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ABSTRACT

The summer of 1983 Reading and Mathematics with Athletics program in New York City provided supplementary remediation in reading and math to 2,157 handicapped New York City students by incorporating sports activities and concepts into instruction. The program was highly effective in meeting its proposed goals and showed marked improvement over previous years in both implementation and effectiveness. In reading, 87.4 percent of the students meeting attendance criteria mastered at least two new reading skills and 72.8 percent mastered three or more. In math, 87.3 percent mastered two or more new skills and 72.1 percent mastered three or more. (In both areas in the two previous years, 60 percent mastered two new skills and less than one third mastered three.) In addition, staff were enthusiastic about the expanded preservice training and the newly introduced inservice training, and saw the incorporation of sports activities and concepts as a strong motivating factor. In marked contrast to previous yuears, transportation was seen as a positive program feature. Finally, teachers found a new curriculum guide to be a useful supplement. Moreover, analysis of aggregate student achievement data from the current and previous years indicated a moderately strong relationship between teachers' use of particular lessons from the guide and student mastery of related skills. (CMG)

OEE Evaluation Report

E.C.I.A. Chapter 1

Reading and Math
with Athletics

Summer 1983

ANNUAL EVALUATION REPORT

February, 1984

E.C.I.A. Chapter 1

Reading and Math
with Athletics

Summer 1983

Division of Special Education
Edward Sermier, Chief Administrator

O.S.E. Reimbursable Programs
Allison Tupper

Helen Kaufman, Program Coordinator

Prepared by:

O.E.E./Special Education Evaluation Unit

Robert Topias, Evaluation Manager
Christine Halfar, Evaluation Specialist
Jerome Margolis, Evaluation Specialist
Frances Francois, Consultant
Janice Eidus, Consultant

New York City Public Schools
Office of Educational Evaluation
Richard Guttenberg, Director

A SUMMARY OF THE EVALUATION OF THE SUMMER 1983 E.C.I.A. CHAPTER 1 PROGRAM READING AND MATHEMATICS WITH ATHLETICS

The summer, 1983 E.C.I.A. Chapter 1 program, Reading and Mathematics with Athletics, provided supplementary remediation in reading and mathematics by incorporating sports activities and concepts into instruction. The program served 2,157 handicapped Chapter 1-eligible students at 13 schools located in the five boroughs. The program operated for four hours a day, five days a week from July 7 to August 17, 1983. Sports activities were provided in conjunction with the Big Apple Sports program.

Results of the analyses of pupil achievement data and interviews and observations indicated that the program was highly effective in meeting its proposed goals and showed marked improvement over previous cycles in both implementation and effectiveness.

In reading, 87.4 percent of the 1,347 students who attended at least 20 sessions mastered two or more new skills and 72.8 percent mastered three or more. For the total population, including those students attending fewer than 20 sessions, 84.3 percent mastered at least two new reading skills, and 61.7 percent mastered three or more. Similarly, in mathematics, 87.3 percent of students who attended at least 20 sessions mastered two or more new skills and 72.1 percent mastered three or more. For the total population, including those students attending fewer than 20 sessions, 77.3 percent mastered at least two new math skills and 60.4 percent mastered three or more. In comparison, in the two previous cycles, 1981 and 1982, no more than about 60 percent of the students who met the attendance criterion mastered at least two skills in either reading or math and fewer than one-third mastered three or more skills in either area.

Staff were quite enthusiastic about the program. Expanded pre-service training was particularly noted, as was the on-site in-service staff training, a new feature in 1983, which provided ongoing consultation in student assessment, individualization of instruction, and use of materials. Teachers reported that the incorporation of athletic activities and sports concepts into the program strongly helped to motivate the students to learn new academic skills; students also benefited by learning new social and recreational skills. Finally, in marked contrast to previous cycles, transportation services were seen as a positive program feature, a situation which staff attributed in part to the introduction of minibuses.

A summer curriculum guide, the Special Education Teacher's Guide in Communication Arts, was developed for the program and was introduced and field-tested in the 1983 cycle. Results, which are presented in a separate O.E.E. report, indicated that teachers found it to be a useful supplementary instructional guide. Moreover, analysis of aggregate student achievement data from the current and previous cycles indicated a moderately strong relationship between teachers' use of particular lessons from the guide and

student mastery of related skills, holding mastery during the previous cycle constant ($r_{partial} = 0.56$).

