

Effects of a Three-Tier Strategic Model of Intensifying Instruction Using a Research-Based Core Reading Program in Grades K-3

Abstract: We examined the effects of a three-tier strategic model of intensifying instruction using *Reading Mastery Plus* in grades K-3 at a Title I school. Teachers received training and coaching before and during the program evaluation. They were assessed on their satisfaction with the program as well. The *Diagnostic Indicators of Basic Early Literacy Skills (DIBELS)* was used as a pre- and posttest for grades K-2; the *Scholastic Reading Inventory (SRI)* served as the pre- and posttest for grade 3. Results showed statistically significant improvements in reading across grades. Also, students who received special education or Title I/Learning Assistance Program (LAP) services demonstrated gains equivalent to their typically achieving peers. Further, teachers were satisfied with all aspects of the program.

Reading skills are the basic building blocks to academic success. In fact, reading skills are vital to success in every academic area. Biancarosa and Snow (2004) noted that “students who do not acquire these skills find themselves at a serious disadvantage in social settings, as civil participants, and in the working world” (p. 3). Unfortunately, many stu-

dents struggle with learning to read at high levels (Przychodzin-Havis et al., 2005).

Torgesen (2004) pinpointed concern at the elementary level stating that “too many children are leaving elementary school with reading skills inadequate for the next level of instruction” (p. 8). This concern is echoed in the data gathered by the National Assessment of Educational Progress (National Center for Education Statistics, 2003), where 37% of fourth graders have reading skills identified as “below basic.”

To improve reading performance, schools should examine what core reading programs are in place and if they are aligned with scientifically-based reading research (Vaughn Gross Center for Reading & Language Arts, 2005). “A strong, core reading curriculum is essential for all students” (editors of *American Educator*, 2004, p. 18). Comprehensive core reading programs address five areas of effective reading instruction (i.e., phonemic awareness, phonics, fluency, vocabulary, and text comprehension) and provide focused and direct instruction to students (Armbruster, Lehr, & Osborn, 2003; Carmine, Silbert, Kame’enui, & Tarver, 2004). When implemented between and across grades (e.g., K-3), these programs provide a “seamless pipeline” of instruction, allowing teachers to engage in meaningful conversations about program levels, skill acquisition, and student performance.

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Core programs are essential aspects of the three-tier reading model (see Vaughn Gross Center for Reading & Language Arts, 2005 for details on this model). Tier 1 instruction involves the core reading program. Tier 2 instruction supports and augments the core reading program and may involve “double dosing” or reteaching aspects of the core program. Tier 2 increases instructional time in reading and often reduces group size (Vaughn & Linan-Thompson, 2004). It may also involve adding a supplemental program to strengthen aspects of the core program, if needed (e.g., adding a fluency-building program such as *Read Naturally*). Tier 3 instruction is much more intensive and is specially designed as compared to Tiers 1 and 2; instructional grouping is even smaller (e.g., one to two students), and instructional time is increased to further intensify instruction. The core program is, more often than not, replaced with an intervention program specially designed to meet the needs of struggling readers. The goal is to exit students from this intensive remediation program so that they may participate more fully in the core program with their typically achieving peers. One question remains—Can a research-based core reading program coupled with a strategic model of intensifying instruction serve *all* students including those receiving Title I/Learning Assistance Program (LAP) and special education services?

Reading Mastery Plus is a comprehensive core reading program aligned with scientifically-based reading research recommendations (see National Institute of Child Health and Human Development [NICHD], 2000); it is a revision of the highly effective *Reading Mastery Classic* program (see Adams & Engelmann [1996]; Schieffer, Marchand-Martella, Martella, Simonsen, & Waldron-Soler [2002]; and Stein & Kinder [2004]). An abundance of research has been published on the *DISTAR Reading* (precursor to *Reading Mastery Classic*) and *Reading Mastery Classic*

programs. In fact, the American Federation of Teachers (1998) noted Direct Instruction as one of seven promising programs to teach reading and language arts stating, “When this program is faithfully implemented, the results are stunning” (p. 9). Studies have examined the effectiveness of these Direct Instruction programs in teaching reading skills to general education students. For example, Ashworth (1999) compared the results of using *Reading Mastery Classic* and *DISTAR Reading I* (Direct Instruction) as opposed to basal reading programs with 36 second graders. They found that the Direct Instruction group had higher vocabulary, comprehension, and language scores than the control group on the *Iowa Test of Basic Skills*. Additionally, Sexton (1989) compared *DISTAR Reading I* to *Harcourt Brace Jovanovich* in improving the reading skills of 80 African American first graders. The *DISTAR Reading I* group scored better in comprehension, vocabulary, judgment and reasoning, and memory scores than the control group on the *Slosson Intelligence Test*.

Several studies examining *DISTAR Reading I* and *Reading Mastery Classic* with elementary-aged remedial readers have noted statistically significant gains in reading skills and large effect sizes in favor of the Direct Instruction groups (Brent, DiObilda, & Gavin, 1986; Dowdell, 1996; Gunn, Biglan, Smolkowski, & Ary, 2000; Summerell & Brannigan, 1977; Torkelson-Trout, Epstein, & Michelson, 2003; Umbach, Darch, & Halpin, 1992). For example, Gunn et al. used *Reading Mastery Classic* (grades 1-2) along with *Corrective Reading* (grades 3-4) as a reading intervention for students at-risk for school failure. In addition, they examined the effectiveness of these programs with Hispanic and non-Hispanic students. They found that both groups of students made greater gains than the control group on the *Woodcock-Johnson-Revised* subtests of Letter-Word Identification, Word Attack, Reading Vocabulary, and Passage Comprehension.

They also scored better on oral reading fluency probes. Additionally, Gunn et al. found that Hispanic students with low English skills benefited as much as did other Hispanic students in the program.

