

Student Reading Achievement as a Function of Idaho Schools' Usage of the Istation Reading Curriculum

Michael A. Cook, PhD
Steven M. Ross, PhD

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Progress monitoring assessments have long been used to provide teachers with formative data on individual students' academic progress during the school year (Markovitz, Hernandez, Hedberg, & Whitmore, 2022; Stecker & Fuchs, 2000). Although such assessments also potentially prepare students for taking end-of-year state tests in Grades 3 to 8, they are especially valuable in earlier, untested grades as measures of achievement. However, the value to students of testing alone may be limited if not coupled with aligned, adaptive instruction that helps them master weaker skills and address misunderstandings about content. The present study was designed to determine the benefits of such supplementary instruction in association with the state of Idaho's longitudinal usage of Istation's formative Indicators of Progress (ISIP). The primary question of interest was how students in schools that also used the associated Istation Reading Curriculum would achieve in reading compared to students in schools that used the ISIP only.

Istation is a digital-based instructional intervention tool for various content areas aimed at pre-K through 8th grade learners. The reading program consists of formative assessments, named Istation Indicators of Progress (ISIP), which are computer-adaptive, and diagnostic literacy assessments designed to track student growth over time. Istation Reading also includes an adaptive, online supplementary curriculum, which generates personalized student data profiles that teachers can use to make data-driven instructional decisions and assign custom learning interventions. Istation's Early Reading (ER) program was designed specifically for students in Grades K-3, focusing on the critical areas of early reading, including phonemic awareness, phonics, vocabulary, reading comprehension, and fluency.

The Idaho state-mandated early literacy assessment for students in Grades K-3 is referred to as the Idaho Reading Indicator (IRI). Istation's ISIP became the state of Idaho's early literacy assessment in the 2018-19 school year. The IRI, now ISIP, is administered to all K-3 public school students in the state and is intended to serve as an early reading diagnostic and screener. A sample of public elementary schools in Idaho piloted the ISIP during the 2017-18 school year. In the 2018-19 school year, all public elementary schools in Idaho administered the ISIP. Schools are now required to administer the ISIP in both the fall and spring and have the option to administer it more frequently for yearly progress monitoring. Schools may also use Istation with students above Grade 3 and have the option of purchasing Istation's related curricular resources.

Prior Statewide Research

In an initial statewide study in Idaho, the Center for Research and Reform in Education (CRRE) at Johns Hopkins University examined the efficacy of the Istation ER program in improving student reading achievement (Wolf, Ross, Eisinger, Reid, &

Armstrong, 2020). Correlational results revealed generally favorable outcomes associated with ISIP usage:

- The ISIP (Idaho Reading Indicator - IRI) assessment had good validity for predicting ISAT ELA (Idaho Standards Achievement Test, English Language Arts) achievement.
- Istation continuous monitoring usage was positively related to both IRI and ISAT ELA performance statewide.
- For Istation “pilot schools,” use of Istation at recommended levels had a small and marginally significant effect on student achievement in reading.

Soon after full implementation of ISIP as the Idaho Reading Indicator, school districts were faced with uncertainty and challenge as they grappled with instructional challenges related to the COVID-19 pandemic. Regardless of the instructional approaches implemented, schools in general were forced to depend much more than in the past on online instruction to increase social distancing and decrease risks of virus transmission via whole-class teacher-led instruction. These conditions created a heightened rationale for the present study’s focus on determining the impacts, using a quasi-experimental design (QED), of school-wide Istation Curriculum subscriptions in addition to the statewide ISIP testing. The study employed mixed methods to address the following questions:

Core Question 1: *What is the effect of the Istation Curriculum program on students’ achievement as measured on the Idaho State ELA assessment (ISAT) and the IRI reading assessment after four years (2017-18 to 2020-21)? Do effects vary:*

- a) for students based on levels of school usage (average sessions, average weeks, average total minutes, percent Istation users)?
- b) for different curriculum implementation (“subscription”) models (campus-wide, individual, partial campus)?
- c) by ELA domain (i.e., Overall, Reading, Writing)?
- d) for different student subgroups (e.g., grade levels, economically disadvantaged, ethnicity, SPED, ELL)?