Based on the findings presented, the following recommendations are offered:

- continue to offer pre-service and in-service training on-site;
- continue to plan for the program as early as possible to ensure optimal student recruitment and provision of materials and supplies;
- continue to incorporate a recreational or athletic component into remedial academic instruction;
- expand the Special Education Teacher's Guide in Communication Arts to cover additional reading objectives; and
- continue to use minibuses, as well as standard and lift buses, for transportation, and to have bus drivers make trial runs so that they are familiar with the bus routes before the program begins.

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I. INTRODUCTION

This is the report of the evaluation of the summer, 1983 E.C.I.A. Chapter 1 program, Reading and Mathematics with Athletics. This program, which was operated by the Division of Special Education (D.S.E.) of the New York City Public Schools, was designed to provide supplementary remediation by incorporating sports activities into reading and math instruction. Students also participated in the New York City Big Apple Sports program.

Over 2,000 handicapped Chapter 1-eligible students participated in the program which took place in 13 schools located in the five boroughs. The program operated for four hours a day, five days a week, from July 7, 1983 to August 17, 1983. The overall goals of the program were to maintain the gains made by the students during the 1982-83 school year and to focus on the kinds of reading and math skills which are tested in the standardized, norm-referenced tests used in the citywide testing program.

The pupil achievement objectives of the program were that 75 percent of the students who attended 20 or more sessions would master at least two new skills in reading and math each, and at least 50 percent would master three or more new skills in each area. Pupil achievement was assessed through ongoing administration of the Fountain Valley Teacher Support System in Reading and the KeyMath Diagnostic Arithmetic Test.

The evaluation of the 1981 summer D.S.E. program, Learning to Read Through the Arts, showed that nearly all (92.2 percent) of the program participants who attended at least 15 sessions mastered at least one new skill in reading, most (63.1 percent) mastered two or more, and about one-third (29.7 percent) mastered at least three. The majority of students

(55 percent) attended 20 or more sessions; average attendance was 20.1 days; mean percentage attendance was 77.4 percent.

Similarly, in 1982, the evaluation of the summer D.S.E. program, Reading and Math Through the Community as Classroom showed that nearly all (87.8 percent) of the students who met the 20-day attendance criterion mastered one skill in reading, and about 92 percent mastered one skill in math; over half mastered two or more reading skills (52.5 percent) or math skills (55.5 percent); and about one-fifth mastered three or more skills in reading (20.5 percent) and nearly one-quarter in math (24 percent). Mean attendance was 21.9 days and nearly three-fourths (70.9 percent) of the students attended at least 20 program sessions; mean percentage attendance was 77.2 percent.

Positive findings from these and previous cycles supported the continued incorporation of a highly motivating recreational or artistic component into the summer program. In the 1983 program, students received 60 minutes of reading instruction, 60 minutes of math instruction, as well as a gym period or athletic instruction. Teachers also integrated sports concepts and the sports-related activities into the teaching of reading and math.

Thus, the purpose of the evaluation was twofold:

- to document the implementation of the program, including the integration of the sports activities with reading and math instruction, and
- to assess student achievement of short-term reading and math skills and examine the specific content areas of achievement in reading.

Both quantitative data on pupil achievement and qualitative data on program implementation were compiled by the Office of Educational Evaluation (O.E.E.) to evaluate the current program. O.E.E. field consultants visited all program sites and completed observation and interview records. Program

teachers recorded pupil achievement data from the Fountain Valley and KeyMath Tests on O.E.E.-developed data retrieval forms. This report presents the findings of the evaluation of the 1983 E.C.I.A. Chapter 1 summer program and relates these results to those of previous cycles.

II. EVALUATION OF PROGRAM IMPLEMENTATION

PROGRAM DESCRIPTION

The 1983 summer program provided supplementary reading and math instruction to over 2,000 handicapped Chapter 1-eligible students who attended special education classes during the regular school year.

