The Impacts of i-Ready Personalized Instruction on Student Reading Achievement

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Contents

EXECUTIVE SUMMARY:
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In July 2021, The Center for Research and Reform in Education (CRRE) at Johns Hopkins University partnered with Curriculum Associates (CA) to conduct an efficacy study of the effects of i-Ready Personalized Instruction on student achievement in a large, suburban school district in southern California. The present report examines findings from quantitative analyses comparing reading achievement gains, as measured by the Smarter Balanced Assessment (SBA). The analyses use multilevel modeling and propensity score matching to compare reading achievement gains between students who experienced both i-Ready Personalized Instruction and Diagnostic testing and students who only participated in i-Ready Diagnostic testing. Additional analyses examined relationships between i-Ready usage metrics and SBA scores. Outcome data from the 2021-22 school year were used in all analyses.

Research questions for this evaluation were:

1. What is the impact of i-Ready Personalized Instruction on Smarter Balanced Assessment reading achievement?

2. How do program effects on reading achievement vary for student subgroups and by school characteristics?
   a. By student demographic characteristics, including grade level, gender, race/ethnicity, disability status, and English language learner status?
   b. By school characteristics, including Title I eligibility, total enrollment size, and the percentage of students of minority race.

3. How do program effects on reading achievement vary by implementation as measured by student usage?

The study sample consisted of about 5,632 students in 22 schools from Grades 3-6 from one school district in southern California. All schools used i-Ready Diagnostic assessments, but some schools were considered "full instruction" and assigned all students to receive both the Diagnostic and Personalized Instruction products. Students in these schools were compared to "Diagnostic-only" students in other "partial Instruction" schools where only some students received the Personalized Instruction product in addition to the Diagnostic product. (These Diagnostic and Personalized Instruction students in partial instruction schools are not included in this study.)

Key findings of the current study include:

School-wide i-Ready Personalized Instruction was associated with reading achievement proficiency and directionally with reading achievement gains.
School-wide implementation of i-Ready Personalized Instruction was associated with an increased likelihood of scoring proficient on the SBA ELA exam in Grades 3-6. Additionally, students in school-wide i-Ready Personalized Instruction schools had directionally more positive gains in reading achievement on the SBA assessment relative to comparison students, but these differences were not statistically significant.

Greater i-Ready Personalized Instruction usage was associated with reading achievement gains. Students who used i-Ready Personalized Instruction for longer amounts of time and number of lessons had significantly higher reading achievement on the SBA in relation to comparison students.

Conclusions

The key results and conclusions of this evaluation are as follows:

- School-wide i-Ready Personalized Instruction was not associated with significantly higher SBA ELA scores but was significantly associated with greater odds of scoring proficient on the SBA ELA test.
- i-Ready Personalized Instruction metrics including total time and lesson count variables were significantly positively associated with reading achievement.

The Impacts of i-Ready Personalized Instruction on Student Reading Achievement

In July 2021, The Center for Research and Reform in Education (CRRE) at Johns Hopkins University partnered with Curriculum Associates (CA) to conduct an efficacy study of the effects of i-Ready Personalized Instruction on student achievement in a large, suburban school district in southern California. The present report examines findings from quantitative analyses comparing reading achievement gains, as measured by the Smarter Balanced Assessment (SBA). The analyses use multilevel modeling and propensity score matching to compare reading achievement gains between students who experienced both i-Ready Personalized Instruction and Diagnostic testing and students who only participated in i-Ready Diagnostic testing. Additional analyses examined relationships between i-Ready usage metrics and SBA scores. Outcome data from the 2021-22 school year were used in all analyses.

The i-Ready Diagnostic assessment is an adaptive assessment designed to provide teachers with actionable insight into student needs. The Diagnostic assessment offers a complete picture of student performance and growth, eliminating the need for multiple, redundant tests. The i-Ready Diagnostic assessment pinpoints student ability level, identifies specific skills students need to learn to accelerate their growth, and charts a personalized learning path for each student.

The i-Ready Personalized Instruction suite delivers online lessons for Grades K-8 students that provide tailored instruction that meets learners at their level, helps them problem solve, and keeps students motivated to continue their progress. Personalized Instruction uses data obtained from the i-Ready Diagnostic assessment to deliver personalized learning paths for each student, balancing rigor and reachability. Online lessons offer students explicit instruction when they need it, along with systematic practice and scaffolded feedback that helps to promote a growth mindset.

