -	35	24	45	Yes
Form 4	8-9	80	.93	30	38	- -	- -	38	24	42	Yes
Arithmetic Concepts											
Form 1	8-9	48	.88	55	16	- -	- -	16	26	32	Yes
Form 2	8-9	48	.88	55	22	- -	- -	22	26	26	Yes
Form 3	8-9	48	.88	55	22	- -	- -	22	26	26	Yes
Form 4	8-9	48	.88	55	23	- -	- -	23	26	25	No
Arithmetic Problem Solving											
Form 1	8-9	34	.79	100	21	- -	- -	21	34	13	No
Form 2	8-9	34	.79	100	24	- -	- -	24	34	10	No
Form 3	8-9	34	.79	100	25	- -	- -	25	34	9	No
Form 4	8-9	34	.79	100	34	- -	- -	34	34	0	No

Table 3. THE EXTENT THAT THE ITEMS ON THE SCIENCE RESEARCH ASSOCIATES ACHIEVEMENT TESTS HAD BEEN EXPOSED TO TEACHING AS INDICATED BY AN ANALYSIS OF THE INSTRUCTIONAL MATERIALS

Science Research Associates, Inc. Achievement Series Sub-tests:	Grade Level	Number of Items in Test	Reliability Coefficient	Percent of Unexposed Items Needed	Number of Exposed Items Found in Audiovisual Programs Only	Number of Exposed Items Found in Laminated Panels Only	Number of Exposed Items Found in Progress Checks Only	Total Exposed Items	Number of Unexposed Items Needed	Actual Number of Unexposed Items Available	Can Use To Plot Scores On Items
Vocabulary											
Form C	7	46	.91	40	38	-	-	38	18	8	No
Form D	7	46	.92	35	30	-	-	30	16	16	Yes
Reading Comprehension											
Form C	7	46	.89	49	30	-	-	30	23	16	No
Form D	7	46	.89	49	30	-	-	30	23	16	No
Arithmetic Reasoning											
Form C	7	43	.87	60	32	-	-	32	26	11	No
Form D	7	43	.85	71	28	-	-	28	30	15	No
Arithmetic Concepts											
Form C	7	47	.90	44	-	9	-	9	21	38	Yes
Form D	7	47	.88	54	-	11	-	11	25	36	Yes
Arithmetic Computation											
Form C	7	47	.93	30	-	18	-	18	14	29	Yes
Form D	7	47	.92	35	-	18	-	18	16	29	Yes

Table 3 Continued

Science Research Associates, Inc. Achievement Series Sub-tests:	Grade Level	Number of Items in Test	Reliability Coefficient	Percent of Unexposed Items Needed	Number of Exposed Items Found in Audiovisual Programs Only	Number of Exposed Items Found in Laminated Panels Only	Number of Exposed Items Found in Progress Checks Only	Total Exposed Items	Number of Unexposed Items Needed	Actual Number of Unexposed Items Available	Can Use To Plot Scores On Items
Vocabulary											
Form C	8-9	46	.89	49	46	-	-	46	23	0	No
Form D	8-9	46	.90	44	46	-	-	46	20	0	No
Reading Comprehension											
Form C	8-9	46	.87	60	20	-	-	20	28	26	No
Form D	8-9	46	.87	60	20	-	-	20	28	26	No
Arithmetic Reasoning											
Form C	8-9	43	.86	65	19	-	-	19	28	24	No
Form D	8-9	43	.78	112	25	-	-	25	43	18	No
Arithmetic Concepts											
Form C	8-9	47	.88	54	-	13	-	13	25	34	Yes
Form D	8-9	47	.86	65	-	16	-	16	31	31	Yes
Arithmetic Computation											
Form C	8-9	47	.92	35	-	28	-	28	16	19	Yes
Form D	8-9	47	.90	44	-	28	-	28	21	19	No

The information from the preceding tables shows that approximately three-fifths of the sub-tests contain items that had been exposed to teaching to the extent they were not usable to measure achievement gain.

On the Iowa Tests of Basic Skills there are four sub-tests on each of the forms for each grade level. Of the possible 32 sub-tests for all four forms of the Iowa Tests of Basic Skills, 18 or 56.25 percent of the sub-tests had test items or closely related test items exposed in the teaching process to the extent they are not usable to plot scores on the unexposed items. Tables 4 and 5 provide an information summary concerning the percentage of test items on the Iowa Tests of Basic Skills that had been exposed in the teaching process.

Table 4. PERCENTAGE OF TEST ITEMS IN IOWA TESTS OF BASIC SKILLS, GRADE 7, THAT HAD BEEN EXPOSED IN THE TEACHING PROCESS

VOCABULARY				READING COMPREHENSION			
Form	No. Items on Test	No. Test Items Exposed	%	Form	No. Items on Test	No. Test Items Exposed	%
1	48	48	100.00	1 (Pre-Test)	78	0	00.00
2	48	48	100.00	2	78	33	42.31
3	48	48	100.00	3	78	35	44.87
4	48	48	100.00	4	78	50	64.10
TOTAL:	192	192	100.00	TOTAL:	312	118	37.82

ARITHMETIC CONCEPTS				ARITHMETIC PROBLEM SOLVING			
Form	No. Items on Test	No. Test Items Exposed	%	Form	No. Items on Test	No. Test Items Exposed	%
1	48	17	35.41	1	32	19	59.37
2	48	22	45.83	2	32	17	53.12
3	48	23	47.91	3	32	19	59.37
4	48	22	45.83	4	32	32	100.00
TOTAL:	192	84	43.75	TOTAL:	128	87	67.97

Table 5. PERCENTAGE OF TEST ITEMS in IOWA TESTS OF BASIC SKILLS, GRADES 8-9 THAT HAD BEEN EXPOSED IN THE TEACHING PROCESS

VOCABULARY				READING COMPREHENSION			
Form	No. Items on Test	No. Test Items Exposed	%	Form	No. Items on Test	No. Test Items Exposed	%
1	48	48	100.00	1 (Pre-Test)	80	0	00.00
2	48	48	100.00	2	80	33	41.25
3	48	48	100.00	3	80	35	43.75
4	48	48	100.00	4	80	38	47.50
TOTAL	192	192	100.00		320	106	33.12

ARITHMETIC CONCEPTS				ARITHMETIC PROBLEM SOLVING			
Form	No. Items on Test	No. Test Items Exposed	%	Form	No. Items on Test	No. Test Items Exposed	%
1	48	16	33.33	1	34	21	61.76
2	48	22	45.83	2	34	24	70.58
3	48	22	45.83	3	34	25	73.52
4	48	23	47.92	4	34	34	100.00
TOTAL	192	83	43.23		136	104	76.47

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On the Science Research Associates Achievement Tests, there are five sub-tests on each of the forms for each grade level. Of the possible 20 sub-tests for the two forms of the Science Research Associates Achievement Tests, 12, or 60 percent of the sub-tests had test items or closely related test items exposed in the teaching process to the extent they are not usable to plot scores on the unexposed items. Tables 6 and 7 provide an information summary concerning the percentage of test items on the Science Research Associates Achievement Tests that had been exposed in the teaching process.

