



The Impact of CORE Professional Development on Second Grade Student Reading Skills Growth

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 **SEGMEASUREMENT**
BUILDING BETTER ASSESSMENTS / EVALUATING PRODUCT EFFECTIVENESS

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Executive Summary

SEG Measurement studied the effectiveness of the Consortium on Reaching Excellence in Education (CORE) professional development and technical assistance provided to teachers implementing the SIPPS Reading Foundational Skills Program along with their broader English Language Arts instruction. The research was conducted in second grade classrooms in the Pajaro Valley Unified School District during the 2018-2019 school year.

The primary question addressed was: “Do students in classes with teachers receiving CORE professional development achieve greater reading skill gains than students in classes with teachers who do not receive CORE professional development?” To answer this question, we compared student reading skill growth in classes with teachers receiving CORE professional development (treatment group) to student reading skill growth in classes with teachers that did not receive CORE professional development (control group).

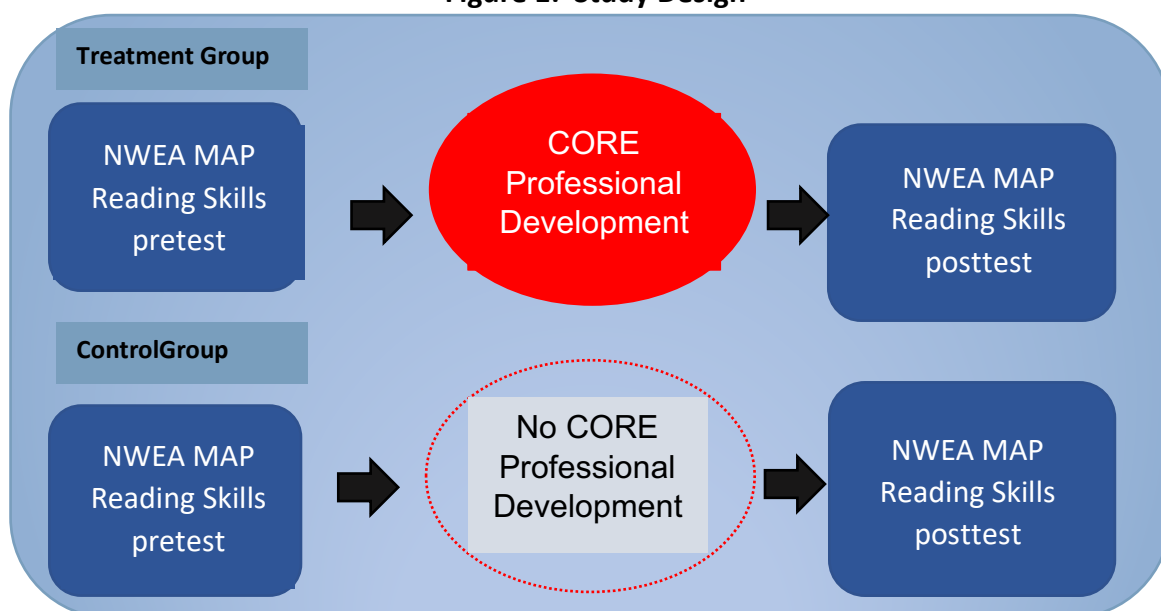
The primary question addressed was “Do students in classes with teachers receiving CORE professional development achieve greater reading skill gains than students in classes with teachers who do not receive CORE professional development?”

Study Design

The study employed a quasi-experimental design with pre and post testing of treatment and control group students. The reading skills of groups of students matched on initial ability and background in classes with teachers receiving CORE professional development (treatment group) and classes with teachers not receiving CORE professional development (control group) were compared. Student reading skills were measured using NWEA’s Measures of Academic Progress (MAP) reading assessment at the beginning of the school year (pretest) and at the end of the school year (posttest).

The study employed a quasi-experimental design with pre and post testing of treatment and control group students.

Figure 1: Study Design



Treatment: CORE Professional Development

The treatment examined in this study is the CORE-provided professional development to assist teachers to understand reading and implement the SIPPS Foundational Skills Reading program in the Pajaro Valley Unified School District.

Primary grade teachers and administrators received training in the Reading Course and on how to use the SIPPS curriculum, followed by modified lesson studies that provided additional modeling and practice to enable teachers to ensure the program components were implemented with fidelity.



Sampling

The treatment and control groups were drawn from the approximately 1422

second grade students in the District. The treatment group was composed of the approximately 450 second grade students in the eight CORE implementation schools. A matched group of 450 second grade students was selected

from the remaining Pajaro second grade students using propensity score matching. Students were matched on a composite propensity score reflecting initial ability, gender, ethnicity, Free

Students were matched on a composite propensity score reflecting initial ability, gender, ethnicity, Free or reduced lunch status, ESL (English as a Second Language) status, and Special Education status.