In addition, numerous studies have been published on the effectiveness of using *DISTAR Reading* or *Reading Mastery Classic* with elementary-aged children identified to receive special education services. In three studies, students in *DISTAR Reading* or *Reading Mastery Classic* outperformed students in other reading programs (i.e., Isaccs & Stennett, 1980; Stein & Goldman, 1980; Stennett & Issacs, 1977). Recently, Cooke, Gibbs, Campbell, and Shalvis (2005) compared two Direct Instruction programs, *Reading Mastery Classic Fast Cycle* and *Horizons Fast Track A-B*. These programs were used with 30 second, third, and fourth graders with mild disabilities. Students in both programs made significant gains on the subtests of Letter-Word Identification, Word Attack, and Passage Comprehension on the *Woodcock-Johnson-Revised*. They were also pre- and posttested using the *North Carolina Literacy Assessment* and found to make gains in print awareness knowledge and phonological awareness. *Reading Mastery Classic* was slightly more effective than *Horizons*, but the difference was not statistically significant. Both Direct Instruction programs did result in significant progress in reading skills.

Students at-risk for school failure typically do not achieve 1 year's worth of growth after 1 year of instruction. *Reading Mastery Classic* has been found to be a valuable tool in teaching students to read at an accelerated rate. Fredrick, Keel, and Neel (2002) examined the rate of reading acquisition of 44 first-grade and 63 second-grade students instructed in the program. The participants were used as their own control by comparing reading acquisition rates prior to and after the implementation of *Reading Mastery Classic*. Fredrick et al. found a statistically significant

difference in the rate of academic gain in favor of using the program as measured by the Word Attack (first graders) and the Word Identification (second graders) subtests of the *Woodcock Reading Mastery Test-Revised*.

Overall, Direct Instruction programs have been shown to be very effective in teaching students to read. Furthermore, these programs (i.e., *DISTAR Reading* and *Reading Mastery Classic*) have a strong research base to validate their effectiveness (Schieffer et al., 2002). Despite the fact that *Reading Mastery Plus* is aligned with NICHD (2000) recommendations and is based on the highly effective *Reading Mastery Classic* program, no published studies were found regarding the effectiveness of this version of the program. Research to date also shows little evidence of the fidelity of implementation of *Reading Mastery* programs and how teacher skill in program implementation affects student achievement in reading (Schieffer et al., 2002). Further, no studies have been conducted to determine the effects of *Reading Mastery Plus* (or *Classic*) within a three-tier strategic model of intensifying instruction.

The purpose of this program evaluation was to determine if *Reading Mastery Plus* could be used effectively at each instructional tier, benefiting all student groups (typically achieving, Title I/LAP, and special education) in grades K-3. Additionally, teacher perceptions of the training, support, implementation, and program were assessed.

Method

Setting

Instruction took place at a Title I elementary school serving students in preschool to grade 6 located in a suburban setting in the Pacific Northwest. Total enrollment in the school for grades K-6 was 659. Of these students, 32% received free or reduced price lunch.

Participants

Of the 371 K-3 students enrolled at the elementary school during the 2004-2005 academic year, 327 (88%) were included in this program evaluation (see Table 1). Those students who were not included in the program evaluation either left during the school year or started late. Thus, 49.6% of the students in the school participated.

Kindergarten students. Seventy-two kindergarten students participated in the present evaluation. Of these students, 51 were typically achieving, 15 were Title I, and 6 received special education services.

First-grade students. Eighty-six first graders participated. Of these students, 52 were typically achieving, 24 were Title I, and 10 received special education services.

Second-grade students. Eighty second-grade students participated. Of these students, 64 were typically achieving, 10 were Title I, and 6 received special education services.

Third-grade students. Eighty-nine third-grade students participated in the present evalua-

tion. Of these students, 68 were typically achieving, 15 were Title I/LAP, and 6 received special education services.

Teachers

Fourteen general education teachers delivered instruction using *Reading Mastery Plus*. All but two teachers, one kindergarten teacher and one second-grade teacher who were newly hired at the beginning of the school year, had used *Reading Mastery Plus* during the previous year.

Kindergarten teachers. Two teachers taught kindergarten. One teacher had a Bachelor's degree and the other teacher had a Master's degree. In terms of experience with teaching and Direct Instruction, one of these teachers had a single year of experience, and the other had 5 years of experience. They had a range of 1 to 5 years of teaching and Direct Instruction experience.

First-grade teachers. Four first-grade teachers participated. They all held Master's degrees in education. They had a range of 4 to 30 years of teaching experience (average = 14

Table 1
Participant Information

Grade	Total	Male	Female	Title I/LAP	Special Ed.	ELL
K	72	37	35	15	6	1
1st	86	49	37	24	10	3
2nd	80	41	39	10	6	1
3rd	89	35	54	15	6	0
Total	327	162	165	79	28	5

years) and a range of 3 to 15 years of Direct Instruction experience (average = 9.3 years). Two student teachers implemented reading instruction with first-grade students during this investigation and taught full time an average of 10 weeks.

Second-grade teachers. Four teachers taught second grade. Teacher education ranged from a Bachelor's degree (one teacher) to Master's degrees (three teachers). They had a range of 13 to 24 years of teaching experience (average = 18.8 years) and 1 to 5 years of Direct Instruction experience (average = 3.3 years). One student teacher taught full-time in the second grade during this evaluation for 12 weeks.

Third-grade teachers. Four teachers taught third grade. Two teachers held Bachelor's degrees and two had Master's degrees. They had a range of 5 to 29 years of teaching experience (average = 16.5 years) and 1 to 7 years of Direct Instruction experience (average = 5.3 years).

Related Services Personnel

A Title I/LAP teacher, LAP teacher, special education teacher, and seven paraeducators provided additional instruction. The Title I/LAP teacher had a Bachelor's degree in special education and a Bachelor's degree in reading. She had 27 years of teaching experience and 4 years of experience using Direct Instruction. The LAP teacher had a Master's degree, 34 years of teaching experience, and 24 years using Direct Instruction.

Kindergarten through third-grade students who qualified for special education services received reading instruction from a resource room teacher for approximately 45 minutes per day. This teacher held a Master's degree and had 16 years of teaching and Direct Instruction experience.

Seven paraeducators taught reading groups. They were females with education ranging from 2 years of college to a Bachelor's degree. They were supervised by the teachers in the classroom and monitored by the Title I/LAP teacher. The paraeducators varied in teaching experience from 2 to 17 years (average = 6.3

Table 1
Participant Information

Caucasian	Hispanic	Asian	African American	American Indian or Alaskan Native	Missing Info. on Race
58	2	4	3	2	3
75	2	5	4	0	0
73	2	1	3	1	0
82	1	3	1	0	2
288	7	13	11	3	5

years). All had experience teaching Direct Instruction, ranging from 2 to 16 years (average = 6.1 years).