Table 6. PERCENTAGE OF TEST ITEMS in SCIENCE RESEARCH ASSOCIATES ACHIEVEMENT TESTS, GRADE 7, THAT HAD BEEN EXPOSED IN THE TEACHING PROCESS

VOCABULARY				READING COMPREHENSION			
Form	No. Items on Test	No. Test Items Exposed	%	Form	No. Items on Test	No. Test Items Exposed	%
C	46	38	82.60	C	46	30	65.22
D	46	30	65.22	D	46	30	65.22
TOTAL	92	68	73.91	TOTAL:	92	60	65.22
ARITHMETIC REASONING				**ARITHMETIC CONCEPTS**			
Form	No. Items on Test	No. Test Items Exposed	%	Form	No. Items on Test	No. Test Items Exposed	%
C	43	32	74.42	C	47	9	19.15
D	43	28	65.12	D	47	11	23.40
TOTAL:	86	60	69.77	TOTAL:	94	20	21.28
ARITHMETIC COMPUTATIONS							
Form	No. Items on Test	No. Test Items Exposed	%				
C	47	18	38.30				
D	47	18	38.30				
TOTAL:	94	36	38.30				

Table 7. PERCENTAGE OF TEST ITEMS in SCIENCE RESEARCH ASSOCIATES ACHIEVEMENT TESTS, GRADES 8 AND 9, THAT HAD BEEN EXPOSED IN THE TEACHING PROCESS

VOCABULARY				READING COMPREHENSION			
Form	No. Items on Test	No. Test Items Exposed	%	Form	No. Items on Test	No. Test Items Exposed	%
C	46	46	100.00	C	46	20	43.47
D	46	46	100.00	D	46	20	43.47
TOTAL:	92	92	100.00	TOTAL:	92	40	43.47

ARITHMETIC REASONING				ARITHMETIC CONCEPTS			
Form	No. Items on Test	No. Test Items Exposed	%	Form	No. Items on Test	No. Test Items Exposed	%
C	43	19	44.18	C	47	13	27.65
D	43	25	58.13	D	47	16	34.04
TOTAL:	86	44	51.16	TOTAL:	94	29	30.85

ARITHMETIC COMPUTATIONS			
Form	No. Items on Test	No. Test Items Exposed	%
C	47	28	59.57
D	47	28	59.57
TOTAL:	94	56	59.57

4. Summary Statement

The achievement gain made by students as related to the number of hours in the instructional program was to be the basis of payment to the contractor. Achievement gain in reading was intended to be the average of the grade level increases earned by students on the vocabulary and reading comprehension tests. The achievement gain in arithmetic was intended to be calculated by using the total of all the arithmetic sub-tests.

Information presented in Tables 4, 5, 6, and 7 indicates that (a) relatively few sub-tests contained a sufficient number of unexposed items to provide a measuring instrument with a reliability coefficient of .80, (b) the sub-tests that seem to possess a sufficient number of unexposed items are not the same sub-tests on both the Iowa Tests of Basic Skills and the Science Research Associates Achievement Tests, and (c) the sub-tests intended to measure reading and arithmetic gains are not now usable because one or both have been invalidated because of exposure of test items in the teaching process.

Therefore, the teaching of test items or closely related test items has invalidated the test results to the extent they cannot be used as a valid measure of achievement.

IV. PRODUCT EVALUATION RESULTS

In presenting the evaluation results, a general format will be followed. The objectives being evaluated will be listed, followed by the evaluation information. Where evaluation evidence was not available or was not valid, this will be stated.

Objective One:

The student in the rapid learning center program will display an increased vocabulary, reading comprehension, and arithmetic knowledge as indicated by scores on the Iowa Tests of Basic Skills or the Science Research Associates Achievement Tests.

Results. Due to the contractor teaching for the test, no valid test results were available.

Objective Two:

The students in the rapid learning center program will display an increased knowledge of study skills as indicated by scores on the Science Research Associates Study Habits Checklist.

Results. The pretest was administered to students in the rapid learning center program during the week of December 8-12, 1969. The post test was given to rapid learning center students during the first two weeks of May, 1970. To ensure uniformity in administering the Study Habits Checklist and to minimize the effects of deficient reading skills, the test administrator read the test questions aloud to all students. One hundred twenty-six students in the rapid learning center program took both the pre and post tests. The results are presented in Table 8.

Table 8. A COMPARISON OF THE PRE AND POST TEST SCORES OF 126 RAPID LEARNING CENTER STUDENTS ON THE SRA STUDY HABITS CHECKLIST

	Pretest	Post test	Difference	t
Mean	86.55	87.81	1.26	.43*
S. D.	23.35	22.56		

* Not significant

The data in Table 8 indicates that the rapid learning center students did not make a statistically significant gain on the Study Habits Checklist. Therefore, objective two was not achieved.

Objective Three:

The students in the rapid learning center program will demonstrate increased application of pronunciation skills as indicated by scores on the Photo Articulation Test.

Results. The pretest was administered to students in the rapid learning center program during the week of December 8-12, 1969. The post test was given to rapid learning center students during the week of May 11-15, 1970. The post tests were given only to those students who had articulation problems as indicated by their pretest scores. To ensure uniformity in administering the Photo Articulation Test, they were administered and scored by certified speech therapists. The test was given on an individual basis to each student. Thirty-seven students in the rapid learning center program were given both the pre and post Photo Articulation Tests. The results are contained in Table 9.

Table 9. A COMPARISON OF THE PRETEST AND POST TEST SCORES OF 37 STUDENTS ON THE PHOTO ARTICULATION TEST

	Number of Defective Sounds on Total Pretests	Number of Defective Sounds on Total Post Tests	Difference	t
Mean	3.46	3.89	.43	.65*
S. D.	2.27	3.25		

* Not significant

The data in Table 9 indicates that the rapid learning center students did not show a statistically significant improvement on the Photo Articulation Test. Objective three was not achieved.

Objective Four:

The students will display knowledge of the world of work by choosing at least one employment goal that is realistic and achievable as judged by the student's counselor.

Results. When students took the post achievement test, the rapid learning center students were given a questionnaire asking them to identify what jobs they would like to get upon high school graduation. They were asked to rank the jobs in terms of their first, second, and third choice. This information was given to the students' counselors to make a judgment on the feasibility of the choices made by the students, considering the counselors' knowledge of the students' interests, aptitudes, and abilities.

The pressures of time prevented the counselors from providing the ratings of the students' vocational choices to the evaluator. Table 10 presents the only available data concerning the occupational goals selected by students from the rapid learning center program and the

counselor's judgment of these goals. The sample is so small it is of questionable value.

Table 10. THE COUNSELORS' RATINGS OF OCCUPATIONAL GOALS SELECTED BY STUDENTS IN THE RAPID LEARNING CENTER PROGRAM

Ratings of Goals By Counselors	Choice I		Choice II		Choice III	
	Number Selecting	Per-cent	Number Selecting	Per-cent	Number Selecting	Per-cent
Entirely unrealistic	5	13.2	4	11.4	0	.0
Possible but unlikely to attain	5	13.2	8	22.8	6	19.3
50-50 chance of attaining	1	2.6	1	2.9	3	9.7
Might attain with extra effort	5	13.2	2	5.8	2	6.5
Very realistic goal	22	57.8	20	57.1	20	64.5
Total	38	100.0	35	100.0	31	100.00

Objective Five:

The students will demonstrate an increased application of good grooming as indicated by an appearance checklist.