Core Question 2: *What are the experiences and attitudes toward Istation usage and the instructional delivery modes experienced during the school year of teachers, principals, and parents?*

This report focuses on the results obtained for Core Question 1. Comprehensive technical reports addressing each question are provided, respectively, in Cook and Ross (2022) and Cook, Ross, Alberg, & Copeland (2021).

Method

Research Design

In February 2021, CRRE completed a data-sharing agreement with the Idaho State Department of Education (ISDE) to obtain spring 2021 ISAT and ISIP data in ELA and reading, respectively, and longitudinal prior achievement data from the 2017-18 to 2020-21 school years. For the primary research focus, contrasts examined patterns of ELA achievement and growth between Idaho elementary students who used Istation Curriculum and those who only participated in the ISIP ER assessment program but did not use the Curriculum. This QED study employed a large sample of close to 60,000 students in 381 clusters (schools), with 184 treatment (Curriculum) clusters and 197 comparison (no Curriculum) clusters, established baseline equivalence for these clusters, and employed an unbiased standardized measure of student achievement (i.e., ISAT). Additional correlational analyses examined the impacts of (a) Istation Curriculum usage variables, (b) student demographics, and (c) Curriculum subscription type.

As context for the design, the Istation Curriculum had been employed as an optional instructional supplement by Idaho schools starting in 2017. A previous evaluation of the ISIP Early Reading (ER) program (Wolf, Ross, Eisinger, Reid, & Armstrong, 2019) showed that, for Istation “pilot schools,” use of the Istation curriculum at recommended levels had a small and marginally significant effect on student reading achievement. This study expanded on the prior evaluation by examining effects of the Istation curriculum longitudinally, but specifically focusing on reading achievement gains from spring 2019 to spring 2021 (skipping spring 2020 because of COVID-19).

Participants

Participants in this evaluation included Idaho elementary school students who were enrolled in Grades K-5 during the 2020-21 school year. We obtained from the Idaho State Department of Education (ISDE) ELA student achievement data from 381 schools across the state of Idaho. Students having at least one eligible outcome score and demographic data from the spring of the 2018-19 and 2020-21 school years were included in these calculations. Table 1 shows sample characteristics for Istation Curriculum and comparison students. Note that the sample under “2020-21” outcomes refers to students with data on at least one eligible outcome and pretest score (i.e., fall 2020 ISIP or spring 2019 ISAT), and the sample under “2018-19 Outcomes” refers to students with data on at least one eligible outcome and pretest score (i.e., fall 2018 ISIP or spring 2017 IRI).

Table 1

Sample characteristics for Istation Curriculum and comparison students

	Istation Curriculum + ISIP	ISIP only
2020-21 Outcomes		
White	74.48	74.04
Hispanic	18.91	18.42
Special Education	13.18	12.92
Econ Dis.	45.11*	31.29
English Learner	10.29	11.60
<i>N</i>	31,733	29,713
2018-19 Outcomes		
White	74.22	74.71
Hispanic	19.53	18.26
Special Education	11.66	11.28
Econ Dis.	51.07*	41.72
English Learner	11.21	11.76
<i>N</i>	17,014	16,678

Note: * $p < .05$.

Across the two samples, students in both conditions were very similar in terms of ethnicity, special education status, and English Learner status. Students were somewhat different in terms of economically disadvantaged status, with significantly higher percentages of economically disadvantaged students receiving the Istation Curriculum. Nearly half of Istation Curriculum students were economically disadvantaged, while only about one-third of ISIP-only students were economically disadvantaged. This difference may be related to the characteristics of schools that elected to use the Istation Curriculum across these years.

Measures

Data sources for the current study include Istation usage data from the 2020-21 school year, ISIP ER scores from each of the 2018-19 through 2020-21 school years, IRI scores from the 2017-18 school year, and ISAT ELA scores from the spring of 2019 and 2021.