A diagnostic-prescriptive methodology was used based on profiles from the Fountain Valley Teacher Support System in Reading and the KeyMath Diagnostic Arithmetic Test. Students received 60 minutes of reading instruction, 60 minutes of math instruction, and at least 30 minutes of a physical education or sports activity daily. In addition, one day each week, students received further sports instruction, primarily in swimming or tennis.

Reading instruction was supplemented by the Special Education Teacher's Guide in Communication Arts, a curriculum guide developed for the program and introduced during the 1983 cycle. The guide was adapted from the Promotional Gates Program curriculum developed by the Division of Curriculum and Instruction for general education. (A separate O.E.E. report documents teacher reactions to the guide and its effect on student achievement.)

Funded program staff were 207 classroom teachers and 207 paraprofessionals. Tax-levy funded staff included site supervisors, teacher trainers, and unit teachers. Staff at each site were also provided by the Big Apple Sports program.

METHODOLOGY

Field consultants visited program sites twice to observe instruction, inspect student records, and interview staff regarding materials, pro-

service and in-service training, and program implementation. In all, 53 classes were observed and 53 teachers (27 reading and 26 math) were interviewed, or approximately two reading teachers and two math teachers at each site. Interviews were also conducted with six unit teachers, twelve site supervisors, and six paraprofessionals.

FINDINGS

Pre-service and In-service Staff Training

Site supervisors attended a full-day orientation session at central headquarters and nearly all of the teachers and paraprofessionals attended a comprehensive, two-day orientation at their sites. The orientation covered the philosophy of the program, methods of incorporating sports into reading and math instruction, test administration and interpretation, as well as a tour of the site.

Most of the teachers, 44 out of 53, were enthusiastic about the expanded orientation. That it was held on-site was seen as very helpful for planning; teachers reported that they were prepared to start teaching immediately instead of having to take time to familiarize themselves with the facility. Teachers also found useful the suggestions offered and the materials made available for integrating sports with reading and math. A number said that the clear overview provided by the orientation enabled them to begin implementation at once. A few of the more experienced teachers found the orientation unneccessary and some said they would have liked more background information on students, particularly medical information.

On-going assistance was available to teachers from on-site teacher trainers who suggested materials and activities and were generally available

for assistance with curriculum. Teachers reported that they found this a highly effective method for providing in-service training.

Setting and Program Organization

At most sites, reading and math instruction for at least some classes were departmentalized; students studied reading with one teacher and math with another teacher. A number of teachers commented that departmentalization promoted students' interest; movement to a different location and interaction with different teachers reportedly counteracted boredom and short attention spans. Classrooms were generally decorated to reflect a sports motif, and student work samples showed that sports were being integrated into the curriculum.

The number of pupils in attendance in the classrooms ranged from three to 15, with an average of eight. All 53 classes visited had a teacher and a paraprofessional, and nine classes had student teachers, as well.

Materials and Supplies

Teachers were asked which materials they found most useful for their students. Reading teachers mentioned over 50 different books, periodicals, and games, as well as teacher-made materials. Most frequently noted were S.R.A Reading Lab, Hammond Incorporated Finding The Main Idea, and Learning Systems Reading Miniworkbooks and Main Idea Context Clues; each was mentioned by six to eight of the 27 reading teachers. Teacher-made materials included rexographs, games, and arts and crafts materials.

Teachers also noted the type of skill for which each material was used. Aggregation of these data showed that comprehension skills were indicated most often (32 percent of all responses), followed by vocabulary development

(25 percent), study skills (18 percent), structural analysis (13 percent), and phonetic analysis (12 percent).

Math teachers listed more than 40 different books, periodicals, and games, in addition to teacher-made materials, as being useful for instruction. The most frequently mentioned commercial materials were S.R.A. Schoolhouse, Random House Problem Solving and Scoring High In Math, Learning Systems Math Miniworkbooks, and Steck-Vaughn Succeeding In Math; each was mentioned by from four to eight of the 26 math teachers.

Teachers indicated that mathematics materials were most often used for instruction in arithmetic operations (42 percent of all responses), next most frequently for applications such as measurement (33 percent), and least often for content, e.g. numeration (25 percent).

All but two sites had materials and supplies available at the beginning of the program. Forty-three of 53 teachers felt that the materials were at an appropriate level for their students.