Results. The pretest is a grooming checklist developed by the Region VIII Education Service Center, Magnolia, Arkansas. The homeroom teacher of each student in the rapid learning center program was asked to rate him on the grooming checklist. Due to pressures of instructional duties and lack of time, the teachers were unable to respond to the request for ratings. Therefore, no data are available to evaluate this objective.

Objective Six:

The students will respond positively to the rapid learning center program as indicated by: (1) a feedback questionnaire, (2) decrease in school absenteeism, (3) decrease in dropout frequency, and (4) improving grades in other classes.

Types of Information: A feedback questionnaire to be given students was developed by the Region VIII Education Service Center, Magnolia, Arkansas. School records were used to determine frequency of absences, dropouts, and grade records.

Data Collection Procedures: Students in the rapid learning center program were given a feedback questionnaire to determine their response to their school experiences. This questionnaire was given at the beginning of the program and again at the end of the program. Because of the nature of the program where students could be entered and exited at different times during the school year, only 67 students took both the pre and post questionnaire.

The school records of the students in both the rapid learning center program and an equated group of non-rapid learning center students were analyzed to determine the frequency of absenteeism, the number who dropped out of school, and the grades earned during the school year.

Results: The results of the pre and post questionnaires are found in Table 11. The "always" is the most positive response for Questions Nos. 2, 4, 7, 10, 11, 13, 17, 18, and 19. The "never" is the most positive response for Questions Nos. 1, 3, 5, 6, 8, 9, 12, 14, 15, and 16.

The scores on the feedback questionnaire were quantified by

establishing a scoring system where 4 points were given for the most positive response, 3 points for the next, 2 for the next, and 1 point for the least positive response. Table 11 presents information comparing the scores of the students on the pre test with their scores on the post test. It will be noted that the information in Table 11 shows a slight numerical increase in the positive attitude of the students towards the rapid learning center program. This difference is not statistically significant. Further analysis is needed regarding students' opinions, to determine what factors were significant in influencing their responses.

Table 11. AN ANALYSIS OF THE CHANGE IN RESPONSES TOWARD SCHOOL ACTIVITIES INDICATED BY STUDENTS IN THE RAPID LEARNING CENTER*

Question	Pretest Responses: Percentage in Rapid Learning Center Program Checking: Always	Often	Seldom	Never	Post Test Responses: Percentage in Rapid Learning Center Program Checking: Always	Often	Seldom	Never
1. It is hard for me to keep my mind on what goes on in class.	9.86	11.27	47.89	30.99	2.90	18.84	43.48	34.78
2. My teachers take a personal interest in me.	33.33	28.99	23.19	14.49	26.09	33.33	27.53	13.04
3. My class work is so dull I have to force myself to do the assignments.	8.70	13.04	27.54	50.72	5.80	10.14	36.23	47.83
4. I don't worry about taking tests.	31.88	24.64	26.09	17.39	30.43	21.74	21.74	26.09
5. I get so little out of doing my schoolwork it is not worth the effort.	14.71	7.35	25.00	52.94	1.45	11.59	28.99	57.97
6. Schoolwork makes me feel like a loser.	7.25	8.70	26.09	57.97	2.90	18.84	27.53	50.72
7. My lessons are easy to understand.	24.64	40.58	28.99	5.80	29.85	37.31	26.87	5.97
8. I dislike my courses.	8.82	23.53	27.94	39.71	1.45	10.14	36.23	52.17
9. The tests I take are unfair.	5.80	2.90	20.29	71.01	0.00	7.25	30.43	62.32
10. My grades make me feel good.	22.06	26.47	27.94	23.53	18.84	31.88	26.09	23.19
11. I feel that I need to stay in school.	64.71	17.65	5.88	11.76	64.71	17.65	11.76	5.88
12. I don't like to ask questions when an assignment is not clear to me.	30.99	26.76	21.13	21.13	17.91	25.37	23.88	32.84
13. My teachers encourage me to do my best.	68.12	10.14	14.49	7.25	60.87	20.29	15.94	2.90
14. Teachers always teach the same old way.	14.49	23.19	28.99	33.33	10.29	11.76	42.65	35.29
15. Classes are too large.	16.42	5.97	32.84	44.78	10.14	14.49	21.74	53.62
16. There is not enough individual help in class	23.19	30.43	20.29	26.09	13.24	23.53	29.41	33.82
17. The classroom is beautiful.	27.54	27.54	15.94	28.99	43.48	18.84	23.19	14.49
18. I have plenty of chance to talk to the teacher	43.48	21.74	21.74	13.04	47.69	15.38	20.00	16.92
19. I like the way my courses are taught.	41.79	26.87	20.90	10.45	49.28	24.64	15.94	10.14

*Students were asked to respond to the questionnaire in terms of the Rapid Learning Center Program.

Table 12. A COMPARISON OF THE CHANGE IN RESPONSES ON A QUESTIONNAIRE TOWARD SCHOOL ACTIVITIES OF 67 STUDENTS IN THE RAPID LEARNING CENTER PROGRAM

	Pretest Responses	Post Test Responses	Differences	"t"
Mean	55.71	57.86	2.15	1.46*
S.D.	3.79	8.15		

* Not significant

To explore the effects of the rapid learning center program on the school absenteeism of the students, the school attendance records were reviewed. Table 13 contains information concerning the mean number of days that the rapid learning center students could have attended the program, and the mean number of days that they actually attended. The difference shows that the rapid learning center students were absent from school an average of 10.47 days.

Table 13. A COMPARISON OF NUMBER OF POSSIBLE DAYS OF SCHOOL ATTENDANCE WITH ACTUAL NUMBER OF DAYS OF ATTENDANCE FOR 351 RLC STUDENTS

	Mean
Possible Days of Attendance	79.46
Actual Days of Attendance	68.99
Difference	10.47

Because the dropout prevention program allowed students to be entered and exited at different intervals, it was difficult to obtain absentee data on a comparable non-rapid learning center group of students.

Data were available concerning the number of days absent for students in the rapid learning center and an equated group of non-rapid learning center students who took the February 2, exit test. Table 14 provides information about the mean number of absences for each group of students. While the students in the rapid learning center have a slightly higher absentee rate, it is not significantly higher. The data on the latter of the tables suggest that the rapid learning center program has not had enough impact to decrease significantly the frequency of school absences.

Table 14. A COMPARISON OF THE FREQUENCY OF ABSENTEEISM FOR STUDENTS IN THE RAPID LEARNING CENTER AND AN EQUATED NON-RAPID LEARNING CENTER GROUP, FEBRUARY 2 EXIT TESTING GROUP

Group	Number	Mean Number of Absences
Rapid Learning Center Students	33	6.68
Equated Non-Rapid Learning Center Group of Students	33	5.53
Difference	--	1.15
"t"	--	.833

The overall goal of the program is the prevention of dropouts. To determine the effectiveness of the rapid learning center program in the prevention of dropouts, an analysis was made of the number of students

dropping out of school from the rapid learning center program and the students from an equated non-rapid learning center group. This information is presented in Table 15. It can be seen from this information that nearly three times as many students dropped out of school from the non-rapid learning center group than dropped out of school from the rapid learning center group. Whether this is a permanent trend can only be determined through a follow-up study.