This study investigates the efficacy of i-Ready Personalized Instruction in one school district by comparing treatment students—those in schools that used i-Ready Personalized Instruction school-wide (for at least 70% of their students) throughout the school year—to comparison students who were not assigned to i-Ready Personalized Instruction in schools that used i-Ready Personalized Instruction for only some students (between 5-33%).

Research questions for this evaluation were:

1. What is the impact of i-Ready Personalized Instruction on Smarter Balanced Assessment reading achievement?

2. How do program effects on reading achievement vary for student subgroups and by school characteristics?
    a. By student demographic characteristics, including grade level, gender, race/ethnicity, disability status, and English language learner status?
    b. By school characteristics, including Title I eligibility, total enrollment size, and the percentage of students of minority race.

3. How do program effects on reading achievement vary by implementation as measured by student usage?

Method

Research Design

This study was a quasi-experimental design (QED) that analyzed end of year summative Smarter Balanced Assessment data and i-Ready Diagnostic assessment and usage data from the 2021-22 school year. Specifically, student achievement gains on the SBA were compared from treatment students—those in schools that used i-Ready Personalized Instruction school-wide (for at least 70% of their students) throughout the school year—to comparison students who were not assigned to i-Ready Personalized Instruction in schools that used i-Ready Personalized Instruction for only some students (between 5-33%). All schools used the i-Ready Diagnostic assessment.

Specifically, SBA English Language Arts (ELA) scores from the 2021-22 school year were obtained for all students in Grades 3-6. We also obtained i-Ready Diagnostic scores from the fall of the 2021-22 school year, along with i-Ready usage data for students who used i-Ready Personalized Instruction. Fall 2021 i-Ready scores were used as the prior achievement variable. As i-Ready Personalized Instruction usage tends to be implemented by school, Hierarchical Linear Modeling (HLM) was used to compare student achievement between students in school-wide i-Ready Personalized Instruction schools and comparison students only using the Diagnostic tool (in schools where only some students received the Personalized Instruction product). We also conducted similar analyses to examine the relationships between usage variables and reading achievement.

Participants

Student data were originally obtained from a total of 6,549 students from one school district in California. This number includes all students in Grades 3-6 in this district. A total of 5,799 students were eligible for inclusion in this study, excluding 750 students in partial treatment schools who received both Personalized Instruction and Diagnostic products. From this study sample, some students ($n = 89$) were missing school demographic data, another group ($n = 12$) were excluded due to lack of

common support during the matching process, and a third group (n = 66) did not have outcome data. This resulted in a final sample of 5,632 students from 22 schools, including 7 treatment (school-wide Personalized Instruction) and 15 comparison (partial Personalized Instruction) schools. Additional attrition calculations are provided in Appendix Table A1, specifically comparing the complete matched sample (n = 5,698) to the final analytic sample.

Student demographics for participants in this study are displayed in Table 1. "Other Race" is defined as races other than White, Black, Hispanic, and Asian, and includes Multiracial, Filipino, Hawaii and Pacific Islander, American Indian, and Alaska Native (which were combined due to variety within and the small numbers of students in these groups). Additionally, Hispanic ethnicity was incorporated separately from race, in accordance with the student demographic information as presented by the districts. Finally, school demographics are also displayed in the latter part of Table 1. Additional information on student socioeconomic status and school urbanicity was not included due to the large number of students missing information on these factors.

Table 1

Student and School characteristics for analytic sample, by treatment group

	Treatment	Comparison
Student Characteristics		
% White	67.7% *	63.6%
% Hispanic	9.0% *	4.6%
% Black	2.5%	2.4%
% Asian	14.9%	24.1% *
% Other Race	5.4% *	3.9%
% Hispanic (ethnicity)	57.2% *	28.8%
% Female	50.0%	49.0%
% English Language Learners (ELLs)	32.5% *	10.2%
% Students with Disabilities (SWD)	13.1% *	10.2%
School Characteristics		
% Title I	75.6% *	22.1%
Total enrollment	769 *	640
% Students of Minority Race	70.2% *	53.3%
n (students)	2,185	3,447
j (schools)	7	15

Note: * p < .05.