Targeted Curriculum

Reading Mastery Plus was the reading program implemented at the Tier 1, 2, and 3 levels. Thus, all students received this program as their primary (core) reading program with increasing intensity from Tiers 1 to 3.

Reading Mastery Plus includes seven levels (i.e., K-6). Only *Levels K-5* were used in the present evaluation with the kindergarten through third-grade classes. *Reading Mastery Plus Level K* (Engelmann, Osborn, Bruner, Engelmann, & Seitz Davis, 2002) includes language and early reading skills taught in 150 lessons. *Reading Mastery Plus Level 1* (Engelmann, Bruner, Osborn, & Seitz Davis, 2002) includes 160 lessons. A *Fast Start* option (Engelmann & Bruner, 2002) is available for students who did not complete Lessons 101 through 150 of *Level K*; *Fast Start* covers the same material in 25 lessons.

Reading Mastery Plus Level 2 (Engelmann, Bruner, Engelmann, Seitz Davis, & Arbogast, 2002) consists of 160 lessons. *Reading Mastery Plus Level 3* (Engelmann & Hanner, 2002a) includes 140 lessons. *Reading Mastery Plus Level 4* (Engelmann & Hanner, 2002b) has 140 lessons. Finally, *Reading Mastery Plus Level 5* (Engelmann, Osborn, Osborn, & Zoref, 2002) includes 120 lessons.

Dependent Variables

Kindergarten through second-grade students in this evaluation were pre- and posttested with the *Dynamic Indicators of Basic Early Literacy Skills (DIBELS)*. Pretest scores were obtained during the first week of instruction in the fall. Posttest scores were obtained mid-May. Additionally, teachers completed a social validation questionnaire.

DIBELS. *DIBELS* (Good & Kaminski, 2002) is a series of tests of the fundamental early lit-

eracy skills identified as critical by the NICHD (2000) and Snow, Burns, and Griffin (1998). *DIBELS* is standardized in its administration and is often used to monitor student progress in essential skills such as phonemic awareness, phonics knowledge, and oral reading fluency.

For the purposes of this investigation, initial sound fluency (i.e., correct onsets per minute) and letter naming fluency (i.e., correct letter names per minute) subtests were compared for kindergarten students (pretest and posttest). Additionally, posttest scores for phoneme segmentation fluency (i.e., number of correct phonemes per minute) and nonsense word fluency (i.e., number of correct letter sounds per minute) were examined for these students. For first-grade students, pre- and posttest scores were compared on the following subtests: letter naming fluency, phonemic segmentation fluency, and nonsense word fluency. Posttest-only scores were obtained for oral reading fluency (i.e., number of correct words read per minute). Pretest and posttest scores were compared for nonsense word fluency and oral reading fluency with second graders.

For the *DIBELS*, standard protocol is to administer the subtests indicated by the test protocol at specified times of the year (e.g., fall, winter, spring). (Note: The posttest-only subtests were presented as such as indicated in the *DIBELS* protocol; a deviation from the standard protocol occurred when all subtests that were given as pretests were re-administered as posttests.) The kindergarten, first-grade, and second-grade descriptors for the beginning- and end-of-year *DIBELS* assessments are presented in Table 2.

Scholastic Reading Inventory (SRI). The *SRI* was used as the pre- and posttest for the third graders. The *SRI* (Scholastic, 2003) is a computer-adaptive assessment instrument for grades 1-12. Students read brief selections of literature and then answer a multiple choice question on the computer screen. The *SRI*

tests comprehension of written literature and vocabulary. It determines a Lexile score for each student. The Lexile score is a measure of student performance ranging from Beginning Reader to 1700+ . A student's reading level range is determined by subtracting 100 and adding 50 (e.g. Lexile score = 1100; reading level range = 1000-1150). In addition to the Lexile, normal curve equivalents (NCE) were calculated. NCEs have a mean of 50 and a standard deviation of 21.06.

Social Validation

Kindergarten through third-grade general education teachers ($N = 14$) responded to a 10-question social validation survey on the *Reading Mastery Plus* program. Three questions required teachers to rate their responses from very poor (1) to excellent (5) on the training they received, the adequacy of the support they received, and how well the daily implementation of the program went. Seven questions required written responses related to what could have been done to improve the training (and support) received, strengths of the *Reading Mastery Plus* program, areas in need of improvement within the program, choice of implementing the program again, effects of the program on students, and other comments.

Design and Procedures

A pre-experimental design was used (Martella, Nelson, & Marchand-Martella, 1999). Several procedures were followed in the implementation of this program.

Teacher and related services personnel training. An educational consultant conducted *Reading Mastery Plus* training. This consultant had a Bachelor's and a Master's degree in special education. She was a former special education teacher and had worked for 8 years as an educational consultant at the time of this evaluation.

All teachers and related services personnel were provided 2 days of *Reading Mastery Plus*

training the year before this evaluation began covering the revisions made to the *Reading Mastery Classic* program. During this same year, new teachers were also given an additional half-day training on the basics of the *Reading Mastery Plus* program.

Reading Mastery Plus placement. All students were tested for placement at the beginning of the school year. Students were grouped with other students of similar skill levels within their respective grades across classrooms. Students were moved up or down depending on individual performance as assessed by within-program assessments.

Reading Mastery Plus instruction. Core reading instruction (Tier 1) took place 5 days per week and lasted 30 to 45 minutes a day for typically achieving students. (Note: Spelling/writing components of *Reading Mastery Plus* were not used; the language component was completed in kindergarten and was used as a full class activity as time allowed in grade 1—students completed 18 to 32 lessons of language, depending upon their teacher/group; workbook activities for *Reading Mastery Plus Levels 3-5* were completed outside of reading group instructional time and took approximately 20-30 minutes.)

Title I (grades K-3) and LAP (grade 3) instruction (Tier 2) was also conducted daily; students received a second dose/reteaching of the core program for 30-40 minutes in small groups. Special education instruction (Tier 3) lasted 110 minutes per day; students did not receive instruction with their typically achieving peers. More intensive instruction was involved to meet the individualized needs of the students (e.g., one-on-one, focused work on individual sounds, use of sound amplifier for students who were hard of hearing, use of laser pointer to help with tracking, individualized motivational systems).