Table 15. A COMPARISON OF THE NUMBER OF SCHOOL DROPOUTS FOR STUDENTS IN THE RAPID LEARNING CENTER PROGRAM AND STUDENTS IN THE EQUATED NON-RAPID LEARNING CENTER GROUP

School	Rapid Learning Center Group			Equated Non-Rapid Learning Center Group		
	Total No. in Group	No. of Dropouts	Per-Cent %	Total No. in Group	No. of Dropouts	Per-Cent %
Arkansas Senior High	54	5	9.25	29	5	17.24
College Hill Junior High	75	7	9.33	32	5	15.62
Jefferson Junior High	78	6	7.69	45	6	13.33
Liberty Eylau Senior High	55	1	1.81	59	15	25.42
Liberty Eylau Junior High	41	0	.00	0	0	.00
Washington Junior High	48	5	10.41	70	11	15.71
TOTAL	351	24	6.84	235	42	17.87

To further analyze the extent to which the rapid learning center program was preventing dropouts, a comparison was made between the frequency of dropouts from the rapid learning center group and the frequency of school dropouts from the entire student population of the participating school districts. This information is found in Table 16, on the following page.

Table 16. A COMPARISON OF THE NUMBER OF SCHOOL DROPOUTS OF STUDENTS IN THE RAPID LEARNING CENTER PROGRAM WITH ALL STUDENTS IN THE PARTICIPATING SCHOOL DISTRICTS (1969-70 SCHOOL YEAR)

School	Rapid Learning Center Group			All Students		
	Number Enrolled	Number of Dropouts	Percent Dropouts	Number Enrolled	Number of Dropouts	Percent Dropouts
Arkansas Senior High School	54	5	9.25	1,414	178	12.59
College Hill Jr. High School	75	7	9.33	530	28	5.28
Jefferson Avenue Jr. High School	78	6	7.69	861	15	1.74
Liberty Eylau Sr. High School	55	1	1.81	672	89	13.24
Liberty Eylau Jr. High School	41	0	.00	446	26	5.83
Washington Jr. High School	48	5	10.41	417	26	6.24
Total	351	24	6.84	4,340	362	8.34

It has been previously pointed out that a number of students were enrolled in the rapid learning center program who did not fulfill the entry criteria. An analysis was made of the frequency of the school dropouts of students from the rapid learning center group according to whether they fulfilled or did not fulfill the entry criteria. The entry criteria were two grades or more behind in mathematics and reading achievement, as indicated on standardized test scores, and having an IQ of 75 or higher on an intelligence test. Where test scores were not available on the students, they are classified in the non-criteria group. The data are presented in Table 17 on the following page.

Table 17. AN ANALYSIS OF THE NUMBER OF SCHOOL DROPOUTS FROM THE RAPID LEARNING CENTER GROUP ACCORDING TO WHETHER THEY FULFILLED ENTRY REQUIREMENT

School	No. in Class	Fulfilled Criteria			Did Not Fulfill Criteria		
		No.	Dropped Out of School	Dropped Out of RLC but in School	No.	Dropped Out of School	Dropped Out of RLC but in School
Arkansas Sr. High	54	24	0	0	30	5	0
College Hill Jr. High	75	35	2	1	40	5	0
Jefferson Avenue Jr. High	78	16	1	5	62	5	2
Liberty Eylau Jr. High	41	39	0	1	2	0	2
Liberty Eylau Sr. High	55	43	0	0	12	1	2
Washington Jr. High	48	24	0	0	24	5	0
TOTAL	351	181	3	7	170	21	6

The striking information in the previous table is that there were very few dropouts from the rapid learning center students who fulfilled entry criteria. Less than one percent of the students fell in this group. Information from the previous three tables indicates that the dropout prevention program did reduce the frequency of dropouts and was particularly effective for those students fulfilling the entry criteria.

Because the United States Office of Education requested that the evaluation data be submitted by August 1, 1970, and because of the extra work involved in investigating the effects of the contractor teaching the test, it was not possible to analyze the complete effects of the rapid learning center program on students' grades in other school subjects.

However, first semester grades were available on those students who took the post tests on February 2, 1970. To see if the rapid learning center program had any effect on the students' grades in other school subjects to this time, a comparison was made of students' last year's spring semester grades with this year's fall semester grades. This was done for the students in the rapid learning center program and for the students in the equated non-rapid learning center group. This information is found in Table 18, on the following page.

Table 13. AN ANALYSIS OF GRADES EARNED BY STUDENTS IN THE RAPID LEARNING CENTER PROGRAM AND THE EQUATED NON-RAPID LEARNING CENTER GROUP

Grades	Rapid Learning Center Students								Non-Rapid Learning Center Students							
	English		Social Studies		Natural Science		Mathematics		English		Social Studies		Natural Science		Mathematics	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
							Second Semester, 1968-69									
A	0	0	0	0	0	0	0	0	0	0	1	3	1	3	0	0
B	1	3	1	3	2	6	2	6	6	19	5	16	4	13	4	13
C	6	18	12	37	5	16	8	26	12	39	10	32	11	35	12	40
D	19	59	13	41	18	56	7	23	8	26	10	32	13	41	7	23
F	6	18	6	18	7	22	14	45	5	16	5	16	2	6	7	23
							First Semester, 1969-70									
A	0	0	0	0	0	0	0	0	3	10	0	0	1	3	0	0
B	1	4	2	8	1	4	1	5	0	0	3	12	0	0	2	7
C	7	28	6	25	3	12	3	16	11	35	7	26	8	30	8	30
D	13	52	9	37	15	57	14	73	13	42	8	31	14	52	11	40
F	4	16	7	30	7	27	1	5	4	13	8	31	4	15	6	22

The number of students receiving grades for each subject area is not the same between groups or from semester to semester within a group. The reason for this is that some students did not take one of the four subjects each semester, and some of the students in the rapid learning center program were in that special program in place of their regular English, social studies, mathematics, or natural science classes.

In looking at the information on the previous table, the following can be noted: (1) the English grades of the rapid learning center students appear to be improving while the English grades of the non-rapid learning center group are becoming lower; (2) grades in courses in social studies, natural science, and mathematics are continuing the trend of becoming poorer each semester for both groups.

Objective Seven:

The project director will display knowledge of the feasibility of a rapid learning center program for all students in the school system as indicated by: (1) feasible cost, (2) available space, (3) appropriateness of rapid learning center material, (4) acceptance by faculty and parents, and (5) permanency of student achievement gains.

Results on Cost Feasibility: The feasibility of the cost for operating a rapid learning center program was to be determined through a cost analysis study. This study was to compare the instructional costs for producing grade level increases of the rapid learning center students with the comparable costs for producing grade level increases for all the students in the participating school districts. Since the test results have been invalidated this study cannot be done. Early in July, 1970, Dorsett submitted to the project director a summary of costs for the dropout prevention program. The president of the company pointed

out, in an accompanying letter, that a number of costs were omitted and that data were submitted hurriedly so as to provide some cost information. The following presents the available cost data for operating the rapid learning center program:

DORSETT EDUCATIONAL SYSTEMS, INCORPORATED

TEXARKANA PROJECT

Direct Instructional Salaries	$ 49,820
Resident Administrative Salaries	33,755
Staff and Consulting while at Texarkana	9,612
Direct Support Labor not at Texarkana	12,651
TOTAL DIRECT LABOR (81% Net Payroll - 19% Burder)	$105,838
Direct Expenses, Materials, Travel, Per Diem	4,217
TOTAL DIRECT COSTS	$110,055
Allocable General and Administrative, Indirect and and Overhead Costs	36,302
TOTAL DIRECT AND ALLOCABLE COSTS	$146,357
Indirect Support Labor	$ 26,718
Indirect Support Expenses	6,411
Indirect Support Overhead	10,812
TOTAL INDIRECT SUPPORT COSTS	$ 43,941

From the above cost data, an estimate can be made of the cost per student and the cost of operating the program per student hourly rate. This information is found in Table 19, on the following page. It should be pointed out that many expenses occur in starting a new project that would not recur in a continuing program. Thus, the cost figures in no way reflect the amount of expenses that would be required in a continuing project. They are presented to provide some limited concept of start-up costs for a new project.