Student Records and Assessment

O.E.E. field consultants found the prescriptive reading logs up-to-date at 25 of the 27 reading classes visited; work samples were available in all classes. Prescriptive math logs were up-to-date at 23 of the 26 math classes and work samples were available in 25 classes.

In most cases all baseline assessment on the Fountain Valley and KeyMath tests took place during the first week of the program. Occasionally, initial testing extended beyond the first week when more than one teacher shared a test kit or when students entered the program late.

Approximately two-thirds of the teachers said they found both the KeyMath and Fountain Valley tests useful for identifying short-term objectives. Of the others, nine thought they were too time-consuming for a summer program, and eight found them inappropriate for their students.

Instructional Activities

Reading teachers used a wide range of methods to teach a variety of reading skills. Consultants observed 27 reading sessions, 21 of which included sports concepts. For example, during one lesson, students categorized various sports according to whether they were played in the water, on land, or in the air. Other examples included a sequencing lesson based on the previous day's sports activity, teacher-made "football" and "baseball" games involving vocabulary flashcards, the reading of sports-related stories, and discussions about the history of various sports.

Reading teachers also described other methods which they employed, in addition to those observed. These included the use of newspapers, magazines such as Sports Illustrated, and a broad range of books to teach vocabulary, study skills, career-planning, and geography, and the rules and regulations of various games and sports for vocabulary, comprehension skills, and spelling. Students reportedly wrote stories based on sports and sports figures, and developed language-experience charts on which they recorded their own participation in sports activities.

Of the 26 mathematics lessons observed, 14 were sports related. One lesson, for example, used a discussion of baseball to teach numbers and sequencing. In other lessons, students developed bar graphs based on soccer

and baseball scores, compared measurements of football fields and broad jumps, and solved math word problems based on a student swim meet.

Other sports-related mathematics lessons described by teachers included the use of team sizes, scoring systems, sports statistics, racing distances, playing field and court dimensions, and hypothetical concessions purchases to teach number concepts, arithmetic operations, and conversions between the metric and English systems of measurement. The mathematics teachers said they also effectively used newspapers, magazines, and books as teaching aids, as did the reading teachers.

Transportation

During the 1983 summer program, transportation was viewed by staff as a positive factor. Site supervisors, unit teachers, reading and math teachers, and paraprofessionals all noted that, with few exceptions, buses were on time and drivers were cooperative with students and school personnel. For the first time, minibuses were used in a number of districts, in addition to standard and lift buses. Staff felt that these minibuses were extremely beneficial to the program: bus rides were shorter and bus drivers were better able to negotiate narrow, crowded streets.

III. EVALUATION OF PUPIL ACHIEVEMENT OBJECTIVES

This chapter presents descriptive analyses of the target population, pupil attendance, and reading and mathematics achievement data. Pupil achievement was monitored through ongoing administration of the Fountain Valley Reading and KeyMath Diagnostic Arithmetic Tests and was reported by program teachers on O.E.E.-designed data retrieval forms.

FINDINGS

Target Population and Attendance

In all, 2,157 students participated. Over half (58 percent) of the students were from Health Conservation 30 classes for learning disabled students; 15 percent were from classes for the emotionally handicapped; nine percent were from classes for the educable mentally retarded; nine percent were from neurologically impaired and emotionally handicapped classes; and the remaining nine percent were from several low incidence programs, including health impaired, visually handicapped, and orthopedically impaired. Students' ages ranged from six to 16 years, with an average age of 10.7 years (S.D. = 2.2).

Over two-thirds (68 percent) of the students for whom attendance data were reported attended 20 or more of the program's 30 sessions. Average attendance was 21.5 sessions. Over 95 percent of the students began the program during the first week.

Evaluation of Reading Objective

The reading objective proposed that 75 percent of the students who attended 20 or more program sessions would demonstrate growth in reading as

shown by mastery of at least two new skills on the Fountain Valley Reading Test and that at least 50 percent would master three or more new skills. Reading data were reported for 2,068 students, or 96 percent of the participants.

To determine whether the objective was attained, a frequency distribution of reading mastery was prepared for students meeting the 20-day attendance criterion. These data, which are presented in Table 1, indicated that approximately 87 percent of the 1,347 students attending 20 or more sessions mastered two or more new reading skills and nearly three-fourths (72.8 percent) mastered three or more. Thus, the objective was surpassed.