Istation usage. Usage data were obtained for all students who were tested by Istation in the 2020-21 school year. General Istation usage consisted of time spent both on ISIP assessments and Istation Curriculum. Usage data for each student included (a) Total Istation usage (in minutes); (b) Total Istation Curriculum usage (in minutes); (c) Total number of Istation sessions completed; and (d) Total number of weeks of usage. Monthly usage data were summed across the school year to provide total usage and number of Istation sessions and weeks for the 2020-21 school year. These sums were the metrics considered in all subsequent analyses.

IRI/ISIP. The Idaho Reading Indicator (IRI) is an early literacy screener that is administered to all Grade K-3 students in the state of Idaho. The previous version of the IRI was administered through the 2017-18 school year. Composite scores for the old IRI were reported as integer values between 1 and 3. Subtests of this version of the IRI included naming fluency, letter sound fluency, and reading curriculum-based measures, with each subtest using a different range of possible scores.

The ISIP-ER assessment replaced the previous IRI in the 2018-19 school year. As with the previous IRI, the ISIP assessment was administered in the fall and spring of each school year to Grades K-3 students. Overall ISIP scores are reported as one of three achievement levels: Tier 1 (At Grade Level), Tier 2 (Near/Below Grade Level), and Tier 3 (Well Below Grade Level). Scale scores generally ranged from 60-375. Subtests included phonemic awareness, letter knowledge, alphabetic decoding, spelling, vocabulary, listening comprehension, and text fluency. ISIP ER scores are nationally normed and vertically scaled across grades, meaning that scores can be directly compared, regardless of student grade level.

ISIP AR. In addition to ISIP ER data, we also examined ISIP AR (Advanced Reading) data from the 2020-21 school year. While the ISIP ER (IRI) assessment is administered to all Grades K-3 students, the ISIP AR assessment is administered to Grades 4-5 students in Idaho elementary schools that elect to use it as an optional assessment. As with ISIP ER scores, ISIP AR scores are nationally normed and vertically scaled. ISIP AR scores were only used as prior achievement variables for Grades 4-5 students, in place of spring 2020 ISAT ELA scores, which were unavailable due to the COVID-19 pandemic.

ISAT. The Idaho Standards Achievement Test (ISAT) is a year-end summative assessment that is administered to all students in Grades 3-8. Overall student scores range from 2000 to 3000, and the ELA subtests include reading, writing, listening, and research. For the present analyses, only the reading, writing, and overall scores, which are a composite of all four ELA subtests, were examined. Table 2 shows ISAT ELA Overall score ranges for each achievement level for Grades 3-5. ISAT scores are vertically scaled and thus, generally increase across grades. The ISAT was administered in the spring of 2019 and 2021, but was skipped in 2020, due to the COVID-19 pandemic.

Table 2

ISAT ELA Overall Score Ranges, by grade

	Level 1	Level 2	Level 3	Level 4
Grade 3	<2367	2367-2431	2432-2489	>2489
Grade 4	<2416	2416-2472	2473-2532	>2532
Grade 5	<2442	2442-2501	2502-2581	>2581

Analytical Approach

Hierarchical linear modeling, with students as the level-1 unit of analysis and schools (representing treatments) as the level-2 unit of analysis, was used to examine differences in reading achievement between students who used the Istation Curriculum and ISIP assessments and students who only used ISIP. This particular analytic approach allowed us to incorporate and control for the school-level use of Istation Curriculum subscriptions and other school-level variables, as well as to control for student-level variables including prior ELA achievement and prior knowledge. Specifically, we examined reading achievement assessment gains on the spring 2021 ISAT reading test, both from the spring 2019 ISAT reading test and the fall 2020 ISIP assessment, as well as on the spring 2021 ISIP statewide assessment. Overall reading or ELA scores were used as the outcome variables in the main analyses, with subscale scores being analyzed in supplemental analyses. Use of the Istation Curriculum was coded both as a single dichotomous variable and as three dummy variables, corresponding to each of the three types of Istation Curriculum licenses that schools could use: school-wide ($n = 158$ schools), partial-school ($n = 8$ schools), or individual student licenses ($n = 92$ schools). For the primary research question regarding Istation Curriculum impacts, the three application types were combined. It is important to note that schools were only included in analyses if they also had students with non-missing state achievement data; this resulted in final analytic school samples of 131 school-wide licenses, 6 partial-school licenses, and 47 sets of individual student licenses.