Table 19. AN ANALYSIS OF THE COST OF OPERATING THE RAPID LEARNING CENTER PROGRAM AS DETERMINED ON PER STUDENT AND HOURLY BASIS

Cost Category	Amount Spent	No. of Students	Cost Per Student	Number of Hours of Instruction	Cost Per Hour
Total Direct Labor	$105,838.00	351	$301.53	24,215	$4.37
Total Direct Costs	110,055,00	351	313.55	24,215	4.54
Total Direct and Allocable Costs	146,357.00	351	416.97	24,215	6.04
Total Indirect Support Costs	43,941.00	351	125.19	24,215	1.81
Total Costs	$190,298.00	351	542.16	24,215	7.86

The space study was not conducted as the school districts are involved in the process of total desegregation. Because of this cultural change some school buildings are being phased out of operation. The available space for operation of learning centers in Phase II will primarily be restricted to the mobile units and existing refurbished classrooms.

The curriculum materials used in the rapid learning center program was to be rated by a cadre of teachers from the participating school districts. The internal evaluators developed a form to be used for the ratings. The project director was unable to secure this information and thus, it is not available for analysis.

Results on Acceptance by Faculty and Parents: A feedback questionnaire was given to all teachers in the participating school districts. The results of the questionnaire are found in Tables 20a and 20b. An analysis of the data in these tables suggests that the teachers are familiar with the rapid learning center program and are willing to try it out in the regular classes. Teachers who had students in their classes who were participating in the rapid learning center program felt that such students' attitudes toward school had improved, and they participated more readily in class discussion, but had not improved their grades, study habits, or class attendance. From the viewpoint of the teachers, it appears that the climate for a change is good toward the dropout prevention program, including the use of teacher aides.

Table 20a. THE RESPONSES OF TEACHERS TO A FEEDBACK QUESTIONNAIRE

Question	Number Responding	
	Yes	No
1. I have heard about the Rapid Learning Center Program	220	0
2. I am familiar with the techniques used in the Rapid Learning Center.	157	52
3. I have visited the Rapid Learning Center.	154	74
4. I have students in my classes who are attending the Rapid Learning Center Program. (If yes, please respond to statements a through f.)	73	108
a. Since attending the RLC program, the attitude of these students toward school has generally improved.	44	13
b. Since attending the RLC, these students show greater concern for their personal appearance.	15	35
c. These students participate more frequently in class discussion than they did before attending the RLC.	30	21
d. These students have improved their study habits and use their time more efficiently.	20	25
e. The students in the RLC have improved their grades in my class.	16	30
f. Class absences of these students have decreased.	26	27

Table 20b. THE EXTENT TEACHERS AGREE WITH STATEMENTS CONCERNING THE DROPOUT PREVENTION PROGRAM

Statement	Number Responding SA	A	D	SD
1. Techniques used in the Rapid Learning Center will work in the regular classroom.	27	105	28	5
2. The teaching machines and programmed instructional materials used in the RLC can be adapted for use in the regular classroom	41	114	13	0
3. The Rapid Learning Center program would be feasible for some classes but not all classes.	28	121	19	2
4. I believe that with the help of an aide my students would achieve as much as in the RLC program.	22	66	41	16
5. An extra attempt should be made to assist the underachiever.	131	59	3	0
6. The addition of RLC equipment and materials to the regular classroom would enable me to more effectively teach the average and above average student as well as the underachiever.	51	87	20	3
7. The Rapid Learning Center program can be effective in preventing dropouts.	42	124	4	6
8. The teacher workload would increase with the addition of teaching machines, record keeping systems, etc. in the regular classroom.	38	96	31	0
9. If given an aide to assist with extra clerical tasks, I would be willing to try RLC techniques in the classroom.	59	96	8	4
10. The Rapid Learning Center is a good idea, but it should be kept separate from the regular classroom.	17	40	82	18
11. I would like to learn more about the Rapid Learning Center program.	91	94	9	0

KEY: SA - Strongly Agree
A - Agree
D - Disagree
SD - Strongly Disagree

July 20, 1970

Parents of students participating in the rapid learning center program were requested to respond to a questionnaire. One hundred and eighteen parents responded. The questionnaire results are found in the following Table 21.

Table 21. AN ANALYSIS OF PARENT RESPONSES ON A QUESTIONNAIRE CONCERNING THE RAPID LEARNING CENTER PROGRAM

ITEM			Percentage of Responses
1.		Have you heard about this special school program your child has attended?	Yes 97.41% No 2.59%
2.		Have you visited the Rapid Learning Center?	Yes 5.13% No 94.87%
		Since my child has been in this special program I feel that he	
3.	(a)	enjoys school more than he used to	69.17%
	(b)	feels the same as he always did about school	28.33
	(c)	likes school less than he did before	2.50
4.	(a)	is more willing to go to school in the morning	52.89%
	(b)	acts the same as ever about going to school in the morning	44.63
	(c)	is not as willing as before to go to school in the morning	2.48
5.	(a)	gets better grades than he used to	67.50%
	(b)	gets about the same grades as always	31.67
	(c)	gets worse grades than he used to	.83
6.	(a)	talks more about school than before	57.14%
	(b)	talks about school about as much as he ever did	38.66
	(c)	talks less about school than he used to	4.20
7.	(a)	brings more schoolwork home than he did before	30.25%
	(b)	brings schoolwork home about as often as before	60.50
	(c)	brings less schoolwork home than he used to	9.24
8.	(a)	talks more often about what he would like to do when he graduates from high school	52.10%
	(b)	talks the same as ever about what he would like to do when he graduates from high school	45.38
	(c)	says less about what he would like to do when he graduates from high school	2.52

TABLE 21: (continued)

ITEM			Percentage of Responses
9.	(a)	is absent from school less than he used to be.....	54.55%
	(b)	is absent from school about as often as before.....	43.64
	(c)	is absent from school more than before.....	1.82
10.	(a)	likes his special classes better than his regular classes...	68.38%
	(b)	likes both kinds of classes the same.....	26.50
	(c)	likes his regular classes better than his special classes...	5.13
		In my opinion, the Rapid Learning Center	
11.	(a)	should become a regular part of the school system.....	91.53%
	(b)	doesn't make any difference in the school system.....	6.78
	(c)	should not be used as a part of the school program.....	1.69
12.	(a)	is worth spending money for.....	68.07%
	(b)	is worth as much as any other school program.....	31.93
	(c)	is a poor way to use the taxpayers' money.....	.00
13.	(a)	will help my child graduate from high school.....	91.60%
	(b)	will have no effect on my child's graduating from high school	7.56
	(c)	could keep my child from graduating from high school.....	.84
14.	(a)	gives my child a better chance for getting ahead in life....	93.28%
	(b)	will have no effect on my child's future.....	5.88
	(c)	may hinder my child's chances for getting ahead.....	.84

The information from the above table reveals that nearly all the parents are aware of the Rapid Learning Center program, but very few have visited the center. The parents, as a whole, are very much in favor of the program and desire it to become a part of the regular school program. Several of the questions reveal responses that the parents feel the program has had some impact on their childrens' interests and performance in school, but there are still a large percentage of responses indicating that their children are not doing much differently than what they have been doing in the past.