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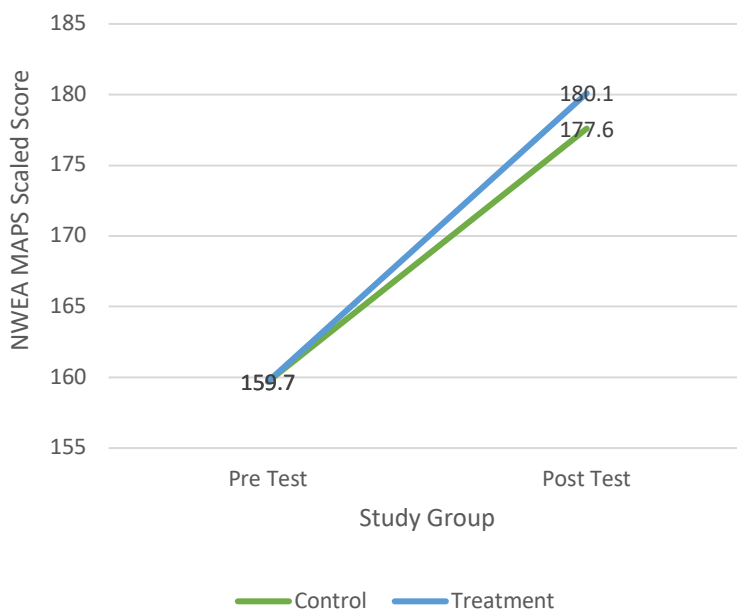
Analysis

We compared student reading skills growth in classes with teachers participating in CORE Professional Development (treatment group) to student reading skills growth in classes with teachers who did not

participate in CORE (control group) to evaluate the effectiveness of CORE Professional Development. We used Analysis of Covariance (ANCOVA) to examine differences in student reading skills between the treatment and control groups compared to the reading skills growth in the control group. ANCOVA can be used to examine the differences in growth between a treatment and control group, while adjusting for any initial differences in reading ability.

Student reading skills growth in the treatment group was compared to the reading skills growth in the control group using Analysis of Covariance (ANCOVA).

Figure 1
Comparison of Treatment and Control Group Second Grade Reading Skills Growth (NWEA MAPS Reading Skills Assessment; Adjusted Pretest Mean)



We also examined the two study groups along with several student characteristics to see if any of those characteristics interacted with participation in CORE to enhance or moderate the effects of CORE alone.

Results

Students in classes with teachers receiving CORE professional development showed significantly greater growth in reading skills than did students in classes with teachers who did not receive CORE Professional Development ($F = 14.01$, $df=1/911$; $p<.001$; Effect Size=.18). The mean reading posttest score for the treatment group was 180.01 while the

control group mean reading posttest score was 177.6 or about a fifth of a standard deviation more growth in reading skills.

We conducted a series of analyses to determine if there were any student characteristics that interacted with the effect of CORE participation. There was a modest interaction between study group and both ethnicity and free and reduced lunch eligibility. Hispanic students and students eligible for free and reduced lunch in classes with teachers receiving CORE Professional Development achieved greater reading skills growth than their counterparts in classes with teachers not receiving CORE Professional Development.

Conclusion

Students in classes with teachers who participated in CORE professional development and technical assistance showed substantially greater improvement in reading skills than students in classes with teachers who did not participate in CORE. There was no meaningful interaction between CORE and the student background characteristics studied.

In conclusion, This study demonstrates that teacher participation in CORE Professional Development is effective in facilitating student reading skills growth.

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The Impact of CORE Professional Development on Second Grade Student Reading Skills Growth

Overview

SEG Measurement studied the effectiveness of CORE professional development and technical assistance provided to teachers implementing the SIPPS Reading Program in Pajaro Valley Unified School District. CORE began providing professional development during the 2017-2018 school year and has increased the scope of the implementation with each subsequent school year. During the first year (2017-2018) CORE worked with 3 of Pajaro's 17 elementary schools; in year two, CORE worked with 9 elementary schools. CORE worked with all 17 schools in the third year of implementation.

This is the second in a series of studies examining the effectiveness of CORE Professional Development and the impact of providing this professional development on student reading skills growth. The first study examined third grade classrooms in the eight CORE-participating schools during the 2018-2019 school year finding that students in classes with teachers participating in CORE Professional Development showed greater growth in reading skills than did students in classes where teachers did not receive CORE Professional Development.