In supplementary analyses, we examined the associations between Istation usage variables and reading achievement gains, using similar HLMs and replacing the treatment variable with an Istation usage variable. This approach allowed us to estimate the effect of one unit of a usage variable on reading achievement gains. We also examined whether differential effects of the Istation curriculum were observed for different student demographic subgroups by adding interaction terms between the Istation Curriculum (treatment) indicator variable and student-level covariates of interest, to the previously described HLMs.

Results

Program Usage

As context for the comparative analyses of treatments, we first examined statistics reflecting time spent on ISIP assessments and Curriculum usage. Table 3 displays average Istation usage statistics, which includes both testing and curriculum time, by grade, for all students who had non-missing usage from the 2020-21 school year, as well as at least one reading achievement score from the 2020-21 school year. Table 3 describes usage for all students, including students who were in schools that did not use the Istation curriculum.

Table 3

Istation average usage statistics in 2020-21 by grade

Grade	Total time*	Total Sessions	Weeks
K (<i>n</i> = 19,949)	501.68	25.83	14.17
1 st (<i>n</i> = 20,805)	605.93	30.49	14.83
2 nd (<i>n</i> = 21,186)	495.73	27.00	14.36
3 rd (<i>n</i> = 20,969)	386.28	21.47	12.84
4 th (<i>n</i> = 10,244)	550.00	25.96	14.49
5 th (<i>n</i> = 9,652)	461.26	22.75	13.40

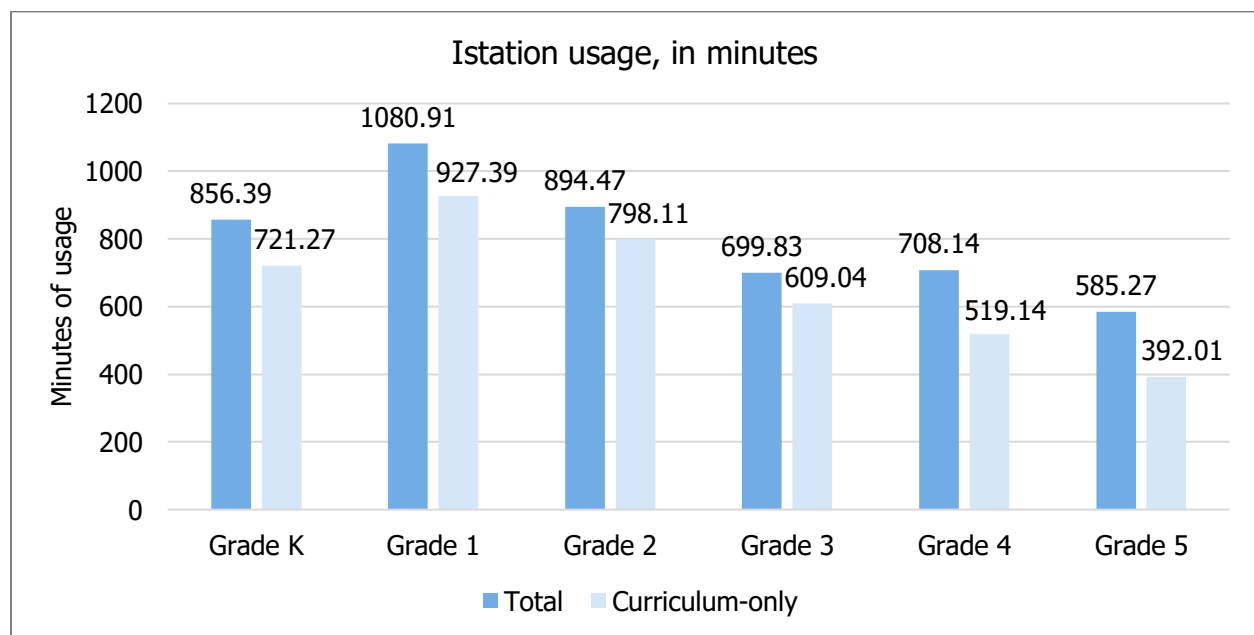
*In minutes

Usage statistics were generally fairly uniform across grades but highest in Grade 1, with students averaging just over 600 minutes and 30 sessions. Average usage generally ranged between 8-10 hours, with Grade 3 being the only grade in which students averaged less than 400 total minutes. Similar patterns also emerged for average weeks of Istation usage.