Results on Permanency of Student Gains: The permanency achievement test was to be given in October, 1970. Since the test results of Phase I have been invalidated, the permanent gain made by students on achievement tests will need to be considered in the Phase II operation of the dropout prevention program.

V. RECOMMENDATIONS

1. Because frequent exit testing during Phase I has caused a number of problems, it is recommended that exit tests be given only at the end of 80 hours and 160 hours of instruction. The testing period should be correlated with the end of the semesters. Furthermore, it is recommended that the 160-hour test be correlated with the regular spring testing program of the school district if at all possible. This will allow a continuity with the regular school program.

2. During Phase I no specific guidelines were established concerning when a student would be exited from the rapid learning center program. It is recommended that students in the learning center programs in Phase II be exited into turnkey classes at the time they take the exit tests if they are within one-half grade level of their proper grade level.

3. A number of problems arose because of lack of clarification of terms or guideline procedures. It is recommended that the following definitions and procedures apply for Phase II operations:

   a. A student will be considered a dropout from the program if he or she leaves school or the program and does not reenter. Exceptions to this definition are: (1) if a student graduates from high school, (2) if a student is drafted into military service, (3) if a student is physically or mentally incapacitated (pregnancy excepted) to such an extent that he or she is not able to participate

in the project and attend school as certified by a licensed physician, (4) other reasons mutually agreed upon in writing by the project director and the contractor.

b. The starting time for each student will be the first day the student enters the program. Any exception to this must be agreed upon by the project director and the contractor, and any such agreement must be made in writing.

c. The target population for Phase II are students fulfilling the following entry criteria: (1) students in 1969-70 RLC program who did not gain one or more grade levels in reading comprehension or mathematics, (2) seventh-grade students who are two or more grade levels deficient in reading or mathematics and who have an IQ of 75 or higher on an intelligence test, and (3) all students in grades 8-12 who are two or more grade levels deficient in reading or mathematics and who have an IQ score of 75 or higher and who did not participate in the 1969-1970 RLC program. The contractor must be willing to accept the conditions and process by which the target population are selected. If any question exists, it must be reconciled within fifteen days of the student's enrollment in the project according to a negotiation procedure agreed upon by the project director and the contractor.

d. The ending time for the instructional program for each student shall be the date when the student took the performance or exit test. If the student takes more than one exit test, the latter test date shall be considered the ending date.

e. Actual instructional time is the time between the starting time and the ending time minus the amount of time that the student was absent from the instructional program.

4. During the Phase I operation difficulties arose because the contractor submitted names of students to take exit tests late and then he often changed the list just prior to the testing date. It is recommended that the project director establish exit test dates and the contractor shall submit the names of students to take tests to the project evaluator ten (10) days prior to the date of the test. This shall be considered the official test list.

5. It is recommended that the contractor not be allowed to use as a practice test any form of any test that is being used as a post test for payment purposes.

6. It is recommended that the contractor submit monthly reports to the project director. The contents of the reports shall be mutually agreed upon by contractor and project director but must include essential financial and evaluation data required in the request for proposal.

7. During Phase I the information available on students in the program was limited. It is recommended that a more comprehensive information system be developed to provide accurate data on each student in the program. The evaluation design might be used as the basis for determining what data need to be included in the system.

8. Lack of personnel handicapped the Phase I operation. It is recommended that additional personnel be employed to help in giving tests, collecting information, working with turnkey teachers, working with parents, counseling with students, showing program to visitors, preparing dissemination information, writing reports, and generally to help the project director.

9. To provide necessary and timely test results, it is recommended that participating school districts in the program administer the planned standardized tests (achievement and intelligence) on a systematic time schedule. This schedule should establish testing dates that would provide test results when they are needed for identifying the target population, choosing the sample to start in the learning center or turnkey programs, and provide evaluation information.

10. It is recommended that contracts be made with the internal evaluator, external auditor, and management support. The contract shall outline the specific responsibilities and roles of each contractor.

11. To assist in the strengthening of the management procedures, it is recommended that the project director or his designate do the following:

    a. Establish an adequate record system concerning the operation of the dropout prevention program. The record system should include agendas and minutes of meetings, copies of all reports received and given, as well as information about equipment, facilities, personnel, and problems encountered.

b. Delegate and review with all personnel their respective functions and responsibilities. This review should include information concerning the organizational structure, channels of communications, required reports, and lines of authority.

c. Hold regularly scheduled meetings with the staff, the advisory committee, and any other involved groups for the purpose of continuous planning, evaluating, and improving the operational process.

d. Submit monthly reports to the school superintendents in the participating school districts so as to keep them involved and informed of the status of the program.

e. Hold regularly scheduled meetings with the learning center and turnkey teachers to obtain process information and make needed adjustments in the program as problems occur.

f. Plan and schedule parents' activities to involve them in the educational process of their children.

g. Prepare and disseminate public information data to interested groups, both within the participating school districts and outside the project area.

h. Establish a time and day when visitors can be accepted rather than allow them to continuously disrupt the program.

12. To avoid "teaching for the test", it is recommended that the following be written in the contract with the contractor:

a. The contractor shall not include in any of his instructional materials any exercises that are the same as the test items used in the tests that will be used to determine

how much the contractor will be paid. The definition of "same" would be determined by the rules outlined on pages 58-59 of this report. Variations in these rules must be mutually agreed upon by contractor and fiscal agent in writing prior to the starting of this project.

b. The internal evaluator shall periodically make a quality control check of the instructional materials in use in the program to determine whether the contractor has fulfilled the requirements listed under "a". The quality control check shall be done once a month and be based on a systematic random sample of the instructional materials.

c. If any single test item, as defined in the rules, is found in the quality control check, the contractor shall be penalized $1,000 for each exposed item.

13. Since the achievement test results for Phase I have been invalidated through teaching to the test, it is recommended that the following alternatives be explored for possible settlement with the contractor:

a. A legal review of the contract might be made to determine the responsibility of the fiscal agent to make payment under existing circumstances.

b. Establish an assumption that contractor shall be paid on the same basis as what it costs the school district to provide instruction. Settlement might then be made on an hourly rate basis or on a per student basis for the instructional services provided by the contractor.

c. Several possibilities have been considered to determine ways of making corrections for the effects of teaching for the test. Within the time and cost constraints imposed upon the internal evaluator for making this evaluation report, the conclusions of this report are that test results are not valid due to the exposure of test items in the instructional material; and thus, a valid correction factor cannot be established. If the school board feels that time and costs are justified to further verify this fact, it is recommended that Step II of the recommendations made by the consultants of Educational Testing Service be explored. If from Step II a sufficient number of test items still remain unexposed, it is recommended that Step III of the consultants' recommendations be explored as the possible basis of payment. The internal evaluators feel that Dr. Dyer's and Mr. Angoff's recommendations are statistically sound.