Kindergarten reading instruction occurred over 100 instructional days. (Note:

Table 2*DIBELS Descriptors for Kindergarten, First Grade, and Second Grade*

	Beginning of Year: Kindergarten	End of Year: Kindergarten
Initial Sound Fluency (ISF)		
	ISF < 4 (At Risk)	
	4 < = ISF < 8 (Some Risk)	
	ISF > = 8 (Low Risk)	
Letter Naming Fluency (LNF)		
	LNF < 2 (At Risk)	LNF < 29 (At Risk)
	2 < = LNF < 8 (Some Risk)	29 < = LNF < 40 (Some Risk)
	LNF > = 8 (Low Risk)	LNF > = 40 (Low Risk)
Phoneme Segmentation Fluency (PSF)		
		PSF < 10 (At Risk)
		10 < = PSF < 35 (Some Risk)
		PSF > = 35 (Low Risk)

Kindergarten teachers began teaching reading in November of the school year.) First-, second-, and third-grade reading instruction occurred over 144, 133, and 122 instructional days, respectively.

Lessons were presented as scripted. A standard error correction was used when errors occurred, as recommended by the program (e.g., model/test/retest). If students did not

meet criterion on a mastery test or reading checkout, specific directions were followed in the program to ensure that students received instruction on needed skills again until mastery was demonstrated.

Decision-making process. Students were tested with mastery tests and reading checkouts to monitor their mastery of the material as specified in the program. All grades used these

Table 2, continued
DIBELS Descriptors for Kindergarten, First Grade, and Second Grade

	Beginning of Year: Kindergarten	End of Year: Kindergarten
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Nonsense Word Fluency (NWF)		
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		NWF < 15
		(At Risk)
		15 ≤ NWF < 25
		(Some Risk)
		NWF ≥ 25
		(Low Risk)
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Oral Reading Fluency (ORF)		
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tests in a similar manner to determine if students were appropriately grouped. Team meetings were held once per week in which the grouping and movement of students could be discussed. Decisions for group movement were predominantly data driven, but teacher judgment had a role as well.

Additional instruction. Some first-grade students participated in *Reading Counts!* (Scholastic,

2005). *Reading Counts!* is a supplemental reading program in which students choose from over 33,000 books at their own Lexile score level and then take a quiz. First graders who performed at the highest levels in the grade ($n = 32$) participated in *Reading Counts!*. In general, first-grade students did not participate in *Reading Counts!* until they reached Lesson 30 in *Level 2 of Reading Mastery Plus*.

Table 2, continued
DIBELS Descriptors for Kindergarten, First Grade, and Second Grade

Beginning of Year: First Grade	End of Year: First Grade	Beginning of Year: Second Grade	End of Year: Second Grade
NWF < 13 (At Risk)	NWF < 30 (Deficit)	NWF < 30 (Deficit)	
13 ≤ NWF < 24 (Some Risk)	30 ≤ NWF < 50 (Emerging)	30 ≤ NWF < 50 (Emerging)	
NWF ≥ 24 (Low Risk)	NWF ≥ 50 (Established)	NWF ≥ 50 (Established)	
	ORF < 20 (At Risk)	ORF < 26 (At Risk)	ORF < 70 (At Risk)
	20 ≤ ORF < 40 (Some Risk)	26 ≤ ORF < 44 (Some Risk)	70 ≤ ORF < 90 (Some Risk)
	ORF ≥ 40 (Low Risk)	ORF ≥ 44 (Low Risk)	ORF ≥ 90 (Low Risk)

All second- and third-grade students participated in *Reading Counts!*.

Third-grade students who received LAP services also received supplemental instruction in *Corrective Reading* in a before-school tutorial program. *Corrective Reading* (Engelmann, Hanner, & Johnson, 1999) is a Direct Instruction remedial reading program for students in grades 3-12. In this tutorial program, three lessons were covered each week, each lasting 35 minutes. Instructional groups included two to five students. Title I/LAP personnel or college student tutors provided instruction. *Decoding Levels B1, B2, and C* were used.

In addition, all first- through third-grade students received explicit spelling instruction in *Spelling Mastery Levels A, B, C, and D* (Dixon & Engelmann, 1999). Students were skill grouped within grades for spelling instruction.

Program Fidelity

The educational consultant conducted coaching sessions. She observed all the general education teachers and the Title I/LAP teacher and provided feedback on their lessons. These individuals were observed twice (once in the fall and once in the spring). Only one kindergarten teacher was observed three times, and one second-grade teacher was observed four times. The reasons for the extra observations were that the kindergarten teacher was newly hired during the current school year, and the second-grade teacher did not receive training the year before because she was on a leave of absence.

Data were collected on teacher implementation of the *Reading Mastery Plus* program. Teachers were rated on five instructional areas: (1) Teacher follows format outlined in *Reading Mastery Plus* program; (2) teacher uses specific praise statements and provides immediate feedback; (3) teacher uses clear signals to evoke group responses; (4) teacher uses proper error correction procedures; and (5) teacher pacing engages students and is appro-

priate to the task. Teachers were rated on a scale of 0 to 5, with 0 = "does not cover at all during the lesson" and 5 = "covers point well during the lesson."

All kindergarten through third-grade general education teachers and the Title I/LAP teacher ($n = 15$) were evaluated. On area 1 the mean score across all teachers was 4.82 (range = 3-5). On area 2 teachers received a mean score of 4.52 (range = 3-5). Teachers scored a mean of 4.26 on area 3 (range = 3-5). On area 4 teachers exhibited a mean score of 4.22 (range = 2-5), and on area 5 teachers scored a mean of 4.58 (range = 4-5).

Statistical Analyses

For kindergarten, first-grade, and second-grade students, t-tests were used to determine if there were statistically significant pretest to posttest changes and differences between group comparisons (i.e., typically achieving vs. Title I/LAP, typically achieving vs. special education, and Title I/LAP vs. special education). A t-test was also used to determine if the pretest to posttest NCE changes and differences between groups were statistically significant for third graders. A Wilcoxon signed-ranks test was used to determine if changes from pretest to posttest and differences between groups were statistically significant for Lexile scores for third graders.