We also compared total usage and curriculum usage in schools that elected to use the Istation curriculum in the 2020-21 school year. Figure 1 displays average levels of total usage and curriculum-only usage for students in schools that used the Istation Curriculum in some fashion in the 2020-21 school year.

Figure 1

Average Istation usage, schools with Istation Curriculum subscriptions



Unsurprisingly, curriculum usage tended to be highest in the same grades that overall usage was highest. Grade 1 students averaged the highest amount of curriculum usage, with an average of over 900 curriculum usage minutes. Starting in Grade 2, curriculum usage declined as grade level increased.

Curriculum Usage and Student Achievement

ISAT outcomes. The primary interest in the present study was comparing achievement growth for students in schools who used the Istation Curriculum in relation to that of students in schools who used ISIP diagnostic assessments only. We compared student growth on the ISAT ELA assessment, first in the 2020-21 school year only, and then across multiple school years. As the ISAT is only administered in the spring of each school year and was not administered in the spring of 2020 due to the COVID-19 pandemic, we used fall ISIP scores as the prior ELA achievement variable in analyzing spring, 2021 ISAT scores. Baseline equivalence was met, with results of baseline analyses found in Appendix A. Istation Curriculum effects were estimated separately for Grade 3 students, who took the ISIP ER assessment as a pretest measure in the fall of 2020, and for Grades 4 and 5 students, who took the ISIP AR assessment as the pretest measure in the fall of 2020. All models included the demographic variables of special education, economically disadvantaged, ELL, and Hispanic students. Table 4 shows the results of the HLM analyses examining 2020-21 ISAT ELA score differences for students in Istation Curriculum schools compared to students in diagnostic-only schools.

Table 4

Effect of Istation Curriculum on ISAT ELA scores, 2020-21 school year

Outcome	Coefficient	SE	<i>p</i> value
Grade 3 (<i>n</i> = 19,119)			
ELA Overall	6.120	2.061	.003**
ELA Reading	3.836	2.331	.100
ELA Writing	8.899	2.890	.002**
Grades 4-5 (<i>n</i> = 18,643)			
ELA Overall	10.021	2.38	<.001***
ELA Reading	7.088	2.489	.004**
ELA Writing	14.522	3.637	<.001***

Note: ** *p* < .01; *** *p* < .001.

Students in schools that used the Istation Curriculum significantly surpassed students in schools that only used ISIP testing on the spring 2021 ISAT ELA assessment. Specifically, Grade 3 curriculum students outscored ISIP-only students by slightly more than 6 points on the overall ELA assessment (*p* = .003) and by nearly 9 points on the Writing assessment (*p* = .002). Grades 4 and 5 curriculum students were

significantly superior in Overall scores (+10 points; $p < .001$), Reading (7 points; $p = .004$), and Writing (over 14 points; $p < .001$).

Table 5 shows the results of similar HLM analyses examining ISAT ELA growth from spring 2019 to spring 2021 (baseline equivalence analysis results can be found in Appendix A). Because the ISAT is administered to students beginning in Grade 3, this longitudinal analysis only includes Grade 5 students from the 2020-21 school year. Analyses revealed that students in Istation Curriculum schools significantly outgained, by an average of 6 points, ISIP-only comparison students in ELA Overall scores ($p = .021$). Their 6.5-point advantage in ISAT ELA Reading gains approached statistical significance ($p = .053$).

Table 5

Effect of Istation Curriculum on ISAT ELA score gains, 2019-2021

Outcome	Coefficient	SE	p value
ELA Overall	6.228	2.705	.021*
ELA Reading	6.608	3.419	.053^
ELA Writing	5.404	4.115	.189

Note: ^ $p < .10$; * $p < .05$; $n = 9,075$.