Looking at the substantive differences between the treatment and comparison groups, Table 1 shows that the treatment sample contained significantly higher percentages of White and Hispanic (in both race and ethnicity) students and lower percentages of Asian students relative to the comparison group. Additionally, the treatment group contained significantly more students who are English Language Learners (ELLs) and Students with Disabilities (SWD).

Comparing school demographics, the bottom part of Table 1 shows that treatment schools have significantly larger enrollments and a greater percentage of students of minority race and were three times more likely to be Title I eligible than comparison schools.

Measures

Data sources for the current study include student i-Ready Diagnostic scores, i-Ready Personalized Instruction usage data, student demographic data, and student SBA achievement data. ELA scores were obtained from both i-Ready Diagnostic and SBA assessments. Student achievement data from the 2021-22 school year were analyzed to compare achievement gains between students in school-wide i-Ready Personalized Instruction schools and comparison students in partial i-Ready Instruction schools who only took the Diagnostic assessments. In addition, i-Ready Personalized Instruction usage data were analyzed to examine relationships between i-Ready usage and SBA test scores.

Smarter Balanced Assessment scores (post-test). The Smarter Balanced Assessment was developed by the Smarter Balanced Assessment Consortium (SBAC) in collaboration with numerous state education agencies to produce valid, reliable, and fair information about students' English Language Arts and math achievement levels relative to the Common Core State Standards (SBAC, 2018). It is a large, computer-adaptive assessment employed for state and federal level accountability and has been shown to be valid and reliable for individual students, at the school level, and for subgroups of students. SBA ELA scores were obtained from the spring of the 2021-22 school year for all Grades 3-6 students. Spring 2022 ELA scores were used as the outcome variables in our analyses.

SBA is a vertically scaled assessment used to capture student current achievement and growth over time. Thus, scores across grades can be compared (i.e., a score of 2100 in Grade 4 is equivalent to a score of 2100 in Grade 5). Overall, SBA scale scores fall on a continuum, ranging from approximately 2000–3000. Table 2 shows the average and range of SBA scores by grade level in the sample, which illustrates the increase in achievement scores as grade levels increase.

Table 2

SBA ELA achievement scaled scores and proficiency, by grade level

Grade level	Average Score	Range of Scores	% Proficient	*n*
3	2437.2	2115 – 2650	55.4%	1,371
4	2493.9	2140 – 2690	62.0%	1,402
5	2525.4	2200 – 2730	62.4%	1,386
6	2554.4	2230 – 2770	61.7%	1,473

SBA additionally separates scores into four achievement levels (1, Not Met; 2, Nearly Met; 3, Met; 4, Exceeded) based on thresholds of proficiency at each grade level. In this analysis we specifically examine whether students were more likely to be proficient (rated Level 3 or 4). The proportion of students who scored proficient at each grade level is also presented above in Table 2.

Demographic variables. The analyses also included a series of demographic variables about students including grade level, race/ethnicity, gender, special education, and English Language Learner status. Student demographic data were provided by both the i-Ready system and the district. Comparisons between these two data sources revealed minimal discrepancies; district data tended to be more complete and thus was primarily used.

Additionally, school-level demographic variables were included to capture school size (total enrollment), school Title I eligibility, and the proportion of students in the school from minoritized racial/ethnic backgrounds. School demographic data were collected from the National Center for Education Statistics (NCES; https://nces.ed.gov/).

i-Ready Diagnostic Scores (pre-test). Overall, i-Ready Diagnostic assessment scores were obtained for Grades 3-6 in the fall of the 2021-22 school year. The fall scores were used as a prior achievement adjustment variable in our main achievement analyses; they were included both in propensity score matching and in the final analytic models as a covariate. i-Ready Diagnostic assessment scores range from 0-800 and are vertically scaled and nationally normed across grades, meaning that scores can be directly compared to each other, regardless of a student's current grade level. In our analyses, i-Ready Diagnostic scores tended to range between 300-600.

i-Ready (Personalized Instruction) Assignment and Usage data. i-Ready data were obtained for all students who were tested by i-Ready (using the Diagnostic assessments) in the 2021-22 school year. Data regarding the assignment (at the individual and school level) and usage of the Personalized Instruction product was provided by Curriculum Associates. The usage data consists of time spent on i-Ready Personalized Instruction lessons and instruction only and thus, does not include time spent on Diagnostic assessments. Usage metrics provided by Curriculum Associates

included: total lessons completed, unique lessons completed, passed lessons, lesson passing rate, total minutes of usage, weeks with at least one completed lesson, and average minutes per week.