To provide the above information it is anticipated that it will take at least 30 days of time involving clerical work, statistical work, and perhaps computer time. Even if the analysis is made there is a high degree of probability that not enough unexposed items will be found to apply a correction factor and the correction factor might very well decrease the recorded student gains. Therefore, it is recommended that if alternative "c" is selected as the basis of settlement the contractor be required to pay the costs.

14. It is recommended that payment to the contractor for Phase II be based on (a) achievement gains made by students, (b) extent contractor attains performance objectives, and (c) the reductions of dropouts. The achievement gains should be measured by standardized tests; the performance objectives should be measured by developing an instrument using a pool of items submitted by the contractor; and the number of dropouts can be assessed from the school records.

A P P E N D I X

Memorandum for: DR. ANDREW

Subject: Analysis of Data to Determine the Effect of the Dorsett Instructional Program on Educational Growth of Students in Texarkana

Date: July 8, 1970

From: Henry S. Dyer
William H. Angoff

The purpose of this memorandum is to outline a procedure for evaluating the real gains of students who participated in the Texarkana Project after adjusting for the fact that certain items on the exit tests have been compromised by having been used essentially unchanged in the instructional materials.

1. The first step in the procedure is to make some judgments about the "sameness" of items that appeared in both the instructional materials and in the exit tests. These we shall call the "exposed" items.

2. The second step is to verify the foregoing judgments by making a statistical analysis to determine how the items identified as "exposed" behave in comparison with items not so identified. If it is found that the exposed items had become easier, then the exit answer sheet for those students will be rescored using only non-exposed items to determine an increment attributable to growth equivalent to the increment that would have been obtained from the full-length test had no items become exposed.

3. The third step is to establish the magnitude of the real gains earned by the students on the non-exposed items.

Step I - Identification of Exposed Items

This step involves a comparison of the instructional exercises (i.e., the programs, the progress checks, and the laminated panels with the items on the exit tests (ITBS and SRA) to identify those items judged to be the "same" as the instructional exercises. The rules for judging "sameness" are as follows:

A test item and an instructional exercise are to be considered the same if

(1) Their wording is identical in all respects despite a change in format.

Example: A. Which of these is a way to find the circumference in inches of a circle with a 6-inch diameter?

(1) 3x3.14 (3) 3x3x3.14

(2) 6x3.14 (4) 2x6x3.14

B. Which of these is a way to find the circumference in inches of a circle with a 6-inch diameter?

(1) 3x3.14 (2) 6x3.14 (3) 3x3x3.14

(4) 2x6x3.14

(Note the change in arrangement of options)

(2) The wording of the stem and the wording of the correct option are identical; despite the fact that other options have been changed.

Example: A. Which of these is a way to find the circumference in inches of a circle with a 6-inch diameter?

(1) 3x3.14 (3) 3x3x3.14

(2) 6x3.14 (4) 2x6x3.14

B. Which of these is a way to find the circumference in inches of a circle with a 6-inch diameter?

(1) 3.14x3 (3) 3x2.14

(2) 6x3.14 (4) 2x6x2.14l6

(3) The correct option is identical andthe main sense of the stem has been retained despite a minor change in wording.

Example: A. Which of these is a way to find the circumference in inches of a circle with a 6-inch diameter?

(1) 3x3.14 (3) 3x3x3.14

(2) 6x3.14 (4) 2x6x3.14

B. The number of inches in the circumference of a circle with a diameter of 6 inches is

(1) 6x3.14 (3) 3x3x3.14

(2) 3x3.14 (4) 6x6x3.14

(4) The main sense of the whole item has been retained despite the fact that it has been restated in the negative.

Example: A. Which of these is a way to find the circumference in inches of a circle with a 6-inch diameter?

(1) 3x3.14 (3) 3x3x3.14

(2) 6x3.14 (4) 2x6x3.14

B. The number of inches in the circumference of a circle with a diameter of 6 inches is not

(1) 6x3.1416 (3) 3x3x3.14

(2) $6x\frac{22}{7}$ (4) $2x3x\frac{22}{7}$

(5) The main sense of the stem has been retained despite a minor change in wording; the correct option is identical; but one or more incorrect options have been changed or omitted.

Example: A. Which of these is a way to find the circumference in inches of a circle with a 6-inch diameter?

(1) 3x3.14 (3) 3x3x3.14

(2) 6x3.14 (4) 2x6x3.14

. . The number of inches in the circumference of a circle having a 6-inch diameter can be found by which one of these?

(1) $3x\frac{22}{7}$ (2) 6x3.14 (3) 3x3x3.14

(6) The item has been changed from a multiple-choice to a true-false item by retaining the stem of the multiple-choice item and incorporating in the stem one of the options (correct or incorrect).

Example: A. Which of these is a way to find the circumference in inches of a circle with a 6-inch diameter?

(1) 3x3.14 (3) 3x3x3.14

(2) 6x3.14 (4) 2x6x3.14

B. The number of inches in the circumference of a circle with a 6-inch diameter is 3x3x3.14

◯ True ◯ False

C. A circle with a 6-inch diameter has a circumference of 6x3.14 inches.

◯ True ◯ False

Since the search for exposed items (i.e., items that according to the rules are the "same" in both the instructional materials and the exit tests) would be a stupendous task if <u>all</u> the instructional materials had to be checked against <u>all</u> the items in <u>all</u> forms of the exit tests, if becomes important to determine a cut-off point beyond which no further search is required for the decision whether a given form of a given exit test must be rejected as invalid. This cut-off point can be determined by reference to the reliability of the exit test as reported in the publisher's manual.

In order to make this determination, we have assumed that if the reliability of scores based on the residue of unexposed items of a form or an exit test drops below .80, then the test cannot be used at all to estimate the amount of progress a student has made. On the basis of this assumption, we suggest that the following table be used to decide when it becomes no longer necessary to search the instructional materials for exposed items in order to declare a test form invalid:

Stop Search Table

If the publisher's reported reliability of the test is:	Then stop the search for exposed items when the per cent of exposed total items on the test form drops below:
.95	79%
.94	74%
.93	70%
.92	65%
.91	60%
.90	56%
.89	51%
.88	46%
.87	40%
.86	35%
.85	29%

This table is based on the formula:

$$c = \frac{r_s(1-r_t)}{r_t(1-r_s)}$$

where c = the proportion of usable items

r_s = the reliability of scores based on a subset of usable items after exposed items have been eliminated

r_t = the reported reliability of the total test

It assumes the requirement that r_s must be at least .80 to provide adequate measurement. (See page 9 below for the formula for r_s.)

Step II - Empirical Verification of the Results of Step I

From Step I two groups of test items will have been identified on each exit test form: (1) those ITBS or SRA items judged to be "exposed" items and (2) those items judged "unexposed."

Two groups of students should now be identified for each form of the test: (1) an "experimental" group -- students who went through the Dorsett instructional program; and (2) a "control" group -- students who were equated with the experimentals in the fall of 1969, but who did not go through the Dorsett instructional program.

The item data for students in the "control" group will be obtained from those answer sheets that represent the first time the student has been exposed to a given form of a given exit test. Thus:

(1) If a student took Form X at entry and Form Y at exit, use his answer sheet for Form Y only.

(2) If he took Form X at entry and only Form X at exit, do not use his answer sheets at all in the analysis.

(3) If he took Form X at entry, Form X as a first exit test, and Form Y as the next exit test, use only his answer sheet from Form Y.

(4) If he took Form X at entry, Form Y as his first exit test, and Form Y again as a later exit test, use only his answer sheet from the first administration of Form Y.