Subgroup analyses. We examined Curriculum effects on ISAT ELA Overall scores separately for special education, economically disadvantaged, ELL, and Hispanic student subgroups, and by grade subgroup, where applicable, that the models employed controlled for fall 2020 ISIP score and the same demographic variables that were included in the main analyses. Results of these analyses are displayed in Table 6.

Table 6

Effect of Istation Curriculum on ISAT ELA Overall scores by subgroup, 2020-21 school year

Subgroup	Coefficient	p value
Grade 3 ($n = 19,119$)		
Special Education ($n = 2,419$)	5.678	.066
Economically Disadvantaged ($n = 6,676$)	5.007	.037*
ELL ($n = 2,204$)	11.781	<.001***
Hispanic ($n = 3,598$)	5.802	.043*
Grades 4-5 ($n = 18,643$)		
Special Education ($n = 2,455$)	13.166	<.001***
Economically Disadvantaged ($n = 6,868$)	12.433	<.001***
ELL ($n = 2,062$)	7.637	.038*
Hispanic ($n = 3,256$)	10.979	<.001***

Note: * $p < .05$; *** $p < .001$.

Positive impacts of the Istation Curriculum were evidenced for nearly all subgroups across both grade clusters of students. Economically disadvantaged (ED), ELL, and Hispanic students in Istation Curriculum schools significantly outgained fellow students in ISIP-only comparison schools, with Grade 3 ED and Hispanic students averaging more than 5-point larger gains, and ELL students averaging nearly 12-point larger gains. Istation Curriculum impacts were even more pronounced in Grades 4-5, with Curriculum students in all subgroups significantly outgaining comparison students. Impacts ranged from nearly 8 points for ELL students to over 13 points for special education students in these grades.

ISIP outcomes. Because the Istation Curriculum is aligned with the ISIP assessment, comparisons of Curriculum students with ISIP-only students on the latter measure were made for exploratory purposes. Table 7 shows the results on spring 2021 ISIP scores, organized by outcome and the prior achievement control variable. Fall 2019 ISIP scores were used as outcome variables for the 2019-20 school year, as the spring 2020 ISIP assessment was not administered due to the COVID-19 pandemic.

Table 7

Effect of Istation Curriculum on ISIP-ER Overall score gains, 2019-2021

Outcome	Pretest	Coefficient	SE	<i>p</i> value	<i>N</i>
Spring 2019	Fall 2018	-0.254	0.183	.165	35,233
Fall 2019	Fall 2018	-0.456	0.318	.009**	35,192
Spring 2021	Fall 2020	0.867	0.353	.014*	59,077
Spring 2021	Fall 2019	1.065	0.382	.005**	55,918
Spring 2021	Fall 2018	0.187	0.462	.686	35,570

Note. **p* < .05; ***p* < .01.

Given that the curriculum was adopted by many schools in 2020-21 largely in response to disruptions by the pandemic and other instructional needs, the important findings concern its impacts on the spring, 2021 ISIP assessment. For exploratory purposes, different baseline years were used in assessing gain. Results showed that students in Istation Curriculum schools gained nearly 1 point more than those in ISIP-only schools from fall 2020 to spring 2021, and slightly more than 1 point from fall 2019 to spring 2021. Conversely, the students in Istation Curriculum schools gained about a half-point less from fall 2018 to fall 2019 than did students in ISIP-only schools. The results of these analyses suggest that Istation Curriculum effects were more positive in the 2020-21 school year than in prior years of implementation. A possible explanation could relate to teachers and students becoming more skilled at using the curriculum over time.

Supplementary Analyses

The comprehensive study (Cook et al., 2022) included exploratory analyses of implementation and usage variables that might have influenced student achievement in Curriculum schools. Below we highlight the main findings.