For the total population, including those students attending fewer than 20 sessions, 84.3 percent mastered one or more new reading skills, 77.2 percent mastered at least two, and 61.7 percent mastered three or more. (These data are presented in Table 2).

Mean number of reading skills mastered by students attending 20 or more sessions was 3.4 (S.D. = 1.8) and mean number mastered by all students was 2.9 (S.D. = 1.9).

Mastery of Component Reading Skills

Comprehension and vocabulary skills apparently received the most attention, as indicated by the numbers of students who mastered skills in these areas. Over half (58.7 percent) of the students mastered one or more comprehension skills and about half (47.2 percent) mastered one or more vocabulary skills. In contrast, about one-fourth (27.7 percent) mastered structural analysis skills and fewer than one-fifth mastered study skills (17.5 percent)

Table 1

Frequency Distribution of Mastery of Reading Skills
by Students Who Attended 20 or More Sessions
N = 1,347

Number of Skills Mastered	Number of Students	(Percent)	Cumulative Percent
9	15	(1.1)	1.1
8	15	(1.1)	2.2
7	44	(3.3)	5.5
6	60	(4.5)	10.0
5	110	(8.2)	18.2
4	398	(29.5)	47.7
3	338	(25.1)	72.8
2	196	(14.6)	87.4
1	74	(5.5)	92.9
0	97	(7.2)	100.1[a]
	1,347		

[a]Total exceeds 100 percent because of rounding.

- Approximately 87 percent of the students who attended at least 20 program sessions mastered two or more new reading skills and nearly three-fourths (72.8 percent) mastered three or more. Mean number of skills mastered was 3.4 (S.D. = 1.8).

Table 2

Frequency Distribution of Mastery of Reading Skills
by All Students for Whom Complete Data Were Reported
N = 2,068

Number of Skills Mastered	Number of Students	(Percent)	Cumulative Percent
9	19	(0.9)	0.9
8	19	(0.9)	1.8
7	55	(2.7)	4.5
6	75	(3.6)	8.1
5	133	(6.4)	14.5
4	531	(25.7)	40.2
3	445	(21.5)	61.7
2	321	(15.5)	77.2
1	147	(7.1)	84.3
0	323	(15.6)	99.9[a]
	2,068		

[a]Does not total 100 percent because of rounding.

- Over 80 percent (84.3 percent) of participating students mastered one or more new reading skills; more than 60 percent (61.7 percent) mastered three or more. Mean number of skills mastered was 2.9 (S.D. = 1.9).

or phonetic analysis skills (15.9 percent). (See Table 3.)

An emphasis on comprehension and vocabulary skills was also reflected in the use of program supplies and equipment. Comprehension and vocabulary workbooks were the most extensively used reading materials; 35 percent of the students used the former and 26.6 percent used the latter. Other widely used reading materials were phonics workbooks, used by 21.6 percent of the students; reading games, used by 15.7 percent; and language workbooks, used by 11.1 percent. (See Table 4).

Impact of the Summer Curriculum Guide on Reading Mastery

Findings on the use and impact of the Special Education Teacher's Guide in Communication Arts are presented in full in a separate O.E.E. report; some of the highlights of those findings are presented here. First, analyses of the teachers' use of the guide showed that the most widely used lessons covered comprehension and vocabulary skills, a finding which parallels those from analyses of individual student achievement and materials use data.

Second, analyses of aggregate student achievement data from the current and previous cycles indicated a moderately strong relationship between teachers' use of particular lessons from the guide and student mastery of the skills addressed in those lessons ($r_{partial} = 0.56$). It was suggested therefore that the use of the guide contributed to increased mastery of those skills covered by lessons in the guide. However, it must be noted that only 14 percent of all Fountain Valley reading objectives were covered by the guide. Moreover, analysis of aggregate achievement data showed that nearly 75 percent of the objectives mastered by all program students were

Table 3

Number of Students Who Mastered One or More New Skills in Each of Five Reading Areas Assessed by the Fountain Valley (N = 2,068)

Skill Area	Number of Students	(Percent of Population)
Comprehension	1,214	(58.7)
Vocabulary	977	(47.2)
Structural Analysis	572	(27.7)
Study Skills	362	(17.5)
Phonetic Analysis	328	(15.9)

- Instruction was focussed largely on comprehension and vocabulary skills. Over half the participating students (58.7 percent) mastered one or more new comprehension skills and slightly less than half (47.2 percent) mastered at least one new vocabulary skill. About one-fourth (27.7 percent) mastered structural analysis skills and about one-sixth mastered study skills (17.5 percent) and phonetic analysis skills (15.9 percent).