The second study described in this report was conducted in second grade classrooms in the nine CORE-participating schools during the 2018-2019 school year. This study explores the impact of teacher participation in the CORE professional development and support at the second-grade level. Second grade student reading skill growth in those classes with teachers who were provided CORE professional development was compared to student reading skill growth in classes with teachers who did not receive CORE professional development. Second-grade student reading skill growth in those schools receiving CORE professional development services was compared to reading skill growth for a matched group of second-grade students drawn from the remaining pool of second grade classrooms in the District not receiving CORE professional development services.

Research Questions

The primary question addressed by this study is: "Do students in classes with teachers receiving CORE professional development achieve greater gains in reading skills than students in classes with teachers who do not receive CORE professional development? The specific operational questions addressed to answer this are:

1. Do students in second grade classrooms in which teachers receive CORE professional development services show larger gains in reading skills than comparable students in

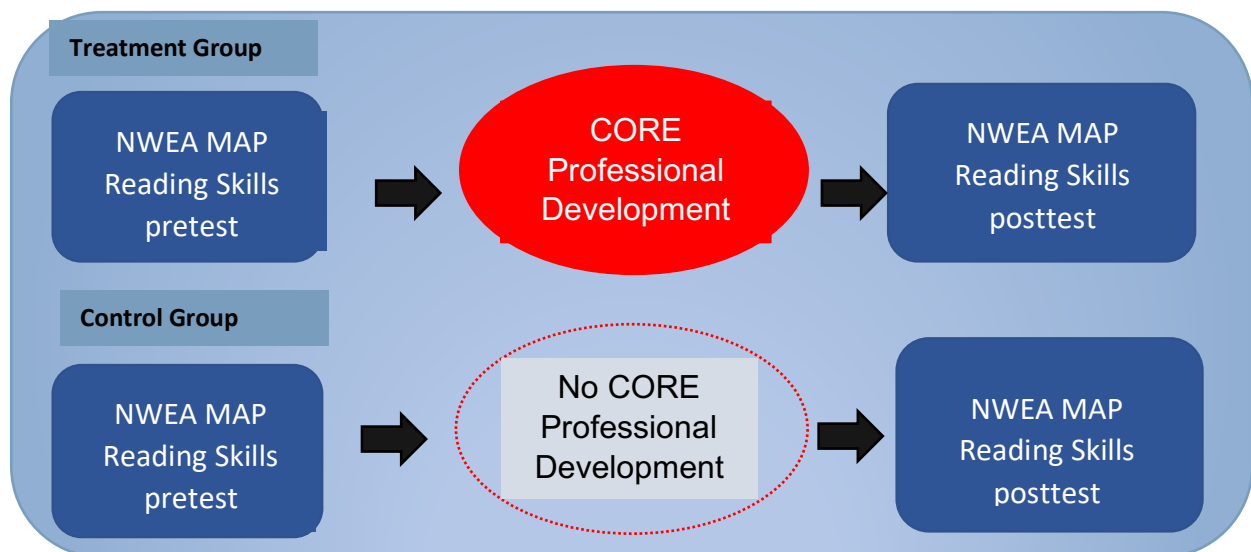
second grade classrooms in which teachers do not receive CORE professional development? (main effect)

2. Is the impact of CORE professional development on reading skills growth greater for any population subgroups? (interaction effects)

Study Design

The study employed a quasi-experimental, pre-post, treatment-control group design consistent with ESSA level 2 evidence. Matched groups of students in classes with teachers receiving CORE professional development (treatment group) and classes with teachers not receiving CORE professional development (control group) were compared. Student reading skills were measured at the beginning of the school year (pretest) and at the end of the school year. (posttest)

Figure 3: Study Design



Treatment: CORE Professional Development

For 25 years the Consortium on Reaching Excellence in Education (CORE) has provided services to more than 150,000 educators at preK-12 schools and districts across the country. CORE offers customized, multi-year professional learning programs to provide the knowledge and skills educators need to implement effective, evidence-based classroom practices in literacy and math that result in sustainable academic excellence.

The treatment examined in this study is the CORE-provided professional development to assist teachers to understand and implement, in addition to their broader English Language Arts instruction, the science of reading (the Reading Course) and the SIPPS Reading Foundational Skills program in the Pajaro Valley Unified School District. The SIPPS curriculum aligns with the science of reading and focuses on phonemic awareness, phonics, encoding (spelling), polysyllabic word

reading and spelling, fluency development, and sight words using an explicit, systematic methodology.