Regarding discrepancies between assignment and usage, in this study, we did not observe any cross-over students from comparison to treatment, and thus all Diagnostic-only (comparison students) had 0's on all usage metrics. However, there were 153 (7.0%) cross-over students from treatment to comparison (i.e., treatment students with no usage metrics), and 91 (4.5%) treatment students who completed only one lesson. Both cross-over and low usage students were retained in their original condition (treatment). Supplemental analyses without the cross-over or low usage students produced the same conclusions presented below in our main analysis.

Analytical Approach

Data for students in Grades 3-6 were analyzed by descriptively examining patterns of SBA scores and usage, as well as by comparing achievement patterns between students in schools using i-Ready Personalized Instruction school-wide (Treatment students) and students who only received i-Ready Diagnostic assessments and who were in schools only partially using i-Ready Personalized Instruction (Comparison students). Hierarchical Linear Modeling (HLM) was used to compare differences in achievement, as measured by the SBA, between treatment and comparison students due to the substantial intraclass correlation value of the outcome (ICC = .133) indicating that a large amount of the variation in the final test score was due to factors at the school level. Schools were chosen as the clustering variable for Level 2, as i-Ready Personalized Instruction assignment varies by school (rather than classroom). The final HLM model used to estimate the impact of treatment on reading achievement was:

Level-1 (Student) Equation:

$$SBAELAScore_{ij} = \beta_{0j} + \beta_{1j}Pretest_{ij} + \beta_{kj} * \sum Student\ Covariates_{ij} + r_{ij}\ [weight_i]$$

Level-2 (School) Equations:

$$\beta_{0j} = \gamma_{00} + \gamma_{01}Treatment_{0j} + \gamma_{0n} * \sum School\ Covariates_{0j} + u_{0j}$$
$$\beta_{1j} = \gamma_{10}$$
$$\beta_{2j} = \gamma_{20}$$
$$\beta_{kj} = \gamma_{k0}$$

where $SBAELAScore_{ij}$ is the SBA ELA score in spring 2022 for student i in school j, γ_{00} is the covariate-adjusted grand mean test score for the comparison group; γ_{10} is the regression coefficient for the pretest; *Pretest* is the student's i-Ready Diagnostic reading score in fall 2021; γ_{k0} are the vector of regression coefficients for the k student

covariates; *Student Covariates* are the vector of student covariates (grade level, gender, race/ethnicity, ELL status, and special education status); r_{ij} is the student-level residual; $[weight_i]$ is the propensity score weight (from the matching process further described below) for student i; γ_{01} is the average treatment effect; *Treatment* is the binary treatment indicator for school j; γ_{0n} are the regression coefficients for the n school covariates; School Covariates is the vector of school covariates (Title I eligibility, enrollment, and percentage of students of minority race); and u_{0j} is the random school effect for school j. All continuous covariates (pretest, school enrollment, and school percentage of students of minority race) were grand-mean centered to facilitate interpretation of the intercept. Effect sizes were calculated using the unadjusted pooled standard deviation of the outcome.

Proficiency Outcome. We additionally investigated the impact of i-Ready Personalized Instruction on the likelihood of students scoring proficient. This model used the same input variables but used a logistic regression to predict the binary outcome that indicated whether each student scored proficient (or not) on the Spring 2022 SBA assessment. Results are presented in odds ratio form and are also translated into probabilities: from log odds to odds (by exponentiation) and then probabilities (p = odds/1+odds) to illustrate how many out of 100 students would be predicted to score proficient. Estimated probabilities for the comparison group are estimated in the same way by converting the intercept coefficient into a probability. The treatment group probabilities accordingly combine the intercept added to the treatment coefficient.