(5) If he took Form X at entry, Form Y as his first exit test, and Form Z as a later exit test, use his answer sheets from both Form Y and from Form Z.

(Note that these rules apply only to the "control" group. For the "experimental" group, use all available answer sheets for each form of the test which has been used as an exit test.)

The basic type of analysis will consist of determining a proportion-pass value for each item on every form of the tests used as an exit test, calculated separately for the "experimental" group and the "control" group. Thus, for each item under consideration in, say, Form Y of a test, two proportion-pass values will be calculated, one for each of the two defined groups. Proportion-pass (p-value) is defined as thenumber of students at an exit testing who answer the item correctly, divided by the total number of students in that group. Thus, $p = \frac{N_{pass}}{N_{tot}}$. After each p-value has been calculated, it will be transformed to "delta," which is the normal deviate corresponding to the p-value, expressed with a mean of 13 and standard deviation of 4. Thus, a p-value of .16 becomes a delta of 17.0; a p-value of .84 becomes a delta of 9.0; a p-value of .76 becomes a delta of 10.2; a p-value of .46 becomes a delta of 13.4; etc.

Once the pairs of deltashave been calculated for the two groups, the items should be separated into two types: those classified according to Step I above as "exposed" and those classified as "unexposed." A bivariate graph should then be prepared with the deltas for the control group along the x-axis and the deltas for the experimental group along the y-axis. Plot the "exposed" items on the bivariate paper, and identify the points with x's. Plot the "unexposed" items on the same paper and identify the points with circles (O) to distinguish them from the "exposed" items.

The points on this plot will form one or two elliptical patterns extending from the lower left-hand section of the page to the upper right-hand section. Those items that are relatively difficult for both groups will appear in the upper right section of the plot; items that are relatively easy for both groups

will appear in the lower left section of the plot; items that are relatively easy for the control group but relatively difficult for the experimental group will appear in the upper left section; and, finally, items that are relatively difficult for the control group but relatively easy for the experimental group will appear in the lower right section. If the "exposed" items are no easier (relatively speaking) for the experimental group than for the control group, the x-points will be entirely intermixed with the o-points, and it will be concluded that the exposure did not operate to bias the results for the instructed group on the form of that exit test and therefore its scores can be taken at face value.

If, however, the x-points tend to fall lower and to the right of the ellipse described by the o-points, then it can be concluded in respect to that form of that exit test that the special instruction which made use of the exit test items did in fact have a specific differential effect on those items, thereby invalidating them for use in judging whether the instructional program had a general positive educational effect.

Clearly, the items in the two ellipses will very likely not be entirely distinct; there will be some overlap, even if the "exposed" and "unexposed" items are behaving differently. As a general rule, it will be the safer course of action to define all items as suspect except those that are clearly non-suspect. For this purpose, draw a line through the general centroid of all points with a slope equal to the ratio determined by the standard deviation of deltas for the experimental group divided by the standard

deviation of the deltas for the control group. The equation for this line is:

$$Y = RX + B,$$

where Y represents the axis for the experimental group,

X represents the axis for the control group,

$R = S.D._{Exp\Delta} / S.D._{Cont\Delta}$

$B = M_{Exp\Delta} - RM_{Cont\Delta}$

Place a ruler parallel to that line and move it toward the upper left of the page until only o-points -- no x-points -- appear above the ruler. Take the items represented by those o-points as the non-suspect, or usable, items for the third step of the analysis.*

Step III - Determination of Rules for Assessing Score Gains

For each form of the tests used at exit, determine the proportion of suspect items and the complementary proportion (c) of usable items. Calculate the reliability of the subset of usable items by the following formula:

$$r_s = \frac{cr_t}{1 + (c-1)r_t},$$

where c is the proportion of the usable items, r_t is the reliability of the full-length test, as reported in the test manual for the grade under consideration, and r_s is the reliability of the given subset of usable items. For example, if the reliability of the full test is .93 and it has been found in the preceding analysis that 2/3 of the items are suspect, with 1/3 non-suspect, the application of the formula given above is as follows:

$$r_s = \frac{(.33)(.93)}{1.00 + (.33-1.00)(.93)}$$

$$r_s = \frac{.31}{1.00-.62} = \frac{.31}{.38}$$

$$r_s = .816$$

*An x-item in the upper left section and beyond the general swarm of o-items is one that should be re-examined to see whether there is any question about the judgment that it has been exposed. Similarly a o-item in the lower right section and beyond the general swarm of x-items should be re-examined for the possibility that it was missed in the search for exposed items.

If r_s is below .80 for any subset of items used in an exit test, then there is no way to get an adequate measure of student performance from that subset.

If r is .80 or above for any subset of items, then continue as follows:

(1) Assemble the papers for the control group on that form of the test and rescore those papers for the subset of items. Compute the mean and standard deviation on that subset (s) and on the total test (t).

(2) Determine the constants of the following equation, which allows the conversion of scores on the subset to estimated scores on the full length test.

$$\hat{Y}_t = PY_s + Q,$$

where $\hat{Y}_t$ = estimated raw score on full length test,

Y_s = observed score on subset of non-exposed items,

$P = \sigma_t/\sigma_s$, and $Q = M_t - PM_s$.

M_t = Mean on full-length test,

σ_t = S.D. on full-length test,

M_s = Mean on subset,

σ_s = S.D. on subset.

If, for example, the equation is

$$\hat{Y}_t = 3.2Y_s + 5.1,$$

and if, for example, a student's score on the subset is 15 ($Y_s = 15$), then $\hat{Y}_t = (3.2)(15) + 5.1 = 48 + 5.1 = 53.1$. When rounded to the nearest whole number, this score is 53. This score is an estimate of what the student's total raw score would have been if none of the items in the exit test had been exposed.

(It should be noted that the foregoing procedure is based on the assumption that the unexposed items are at least reasonably representative of all the items on the exit test form with respect to content, difficulty level, and level of discrimination. To the degree that this assumption does not hold the procedure is open to some question. It would be desirable to check this assumption to the extent possible by an examination of the test content and by an examination of the distribution of item difficulties of the subset of unexposed items in comparison with the remaining exposed items, as observed in the control group. This check should be made if there is time.)

Using the student's estimated raw score on the exit test, enter the table of grade equivalencies to determine the estimated grade equivalent score on the exit test form. Subtract his entry grade equivalent score from his estimated exit grade equivalent score to get his estimated grade equivalent gain (G_{est}).

Inasmuch as G_{est} is derived from a less reliable measure of exit performance than could have been possible had none of the items been exposed, some adjustment for this unreliability should be made in the G_{est}. The need for this adjustment makes itself evident in the fact that the correlation of grade level with test performance is lower, and that the slope of the regression line of test performance on grade level is smaller, when the test is less reliable. The result is that a given score difference represents a greater grade equivalent difference than it should. Moreover, because of the lower correlation of grade and test score (due to the lower test reliability), there is greater

regression toward the mean. Therefore it would be expected that with a low-scoring group like the one under study here, higher GE estimates would be made for its students than would be made if the test were more reliable, and thereby correlating higher with grade level. However, the adjustment called for here appears to be a highly complex one, and therefore, it will not be attempted. Suffice it to say that the omission of the adjustment tends to overestimate the true grade equivalents for the students on the exit tests and makes it appear that they experienced somewhat greater educational growth than was actually the case.