Primary grade teachers and administrators received training on the five elements of effective reading instruction through the Reading Academy) and how to use the SIPPS curriculum, followed by modified lesson studies that provided additional modeling and practice to enable teachers to ensure the program components are implemented with fidelity. The CORE consultants provided ongoing classroom coaching to maximize teacher effectiveness in delivering the instructional routines with fidelity. The consultant modeled lesson components and instructional routines, co-taught lessons, and observed and provided feedback. In addition, specific sessions with administrators, especially principals, as well as teachers on special assignment and coaches focused on reviewing the program's progress monitoring data and instructional challenges. Learning walks into classrooms were conducted to help ensure principals and coaches learned what instruction needed to look like and to learn how to solve problems of practice. Following each site visit, principals and district leaders received a report of findings with next steps for actions.

Since the 2017-2018 school year CORE has provided professional development to the Pajaro Valley District to support the primary grade ELA SIPPS implementation. The work began with 3 schools, focusing on K-2 and has increasingly moved to include third grade and implementations at all 17 district elementary schools.

Measures

Student information (e.g., gender, free and reduced lunch eligibility) was obtained from Pajaro Valley Unified School District. The District collects and maintains this information and provided this background information for each participating student.

Reading skills were measured using the NWEA Measures of Academic Progress (MAP). The MAP was administered at the beginning (pretest) and end of the school year (posttest). MAP is a widely used measure of reading skills. NWEA reports test reliability above .90 and provides validity support drawn from several studies.

The MAP assessment is reported on a single developmental scale covering grades 1-12, facilitating the measurement of growth over time and score comparability over time. MAP is both computer-administered and computer-adaptive. MAP scores range from 100-350.

Data Collection

In December 2019, Pajaro Valley Unified School District provided SEG Measurement with a data file containing the reading assessment data and background information for all 2018-second grade students in the District. For each second-grade student, the data file provided:

- Student name
- Student ID

- School
- Teacher
- Gender
- Ethnicity
- Special Ed status
- ESL status
- Free or reduced lunch eligibility
- Fall 2018 MAP reading score
- Spring 2019 MAP reading score

Sampling

Population. Participants in this study were drawn from the Pajaro Valley Unified School District. Pajaro serves approximately 20,000 students. The students are largely Hispanic; approximately half the students are English Learners and nearly three quarters of the students are eligible for free or reduced lunch.

Sample. There are about 1,300 second grade students in the District. Of those, approximately 900 second grade students participated in the study. One half of those participating were in the treatment group and one half were in the control group.

The treatment group was composed of the approximately 450-475 second grade students in the eight CORE implementation schools, with teachers receiving Professional Development from CORE. A matched control group of second grade students was selected from the remaining Pajaro second grade students using propensity score matching. A logistic regression-based propensity score model was used. Students were matched on a composite propensity score based on initial ability, gender, ethnicity, Free or reduced lunch status, ESL status, and Special Ed status. Sampling was done without replacement and matches were required to be within 5% of the composite propensity score.

We examined the two groups to evaluate their comparability.

Initial Ability. The treatment and control group were well matched in initial ability. The average (mean) fall pretest reading scores for the two study groups were within 5.5 points of each other, about two fifths of a standard deviation apart (.41 SD). This is within the conventional .5 standard deviation convention.

Study Group	Mean	N	Std. Deviation
Control	176.06	451	13.576

Table1
Initial Ability of
Control Group

Treatment	181.56	460	12.788
Total	178.84	911	13.461

Comparison of
Treatment and
Sample

(NWEA MAP Reading Pretest)

Gender. The treatment and control group were well matched with respect to gender. There was no significant difference in gender distribution between the two groups (chi square=.003; df=1; p<.999).

Table 2
Comparison of Gender
for Treatment and Control Group Samples

		Gender		Total
		Female	Male	
Study Group	Control	232	243	475
	Treatment	219	231	450
Total		451	474	925

Ethnicity. The ethnicity of the two study groups was similar; more than 90% of the students in both study groups were Hispanic. There were no significant differences in ethnic distribution of the study groups (chi square=2.82; df=5; p<.728).

Table 3
Comparison of Ethnicity for Treatment and Control Group Samples

		Ethnicity						Total
		American Indian	Asian	Filipino	Hispanic	Multiple	White	
Study Group	Control	0	3	1	412	3	32	451
	Treatment	1	2	0	440	3	28	474
Total		1	5	1	852	6	60	925

Free and Reduced Lunch. Both the treatment and control groups had a similar distribution of students eligible for free and reduced lunch. Nearly 90% of the students were eligible for free or reduced lunch. There were no significant differences in the distribution of free and reduced lunch eligibility (chi square=.05; df=5; p<.822).

Table 4
Comparison of Free and Reduced Lunch Status
for Treatment and Control Group Samples

		Free and Reduced Lunch Status		Total
		Not Eligible	Eligible for Free or Reduced Lunch	
Study Group	Control	68	74	142
	Treatment	383	400	783
Total		451	474	925

ESL Status. The proportion of students categorized as ESL was similar for both the treatment and control groups, but there was a somewhat greater tendency for students in the control group to be categorized as ESL, with statistically significant differences in ESL classification between the two groups (chi square=4.08; df=1; p<.043). While statistically significant, the differences were not meaningful.