Subgroup Variation. We also analyzed how the impact of i-Ready Personalized Instruction varied by student subgroups. To test if the impact of treatment was different for different types of students, we included an interaction term between the student subgroup (such as students of Hispanic ethnicity) and treatment. This allowed us to estimate the relationship between treatment and achievement growth specific to a student subgroup (such as students of Hispanic ethnicity versus those not of Hispanic ethnicity). We tested all subgroups included in the model (used as covariates), but we did not find any significant differences so none of these analyses are presented in the main text of the report.

Usage Analyses. For usage analyses, HLM models tested the unique effect of each usage metric by adding the continuous usage measures to the model with the binary treatment variable (i-Ready Personalized Instruction vs. Diagnostic testing only). This allowed us to estimate the effect of individual units of instruction, such as one hour of usage or one completed lesson, on SBA scores, in relation to students who did not use i-Ready Personalized Instruction. Usage variables were not mean centered.

Propensity Score Weighting to Achieve Baseline Equivalence. Initially, baseline equivalence was not met for fall 2021 i-Ready ELA Diagnostic scores. Baseline equivalence is defined as being met if the standardized mean difference between treatment and comparison groups is less than 0.25 SD (WWC, 2020). Unadjusted

means for fall 2021 i-Ready ELA Diagnostic scores and other covariates are presented in Table 3.

Table 3

Baseline equivalence on covariates, unadjusted

Outcome	Treatment		Comparison		Stan. Mean Diff.
	Mean	SD	Mean	SD	
Fall 2021 i-Ready score	530.77	64.79	566.27	54.50	−.593
White (race)	.677	.468	.636	.481	.088
Hispanic (race)	.090	.286	.046	.209	.175
Black (race)	.025	.157	.024	.152	.009
Asian (race)	.149	.356	.241	.428	−.234
Other (race)	.054	.226	.039	.193	.073
Hispanic (ethnicity)	.572	.495	.288	.453	.600
Female	.500	.500	.490	.500	.020
ELL	.325	.469	.102	.302	.568
SPED	.131	.337	.241	.302	−.093
Grade 3	.248	.432	.243	.427	.018
Grade 4	.258	.438	.244	.429	.035
Grade 5	.249	.433	.244	.430	.013
Grade 6	.244	.430	.272	.445	−.064
n	2,185		3,447		

Note: SD=standard deviation.

To adjust for the large standardized mean differences between treatment and comparison students on baseline achievement, propensity score matching (PSM) was used in all analyses for the purpose of creating comparison groups that were as similar as possible to groups of treatment students. First, prior to the receipt of any outcome data, treatment students were matched to similar comparison students (using a radius matching approach with a caliper of .05 standard deviations of the propensity score). All comparison cases within the caliper range were matched to that treatment case. Next, during the analysis, treatment students were each given a weight of one, and comparison students were each weighted based on the total number of treatment cases to which they were matched.

The result of these PSM and weighting procedures was that comparison students who were more similar to treatment students (in terms of prior achievement and demographic covariates) were weighted more heavily in the analyses, and comparison students who were less similar to treatment students were weighted less. After these weights were applied to comparison students, baseline equivalence was achieved for

fall 2021 ELA i-Ready Diagnostic scores and all covariates of concern, with a standardized mean difference of magnitude of less than 0.24, as shown in Table 4.

Table 4

Baseline equivalence on covariates, adjusted

	Treatment		Comparison		T vs. C Difference (adjusted)	Pooled Unadjusted SD	Stan. Mean Diff.
Outcome	Mean	SD	Mean	SD			
Fall 2021 i-Ready score	530.77	64.79	532.27	65.17	− 1.499	61.195	−.025
White (race)	.677	.468	.655	.476	.023	.476	.048
Hispanic (race)	.090	.286	.109	.312	−.020	.243	−.081
Black (race)	.025	.157	.025	.157	−.000	.154	−.001
Asian (race)	.149	.356	.147	.35	.001	.404	.003
Other (race)	.054	.226	.055	.227	−.001	.206	−.003
Hispanic (ethnicity)	.572	.495	.567	.496	.005	.490	.011
Female	.500	.500	.518	.500	−.018	.500	−.036
ELL	.325	.469	.332	.471	−.007	.391	−.017
SPED	.131	.337	.133	.340	−.003	.316	−.008
Grade 3	.248	.432	.255	.431	.002	.429	.005
Grade 4	.258	.438	.263	.440	−.004	.432	−.010
Grade 5	.249	.433	.240	.427	.009	.431	.021
Grade 6	.244	.430	.251	.434	−.007	.440	−.016
n	2,185		3,447				

Notes: 1. SD=standard deviation; T = treatment; C = comparison. 2. All estimates include propensity-score weights.