Additionally, estimates of effect size (ES) were calculated (posttest mean minus pretest mean divided by pretest standard deviation) across grades to determine the magnitude of the pretest to posttest changes by calculating the difference between the two scores and dividing by the pretest standard deviation.

Results

Kindergarten Students

Pretest/posttest and posttest only. Table 3 shows the results of kindergarteners across all

DIBELS subtests. There were statistically significant and large effect size changes for initial sound fluency and letter naming fluency. When compared to the descriptors provided in Table 2, the mean total posttest scores for letter naming fluency, phoneme segmentation fluency, and nonsense word fluency fell in the “low risk” category. Additionally, all groups (typically achieving, Title I, special education)

had statistically significant increases from pretest to posttest assessments.

Comparisons. When typically achieving students were compared to students who received Title I services (see Table 3), statistically significant differences across all subtests (i.e., initial sound fluency: pretest— $t [64] = 2.18, p < .05$, posttest— $t [64] = 2.45, p < .05$; letter naming fluency: pretest— $t [64] = 4.43, p < .05$, posttest— $t [64] = 4.43, p < .05$).

Table 3
Kindergarten DIBELS Scores

<i>DIBELS</i> Subtest	Typically Achieving ($n = 51$)	Title I ($n = 15$)	Special Education ($n = 6$)	Total ($N = 72$)
Initial Sound				
Pre (sd)	12.67 (9.11)	7.27 (5.31)	3.00 (4.00)	10.74 (8.68)
Post (sd)	27.29 (16.30)	16.60 (8.06)	18.83 (7.86)	24.36 (15.02)
Change (sd)	14.62 (14.22)	9.33 (8.50)	15.83 (6.20)	13.62 (12.82)
Effect Size	1.60	1.76	3.96	1.57
$t =$	7.35*	4.25*	6.25**	9.02*
Letter Naming				
Pre (sd)	20.49 (13.07)	4.60 (8.42)	14.67 (9.48)	16.69 (13.50)
Post (sd)	45.63 (15.38)	28.27 (13.74)	32.83 (11.62)	40.94 (16.39)
Change (sd)	25.14 (13.81)	23.67 (10.15)	18.16 (13.38)	24.25 (13.08)
Effect Size	1.92	2.81	1.92	1.79
$t =$	13.00*	4.57***	3.33***	15.74*
Phoneme Segmentation				
Post (sd)	43.02 (14.80)	31.73 (20.40)	25.83 (19.27)	39.24 (17.31)
Nonsense Word				
Post (sd)	38.76 (18.94)	22.27 (9.35)	26.17 (13.14)	34.28 (18.23)

* $p < .001$; ** $p < .01$; *** $p < .05$; sd = standard deviation

.001, posttest— $t [64] = 3.93, p < .001$; phoneme segmentation fluency posttest: $t [64] = 2.37, p < .05$; and nonsense word fluency posttest: $t [64] = 3.25, p < .01$ were observed. In all assessments, typically achieving students outscored students who received Title I services. There were no statistically significant differences between the two groups on changes from pretest to posttest for initial sound fluency and letter naming fluency indicating that students who received Title I services demonstrated gains similar to those shown by typically achieving students. When compared to *DIBELS* categories in Table 2, the average posttest scores for typically achieving students fell in the “low risk” category for letter naming fluency, phoneme segmentation fluency, and nonsense word fluency. The average posttest scores for students who received Title I services fell in the “at risk” category for letter naming fluency and the “some risk” category for phoneme segmentation fluency and nonsense word fluency.

Differences were observed between typically achieving students and students who received special education services on pretest and posttest assessments across all subtests, with typically achieving students outscoring students who received special education services. However, these differences reached statistical significance only for the initial sound fluency pretest ($t [55] = 2.55, p < .05$) and phoneme segmentation fluency posttest ($t [55] = 2.61, p < .05$). Importantly, there were no statistically significant differences between the two groups on changes from pretest to posttest for initial sound fluency and letter naming fluency. Thus, students who received special education services showed gains similar to those shown by typically achieving students. When compared to the descriptors listed in Table 2, average posttest scores on letter naming fluency and phoneme segmentation fluency were categorized as “some risk” for students who received special education services. For nonsense word fluency, the average

score for students who received special education services was in the “low risk” category.

As shown in Table 3, differences were found between students who received Title I services and those who received special education services. However, the only statistically significant difference was found for the letter naming fluency pretest ($t [19] = 2.39, p < .05$), favoring students who received special education services. The gain score differences between the two groups were not statistically significant.

First-Grade Students

Pretest/posttest and posttest only. Table 4 shows the results of first graders on the *DIBELS*. There were statistically significant and large effect size changes for letter naming fluency, phoneme segmentation fluency, and nonsense word fluency. When compared to the descriptors provided in Table 2, the total mean posttest scores for phoneme segmentation fluency and nonsense word fluency fell in the “established” category; the mean posttest score for oral reading fluency fell in the “low risk” category. Additionally, all groups had statistically significant increases from pretest to posttest assessments.

Comparisons. Typically achieving students outperformed students who received Title I services on all pretest and posttest assessments across subtests. There were statistically significant differences between the two groups on letter naming fluency: pretest— $t [74] = 3.26, p < .01$, posttest— $t [74] = 4.41, p < .001$; phoneme segmentation fluency: pretest— $t [74] = 2.93, p < .01$; nonsense word fluency: pretest— $t [74] = 4.70, p < .001$, posttest— $t [74] = 3.35, p < .001$; and oral reading fluency: posttest— $t [74] = 6.12, p < .001$. There were no statistically significant differences between typically achieving students and students who received Title I services on changes from pretest to posttest for the subtests. Therefore, students who received Title I

services had gains similar to those shown by typically achieving students. When compared to the descriptors in Table 2, the average

posttest scores for typically achieving students and those who received Title I services fell in the “established” categories for phoneme seg-

