RESEARCH REPORT

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The Impact of IXL on Math and ELA Learning in an Oklahoma School District

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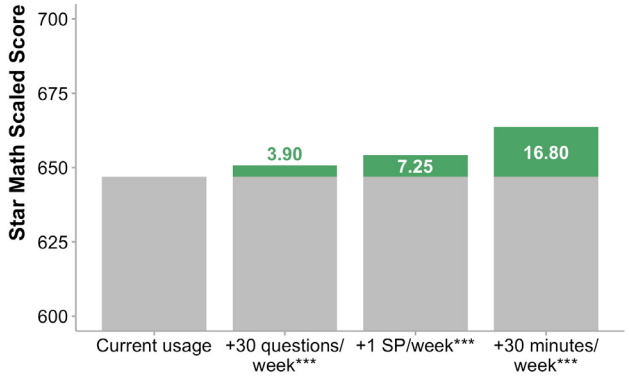
Executive Summary

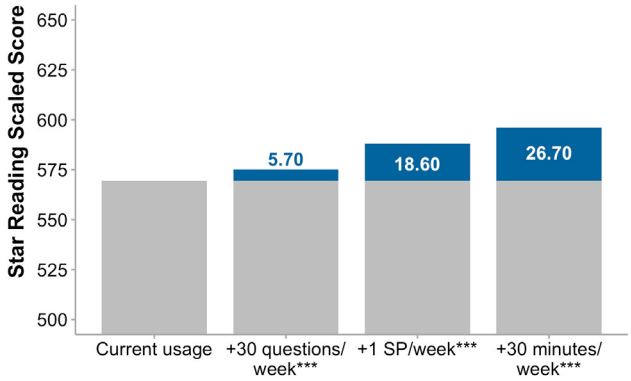
IXL is an end-to-end teaching and learning solution that engages learners in grades Pre-K through 12 with a comprehensive curriculum and personalized recommendations for meeting learning goals. Previous research has shown that IXL can have a significant positive impact on students' academic performance (Bashkov, 2021; Empirical Education, 2013).

The goal of this study was to examine IXL usage among first- through eighth-grade students in a large, suburban Oklahoma school district and its relation to their academic growth in math and English language arts (ELA), as measured by the Star Assessments. Using a pretest-posttest design, we found[1]:

- **Higher IXL Math usage was associated with better Star Math performance.** Students performed better on the assessment when they answered more questions, reached proficiency in more skills (SP), and/or spent more time on IXL.



- **Higher IXL ELA usage was associated with better Star Reading performance.** Students performed better on the assessment when they answered more questions, reached proficiency in more skills (SP), and/or spent more time on IXL.



[1] *Note.* In all figures, *** indicates statistical significance at the $p < .001$ level. SP = skills proficient (i.e., SmartScore of 80+)

Background

IXL is an end-to-end teaching and learning solution that engages learners in grades Pre-K through 12 with a comprehensive curriculum and personalized recommendations for meeting learning goals. It covers four main subject areas: mathematics, English language arts (ELA), science, and social studies. As of this writing, IXL is used by 1 in 4 students in the U.S. and by over 13 million students worldwide. IXL is deeply rooted in learning sciences research (see Bashkov et al., 2021) and engages each student in a personalized learning experience tailored to their working level. As a result, students work through problems that are neither too easy nor too difficult, which in turn supports their self-efficacy and motivation for continued learning.

The goal of the present study was to examine the impact of IXL usage on math and reading achievement among elementary and middle school students. Specifically, we examined the relationship between amount of IXL usage and performance on end-of-year Star Math and Star Reading assessments among students in grades 1 through 8 in a large, suburban Oklahoma school district.

RESEARCH QUESTIONS

In two sets of analyses, we aimed to answer the following research questions:

1. **Usage effects of IXL Math:** Controlling for prior performance and grade level, how does the amount of IXL Math usage (e.g., questions answered per week) relate to students' scores on the Star Math assessment and relative growth in math?

2. **Usage effects of IXL ELA:** Controlling for prior performance and grade level, how does the amount of IXL ELA usage (e.g., questions answered per week) relate to students' scores on the Star Reading assessment and relative growth in reading?

Study Design and Methodology

DATA SOURCES

Assessment Data

The participating school district in Oklahoma provided student-level Star Assessment scores from the beginning-of-year (Fall 2021) and end-of-year (Spring 2022) administrations of the assessments (student-level demographic data were not available). The Star Assessments are widely used as formative assessments in districts nationwide and have been extensively validated (see Renaissance Learning, 2020). Both Star Math and Star Reading are computer adaptive tests (CATs), meaning that question difficulty changes based on students' patterns of correct and incorrect responses. For more information about the Star Assessments, see https://www.renaissance.com/products/star-assessments/.

