

# CAPIT Reading: Impact in an Oklahoma School District

*June 2022*

*This report leverages product usage data and school district data to explore the impact of CAPIT Reading usage on student outcomes.*

## Introduction and Principal Findings

The developers of CAPIT Reading contracted with Evidentially, Inc. to evaluate the effectiveness of their product in a suburban school district in Oklahoma. CAPIT Reading is a comprehensive PK-2 literacy solution that includes a digital phonics curriculum and teacher professional development.

This study analyzed the impact of CAPIT Reading in the fall semester of 2019 on student achievement in early reading, as measured by the aimsweb reading assessment for kindergarten students. The study is designed to Tier 2 ESSA standards for moderate evidence.<sup>1</sup> There are two principal findings.

- CAPIT Reading had a significant impact on the Letter Word Sounds Fluency (LWSF) and aimsweb Early Literacy Composite scores. The estimated effect sizes are estimated at .29 and .17, respectively.
- There was no evidence of significant negative differential impact of CAPIT for students with varying demographic characteristics; CAPIT had a positive impact for all students.

## Results

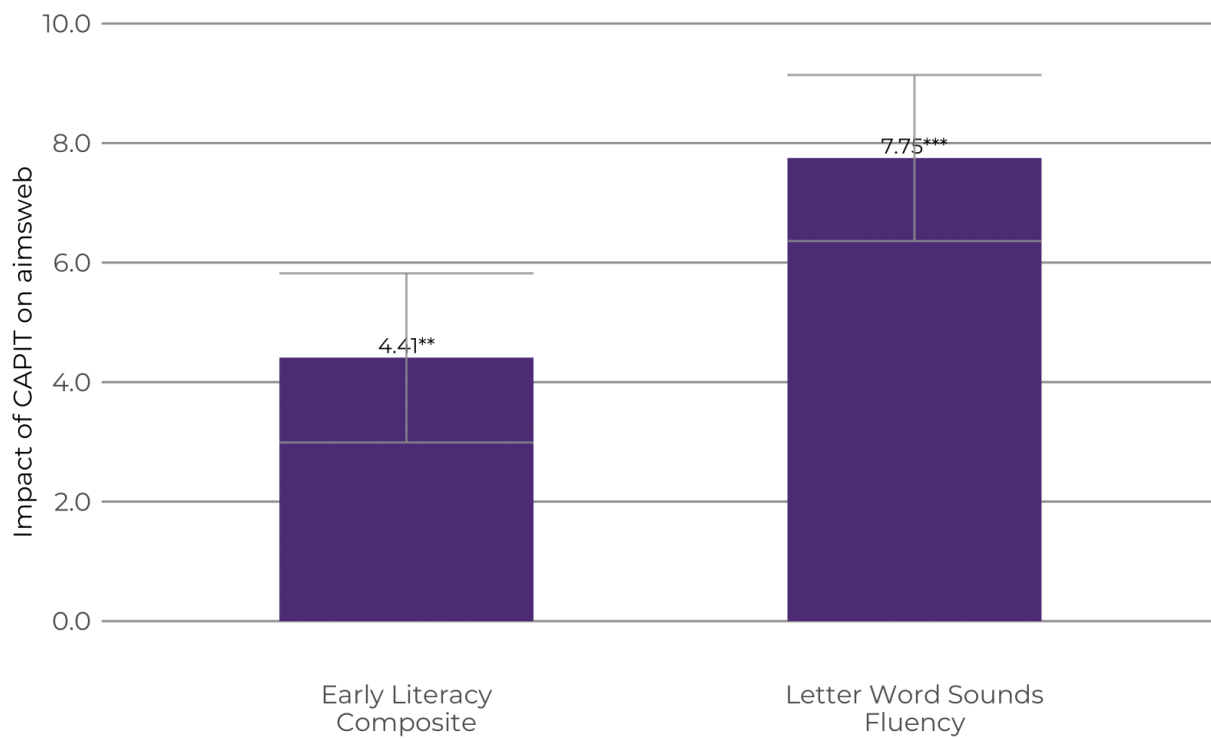
We found a positive impact of CAPIT Reading on student early reading achievement on the aimsweb assessment for kindergarten students estimated at 4.4 test score points for the aimsweb Early Literacy Composite score (effect size .17,  $p = .01$ ) and 7.8 points for the LWSF score (effect size .29,  $p < .001$ ). This impact on the LWSF score is equivalent to a 29% increase in growth for the average CAPIT student from the fall to winter tests, and we have strong confidence in this result.

