

# Multisensory Teaching Approach for Reading, Spelling, and Handwriting, Orton-Gillingham Based Curriculum, in a Public School Setting

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*This paper includes an overview of curriculum information and the basic techniques of a multisensory approach for teaching alphabet and dictionary skills, reading, spelling, and cursive handwriting. It also reports the results of a four-year study of reading and spelling in both remedial and nonremedial classes in a public school. The California Achievement Test (CAT) scores in reading and spelling for students in both remedial and nonremedial classes improved over baseline scores following this multisensory approach. Additionally, there was a tendency for the CAT mean scores to increase corresponding to the number of years students had been taught by the multisensory program.*

The relationship of perception and/or language to reading, spelling, and handwriting achievement has been investigated extensively (Belmont and Birch 1965; Bruner 1957; Critchley 1964, 1970; Cruickshank 1966; Hermann 1959; Kephart 1960; Kirk 1963, 1968; Money 1962; Myklebust and Johnson 1967; Orton 1928, 1929, 1932, 1937; Rappaport 1969; Strauss and Lehtinen 1947; Thompson 1966; Werner and Strauss 1939, 1940). Some theorists have postulated that various kinds of perceptual training prerequisite to educational instruction would improve an individual's ability to master academic skills of reading, spelling, and handwriting (Barsch 1967; Frostig and Maslow 1969; Kephart 1960; Rappaport 1969). Other researchers also have considered the role of

language as related to reading, spelling, and handwriting skills (de Hirsch, Jansky, and Langford 1966; Gough and Hillinger 1980; Gough and Tunmer 1986; Kirk and Bateman 1962; Liberman 1982; Liberman and Rubin 1983; Liberman and Shankweiler 1985; Mann 1984; Myklebust and Johnson 1967; Orton 1928, 1929, 1932, 1937). Orton (1929) recognized that perception played a role in the ability to master written language skills; however, he suggested that the answer to remediation lay in developing different instructional methods for teaching reading, spelling, and handwriting skills. Both Monroe (1932) and Gillingham (1936), working with Orton, developed phonic remedial procedures for teaching dyslexic children. Gillingham and Stillman (1956) published a manual recommending teaching methods and multisensory techniques based on Orton's theories and suggestions. For additional background information on Orton's theories concerning language difficulties, consult Rawson (1974).

During 1965 to 1975, Alphabetic Phonics (AP), a curriculum for teaching reading, spelling, and cursive handwriting was developed by the staff of the Texas Scottish Rite Hospital Language Laboratory in Dallas, Texas (Waites and Cox 1969). Beginning with the Orton-Gillingham-Stillman system of remedial language training, an interdisciplinary staff of educators, physicians, psychologists, speech therapists, occupational therapists, and physical therapists worked daily with approximately 100 children, expanding the Orton-Gillingham-Stillman system to include the teachings of Bruner, Piaget, Fernald, Montessori, Carroll, Bloom, and others (Cox 1984). This refinement, structuring, and expansion of the original system made it possible to work with small homogeneous groups of students, rather than on an individual basis, as Gillingham recommended. Beginning in 1977, the AP materials and techniques were used for teaching one remedial class in a small public school district in Northeast Texas. Because of the progress made by the students in this class, in 1978 a group of regular classroom teachers became interested in using AP materials and techniques for all students in their regular classrooms. Additional materials, called the Multisensory Teaching Approach for Reading, Spelling, and Handwriting (MTARSH) Program and the Classroom Alphabetic Phonics (CAP) alphabet and dictionary skills, were developed for this purpose.<sup>1</sup> The development of these materials made it possible to use the same precise Orton-Gillingham-Stillman and AP techniques and materials with large homogeneous groups of children as well as with small homogeneous groups of dyslexic and learning-disabled students. This article reports the results of an experimental project employing the

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<sup>1</sup>Information concerning the MTARSH and CAP programs may be obtained from Margaret T. Smith, 814 South Bois d'Arc, Forney, TX 75126.

MTARSH Program which took place in a public school during a four-year period beginning in 1977.