IXL Usage Data

IXL usage data were obtained from IXL's database. When students use IXL, they complete practice problems organized within "skills," or specific topic areas within a subject. IXL uses a proprietary *SmartScore* to indicate a student's proficiency within a skill. The SmartScore ranges from 0-100 and increases as students answer questions correctly. However, it is not a percent correct score; a SmartScore of 100 is always possible. A SmartScore of 80 indicates proficiency in a skill, and a SmartScore of 100 indicates mastery. IXL recommends that students should aim to reach proficiency in at least two skills per week (SP/week; An et al., 2022).

PARTICIPANTS

We included data from students with any amount of IXL usage in the 2021-22 school year. The base sample size for the IXL Math analysis was 8,059 students in grades 2-6; these were the grades in the district that used the Star Math assessment. The base sample size for the IXL ELA analysis was 11,307 students in grades 1-8. Prior to analysis, we identified any students with usage greater than 3 *SD* from the mean on any usage metric (e.g., number of questions answered per week) as outliers and excluded them from all analyses (math *n* outliers = 251, or 3.11%; ELA *n* outliers = 318, or 2.81%). This resulted in a final sample size of 7,808 students for the math analysis and 10,989 students for the ELA analysis. See Table 1 for descriptive statistics of students' IXL usage. Additional sample descriptives are presented in Table A (Appendix A).

Table 1. Students' IXL Math and IXL ELA usage during the 2021-22 school year

Weekly IXL usage	IXL Math (*n* = 7,808)				IXL ELA (*n* = 10,989)			
	M	*SD*	Min	Max	*M*	*SD*	Min	Max
Time spent (in minutes)	25.31	14.40	0.20	79.52	20.88	13.34	0.04	68.27
Questions answered	75.01	47.67	0.22	276.81	65.67	43.59	0.33	240.31
Skills proficient	1.83	1.17	0.00	6.78	1.31	0.93	0.00	4.78

ANALYSIS

Outcome Measures and Covariates

Performance at pretest (beginning-of-year) and posttest (end-of-year) was measured using the Star Math or Star Reading assessments. Several outcome measures are provided by the Star Assessments; in this study, we focus on two: scaled score and student growth percentile (SGP). Scaled scores range from 0-1400 and are determined by the number of items a student answered correctly and the difficulty of those items. By analyzing scaled score, we were able to examine the impact of IXL on students' *absolute* growth from the beginning to the end of the year. The second measure, SGP, is a relative measure of performance that incorporates achievement history: it is a percentile ranking of growth relative to students with similar past achievement. By analyzing SGP,

we were able to assess the impact of IXL on students' growth *relative* to what would be predicted based on their prior performance. For more information about SGP, see https://www.renaissance.com/resources/student-growth-percentile/.

In the models that examined the impact of IXL usage on students' scaled scores, we included baseline performance (i.e., beginning-of-year Star score) and grade level as covariates, as recommended by What Works Clearinghouse (WWC) guidelines (WWC, 2020). In the models that examined the impact of IXL usage on students' SGP, we included only grade level as a covariate because prior performance is accounted for as part of the SGP calculation.

Model Specification

Participants were enrolled in multiple schools across the district; therefore, we specified and tested multilevel regression models to account for clustering at the school level. We specified and tested separate models for each IXL usage metric due to the fact that the usage metrics were significantly intercorrelated (math range: $r = .67$ to $r = .79$; ELA range: $r = .64$ to $r = .79$).

For each dependent variable and subject separately (i.e., scaled score and SGP in math; scaled score and SGP in ELA), we regressed the end-of-year Star outcome on the covariates named above and one IXL usage metric at a time: average number of questions answered per week, average number of skills proficient (SP) per week, or average time spent (in minutes) per week.

Following WWC (2020) guidelines, each effect is accompanied by a test of statistical significance using a probability (p) value, a measure of effect size, and corresponding percentile gain where applicable. The p-value is the probability of observing the current or more extreme data, assuming the effect is zero (Cohen, 1994). The smaller the p-value, the less likely it is that the result occurred at random, with p-values less than .05 considered statistically significant. As there was no control or comparison group, we report standardized regression coefficients to gauge the practical significance of IXL usage relative to the effects of the covariates.

Results

IXL MATH

Scaled Score

All IXL usage metrics were positively and significantly associated with scaled score on the end-of-year Star Math assessment, controlling for baseline performance and grade level (see Tables B1-B3 in Appendix B for full model results). Based on these model coefficients and typical usage amounts, a student's Star Math scaled score would be expected to increase by 3.9 points for every additional 30 questions they answered on IXL each week ($\beta = 0.05$, $p < .001$), 7.3 points for each additional skill they reached proficiency in each week ($\beta = 0.06$, $p < .001$), or 16.8 points for every additional 30 minutes they spent using IXL each week ($\beta = 0.06$, $p < .001$; see Figure 1).