We found little evidence of differential impact favoring student subgroups, meaning that this positive impact for CAPIT users did not vary according to student characteristics such as eligibility for free and reduced-price lunch, race, or gender. We found limited evidence that the impact on aimsweb overall was greater for special education students by 4.9 points ( $p = .09$ ) and that the impact on LWSF scores was greater for English Language Learners by 7.4 points ( $p = .09$ ). Impact of CAPIT reading does not vary significantly across other student groups.

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<sup>1</sup> Non-regulatory guidance: Using evidence to strengthen education investments. Retrieved from <https://www2.ed.gov/policy/elsec/leg/essa/guidanceusesinvestment.pdf>

These findings are shown in Figure 1 (and Table 1). The grey bars in Figure 1 show the 95% confidence interval for the estimated impact.



**FIGURE 1. IMPACT OF CAPIT READING ON AIMSWEB SCORES**

Note. Gray bars illustrate the 95% confidence interval. There is strong evidence that the results fall within this range. LWS is Letter Word Sounds.

**TABLE 1. MAIN RESULTS**

Category	Estimate	<i>p</i> value	Effect size
Early Literacy Composite	4.41	.01	.17
Letter Word Sounds Fluency	7.75	<.001	.29

# Technical Details

## DATA PREPARATION

This study of CAPIT Reading is based on student data from the district and student-level application usage data from CAPIT from the 2019-20 school year. Student data from the district included demographics, school and teacher identifiers, fall pretest score, and winter outcome score from the aimsweb Reading assessment for all kindergarten students. Aimsweb is a formative assessment administered in the fall, winter, and spring to measure early reading skills. CAPIT data included the first and last dates of usage for each student,<sup>2</sup> and other usage metrics.

## STUDY DESIGN

This study uses a quasi-experimental comparison group design. Based on the analysis of the distribution of usage metrics across students, classrooms, and schools, we determined that CAPIT was assigned at the school level. However, the dates when the actual use of CAPIT started varies within schools across classrooms. Across the 18 elementary schools in the district, there were 8 schools where no students used CAPIT, 4 schools where nearly all kindergarten students used CAPIT, and 6 schools where varying proportions of students used CAPIT and/or where students started using CAPIT after the Winter test. All students enrolled in the 4 schools that used CAPIT Reading were included in the treatment group (regardless of actual CAPIT usage), and the comparison group included all students in the 8 schools with no CAPIT usage. The last group of 6 schools with inconsistent CAPIT implementation was excluded from the study.

The outcome of interest in this study was student achievement in early reading, as measured by the aimsweb assessment. In kindergarten, students took the LWSF and Letter Naming Fluency (LNF) tests, which are combined into the aimsweb Early Literacy Composite score. The tests (outcomes) were administered in January 2020. The pretest was administered in August 2019.

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<sup>2</sup> The majority of students began using CAPIT in late September or early October and continued through the end of January.

## ANALYTIC SAMPLE

The original sample included 524 CAPIT students across 26 classes and 1,063 comparison students across 53 classes. 198 students from the 12 schools included in the study were excluded from the analysis due to missing pretest or outcome test data, leaving the analytic sample in this study with 1,389 students: 460 in the CAPIT group and 929 in the comparison group. The sample was balanced with less than .25 standard deviations on each covariate and required no additional balancing or matching; the final parameters of the analytic sample are presented in Table 2.