## Method

### Organization of the Curriculum

The MTARSH Program, a practical application of a mastery learning model (Bloom 1968; Carroll 1963), addresses the beginning reading requirements as described by Chall (1983) as Stage One (Decoding) and Stage Two (Confirmation). Four areas of study, alphabet and dictionary training, cursive handwriting, reading, and spelling are organized for mastery learning. The program is ungraded and follows the sequence of reading and spelling concepts as listed in the AP curriculum (Cox 1984). Alphabet and cursive-handwriting activities and techniques are based on the recommendations of Gillingham and Stillman (1956) and Cox (1984). Reading and spelling concepts include a study of phoneme-grapheme correspondences as well as pronunciation and spelling rules. The MTARSH Program includes specific directions for teaching, reviewing, and practicing with each grapheme and concept. Practice activities follow a skill hierarchy, and criterion-referenced mastery checks are included for periodic evaluation for mastery. Comprehension skills are taught through verbal expression, beginning on the oral level and progressing to written expression. A management system designed to keep track of each individual student's mastery enables teachers to individualize practice so that each student can practice sufficiently to meet the mastery criteria (90–100 percent) for each concept or skill.

### Teaching Techniques

Two basic decoding techniques are employed: synthesizing phonics and memorizing whole words. Synthesizing phonics and procedures for sounding out unknown words are used for words that are regular. Irregular words must be memorized; multisensory techniques for learning whole words are based on those developed by Fernald (1943). Primary emphasis is placed on learning the regularities of the English language (Hanna et al. 1966).

Specific techniques are designed for each aspect of the mastery progression: introduction, review, practice. The smallest units of written language, letters and letter clusters, are taught simultaneously for reading, spelling, and cursive handwriting, using the multisensory steps recommended by Gillingham and Stillman (1956). Once introduced, these graphemes are reviewed daily. Concepts which teach pronunciation and spelling rules and procedures designed to develop independent readers and spellers are emphasized throughout all

activities. Evaluation involves both teacher and student; the teacher's primary responsibility is to teach students how to evaluate their learning progress.

### Procedure

The AP approach to teaching basic reading, spelling, and cursive handwriting was introduced into this public school in the fall of 1977 with six students in a remedial class receiving instruction from one teacher being trained in this approach. Although the original plan did not include offering this type of instruction to other students, because of the interest of other teachers, administrators, and parents in the school district, the program gradually expanded into other classes. Three years later, beginning with the fall semester of 1980, all students enrolled in Grades 1 through 6 in both remedial and nonremedial classes were receiving instruction by the MTARSH Program. (See Table I.) The remedial classes were composed of students who qualified for Chapter I or Special Education/L.L.D. programs; all other students enrolled in this public school were classified as nonremedial. Grade 1 received 25 minutes of daily instruction, and Grades 2, 3, 4, 5, and 6 received 55 minutes of daily instruction. Remedial classes received the MTARSH Program as their only instruction in reading, spelling, and cursive handwriting. The MTARSH Program was taught to nonremedial students in lieu of the regular state-adopted spelling and handwriting programs, although the supplemental reading materials and the state-adopted basal readers continued to be used.

During the four years covered in this study, 426 students were trained by the MTARSH Program; of these, 282 were enrolled in remedial classes and 144 in nonremedial classes. No modification was made in the school-wide evaluation procedure. For instance, in April of each year, the California Achievement Test (CAT) was administered to all students enrolled in this elementary school, a routine administrative procedure, with CAT Form 1970A being used from 1976 through 1979. In 1980 and again in 1981, CAT Form 1977-78C was administered. Scores obtained from CAT Form 1977-78C were converted to 1970A norms, and all data reported in this article are based on Form 1970A of the CAT.

Students advanced from grade to grade according to school policy. For example, students enrolled in the third grade in 1978-79 were the same students who were in the fourth grade in 1979-80, in the fifth grade in 1980-81, and so on. As the pupils advanced from one grade to the next, there was some attrition and addition of students to the classes; however, the majority of the students in each class and grade had received the number of years of instruction by the MTARSH Program as indicated in Tables II, III, IV, and V.

Two of the 14 teachers involved in this study had received special training in the use of AP materials and techniques. The remaining 12 teachers were untrained and relied on workshops and field-test copies of the MTARSH Program for guidance. The chronology of the gradual expansion of the MTARSH Program into the other classes is found in Table I.

## Results

Mean scores for nonremedial spelling and reading classes were always higher than mean scores for remedial classes. However, for both nonremedial and remedial classes, mean scores made in years after baseline (baseline being the two years prior to the introduction of the MTARSH Program) tended to be higher than mean baseline scores.