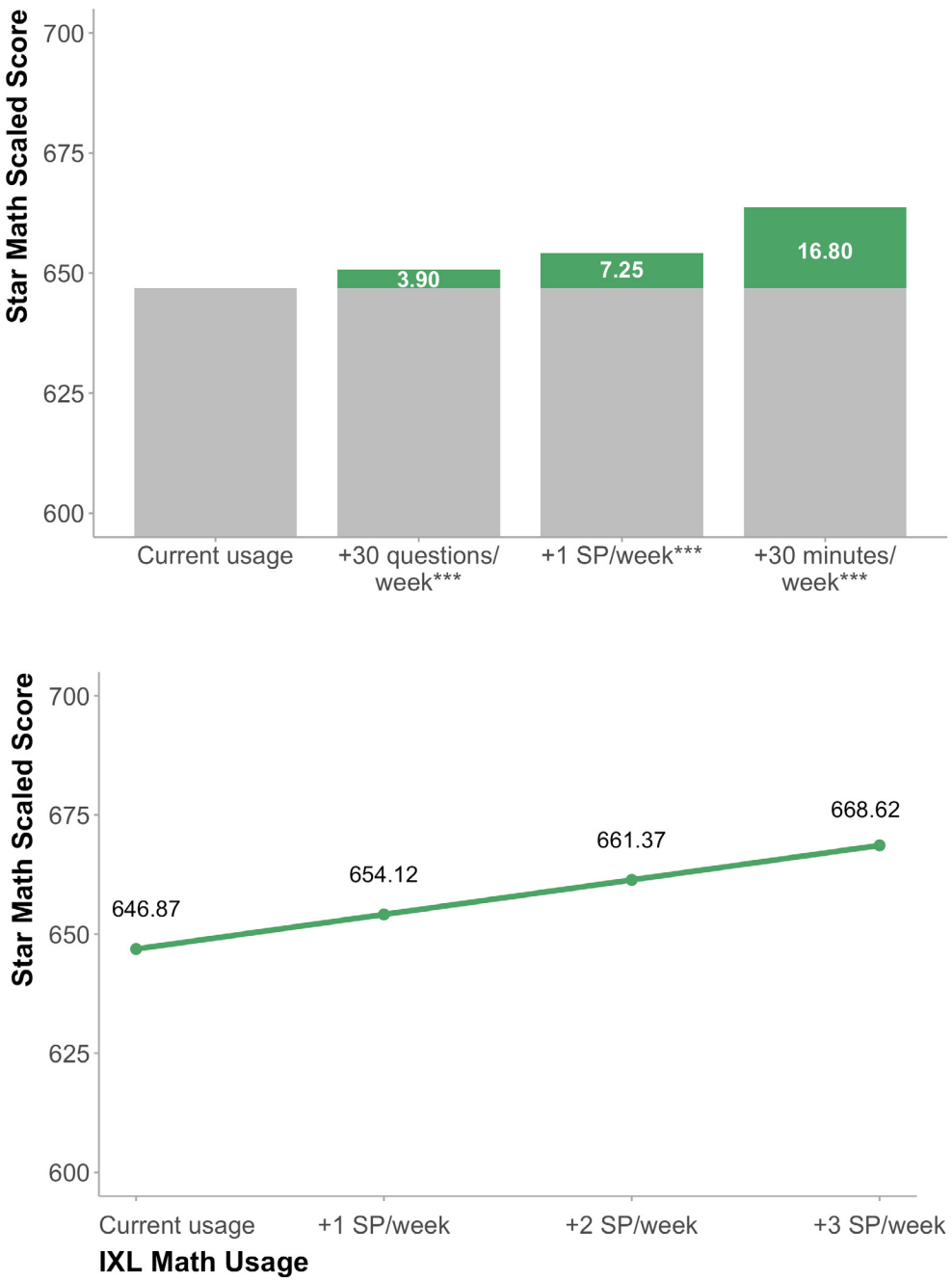


Figure 1. Expected usage effects of IXL Math on Star Math scaled score.

Note: SP/week = skills proficient per week.

STUDENT GROWTH PERCENTILE

As in the scaled score analysis, all IXL usage metrics were positively and significantly associated with Star Math SGP, controlling for grade level (see Tables B4-B6 in Appendix B for full model results). Based on these model coefficients and typical usage amounts, a student's Star Math SGP would be expected to increase by 1.8 points for every additional 30 questions they answered on IXL each week

(β = 0.10, $p < .001$), 3.07 points for each additional skill they reached proficiency in each week (β = 0.12, $p < .001$), or 7.2 points for every additional 30 minutes they spent using IXL each week (β = 0.12, $p < .001$; see Figure 2).