Table 5
Comparison of ESL Status
for Treatment and Control Group Samples

		ESL Status		Total
		No	Yes	
Study Group	Control	189	262	451
	Treatment	230	244	474
Total		419	506	925

Special Needs Status. The proportion of students identified as having special needs was similar for both the treatment and control groups. There were no significant differences in Special Education Status between the two groups (chi square=1.96; df=1; p<.16).

Table 6
Comparison of Special Needs Status
for Treatment and Control Group Samples

		Special Needs Status		Total
		N	Y	
Study Group	Control	391	60	451
	Treatment	425	49	474
Total		816	109	364

Attrition. Four hundred seventy-four treatment and 451 control students were included in the final matched sample after removing students without a pre or post test score. Participating students were required to have both a pre and posttest to be included in the analyses. Students who left the district before the posttest or otherwise did not have a posttest score were not included in the analyses. The number of students included in any analysis was further reduced if any students had missing data on relevant variables in the analysis. Overall, these factors contributed to the approximately 10% to-20% reduction in sample size from the total population.

Data Analysis/Results

The effectiveness of CORE Professional Development was evaluated. Student reading skills growth in the treatment group was compared to student reading skills growth in the control group using Analysis of Covariance (ANCOVA). ANCOVA can be used to examine the differences in outcomes between a treatment and control group, while adjusting for any differences in initial reading skills. Specifically, ANCOVA was used to examine the differences in reading skills posttest scores (dependent variable) between the treatment and control groups (independent variable) while adjusting for the initial reading skills of the students (reading pretest scores). Adjusting for any differences in initial ability helps ensure that both groups have a common baseline starting point.

First, we examined the overall differences in reading skills between the treatment and control group (main effects) Then, we explored whether or not teacher participation in CORE professional development was more effective for select population subgroups, examining the interaction between study group and student characteristics.

Comparison of Treatment and Control Group Reading Skills Growth

Students in classes with teachers receiving CORE professional development showed significantly greater growth in reading skills than did students in classes with teachers who did not receive CORE professional development ($F = 14.01, df=1/911; p<.001$ Effect Size=.18). The treatment group achieved a mean reading skills posttest score of 180.1, while the control group achieved a

mean reading skills posttest score of 177.6. These results are shown in Tables 7 and 8 and Figure 4.

Table 7
ANCOVA of the
Treatment and Control Group NWEA MAP Reading Posttest Scores

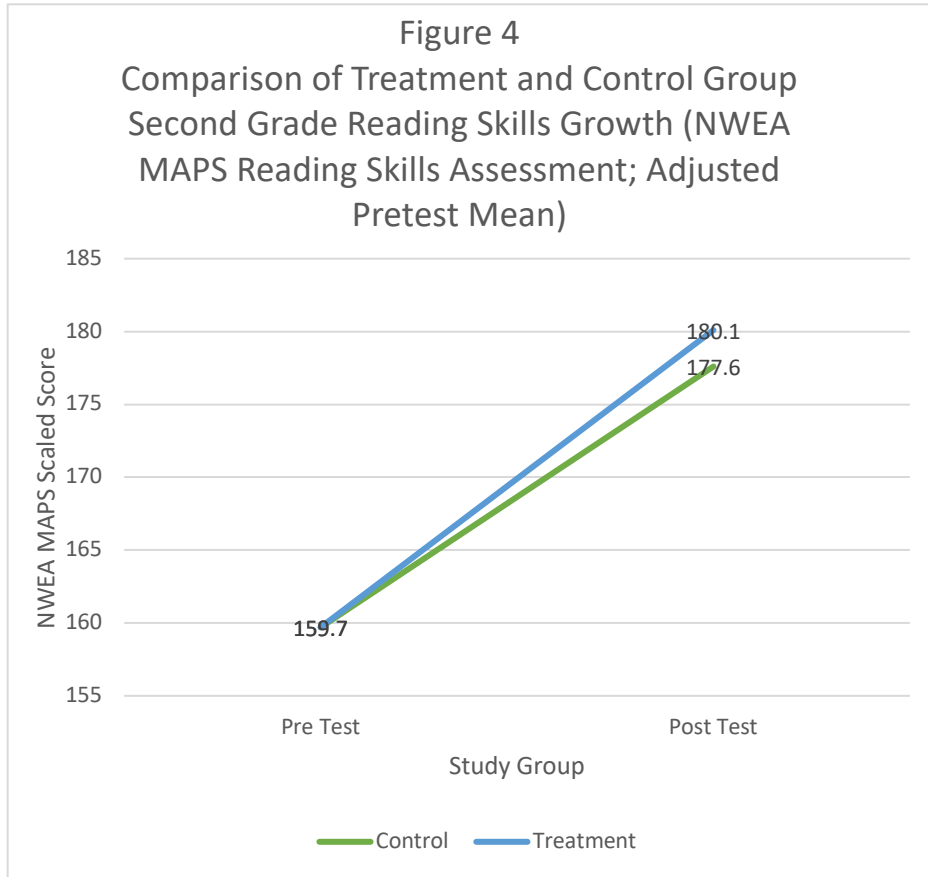
Source	Type III Sum of Squares	Df	Mean Square	F	Significance
;Corrected Model	76870.783 ^a	2	38435.392	396.47	.001
Intercept	17792.228	1	17792.228	183.53	.001
Reading Pretest Score	69979.397	1	69979.397	721.86	.001
Study Group	1358.593	1	1358.593	14.01	.001
Error	88024.519	908	96.943		
Total	29300571.000	911			
Corrected Total	164895.302	910			