**TABLE 2. CHARACTERISTICS OF STUDY SAMPLE (STUDENTS)**

Category	CAPIT group	Comparison group	Pooled Standard Deviation	Difference in % Standard Deviation
% Female	48	48	50	0.5
% White	66	54	49	24.7
% Black	9	12	31	9.6
% Hispanic	13	12	33	2.5
% Asian	1	5	19	22.4
% Multiracial	9	14	33	14.6
% English Learners	9	8	28	4.1
% Eligible for free or reduced-price lunch	32	28	46	8.8
% Special education	12	13	33	2.0
Fall aimsweb Composite	52.9	54.2	28	4.4
Total Students	460	929	n/a	n/a

## ANALYSIS

The analysis of CAPIT impact was performed using a hierarchical linear regression model whereby average program effect was estimated, adjusting for student characteristics and pretest, and taking into account clustering of students and teachers in schools. CAPIT usage was modeled by a binary variable that had the value of 'one' for all students in the four treatment schools and the value of 'zero' for all students in the eight comparison schools. In addition, we performed moderator analysis for those outcomes that showed significant effect of CAPIT Reading. In the moderator analysis, interactions of the CAPIT effect with student characteristics are added to the model, thus allowing the identification of significant differences in the impact of the product across student groups.

In the results reported below (Table 3-6), 'estimate' shows the contribution of student characteristics, pretest, and CAPIT usage on the outcome expressed in the units of a particular test scale (regression coefficients). A comparison of the CAPIT effect estimates with other regression coefficients for demographic variables allows assessing the potential of CAPIT to reduce an achievement gap. An example of this is the results in Table 3: the estimate of the impact of CAPIT is 7.75 points, showing a larger impact than most other student characteristics. Among all kindergarten students nationally who take the Letter Word Sounds Fluency test, the average scores grow between the fall and winter test administrations by a factor of 3.1 – from 9 points to 28 points<sup>3</sup>. The average scores of CAPIT students included in this study grow by a factor of 4, which represents an additional 29% growth due to the use of CAPIT.

The 'p value' is the measure of the precision of the results or the strength of evidence that the effect in question is statistically different from zero. Conventional interpretation is that a *p* value of .05 or less signifies strong evidence, and *p* values above .05 but less than .20 provide limited evidence. Higher *p* values imply that our results provide no reliable information about the impact of usage on outcomes, since the probability that the true effect is zero—or even has an opposite sign—is too high. Higher *p* values (lower precision of the results) are typical when the sample of students is small and does not necessarily mean that there is no impact.

The district administers the LNF assessment as part of the aimsweb overall. However, CAPIT Reading does not teach letter names as a part of their program and did not expect to see an impact on the LNF subscore of the aimsweb assessment for kindergarten students. Accordingly, an analysis of CAPIT on the LNF subscore found a *p* value of .35. This implies that, in this study, the positive effect of CAPIT on this outcome could not be established, and therefore, the improvement in the aimsweb overall score should be attributed to the gains in the LWSF scale. In the moderator analyses (Tables 4 and 6), *p* values in excess of .2 imply that the effect of CAPIT does not vary across student groups. Limited evidence of a greater-than-average impact of CAPIT on students with disabilities and English Learner students is signified by corresponding *p* values of 0.09.

Disclaimer: It must be taken into account that these results are obtained using a relatively small sample in a particular school district and may not necessarily be replicable elsewhere.

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<sup>3</sup> NCS Pearson, Inc. (2012). aimsweb Technical Manual. Bloomington, MN: NCS Pearson, Inc.

## Detailed Results

Detailed results are provided in Tables 3-6. Effect sizes are reported only for the main impact estimate, as there not significant differences for student subgroups.

**TABLE 3. DETAILED RESULTS OF THE IMPACT OF CAPIT READING ON LETTER WORD SOUND SCALE**

Group	Estimate	Standard Error	<i>p value</i>	Effect size
Intercept	4.52	3.63	.21	
CAPIT use (binary)	7.75	1.79	<.001	0.29
Fall LWSF	0.67	0.02	<.001	
Female	-0.45	0.98	.65	
Asian	8.92	4.28	.04	
Black	-3.00	3.64	.41	
Hispanic	-3.38	3.59	.35	
White	-1.98	3.33	.55	
Multiracial	-3.08	3.56	.39	
English Learners	0.61	2.03	.77	
Special Education	-4.30	1.59	.01	
Eligible for free or reduced-price lunch	-4.73	1.25	<.001	

Note. LWS is Letter Word Sounds.