Results

i-Ready Personalized Instruction usage. We first descriptively examine patterns of i-Ready usage by grade level. "i-Ready usage" data refers only to usage of i-Ready Personalized Instruction, not including any time spent on Diagnostic assessments. Table 5 shows descriptive statistics relating to i-Ready reading usage metrics for all treatment students in the analytic sample for the analyses that follow. As previously discussed, some treatment students (153, or 7.0% of all treatment students)

had zero usage, but this group of students are still included as treatment students in analyses and are represented in the usage metric averages below.

Table 5

i-Ready Personalized Instruction usage means and standard deviations for treatment students in reading, by grade level

	Grade 3	Grade 4	Grade 5	Grade 6
Total lessons	22.36	29.87	21.14	15.04
	(20.78)	(27.77)	(19.60)	(20.90)
Unique lessons	19.70	26.23	18.02	12.74
	(18.12)	(24.44)	(16.73)	(17.58)
Passed lessons	18.43	24.47	16.83	11.69
	(17.40)	(24.06)	(15.99)	(16.63)
Lesson passage rate	78.3%	75.6%	76.0%	63.7%
	(24.1)	(25.3)	(24.8)	(36.2)
Minutes of Usage (total)	361.17	512.14	367.00	342.56
	(381.70)	(482.31)	(368.93)	(526.92)
Weeks of Usage	13.31	14.18	12.02	8.88
	(7.40)	(8.11)	(6.53)	(8.91)
Minutes Per Week (average)	23.17	30.67	26.50	25.32
	(15.38)	(18.13)	(14.89)	(20.11)
n	542	564	545	534

Note: Standard deviations are presented in parentheses below the mean.

On average, students who used i-Ready Personalized Instruction completed 24 lessons, using i-Ready for a total of 397 minutes, over a total of 12 weeks for an average of 26 minutes per week. Usage metrics were generally highest for Grade 4 and in similar ranges among the other grades. Although Grade 6 students completed fewer overall lessons and over fewer weeks than other grades, their usage was more concentrated, as indicated by their high average minutes per week usage.

Distributionally, total usage figures (like total lessons, total minutes) were mostly positively skewed (which is evidenced in the large standard deviation values in Table 5, which are nearly as large as the mean for some measures). This means that a large number of students had infrequent usage, with a quarter of students completing fewer than 6 lessons or 98 minutes of activity (and averaging less than 17 minutes per week). Metrics for the total number of weeks used and the average minutes per week had more evenly distributed values (and fewer students clustered close to 0) but were still positively skewed. The only exception to this right skew was the lesson passage rate which had a negative skew with most students having high passage rates close to 100%.

Achievement descriptive statistics. In Table 6 we present, by treatment group, fall 2021 i-Ready and spring 2022 SBA ELA scores, as SBA scores were the main outcome variable in our analyses.

Table 6

Mean Unadjusted i-Ready and SBA ELA scores, 2021-22, by treatment group

	Treatment	Comparison
Fall i-Ready score	530.24	566.25
Spring SBA score	2470.21	2524.94
% proficient	48.0%	68.2%
n	2,185	3,447

Note: Means are unadjusted.

As noted previously, prior to any adjustments, comparison students scored higher on the fall i-Ready Diagnostic assessment than did treatment students. This difference may be related to characteristics of schools that decided to implement school-wide i-Ready Personalized Instruction as opposed to using the Diagnostic-only program with some of their students. Additionally, in partial instruction schools, i-Ready Personalized Instruction is purchased as a supplement for students who are underperforming and need extra support. Unadjusted spring SBA scores (and percent proficient) also tended to be higher, on average, for comparison students. Main analyses below use propensity score matching and covariates to adjust for these potential differences.

Main achievement analyses

In this section, we present the results of analyses examining the effect of i-Ready Personalized Instruction for treatment students (in schools with school-wide i-Ready Personalized Instruction) on reading achievement, in relation to comparison (only assigned to Diagnostic testing, in schools with only some i-Ready Personalized Instruction). We first present results on SBA scores and then SBA proficiency.