a. Covariate in the model is evaluated at 159.71.

Table 8
Descriptive Comparison of the Treatment and Control Group
Mean NWEA Reading Posttest Scores (Adjusted for Pretest Performance)

Group	Number of Students	Posttest Scores	
		Mean	Standard Deviation
Control	451	177.58 ^a	13.576
Treatment	460	180.06 ^a	12.788
Total	911	178.82 ^a	13.461

a. Covariates are evaluated at the Reading Skills Pretest Score = 159.71



Interaction Between Study Group and Student Characteristics

SEG Measurement examined several student background characteristics and Study Group Membership to determine if CORE professional development interacted with student characteristics to moderate or enhance the impact of CORE professional development on reading skills development.

We examined the interaction between Study Group and Gender, Ethnicity, ESL status, Free and Reduced Lunch Status, and Special Education Status.

Interaction between Study Group and Gender. There was no significant interaction between Study Group and Gender ($F = .001=1.66$, $df=910$; $p=.198$), suggesting that CORE Professional Development was equally effective at achieving reading skills growth for both boys and girls.

These results appear in Tables 9 and 10.

Table 9
ANCOVA of the
Treatment and Control Group by Gender
NWEA MAP Reading Posttest Scores

Source	Type III Sum of Squares	Df	Mean Square	F	Significance
Corrected Model	77600.597 ^a	4	19400.149	201.347	.001
Intercept	17914.451	1	17914.451	185.928	.001
Reading Skills	69559.402	1	69559.402	721.932	.001
StudyGroup	1333.367	1	1333.367	13.839	.001
Gender	575.769	1	575.769	5.976	.015
StudyGroup * Gender	159.596	1	159.596	1.656	.198
Error	87294.705	906	96.352		
Total	29300571.000	911			
Corrected Total	164895.302	910			

Table 10
Descriptive Comparison of the Treatment and Control Group
by Gender
Mean NWEA Reading Posttest Scores
(Adjusted for Pretest Performance)

Group	Gender	Number of Students	Posttest Scores	
			Mean	Standard Deviation
Control	Male	232	176.401 ^a	13.760
	Female	219	178.830 ^a	13.277
Treatment	Female	234	179.695 ^a	12.940
	Male	226	180.449 ^a	12.592

Interaction between Study Group and Ethnicity. There was a significant interaction between Study Group and Ethnicity ($F = .85$, $df=9/901$; $p=.47$). Student reading skills growth between treatment and control classes depended on student ethnicity. Specifically, we found that reading skills growth for Hispanic students in classes with teachers receiving CORE Professional Development (179.96) was significantly greater than for Hispanic students in classes with teachers that did not receive CORE Professional Development (177.18). While the magnitude of this effect was greater for Hispanics than seen for the overall sample, caution should be used in interpreting these results because there were very small sample sizes for all but White and Hispanic students. More than 90% of the treatment and control group were Hispanic.