**TABLE 4. MODERATOR RESULTS OF THE IMPACT OF CAPIT READING ON LETTER WORD SOUNDS FLUENCY SCALE**

Group	Estimate	<i>p value</i>
Female	-1.69	>.2
Asian	7.00	>.2
Black	7.65	>.2
Hispanic	2.18	>.2
White	3.11	>.2
English Learners	5.26	>.2
Special Education	7.44	.09
Eligible for free or reduced-price lunch	3.78	>.2

**TABLE 5. DETAILED RESULTS ON THE IMPACT OF CAPIT READING ON AIMSWEB COMPOSITE SCORE**

Group	Estimate	Standard Error	<i>p</i> value	Effect size
Intercept	9.49	3.05	<.001	
CAPIT use (binary)	4.41	1.59	.01	0.17
Fall aimsweb Composite	0.71	0.02	<.001	
Female	0.16	0.84	.85	
Asian	7.40	3.67	.04	
Black	-0.18	3.12	.95	
Hispanic	-1.97	3.07	.52	
White	-0.50	2.85	.86	
Multiracial	-1.33	3.04	.66	
English Learners	-0.83	1.74	.64	
Special Education	-4.42	1.36	<.001	
Eligible for free or reduced-price lunch	-2.27	1.07	.03	

**TABLE 6. MODERATOR RESULTS OF THE IMPACT OF CAPIT READING ON AIMSWEB COMPOSITE SCORE**

Group	Estimate	<i>p</i> value
Female	0.84	>.2
Asian	11.11	>.2
Black	7.55	>.2
Hispanic	2.65	>.2
White	5.04	>.2
English Learners	7.12	>.2
Special Education	2.88	>.2
Eligible for free or reduced-price lunch	4.91	0.09



## Appendix A. Exploratory Analyses

CAPIT is a 2-year program where—when implemented under ideal conditions—students progress through all lessons in each of the three levels over the course of kindergarten and 1<sup>st</sup> grade. The student impact study above for kindergarten students was conducted in the 2019-20 school year after a very limited pilot in 2018-19 in only one school. While not implemented with fidelity, the program was available to use for 1<sup>st</sup> grade students in 2019-20 as well. The only assessment administered for 1<sup>st</sup> grade students was the Oral Reading Fluency (ORF) subscore. However, the program developers would expect impact on a measure like ORF in 2<sup>nd</sup> grade only after completion of the program after 2 years. We performed an exploratory analysis of 1<sup>st</sup> grade students using the same design as for the main analysis and found no impact of CAPIT reading on ORF for 1<sup>st</sup> grade students,  $p = .68$  (see Table A1). The sample included 447 CAPIT students and 936 comparison students and was well-balanced with differences of less than .25 standard deviations on each covariate (see Table A2).

**TABLE A1. DETAILED RESULTS ON THE IMPACT OF CAPIT READING ON GRADE 1 ORAL READING FLUENCY**

Group	Estimate	Standard Error	$p$ value	Effect size
Intercept			<.001	
CAPIT use (binary)	-0.49	1.19	.68	-0.02
Fall ORF	0.86	0.01	<.001	
Female	-0.11	0.66	.86	
Asian	-1.25	2.72	.64	
Black	-6.29	2.41	.01	
Hispanic	-6.04	2.42	.01	
White	-4.32	2.23	.05	
Multiracial	-4.35	2.39	.07	
English Learners	-1.54	1.43	.28	
Special Education	-5.44	1.03	<.001	
Eligible for free or reduced-price lunch	-3.73	0.84	<.001	

Note. ORF is Oral Reading Fluency.

**TABLE A2. CHARACTERISTICS OF STUDY SAMPLE (STUDENTS)**

Category	CAPIT group	Comparison group	Pooled Standard Deviation	Difference in % Standard Deviation
% Female	51	47	50	7.8
% White	61	55	50	12.6
% Black	11	14	33	9.4
% Hispanic	15	11	33	11.4
% Asian	2	6	22	20.6
% Multiracial	11	11	32	2.5
% English Learners	8	8	27	0.4
% Eligible for free or reduced-price lunch	36	28	46	18.9
% Special education	11	15	34	9.5
Fall aimsweb ORF	36.6	37.7	32	3.4
Total Students	460	929	n/a	n/a