### Remedial Classes

A one-way analysis of variance indicated that when class means were compared with baseline means, statistically significant score gains in remedial spelling and reading were made for students in Grades 3 and 5 and in Grades 3, 5, and 6, respectively. An inspection of the means of the classes showed that when the mean of a given class was compared with the baseline mean, there was an improvement in 92 percent of the comparisons.

### Nonremedial Classes

A one-way analysis of variance indicated that when class means were compared with baseline means, statistically significant score gains were made in spelling for students in Grades 3, 4, 5, and 6 and in reading for students in Grades 3 and 5. An inspection of the means of the classes showed that when the mean of a given class was compared

Table I  
Chronology of the Introduction of the MTARSH Program

Grade	Year					
	1977-78*	1978-79*	1979-80*	1980-81*	1979-80**	1980-81**
6	X	X	X	X		X
5		X	X	X		X
4		X	X	X	X	X
3		X	X	X	X	X
2			X	X	X	X
1			X	X		X

\* Remedial classes

\*\* Nonremedial classes

with the baseline mean, there was an improvement in 83 percent of the comparisons.

### Statistical Analysis

The specific comparisons accompanied by a statistical analysis follow. The means and standard deviations for CAT scores, along with the number of students in each grade and class, are presented in Tables II, III, IV, and V.

A one-way analysis of variance was used to test whether differences among the means of classes in a given grade were statistically significant, as a function of the number of years being taught by the MTARSH Program. When an overall *F*-ratio was significant, the Tukey's Honestly Significant Difference (HSD) posteriori test was employed to identify the specific classes that were statistically different from each other. The alpha level was set at .05 for all analyses.

*Remedial Spelling (Table II).* Grade 3: The baseline mean score (baseline being the two years prior to the introduction of the MTARSH Program) was 299.08, and the mean scores after 1, 2, and 3 years of instruction by the MTARSH Program were 314.17, 312.65, and 360.39,

Table II  
CAT Mean Scores, Standard Deviations, and N's for Students Enrolled in Remedial Spelling Classes When Tested (a) During the Baseline Period and (b) After Instruction by the MTARSH Program

Grade	Years taught by MTARSH Program		S.D.	No. of students	School year when tested
	Mean				
3	baseline	299.08	43.59	12	1977-78
	1	314.17	48.25	24	1978-79
	2	312.65	27.82	26	1979-80
	3	360.39	43.33	28	1980-81
4	baseline	325.73	52.37	30	1976-77; 1977-78
	1	352.29	37.20	17	1978-79
	2	338.20	31.95	20	1979-80
	3	345.57	45.82	28	1980-81
5	baseline	351.88	60.30	25	1976-77; 1977-78
	1	344.33	59.20	18	1978-79
	2	383.88	43.58	24	1979-80
	3	398.93	69.33	27	1980-81
6	baseline	378.64	67.46	11	1976-77
	1	398.77	41.63	13	1977-78
	2	380.29	63.15	17	1978-79
	3	382.32	48.85	19	1979-80
	4	415.25	64.27	20	1980-81

respectively,  $F(3, 86) = 9.88, p < .00001$ . Students' CAT scores after being taught by the MTARSH Program for three years were superior to their baseline scores and also superior to their scores after both one and two years of being taught by the MTARSH Program. Grade 4: The means ranged from a baseline of 325.73 to 352.29; however, none of the means were significantly different from each other,  $F(3, 91) = 1.62, p > .05$ . Grade 5: The baseline mean score was 351.88, and mean scores were 344.33, 383.88, and 398.93 after one, two, and three years of instruction by the MTARSH Program, respectively,  $F(3, 90) = 4.46, p < .006$ . The mean score after three years of being taught by the MTARSH Program was superior to both the baseline mean score and the mean score after one year of being taught by the MTARSH Program. Grade 6: The baseline mean score was 378.64, and mean scores after one, two, three, and four years of instruction by the MTARSH Program were 398.77, 380.29, 382.32, and 415.25, respectively. None of the means were significantly different from each other,  $F(4, 65) = 1.30, p > .05$ .