Table 11
ANCOVA of the
Treatment and Control Group by Ethnicity
NWEA MAP Reading Posttest Scores

Source	Type III Sum of Squares	Df	Mean Square	F	Significance
Corrected Model	77925.702 ^a	9	8658.411	89.70bb	<.001
Intercept	14367.667	1	14367.667	148.85	<.001
Reading Skills	68848.246	1	68848.246	713.26	<.001
StudyGroup	2.482	1	2.482	.03	.87
Gender	754.584	4	188.646	1.95	.10
StudyGroup * Ethnicity	245.639	3	81.880	.85	.47
Error	86969.600	901	96.526		
Total	29300571.000	911			
Corrected Total	164895.302	910			

Table 12
Descriptive Comparison of the Treatment and Control Group by Ethnicity
Mean NWEA Reading Posttest Scores (Adjusted for Pretest Performance)

Group	Ethnicity	Number of	Posttest Scores	
		Students	Mean	Standard Deviation
Control	Asian	3	178.20	10.60
	Filipino	1	170.31	.
	Hispanic	412	177.18	13.70
	Two or More Races	3	185.17	11.02
	White	32	182.27	12.32
Treatment	Asian	2	182.20	23.34
	Filipino	0		
	Hispanic	429	179.96	12.36
	Two or More Races	3	181.29	13.61
	White	26	181.338 ^a	16.935

Interaction between Study Group and ESL Status. There was a significant interaction between Study Group and ESL status ($F = 3.87, df=4/906; p=.05$) The extent of reading gains was dependent on whether the student was classified as ESL. ESL students in the treatment group (Mean=174.73) improved their reading skills more than ESL students in the Control group (Mean=171.16) suggesting that teacher participation in the CORE PD was particularly effective for ESL students. The magnitude of the effect seen for ESL students was greater than that seen for the overall sample.

Table 13
ANCOVA of the
Treatment and Control Group by ESL Status
NWEA MAP Reading Posttest Scores

	Type III Sum of Squares	Df	Mean Square	F	Significance
Corrected Model	82245.386 ^a	4	20561.347	225.39	<.001
Intercept	22262.405	1	22262.405	244.04	<.001
Reading Skills	46233.227	1	46233.227	506.80	<.001
StudyGroup	1230.169	1	1230.169	13.49	<.001
ESLStatus	5005.369	1	5005.369	54.87	<.001
StudyGroup * ESLStatus	353.396	1	353.396	3.87	.05
Error	82649.916	906	91.225		
Total	29300571.000	911			
Corrected Total	164895.302	910			

Table 14
Descriptive Comparison of the Treatment and Control Group by ESL status
Mean NWEA Reading Posttest Scores (Adjusted for Pretest Performance)

Group	ESL Status	Number of Students	Posttest Scores	
			Mean	Standard Deviation
Control	No	189	182.85	12.92
	Yes	262	171.16	11.83
Treatment	No	221	181.14	12.67
	Yes	239	174.72	10.38

Interaction between Study Group and Free and Reduced Lunch Eligibility. There was a significant interaction between Study Group and Free or Reduced Lunch Eligibility ($F = 4.86, df=4/906; p=.03$), revealing that student reading skills growth between treatment and control teachers depended on student free and reduced lunch eligibility. Specifically, reading skills growth for students eligible for free or reduced lunch in classes with teachers receiving CORE

Professional Development (179.89) was higher than for students eligible for free and reduced lunch in classes with teachers that did not receive CORE PD (176.79). The magnitude of the difference was greater than that seen for the overall sample. This suggests that CORE Professional Development may be particularly beneficial for students at lower economic levels (as reflected in free and reduced lunch eligibility as a proxy for economic level).

Table 15
ANCOVA of the
Treatment and Control Group by Free or Reduced Lunch Eligibility
NWEA MAP Reading Posttest Scores

Source	Type III Sum of Squares	Df	Mean Square	F	Significance
Corrected Model	78496.720 ^a	4	19624.180	205.79	<.001
Intercept	18368.953	1	18368.953	192.62	<.001
Reading Skills	67223.091	1	67223.091	704.92	<.001
StudyGroup	143.909	1	143.909	1.51	.22
Free or Reduced Lunch	1193.830	1	1193.830	12.52	<.001
StudyGroup * Free or Reduced Lunch	463.233	1	463.233	4.89	.03
Error	86398.582	906	95.363		
Total	29300571.000	911			
Corrected Total	164895.302	910			

Table 16
Descriptive Comparison of the Treatment and Control Group
by Free or Reduced Lunch Eligibility
Mean NWEA Reading Posttest Scores (Adjusted for Pretest Performance)

Group	Gender	Number of Students	Posttest Scores	
			Mean	Standard Deviation
Control	No Free or Reduced Lunch	68	181.96	13.35
	Yes Free or Reduced Lunch	333	176.79	13.42
Treatment	No Free or Reduced Lunch	73	181.10	14.45
	Yes Free or Reduced Lunch	387	179.89	12.25

Interaction between Study Group and Special Education Status. There was a significant interaction between Study Group and Special Ed Status (F =3.84, df=9/901; p=.05). The extent of reading gains was dependent on whether the student was classified as Special Education.