Table 4
First-Grade DIBELS Scores

<i>DIBELS</i> Subtest	Typically Achieving (<i>n</i> = 52)	Title I (<i>n</i> = 24)	Special Education (<i>n</i> = 10)	Total (<i>N</i> = 86)
Letter Naming				
Pre (sd)	38.33 (12.59)	28.21 (12.53)	24.70 (13.61)	33.92 (13.72)
Post (sd)	74.31 (12.24)	60.25 (14.34)	57.60 (14.87)	68.44 (14.93)
Change (sd)	35.98 (14.59)	32.04 (14.30)	32.90 (14.35)	34.52 (14.43)
Effect Size	2.86	2.56	2.42	2.52
<i>t</i> =	17.78*	10.98*	7.25*	22.19*
Phoneme Segmentation				
Pre (sd)	41.75 (16.40)	29.46 (18.23)	24.60 (20.00)	36.33 (18.47)
Post (sd)	55.54 (12.18)	52.88 (11.31)	53.90 (8.44)	54.60 (11.51)
Change (sd)	13.79 (18.52)	23.42 (22.51)	29.30 (13.84)	18.27 (19.93)
Effect Size	.84	1.28	1.47	.99
<i>t</i> =	5.37*	5.10*	6.69*	8.51*
Nonsense Word				
Pre (sd)	36.54 (18.80)	17.04 (11.13)	23.20 (23.34)	29.55 (19.55)
Post (sd)	80.62 (26.97)	60.50 (16.96)	55.00 (17.34)	72.02 (25.74)
Change (sd)	44.08 (24.19)	43.46 (20.49)	31.80 (24.24)	42.47 (23.29)
Effect Size	2.34	3.90	1.36	2.17
<i>t</i> =	13.14*	10.39*	4.15**	16.92*
Oral Reading				
Post (sd)	77.85 (31.64)	37.00 (11.55)	52.30 (43.55)	63.48 (34.30)

p* < .001; *p* < .01; sd = standard deviation

mentation fluency and nonsense word fluency. The average score for typically achieving students fell in the “low risk” category for oral reading fluency, while the average score for students who received Title I services fell in the “some risk” category for the same subtest.

Differences were found between typically achieving students and students who received special education services across all subtests, with typically achieving students outscoring students who received special education services. However, these differences reached statistical significance only for the letter naming fluency: pretest— $t [60] = 3.10, p < .01$, posttest— $t [60] = 3.82, p < .001$; phoneme segmentation fluency pretest— $t [60] = 2.92, p < .01$; and nonsense word fluency posttest— $t [60] = 2.88, p < .01$. There was a statistically significant difference between groups on change scores for phoneme segmentation fluency, favoring students who received special education services ($t [60] = 2.51, p < .05$). These results show that students who received special education services had similar or greater gains to those shown by typically achieving students. Compared to the descriptors in Table 2, the average posttest scores for students who received special education services fell in the “established” category for phoneme segmentation fluency and nonsense word fluency. The average score was in the “low risk” category for oral reading fluency.

Scores for students who received Title I services and students who received special education services were similar with the exception of the oral reading posttest score favoring students receiving special education services. However, none of the differences reached statistical significance. Additionally, both groups made similar pretest to posttest gains for all subtests.

Second-Grade Students

Pretest/posttest and posttest only. Table 5 summarizes the performance of second graders on the

DIBELS subtests. There were statistically significant and moderate to large effect size changes for nonsense word fluency and oral reading fluency. When compared to the descriptors provided in Table 2, the total mean posttest score for oral reading fluency fell in the “low risk” category. Additionally, all groups showed statistically significant increases from pretest to posttest assessments.

Comparisons. Typically achieving students outperformed students who received Title I services on all pretest and posttest assessments across both subtests. Statistically significant differences were found between the two groups only on nonsense word fluency: pretest— $t [72] = 2.66, p < .01$; and oral reading fluency: pretest— $t [72] = 3.06, p = .01$, posttest— $t [72] = 3.48, p < .001$. Compared to the descriptors in Table 2, the average score for typically achieving was considered “low risk” for oral reading fluency, while students who received Title I services fell in the “some risk” category for this same subtest.

Typically achieving students outscored students who received special education services on all pretest and posttest assessments. Statistically significant differences were found between the two groups on only the oral reading fluency: pretest— $t [68] = 2.29, p < .05$, and posttest— $t [68] = 2.97, p < .01$. Even though there were differences from pretest to posttest, there were no statistically significant differences between the two groups on changes from pretest to posttest for nonsense word fluency and oral reading fluency. This result indicates that students who received special education services had gains similar to those shown by typically achieving students. When comparing the average score on oral reading fluency for students who received special education services to the descriptors listed in Table 2, it was evident that the average score fell in the “some risk” category.

Students who received Title I services performed similarly to students who received special education services. None of the differences reached statistical significance. There were also no statistically significant changes in pretest to posttest scores.

Third-Grade Students

Pretest/posttest and posttest only. Table 6 summarizes third-grade mean scores on the *SRI*. The total mean pretest to posttest differences for NCE and Lexile scores were statistically significant. Additionally, the typically achieving and Title I/LAP groups had statistically significant increases on all pretest to posttest assessments. The special education group had a

statistically significant gain on the NCE; however, the changes for the special education group (Lexile) did not reach statistical significance (due to a lack of statistical power because of small sample size).

Comparisons. Typically achieving students scored significantly higher than students who received Title I/LAP services on both the pretest and posttest assessments. The NCE and Lexile differences on the pretest were statistically significant beyond the $p < .001$ level ($t [81] = 7.83$ —NCE; $Z = 5.51$ —Lexile); the NCE and Lexile differences on the posttest were also statistically significant beyond the $p < .001$ level ($t [81] = 6.07$ —NCE; $Z =$

Table 5
Second-Grade DIBELS Scores

<i>DIBELS</i> Subtest	Typically Achieving ($n = 64$)	Title I ($n = 10$)	Special Education ($n = 6$)	Total ($N = 80$)
Nonsense Word				
Pre (sd)	74.30 (36.51)	42.90 (16.65)	58.17 (29.27)	69.16 (35.59)
Post (sd)	92.38 (34.97)	70.30 (24.39)	83.00 (28.38)	88.91 (33.91)
Change (sd)	18.08 (24.48)	27.40 (15.91)	24.83 (19.46)	19.75 (23.29)
Effect Size	.50	1.65	.85	.55
$t =$	5.91*	5.45*	3.13**	7.59*
Oral Reading				
Pre (sd)	69.02 (41.49)	28.30 (14.32)	29.67 (17.75)	60.98 (40.96)
Post (sd)	118.56 (37.37)	75.30 (29.87)	71.83 (29.69)	109.65 (39.92)
Change (sd)	49.55 (15.36)	47.00 (19.58)	42.16 (15.68)	48.67 (15.86)
Effect Size	1.19	3.28	2.38	1.19
$t =$	25.81*	7.59*	6.59*	27.45*

* $p < .001$; ** $p < .05$; sd = standard deviation

4.99—Lexile). There were also statistically significant differences in the change between the pretest and posttest. Interestingly, students who received Title I/LAP services had a significantly greater change from pretest to posttest ($t [81] = 3.48, p < .001$ —NCE; $Z = 2.63; p < .01$ —Lexile) than did typically achieving students.