Table 4

Total Number of Students for Whom Each Category of Program Supplies and Equipment Was Used for Instruction (N = 2,157)

Category	Number of Students	(Percent of Population)
Reading and Language Arts		
Comprehension Workbooks	755	(35.0)
Vocabulary Workbooks	574	(26.6)
Phonics Workbooks	466	(21.6)
Reading Games	339	(15.7)
Language Workbooks	239	(11.1)
Reading Kits (e.g. S.R.A. Lab)	208	(9.6)
Basal Readers (Textbooks)	99	(4.6)
Writing Workbooks	44	(2.0)
Reading Machines (Hardware)	4	(0.2)
Mathematics		
Math Workbooks	882	(40.9)
Math Games	380	(17.6)
Math/Science Kits (e.g. Schoolhouse)	241	(11.2)
Manipulative Math Materials	223	(10.3)
Math Textbooks	73	(3.4)
Life Skills Math Materials	47	(2.2)
Other		
General Supplies	594	(27.5)
Other	396	(18.4)
Craft Materials	314	(14.6)
Motor Education Materials	57	(2.6)

- Comprehension, vocabulary, and phonics workbooks were the most widely used reading materials.
- Mathematics workbooks were the most widely used math materials.

Table 5

Frequency Distribution of Mastery of Math Skills
By Students Who Attended 20 or More Program Sessions
N = 1,347

Number of Skills Mastered	Number of Students	(Percent)	Cumulative Percent
9	39	(2.9)	2.9
8	14	(1.0)	3.9
7	32	(2.4)	6.3
6	58	(4.3)	10.6
5	116	(8.6)	19.2
4	417	(31.0)	50.2
3	295	(21.9)	72.1
2	205	(15.2)	87.3
1	76	(5.6)	92.9
0	95	(7.1)	100.0
	1,347		

- Approximately 87 percent of the students who attended at least 20 program sesions mastered two or more new math skills and nearly three-fourths (72.1 percent) mastered three or more. Mean number of skills mastered was 3.5 (S.D. = 1.9).

skills not covered by the guide, indicating that teachers chose a wide range of objectives for instruction. Accordingly, it was recommended that the guide be expanded to cover additional Fountain Valley objectives.

Evaluation of Mathematics Objective

The mathematics objective proposed that 75 percent of the students who attended 20 or more program sessions would demonstrate growth in mathematics as shown by mastery of at least two new skills on the KeyMath Diagnostic Arithmetic Test, and at least 50 percent would master three or more skills. Mathematics data were reported for 2,068 students.

To determine whether the objective was attained, a frequency distribution of mathematics mastery was prepared for students meeting the 20-day attendance criterion. These data, which are presented in Table 5, indicated that approximately 87 percent of students attending 20 or more sessions mastered two or more new math skills and nearly three-fourths (72.1 percent) mastered three or more. Thus, the objective was surpassed.

For the total population, including those students attending fewer than 20 sessions, 84.3 percent mastered at least one new skill, 77.3 percent mastered two or more, and 60.4 percent mastered three or more. (These data are presented in Table 6.)

Mean number of mathematics skills mastered by students attending 20 or more sessions was 3.5 (S.D. = 1.9) and mean number mastered by all students was 3.0 (S.D. = 2.0).

Table 6

Frequency Distribution of Mastery of Math Skills
by Students for Whom Complete Data Were Reported
N = 2,068

Number of Skills Mastered	Number of Students	(Percent)	Cumulative Percent
9	49	(2.4)	2.4
8	20	(1.0)	3.4
7	38	(1.8)	5.2
6	71	(3.4)	8.6
5	148	(7.2)	15.8
4	540	(26.1)	41.9
3	382	(18.5)	60.4
2	349	(16.9)	77.3
1	145	(7.0)	84.3
0	326	(15.8)	100.1[a]
	2,068		

[a]Total exceeds 100 percent because of rounding.