SBA Scores. Results of analyses examining the impact of treatment on SBA ELA scores are found in Table 7. We report unstandardized regression coefficients, standard errors, and effect sizes in this table.

Table 7

Analyses of i-Ready Personalized Instruction on SBA ELA scores

Outcome	Estimate	Standard Error	*p* value	Effect size
Treatment	4.162	3.089	.178	0.038
Constant	2490.191	5.399		

Notes: 1. *N* = 5,632; *j* (schools) = 22. 2. Adjusted estimates with PSM weights and covariates.

There was not a statistically significant effect of treatment on SBA ELA scores in relation to the comparison condition. The treatment (impact) estimate in Table 7 can be interpreted as the average difference between treatment and comparison students. For example, the regression estimate for treatment indicates that after adjusting for prior achievement and demographics, treatment students scored an average of 4 points higher on the SBA ELA test than did comparison students.

Interpreting the effect size, after adjusting for prior achievement and demographics, treatment students scored an average of 0.04 standard deviations higher on the SBA ELA assessment than did comparison students. In relation to effect sizes from randomized control trials evaluating the impact of interventions on reading scores in large samples, this effect size is in the 30-40th percentile of study impacts, indicating a substantial impact and efficacious intervention (Kraft, 2020). Interpreted as percentile growth, the average comparison student would be predicted to score 1.5 percentile points higher (moving from the 50 to 51.5 percentile rank) if they had received the intervention.

SBA Proficiency. We also examined the impact of treatment on students' likelihood of achieving SBA proficiency (a yes/no outcome). Results from this analysis are presented in Table 8. Results are presented as odds ratios, which can be interpreted as the odds, or likelihood, of being proficient.

Table 8

Analyses of i-Ready Personalized Instruction on SBA ELA proficiency

Outcome	Odds Ratio	Standard Error	*p* value
Treatment	1.599	0.303	.013
Constant	6.699	1.219	

Notes: 1. *N* = 5,632; *j* (schools) = 22. 2. Adjusted estimates with PSM weights and covariates.

Mirroring the direction of the impacts on SBA scores, Table 8 shows that treatment had a positive significant impact on the proportion of students who were categorized as proficient on the SBA ELA assessment, based on their SBA score (*p* < .05). Specifically, the treatment impact in Table 8 says that treatment students had 1.6

times greater odds than comparison students of scoring proficient on the SBA ELA assessment in spring 2022.

Although the main effect was only statistically significant for students achieving proficiency and not improving their overall score generally, the directional trend was positive on both outcomes, indicating that i-Ready Personalized Instruction consistently improved student achievement in reading.

Subgroup analyses

We also conducted a series of supplementary analyses in which we examined the impact of treatment across different student subgroups including grade level, student race/ethnicity, gender, ELL status, SPED status, and school Title I eligibility. In this evaluation, however, none of the subgroup impacts were significant and thus are not presented here. (For an example, Appendix Table B1 presents the results from the analysis by grade level.)

Usage Analyses

Next, we present a series of analyses examining the associations between i-Ready usage metrics and reading achievement. These analyses are identical to the previous achievement analyses, with the addition of an i-Ready usage variable in each model. A separate analysis (and model) was run for each i-Ready usage measure. i-Ready usage metrics used in these analyses include the number of completed lessons, number of unique lessons, and number passed lessons, along with total minutes and weeks of usage.

ELA usage. We present the results of analyses examining the effects of i-Ready Personalized Instruction usage variables on reading achievement. Table 9 shows the unstandardized coefficients of all usage variables, which estimate the impact of one unit of usage on achievement, compared to no usage (for those in the comparison or treatment group).

Table 9

Associations between i-Ready Personalized Instruction usage and reading achievement

Usage Measure	Estimate	Standard Error
# of lessons	0.275***	0.057
# of unique lessons	0.347***	0.069
# of passed lessons	0.386***	0.069
Minutes of Usage (total)	0.008*	0.004
Weeks of Usage	0.281	0.201

Note: $N = 5,632$; * $p < .05$, *** $p < .001$.