Typically achieving students were found to have scored significantly higher than students who received special education services on pretest and posttest assessments. For example, the NCE and Lexile differences on the pretest were statistically significant at the $p <$

.001 level ($t [72] = 5.21$ —NCE; $Z = 3.71$ —Lexile); the NCE and Lexile difference on the posttest were also statistically significant beyond the $p < .001$ level ($t [72] = 5.05$ —NCE; $Z = 3.45$ —Lexile). However, there was not a statistically significant difference in the change between the pretest and posttest assessments on either NCE or Lexile scores, although students who received special education services had a greater change than did typically achieving students.

Students who received Title I/LAP services had slightly higher posttest scores and a greater gain from pretest to posttest assess-

Table 6
Third-Grade SRI Scores

	Typically Achieving ($n = 68$)	Title I/LAP ($n = 15$)	Special Education ($n = 6$)	Total ($N = 89$)
NCE				
Pre (sd)	51.80 (18.37)	13.18 (10.61)	11.83 (12.38)	42.60 (23.69)
Post (sd)	66.72 (16.08)	39.87 (12.42)	30.78 (23.58)	59.77 (20.37)
Change (sd)	14.92 (12.11)	26.69 (10.58)	18.95 (16.32)	17.17 (12.81)
Effect Size	.81	2.52	1.53	.72
$t =$	10.16*	9.77*	2.84**	12.64*
Lexile				
Pre (sd)	592.87 (207.75)	161.07 (83.04)	162.50 (91.34)	491.08 (261.46)
Post (sd)	768.07 (196.99)	441.20 (149.80)	370.83 (228.54)	686.20 (241.40)
Change (sd)	175.20 (133.10)	280.13 (122.90)	208.33 (194.12)	195.12 (139.94)
Effect Size	.84	3.37	2.28	.75
$Z =$	6.87*	3.41*	1.83	7.78*

* $p < .001$; ** $p < .05$; sd = standard deviation

ments than did students who received special education services; however, these differences were small and did not reach statistical significance.

Social Validation

On the social validation survey, general education teachers rated the adequacy of the training as a 4.79 (range = 4 to 5). The majority of teachers (i.e., eight of 14) stated they thought nothing could be done to improve the training. Other comments related to having retraining before school, watching their own videotapes for evaluation purposes, and observing other teachers during reading groups.

The teachers rated the adequacy of the support they received while implementing the program as a 4.93 (range = 4 to 5). All teachers said nothing more could have been done to improve the support they received.

When asked how well the daily implementation of the program went, the average rating was 4.5 (range = 3 to 5). Only positive comments were noted with regard to implementing the program again in their classrooms. For example, “Yes, because once you are trained and groups are established it practically runs itself. As the teacher, I can concentrate on teaching my kids, not inventing curriculum.”

Positive comments were also noted about the strengths of the *Reading Mastery Plus* program. Examples of teacher comments included, “I loved the coaching model—specific feedback was appreciated; it is sequenced so all children learn to read efficiently; systematic approach to teaching phonics; emphasis on data to drive instructional decisions; it works and kids are successful, *all* kids.”

When asked what areas needed improvement in the *Reading Mastery Plus* program both kindergarten teachers expressed concern over students not knowing their letter names well, the print not being consistent with the way

writing was taught, only lowercase letters being used, and confusing use of “and” at the beginning of sentences. Three out of four first-grade teachers expressed a need for a “fast cycle” version of the program to accelerate capable students. Second- and third-grade teachers reported that the program needed to have higher-level questions in *Reading Mastery Levels 1* and *2* as well as rate and accuracy blackline masters for all levels.

When asked to explain the effects of the program on their students, all teachers stated that their students learned to read at high levels. Under “other comments” the majority of statements related to the hope that their school would continue implementing *Reading Mastery Plus*.

Discussion

This study examined the effectiveness of using a strategic model of intensifying instruction using *Reading Mastery Plus* with students in grades K-3 at a Title I elementary school. Results of this study indicated that an explicit reading program addressing the critical elements of scientifically-based reading research identified by the NICHD (2000) benefited *all* students in learning to read across intensifying tiers of instruction. When considering programs within a three-tier model of reading (see Vaughn Gross Center for Reading & Language Arts, 2005), this evaluation showed that one program—*Reading Mastery Plus*—could be implemented across Tiers 1, 2, and 3, with intensity and instructional time changes rather than the use of different programs. This finding is important because students never “left” the core (primary) program. Further, when a new program was used to supplement instruction (grade 3), it involved the same instructional methodology (e.g., *Corrective Reading* and *Reading Mastery Plus* are both Direct Instruction reading programs). Alignment and consistency across instruc-

tional tiers within the three-tier model proved to be key in this endeavor.

There were statistically significant improvements by kindergarten, first-grade, and second-grade students on all *DIBELS* subtests. Perhaps more importantly, the magnitude of improvement (effect size) was quite large, ranging from .50 (nonsense word fluency—second-grade typically achieving students) to 3.96 (initial sound fluency—kindergarten special education). For third-grade students, effect size improvements on the *SRI* ranged from .72 (NCE scores for total students combined) to 3.37 (Lexile scores for students who received Title I/LAP services). Consider that an effect size of .25 is considered educationally significant (Adams & Engelmann, 1996). Thus, students in the *Reading Mastery Plus* program demonstrated pretest to posttest improvements of more than half of a standard deviation on *all* subtests.

Although there were statistically significant differences on pretest and posttest assessments between typically achieving students and those who received Title I/LAP services and between typically achieving students and those who received special education services, the magnitude of the gains made from pretest to posttest assessments were similar. Thus, students demonstrated large and important improvements in their reading skills, whether or not they were at risk for school failure or had disabilities.