- Over 80 percent (84.3 percent) of participating students mastered one or more new math skills; more than 60 percent (60.4 percent) mastered three or more. Mean number of skills mastered was 3.0 (S.D. = 2.0).

IV. CONCLUSIONS AND RECOMMENDATIONS

The summer, 1983 E.C.I.A. Chapter 1 program, Reading and Mathematics with Athletics, provided supplementary remediation by incorporating sports activities into reading and math instruction. The program served 2,157 handicapped Chapter 1-eligible students at 13 schools located in the five boroughs. The program operated for four hours a day, five days a week from July 7, 1983 to August 17, 1983.

Results of the analyses of pupil achievement data, interviews, and observations indicated that the summer program was highly effective in meeting its proposed goals. Approximately 87 percent of the 1,347 students attending 20 or more sessions mastered two or more new reading skills and nearly three-fourths (72.8 percent) mastered three or more. For the total population, including those students attending fewer than 20 sessions, 84.3 percent mastered at least two new reading skills, and 61.7 percent mastered three or more.

The program also achieved positive results in meeting its proposed goals in mathematics. Approximately 87 percent of students attending 20 or more sessions mastered two or more new math skills and nearly three-fourths (72.1 percent) mastered three or more. For the total population, including those students attending fewer than 20 sessions, 77.3 percent mastered two or more new skills and 60.4 percent mastered three or more.

In comparison, in the two previous cycles, 1981 and 1982, no more than about 60 percent of the students who met the attendance criterion mastered at least two skills in either reading or math and fewer than one-third mastered three or more skills in either area.

Staff were quite enthusiastic about the design and implementation of the program during the 1983 cycle. Expanded on-site training was seen as particularly effective in preparing teachers for the program as well as in providing ongoing consultation in student assessment, individualization of instruction, and use of materials. Teachers reported that the incorporation of athletic activities and sports concepts into the program strongly helped to motivate the students to learn new academic skills. In addition, they felt that the students benefited by learning new social and recreational skills. Finally, in marked contrast to previous cycles, transportation services were seen as a positive program feature, a situation which staff attributed at least in part to the introduction of minibuses.

A summer curriculum guide, the Special Education Teacher's Guide in Communication Arts, was developed for the program and was introduced and field-tested in the 1983 cycle. Results, which are presented in a separate O.E.E. report, indicated that teachers found it to be a useful supplementary instructional guide. Moreover, analysis of aggregate student achievement data from the current and previous cycles indicated a moderately strong relationship between teachers' use of particular lessons from the guide and student mastery of related skills, holding mastery during the previous cycle constant ($r_{partial} = 0.56$). It was suggested that use of the guide contributed to increased mastery of those skills covered by lessons in the guide; however, it was noted that the guide addressed only about 14 percent of all Fountain Valley reading objectives. In addition, student achievement data indicated that nearly 75 percent of the reading objectives mastered by all program participants were skills not covered by the guide, indicating that

teachers chose a wide range of objectives for instruction. Accordingly, it was recommended that the curriculum guide be expanded to address additional Fountain Valley objectives.

In summary, the findings of the evaluation of the 1983 program showed substantial improvement in all aspects of program functioning, a trend which has been apparent over a number of years but which was most striking in the current cycle. The improvement in student achievement has already been noted; in addition, the data showed that the program was also more effective organizationally, as shown by prompt start-up, timely delivery of materials and supplies, effective staff training, and problem-free transportation services.

Based on the findings which have been presented, the following recommendations are offered:

- continue to offer pre-service and in-service training on-site;
- continue to incorporate a recreational or artistic component into remedial academic instruction;
- continue to plan for the program as early as possible to ensure optimal student recruitment and provision of materials and supplies;
- expand the Special Education Teacher's Guide in Communication Arts to cover additional Fountain Valley reading objectives; and
- continue to use minibuses, as well as standard and lift buses, for transportation, and to have bus drivers make trial runs so that they are familiar with the bus routes before the program begins.