Subscription type. Curriculum effects on ISAT ELA and ISIP scores were examined for each of the subscription types used in 2020-21: campus-wide (Grade 3 = 127 schools; Grades 4/5 = 115 schools), partial-campus (Grade 3 = 5 schools; Grades 4/5 = 3 schools), or individual student accounts (Grade 3 = 45 schools; Grades 4/5 = 30 schools). HLM analyses indicated that in all grades, students in schools with campus-wide or individual Istation Curriculum subscriptions generally significantly outgained comparison students on ISAT ELA overall and subscale scores in the 2020-21 school year and from 2019-20 to 2020-21. However, no significant impacts in any grade or time period were evidenced in schools with partial-campus Curriculum subscriptions. Analyses of 2021 ISIP scores similarly showed significant fall-to-spring gains for students in schools with campus-wide and individual subscriptions but not for those with partial campus subscriptions (Cook et al., 2022).

Usage levels and relationships. Additional exploratory analyses examined the relationship between ISAT scores and four Istation usage measures: hours of total usage (testing and curriculum), sessions, weeks, and, most relevant here, total minutes of curriculum usage. Gains from the spring 2019 to the spring 2021 ISAT ELA assessment were weakly associated with total hours only ($p < .004$). Gains from the fall 2020 ISIP to the spring 2021 ISAT were significant for all four measures (all p 's $< .05$) but still small in practical importance. For example, approximately 7.5 hours of curriculum usage was associated with only a 1-point increase on the ISAT ELA.

Discussion

The purpose of this evaluation was to examine the association between adoption of the Istation Curriculum package and ELA achievement, as measured primarily by the ISAT and secondarily by the ISIP ER assessment, which serves as the IRI in the state of Idaho. Supplementary findings concerned the influences on Curriculum effects on ISAT achievement of student demographics, student usage, grade level, and type of Curriculum subscription. With regard to the primary research question, results of hierarchical linear models showed that students in Istation Curriculum schools had significantly higher ISAT ELA and ISIP IRI scores than did students in schools that did not use the Curriculum. Notably, significant gains on ISAT were found when using either fall 2020 ISIP or spring 2019 ISAT ELA assessment as the prior achievement control variable, indicating stability for this impact.

Interestingly, in analyses of student achievement prior to the pandemic, students in Istation Curriculum schools averaged smaller gains than did students in non-Istation

Curriculum schools. This effect, however, could be attributable in part to the schools having less familiarity with and experience using the curriculum than was the case post-pandemic in 2021. It also could reflect greater reliance on the curriculum by the adopting schools based on disruptions they previously experienced with face-to-face reading instruction due to the pandemic. Overall student Istation usage was higher in Grades K-2 than in Grades 3-5. This pattern may reflect teachers relying more on the core reading curriculum and less on supplementary programming in the grades tested on ISAT and therefore imposing greater accountability for achievement.

Other findings showed Curriculum effects in schools having campus-wide or individual curriculum subscriptions but not in schools that used partial-campus subscriptions. While further study is needed to examine differences in how the Curriculum was implemented in these three contexts, a possible explanation, supported in part by the much larger numbers of students who participated in the campus-wide and individual programs, is that implementation was more structured and of stronger fidelity schoolwide in the latter conditions. The quantity of usage, unsurprisingly based on our past studies of Istation and other progress monitoring assessments (e.g., Cook, Eisinger, & Ross, 2022; Cook, Ross, & Alberg, 2020) was a weak predictor of student achievement, reflecting a nonlinear relationship across performance quartiles.

A strength of the present study was examining across an entire state schools' naturalistic choices to use the Istation Curriculum as a supplement to the required diagnostic testing. A concomitant weakness of this large-scale implementation, however, was lack of control over, or specific data indicating, how the Curriculum was employed within schools and with particular students, other than the basic type of subscription that schools acquired. The broad finding of interest was that where the Curriculum was adopted as a supplementary resource, student achievement on an independent, standardized ELA assessment (the ISAT) improved both statistically significantly and educationally meaningfully with regard to actual test score increases. Importantly, these advantages were also realized by four lower-achieving student subgroups examined: economically disadvantaged, special education, English language learners, and Hispanic populations. The implication is that the value of online progress monitoring assessments, such as Istation diagnostic testing, can be enhanced by the provision of aligned online instruction to support comprehension and skill development, and adaptively address individual learner needs.