Another important finding was that average posttest scores for students who received Title I/LAP services or special education services fell in the “at risk” category only once (i.e., letter naming fluency—students who received Title I services). The average posttest scores for first-grade students who received Title I/LAP services or special education services never fell below the “established” categories for phoneme segmentation fluency and nonsense word fluency. In other words, the average scores for these students only fell in the

“at risk” category once and never fell in the “deficit” categories that might be expected for students who received such services.

Additionally, there were few differences between students who received Title I/LAP and special education services. This finding is important given that students receiving special education services would be expected to be significantly below these other students.

Other noteworthy results were that the school involved in this study was the only Direct Instruction school in the district; it also had the highest test scores in reading and writing compared to other district schools on the Washington Assessment of Student Learning (WASL), administered in fourth grade. Further, the school received one of nine Title I academic achievement awards offered by the state in December of 2005.

As stated by the editors for *American Educator* (2004), it is essential to provide a strong core reading curriculum to *all* students. The elementary school involved in this evaluation provided such a core reading program. Thus, it is important to examine if students who come to the school from other schools differed in their reading performance. Preliminary data suggested that students from other schools did differ from those students enrolled in the evaluation school at the beginning of the year. However, the differences were not apparent until third grade. When considering differences between first graders who were at the evaluation school the previous year (in kindergarten) to those students attending another school, there were statistically significant pretest differences on letter naming fluency and phoneme segmentation fluency. There were no statistically significant pretest differences on nonsense word fluency. For second graders (students at the evaluation school in first grade compared to students attending another school), there were no statistically significant pretest differences on any subtest.

However, for third-grade students (students at the evaluation school in second grade compared to students attending another school), there were statistically significant pretest differences on the *SRF*. Additionally, effect size differences were large, ranging from .81 (Lexile scores) to .98 (NCE scores) favoring students who were at the evaluation school. Although there were differences between students from other schools and those at the evaluation school, the magnitude of these differences did not reach statistical significance until third grade. One possible reason for this finding is that the potential lack of exposure to a strong core K-3 reading program is cumulative in nature; thus, deficits do not become large enough until students reach third grade. This finding is echoed by others who note that the earlier effective reading instruction is provided, the better, and the longer we wait to implement effective reading instruction, the harder it is for students to acquire skills at high levels (Carnine et al., 2004; Juel, 1988).

The results of this study are educationally noteworthy. It is critical that all students learn to read in the primary grades. This skill is essential to future success in school and in life. Unfortunately, students from all backgrounds may still struggle with reading (Snow et al., 1998). Because educators are given the responsibility to ensure that all students learn to read, research on explicit programs such as *Reading Mastery Plus* is essential. This information is useful to school personnel so that effective core reading programs are selected and implemented in their schools.

A great deal of research has been conducted on the effectiveness of *Reading Mastery Classic* (see Schieffer et al., 2002 for details); however, no published research has been conducted on the effectiveness of *Reading Mastery Plus*. *Reading Mastery Plus* offers explicit instruction in the five critical elements of reading instruction identified by the NICHD (2000). This evaluation was important because

it offers further evidence of student success using a core reading program containing these five critical elements.

Further, this evaluation adds important information on *Reading Mastery* programs in the area of program fidelity. That is, this evaluation demonstrated high levels of program implementation integrity; teachers conducted the program as recommended by the authors, using well established instructional delivery procedures. Schieffer et al. (2002) recommended further evidence of treatment integrity in Direct Instruction reading programs. This evidence provides important information on how well trained teachers were and how faithfully the program was implemented. Further, the social validation information notes important aspects that could either make or “break” a Direct Instruction implementation—namely, how satisfied teachers were with the training, support, and program. In this evaluation, teachers were overwhelmingly positive about *Reading Mastery Plus*, hoping to ensure its continued implementation in the school despite the fact that it was the only Direct Instruction school in the district.

Even with the many benefits of this study, several limitations were present. First, this study did not use a true experimental design. Without a control group it was not possible to compare the gains made by the experimental group to students who received different core reading instruction. Future studies should examine the effectiveness of explicit programs such as *Reading Mastery Plus* using an experimental design that includes a control group. This type of design would allow practitioners to draw causal relationships from the investigation.

Second, other factors could have accounted for some of the changes observed from pretest to posttest in this evaluation. Students were concurrently receiving instruction in another Direct Instruction program—*Spelling Mastery*. *Spelling Mastery* teaches students to use strate-

gies in spelling that may be generalizable to reading. For example, students learn patterns in spelling based on the sounds of words. Students also participated in *Reading Counts!*. Students who read more, such as students who read books in *Reading Counts!*, may have become better readers from the sheer practice of reading (see Cunningham & Stanovich, 1998 for details). Future studies should attempt to isolate the amount of Direct Instruction students receive to the program under investigation.

Third, no data were gathered on student generalization of reading skills to other areas. One first-grade teacher commented that generalization of reading skills to books outside of the program was difficult unless students were motivated to do so until approximately 20 to 30 lessons into *Level 2* because of the specialized orthography that is used in *Reading Mastery Plus*. However, this orthography is gradually faded, and it is a form of scaffolding that helps ensure the success of all students in the critical early phases of learning to read. It can be argued that the success students experience as a result of the orthography outweighs the temporary difficulty it may pose to generalization. Future studies should examine generalization of reading skills to other areas.

Fourth, students at this school had scored higher than other district schools in previous years on the WASL in the area of reading and writing. In the future, research should examine implementing the program in a similar way at a school that has had low performance on the WASL. Future studies should be conducted with schools that are low performing on state assessments, adding further evidence that reading gains were the result of the program implementation.

This evaluation was important because it showed the successful implementation of *Reading Mastery Plus* with kindergarten through third-grade students in a Title I school. This evaluation gave evidence of the program's

effectiveness with students at-risk for school failure and those identified to receive special education services. Additionally, although a great deal of research has been conducted on the precursor programs to *Reading Mastery Plus* (e.g., *DISTAR Reading* and *Reading Mastery Classic*), no research has been published on the effectiveness of this program. This evaluation provides further evidence on issues of program integrity and social validation. Further, this evaluation provides valuable information to aid educators in their search for effective core reading programs for students in grades K-3 used as part of a three-tier reading model.

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