Students not identified as special ed in classes with teachers receiving CORE PD (Mean=180.71) increased their reading skills more than those students not identified as Special Ed in classes with teachers not receiving CORE PD (Mean=177.90)

On the surface, this would suggest that the provision of CORE Professional Development was particularly effective in increasing reading skills for students that are not classified as Special Education. However, caution should be used in drawing any conclusions for Special Education since the pd provided did not specifically include Special Education teachers. Special Education teachers were not directly included in the CORE implementation. This is consistent with the relatively small number of special ed students included in this study. Only 43 students in the treatment group and only 60 students in the control group were classified as special education. These students typically receive a narrow set of special education services in the regular classroom.

Table 17
ANCOVA of the
Treatment and Control Group by Special Ed Status
NWEA MAP Reading Posttest Scores

Source	Type III Sum of Squares	Df	Mean Square	F	Significance
Corrected Model	78888.812 ^a	4	19722.203	207.76	<.001
Intercept	18081.044	1	18081.044	190.47	<.001
Reading Skills	66381.535	1	66381.535	699.27	<.001
StudyGroup	55.436	1	55.436	.58	.45
Special Ed Status	1850.918	1	1850.918	19.50	<.001
StudyGroup * Special Ed Status	364.521	1	364.521	3.84	.05
Error	86006.489	906	94.930		
Total	29300571.000	911			
Corrected Total	164895.302	910			

Table 18
Descriptive Comparison of the Treatment and Control Group
by Special Ed Status
Mean NWEA Reading Posttest Scores (Adjusted for Pretest Performance)

Group	Gender	Number of Students	Posttest Scores	
			Mean	Standard Deviation
Control	Not Identified as Special Ed	391	177.90	13.42
	Yes Identified as Special Ed	60	175.33	13.99

Treatment	Not Identified as Special Ed	417	180.71	12.35
	Yes Identified as Special Ed	43	174.10	13.04

Discussion

This study examined the impact of teacher participation in CORE professional development and technical assistance on student reading skill growth. Students in classes with teachers who participated in CORE professional development and technical assistance showed substantially greater improvement in reading skills than students in classes with teachers that did not participate in CORE.

These results indicate that providing CORE Professional Development for teachers is an effective tool for developing second-grade student reading skills. Students in classes in which teachers received CORE professional development showed greater reading skills growth than comparable students in classes in which teachers did not receive CORE professional development. These results suggest that providing CORE professional development and technical assistance to teachers can contribute to student reading skills growth.

Study Design. The difference in reading skills growth between students in classes with teachers participating in the CORE professional development and support and students in those in classes with teachers that did not participate in CORE professional development. This question was addressed using a quasi-experimental design with matched groups of students; both groups of students completed the NWEA MAP Reading Skills assessment as a pretest of reading skills and a posttest of reading skills. The two study groups were matched with respect to initial ability and student characteristics; this was a highly powered sample with more than 900 students surviving the matching procedure for the analyses.

Using ANCOVA, the growth in reading skills was compared, adjusting for any potential differences in reading skill revealed by the pretest. We also examined the impact of the treatment along with several student characteristics to see if any of those characteristics interacted with participation in CORE treatment and if any of those characteristics enhanced or moderated the effect seen when looking at CORE alone. Again, we used ANCOVA to look at CORE participation and each student characteristic to see how this enhanced or moderated the impact of CORE participation on student reading skill growth.

Results. Students in the treatment group with teachers who participated in CORE showed significantly greater growth in reading skills than did the control group students with teachers who did not participate in CORE ($F = 14.01$, $df=1/911$; $p<.001$; Effect Size=.18). Students in the treatment group showed about a fifth of a standard deviation more growth in reading skills

than did the control group students. There were no meaningful findings with regard to gender, ethnicity, free and reduce lunch status, ESL status and special ed classification interactions with study group membership.

Context for success. The overall effect size (.18) for CORE is particularly notable given that the professional development treatment was provided to teachers and is not a direct treatment delivered to students. While ultimately it is likely to manifest as a direct treatment to students (through instruction), professional development is a mediated treatment, a treatment one step removed from actual student instruction. That CORE professional development produced about a fifth of a standard deviation greater reading skills growth, given that it is one step removed from direct student instruction is impressive.

These findings are consistent with our earlier study examining the impact of CORE on student reading skills at the third-grade level. While this strengthens the conclusion that CORE Professional Development participation leads to greater improvements in student reading skills, still one should use caution in overgeneralizing these findings. Additional research currently underway with a larger samples and multiple grade levels will help validate what we found in this study.

Conclusion. In conclusion, this study demonstrates that teacher participation in CORE Professional Development is effective in facilitating student reading skills growth. While other factors certainly contribute to student achievement, (e.g. teacher characteristics, student characteristics, curriculum and instruction), this study demonstrates that CORE professional development and technical assistance can make a significant difference in student reading skills.