References

- Cook, M., & Ross, S. (2022). *Student reading achievement as a function of Idaho school's usage of Istation's Early Reading (ISIP ER) program*. Baltimore, MD: Center for Research and Reform in Education, Johns Hopkins University.
- Cook, M., Eisinger, J., & Ross, S. (2022). *Efficacy study of Imagine Lectura in Houston, ISD*. Baltimore, MD: Center for Research and Reform in Education, Johns Hopkins University.
- Cook, M., Ross, S., & Alberg, M. (2022). *Mixed methods evaluation of Istation's Early Reading Assessment in Spartanburg County School District 7*. Baltimore, MD: Center for Research and Reform in Education, Johns Hopkins University.
- Cook, M., Ross, S., Alberg, M., & Copeland, S. (2021). *Student reading achievement as a function of Idaho schools' usage of Istation's Early Reading (ISIP ER) program and varied instructional modes in response to the Covid-19 pandemic: Case study report*. Baltimore, MD: Center for Research and Reform in Education, Johns Hopkins University.
- Markovitz, C. E., Hernandez, M. W., Hedberg, E. C., & Whitmore, H. W. (2022). Evaluating the effectiveness of the volunteer one-on-one tutoring model for early elementary school reading intervention: A randomized controlled trial replication study. *American Educational Research Journal*, 59(4) 788-819.
- Stecker, P.M., & Fuchs, L.S. (2000). Effecting superior achievement using curriculum-based measurement: The importance of individual progress monitoring. *Learning Disability Research and Practice*, 15, 128-134.
- Wolf, R., Ross, S., Eisinger, J., Reid, A., & Armstrong, C. (2020). *Evaluation of the Istation Early Reading Program in Idaho*. Baltimore, MD: Center for Research and Reform in Education, Johns Hopkins University.

Appendix A: Baseline Equivalence Tables

Table A1

Baseline equivalence by grade band, Fall 2020 ISIP-ER Overall Scores

	Overall Mean	Treatment Mean (SD)	Control Mean (SD)	Adjusted T v C Difference	Pooled Unadjusted SD	Stan. Mean Diff.
Grade 3 (<i>n</i> = 19,119)	238.47	237.55 (18.29)	239.22 (18.31)	-0.30	18.30	-0.02
Grades 4-5 (<i>n</i> = 18,643)	1886.59	1882.67 (190.31)	1895.64 (199.86)	-21.19	193.25	-0.11

Table A2

Baseline equivalence by grade band, Spring 2019 ISAT ELA Overall Scores

	Overall Mean	Treatment Mean (SD)	Control Mean (SD)	Adjusted T v C Difference	Pooled Unadjusted SD	Stan. Mean Diff.
ISAT Overall	2425.01	2424.82 (86.71)	2425.42 (89.53)	-1.82	87.60	-0.02
ISAT Reading	2430.97	2429.95 (99.83)	2433.18 (102.48)	-5.36	100.67	-0.05
ISAT Writing	2416.88	2417.57 (109.04)	2415.36 (113.94)	3.15	110.60	0.03

Table A3

Baseline equivalence, overall ISIP-ER scores, by longitudinal sample

Pretest (Outcome)	Overall Mean	Treatment Mean (SD)	Control Mean (SD)	Adjusted T v C Difference	Pooled Unadjusted SD	Stan. Mean Diff.
Fall 2018 (Spring 2019)	189.11	188.00 (16.77)	190.07 (17.48)	-1.41	17.15	-0.08
Fall 2018 (Fall 2019)	189.09	187.96 (16.78)	190.06 (17.45)	-1.63	17.14	-0.09
Fall 2020 (Spring 2021)	219.89	218.71 (22.88)	220.88 (23.11)	-1.46	23.01	-0.06
Fall 2019 (Spring 2021)	201.72	200.41 (23.63)	202.84 (24.01)	-1.53	23.84	-0.06
Fall 2018 (Spring 2021)	188.96	187.90 (16.80)	189.87 (17.39)	-1.18	17.12	-0.07