All the usage variables were significantly positively associated with SBA ELA scores with the exception of the weeks of usage. Further, three of these variables were significant at the .001 alpha significance level. Coefficients in Table 9 can be interpreted as the expected change in SBA ELA score for every unit of a usage variable. For example, looking at the second to last row, every extra minute of usage was associated with a 0.008-point increase in SBA ELA score. Thus, usage for the average student, who completed 397 minutes of instruction, would be associated with a 3.2-point SBA ELA score increase. Similarly, the average user who completed 24 lessons would be expected to gain 6.6-points on their SBA ELA score. Furthermore, for the treatment student who followed the guidelines of 18 weeks of usage, this amount of usage would be associated with a 5.1-point SBA ELA score increase. However, it should be noted, that while our model estimates this linear, similar impact across all usage values, there may, in reality, be different returns at different values of usage. For example, going from 10-20 minutes may increase scores more than going from 160 to 170 minutes.

Discussion

The purpose of this evaluation was to examine the impact of i-Ready Personalized Instruction on reading achievement, as measured by SBA scores. We compared students in schools using i-Ready Personalized Instruction school-wide (Treatment students) to students who only received i-Ready Diagnostic assessments and who were in schools only partially using i-Ready Personalized Instruction (Comparison students). We also examined associations between various i-Ready usage metrics and achievement.

In interpreting the findings of this evaluation, some limitations should be noted. First, while we adjusted for as many demographic variables as possible, some student information, namely economic disadvantage, were not available from the school district involved in this evaluation, meaning we were unable to adjust for these variables or conduct relevant subgroup analyses. Similarly, we had access only to spring 2022 SBA scores and i-Ready score and usage data from the 2021-22 school year. This limited our analyses to only one year and to strictly quantitative measures, which precluded drawing any substantive conclusions regarding the fidelity of implementation within classrooms by teachers and students, outside of the quantitative usage data supplied to us by Curriculum Associates. Analyses of usage data suggested varied usage by individual students and that these usage amounts potentially contributed to the observed impacts of the program.

Reading Achievement Gains

We did not find that treatment students had significantly higher SBA ELA scores, although directionally, treatment students averaged higher SBA ELA scores than did comparison students. Supplementary analysis of students achieving proficiency in

reading on their SBA score showed that treatment did have a statistically significant impact on this outcome. Specifically, students in the treatment group had 1.6 times higher odds of scoring proficient (versus not scoring at least proficient) than their peers in the comparison group. No significant patterns were found in the impact of treatment on specific student subgroups.

Usage Patterns

Descriptive analysis of usage by grade revealed that usage metrics were generally highest in fourth grade but comparable across all grades. Students in Grade 6 tended to complete fewer lessons but participated in i-Ready Personalized Instruction in a more concentrated fashion over fewer weeks.

Multilevel, weighted regression analyses with usage variables showed that four of the five usage metrics we considered were significantly positively related to student reading achievement. Specifically, average usage (397 minutes of instruction) was associated with a 3.2-point greater reading achievement on the SBA ELA assessment.

Conclusions

Overall, this analysis presents promising evidence of i-Ready Personalized Instruction on student reading proficiency. This relationship between i-Ready Personalized Instruction and reading achievement was strongest for students with higher usage of the program. Future studies should seek to further examine the reasons behind this variation in usage.

References

Kraft, M. A. (2020). Interpreting effect sizes of education interventions. *Educational Researcher*, *49*(4), 241-253.

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Appendix A: Attrition Table

Table A1

Attrition between assignment and analysis

	Pre-test group (*n*, at assignment)	Post-test group (*n*, final analytic sample)	Attrited students (*n*)	Attrition %
Treatment	2210	2185	25	1.13%
Comparison	3488	3447	41	1.18%
Total	5698	5632	66	1.16%
			Differential attrition	0.04%

Appendix B: Supplementary Results Table

Table B1

Impacts of i-Ready Personalized Instruction on SBA ELA achievement, by grade level

Grade	Estimate	Standard Error	p value	Effect size
3	1.255	8.124	.877	0.012
4	9.416	6.840	.169	0.087
5	1.656	5.956	.781	0.015
6	3.725	6.445	.563	0.034

Notes: 1. N = 5,632; j (schools) = 22. 2. Adjusted estimates with PSM weights and covariates. 3. Grade level estimates combine overall treatment impact (estimated for Grade 3) and the grade-specific differential treatment impact.