*Remedial Reading (Table III).* Grade 3: The baseline mean score was 297.09, with means of 323.50, 307.69, and 343.79 corresponding to one, two, and three years of instruction by the MTARSH Program, respectively,  $F(3, 96) = 3.52, p < .02$ . CAT scores made after the third year

Table III

CAT Mean Scores, Standard Deviations, and N's for Students Enrolled in Remedial Reading Classes When Tested (a) During the Baseline Period and (b) After Instruction by the MTARSH Program

Grade	Years taught by MTARSH Program		Mean	S.D.	No. of students	School year when tested
3	baseline		297.09	40.60	22	1976-77; 1977-78
	1		323.50	42.24	24	1978-79
	2		307.69	50.35	26	1979-80
	3		343.79	74.05	28	1980-81
4	baseline		318.17	46.24	30	1976-77; 1977-78
	1		325.47	29.80	17	1978-79
	2		328.70	44.16	20	1979-80
	3		329.25	52.91	28	1980-81
5	baseline		353.70	44.48	27	1976-77; 1977-78
	1		345.39	35.51	18	1978-79
	2		382.21	44.82	24	1979-80
	3		399.74	63.00	27	1980-81
6	baseline		361.68	44.32	28	1975-76; 1976-77
	1		368.08	49.54	13	1977-78
	2		379.94	43.53	18	1978-79
	3		391.32	42.03	19	1979-80
	4		414.85	57.24	20	1980-81

of instruction by the MTARSH Program were superior to baseline scores. Grade 4: The CAT baseline mean scores ranged from 318.17 to 329.25. None of the means were significantly different from each other,  $F < \text{unity}$ . Grade 5: The baseline mean score was 353.70, with 345.39, 382.21, and 399.74 being the means after one, two, and three years of instruction by the MTARSH Program, respectively  $F(3, 92) = 6.22, p < .0007$ . The mean score after the third year of instruction by the MTARSH Program was significantly different from both the baseline mean score and the mean score after one year of instruction by the MTARSH Program. Grade 6: The baseline mean score was 361.68, with 368.08, 379.94, 391.32, and 414.85 being the means after one, two, three, and four years of instruction by the MTARSH Program, respectively,  $F(4, 93) = 4.16, p < .004$ . The mean score after four years of being taught by the MTARSH Program was significantly greater than the baseline mean score.

*Nonremedial Spelling (Table IV).* Grade 3: The baseline mean score was 405.26, with 382.65 and 497.44 being the mean scores after one and two years of instruction by the MTARSH Program, respectively,  $F(2, 83) = 44.33, p < .00001$ . The mean score after two years of instruction by the MTARSH Program was superior to both the baseline mean score and the mean score after one year of instruction by the MTARSH Program. Grade 4: The baseline mean score was 432.62, and the mean scores after one and two years of instruction by the MTARSH Program were 384.27 and 447.96, respectively,  $F(2, 94) = 10.18, p < .0001$ . Both the baseline mean score and the mean score after two years of instruction

Table IV

CAT Mean Scores, Standard Deviations, and N's for Students Enrolled in Nonremedial Spelling Classes When Tested (a) During the Baseline Period and (b) After Instruction by the MTARSH Program

Grade	Years taught by MTARSH		Mean	S.D.	No. of students	School year when tested
	Program					
3	baseline		405.26	46.69	43	1977-78; 1978-79
	1		382.65	40.66	20	1979-80
	2		497.44	35.11	23	1980-81
4	baseline		432.62	52.05	45	1977-78; 1978-79
	1		384.27	43.14	26	1979-80
	2		447.96	65.74	26	1980-81
5	baseline		453.10	39.31	48	1978-79; 1979-80
	1		504.00	64.45	25	1980-81
6	baseline		476.77	63.34	56	1978-79; 1979-80
	1		507.17	55.33	23	1980-81



by the MTARSH Program were significantly greater than the mean score after one year of instruction by the MTARSH Program. Grade 5: The baseline mean score was 453.10, and the mean score after one year of instruction by the MTARSH Program was 504.00,  $F(1, 71) = 9.01, p < .0003$ . Grade 6: The baseline mean score was 476.77, and the mean score after 1 year of instruction by the MTARSH Program was 507.17,  $F(1, 77) = 4.03, p < .05$ .