As a further exploratory analysis, we performed a correlational analysis to estimate the association between the amount of usage and early reading outcome among CAPIT users. This analysis included all students across the 10 schools with any CAPIT usage. The sample for this included 747 kindergarten students and 365 first grade students. To minimize the possible effect of selection bias on the results, we did not use actual usage days or the number of activities completed (better prepared students are more likely to engage with the product more actively and completed more tasks). Instead, we calculated a metric that only measures the student's access to the product. We denote this metric 'usage days' and calculate as the number of calendar days between the first recorded usage of CAPIT in the student's classroom and the end of the fall semester. Presumably, this metric shows the maximum possible amount of time that the students of a particular teacher were given access to CAPIT. This metric is not precise because we don't know if teachers were assigning CAPIT activities to all students, or whether they used the product actively through the last days of the semester.

We found limited evidence of an association between the number of usage days and outcomes on the LWSF (Table A3) and aimsweb Composite (Table A4) scores for kindergarten students and the ORF score (Table A5) for first grade students, furthering the promising findings of the main student impact study.

These estimates are the incremental scale score gain associated with one extra usage day. 'Effect sizes' were calculated by multiplying the estimate by the average

number of usage days for students, which was 70 days (71 days for kindergarten students and 69 for first grade). These estimates should be taken with caution and should not be compared to the main results, because this study does not follow a rigorous quasi-experimental design. However, the results do provide valid Tier 3 (promising evidence), based on the ESSA tiers of evidence<sup>4</sup>. Effect sizes are reported only for the main impact estimate, as there not significant differences for student subgroups.

**TABLE A3. CORRELATION OF CAPIT READING USAGE WITH KINDERGARTEN LETTER WORD SOUNDS FLUENCY**

Group	Estimate	Standard Error	<i>p</i> value	Effect size
Intercept	7.82	6.92	.26	
Usage days	0.07	0.05	.16	0.19
Fall LWSF	0.56	0.03	.00	
Female	-0.39	1.44	.79	
Asian	7.87	8.00	.33	
Black	2.90	6.14	.64	
Hispanic	2.88	5.94	.63	
White	5.40	5.53	.33	
Multiracial	4.39	5.87	.45	
English Learners	1.46	2.95	.62	
Special Education	-4.26	2.42	.08	
Eligible for free or reduced-price lunch	-4.33	1.90	.02	

Note. LWS is Letter Word Sounds.

<sup>4</sup> Non-regulatory guidance: Using evidence to strengthen education investments. Retrieved from <https://www2.ed.gov/policy/elsec/leg/essa/guidanceuseseseinvestment.pdf>

**TABLE A4. CORRELATION OF CAPIT READING USAGE WITH KINDERGARTEN AIMSWEB COMPOSITE SCORE**

Group	Estimate	Standard Error	<i>p</i> value	Effect size
Intercept	6.16	5.89	.30	
Usage days	0.07	0.05	.15	0.17
Fall aimsweb Composite	0.61	0.02	.00	
Female	1.45	1.24	.24	
Asian	11.84	6.87	.08	
Black	5.92	5.26	.26	
Hispanic	6.40	5.09	.21	
White	8.76	4.74	.06	
Multiracial	9.18	5.03	.07	
English Learners	0.13	2.53	.96	
Special Education	-4.79	2.07	.02	
Eligible for free or reduced-price lunch	-3.13	1.63	.05	

**TABLE A5. CORRELATION OF CAPIT READING USAGE WITH GRADE 1 ORAL READING FLUENCY**

Group	Estimate	Standard Error	<i>p</i> value	Effect size
Intercept	9.32	5.45	.09	
Usage days	0.06	0.03	.07	0.13
Fall ORF	0.86	0.02	.00	
Female	0.28	1.19	.81	
Asian	2.93	7.40	.69	
Black	-1.53	5.19	.77	
Hispanic	0.33	4.99	.95	
White	0.38	4.69	.94	
Multiracial	3.36	5.01	.50	
English Learners	-4.31	3.06	.16	
Special Education	-3.72	1.99	.06	
Eligible for free or reduced-price lunch	-3.17	1.52	.04	

Note. ORF is Oral Reading Fluency.