*Nonremedial Reading (Table V).* Grade 3: The baseline mean score was 415.40, and the mean scores after one and two years of instruction by the MTARSH Program were 417.30 and 481.52, respectively,  $F(2, 83) = 18.20, p < .00001$ . The mean score after two years of instruction by the MTARSH Program was significantly greater than both the baseline mean score and the mean score after one year of instruction by the MTARSH Program. Grade 4: Mean scores ranged from 410.46 to 425.92,  $F < \text{unity}$ . Grade 5: The baseline mean score was 453.58, and the mean score after one year of instruction by the MTARSH Program was 482.42,  $F(1, 72) = 6.40, p < .01$ . Grade 6: The baseline mean score was 476.18, and the mean score after one year of instruction by the MTARSH Program was 498.09,  $F(1, 77) = 3.11, p > .05$ .

### Observational Trends

Tables II, III, IV, and V indicate that students in the remedial classes of spelling and reading always made lower scores on the CAT than did students in nonremedial classes, which was not an unexpected finding. A less predictable result was the tendency for students

Table V

CAT Mean Scores, Standard Deviations, and N's for Students Enrolled in Nonremedial Reading Classes When Tested (a) During the Baseline Period and (b) After Instruction by the MTARSH Program

Grade	Years taught by		Mean	S.D.	No. of students	School year when tested
	MTARSH Program					
3	baseline		415.40	47.13	43	1977-78; 1978-79
	1		417.30	46.32	20	1979-80
	2		481.52	37.52	23	1980-81
4	baseline		423.91	50.89	45	1977-78; 1978-79
	1		425.92	45.48	26	1979-80
	2		410.46	46.95	26	1980-81
5	baseline		453.58	46.62	48	1978-79; 1979-80
	1		482.42	47.18	26	1980-81
6	baseline		476.18	49.83	56	1978-79; 1979-80
	1		498.09	51.04	23	1980-81

in both remedial and nonremedial classes to make higher scores on the CAT after being instructed by the MTARSH Program than they made on baseline scores. Except for one comparison, CAT scores for classes in remedial spelling were superior to baseline scores, and the same trend was true for classes in remedial reading. For the nonremedial spelling, the CAT scores in two classes fell below baseline; and one class fell below baseline in nonremedial reading.

Another trend was that students' CAT scores tended to be related to the number of years taught by the MTARSH Program; the longer students had been taught by the MTARSH Program, the higher the scores. An index of this relationship was obtained by counting the number of times CAT scores for a given year of instruction by the MTARSH Program exceeded the scores obtained in the previous year of instruction by the MTARSH Program for a given class and grade. Table II shows that for classes in remedial spelling and six of the nine comparisons, the CAT scores for a given year of instruction by the MTARSH Program exceeded the scores made in the previous year of instruction by the MTARSH Program. The same trend was found for remedial reading (Table III), with eight of the nine comparisons being superior to the previous year of instruction by the MTARSH Program. For nonremedial spelling, CAT scores in the subsequent year always were superior to the previous year, and such was the case for one of the two comparisons for nonremedial reading (see Tables III and IV, respectively).

### Discussion

Both statistical analysis and observational trends suggest that CAT scores in spelling and reading for students in both remedial and nonremedial classes tend to improve over baseline scores following instruction by the MTARSH Program. Also, there was a tendency for CAT mean scores to increase corresponding to the number of years students had been taught by the MTARSH Program. However, these trends were not as evident for the classes in Grade 4 as they were for classes in Grades 3, 5, and 6. For the classes' remedial spelling, remedial reading, and nonremedial reading in Grade 4, the difference between the means relative to the number of years of instruction by the MTARSH Program was not significant; and in nonremedial spelling, the significance was due to depressed CAT scores in the first year after instruction by the MTARSH Program. The phenomenon of atypical fourth-grade scores has been addressed by Chall (1983), who referred to it as "the fourth-grade slump" (p. 67).

This was the first time the MTARSH Program was employed in a public school setting in both remedial and nonremedial classes. The

results indicated that, in this school, the MTARSH Program was used successfully with students enrolled in both remedial and nonremedial classes. The MTARSH Program shows promise for teaching in both remedial and nonremedial classes. Although the data analyses were limited to Grades 3 through 6, it would not be unreasonable to generalize that the MTARSH Program could be used prior to Grade 3 or after Grade 6.

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