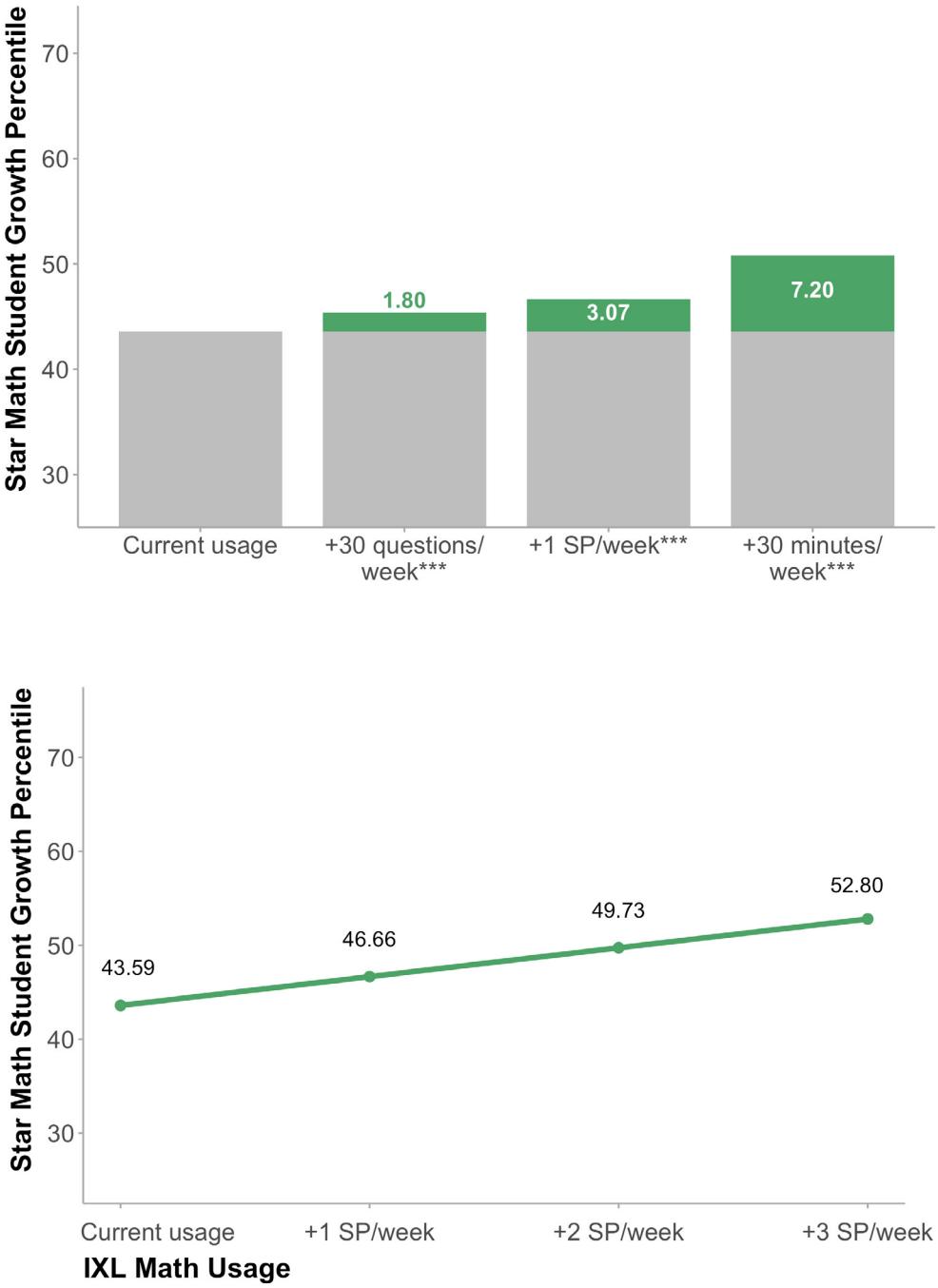


Figure 2. Expected usage effects of IXL Math on Star Math student growth percentile.

Note: SP/week = skills proficient per week.

IXL ELA

Scaled Score

All IXL ELA usage metrics were positively and significantly associated with scaled score on the end-of-year Star Reading assessment, controlling for baseline performance and grade level (see Tables C1-C3 in Appendix C for full model results). Based on these model coefficients and typical usage amounts, a student's Star Reading scaled score would be expected to increase by 5.7 points for every additional 30 questions they answered on IXL each week (β = 0.03, $p < .001$), 18.6 points for each additional skill they reached proficiency in each week (β = 0.06, $p < .001$), or 26.7 points for every additional 30 minutes they spent using IXL each week (β = 0.04, $p < .001$; see Figure 3).

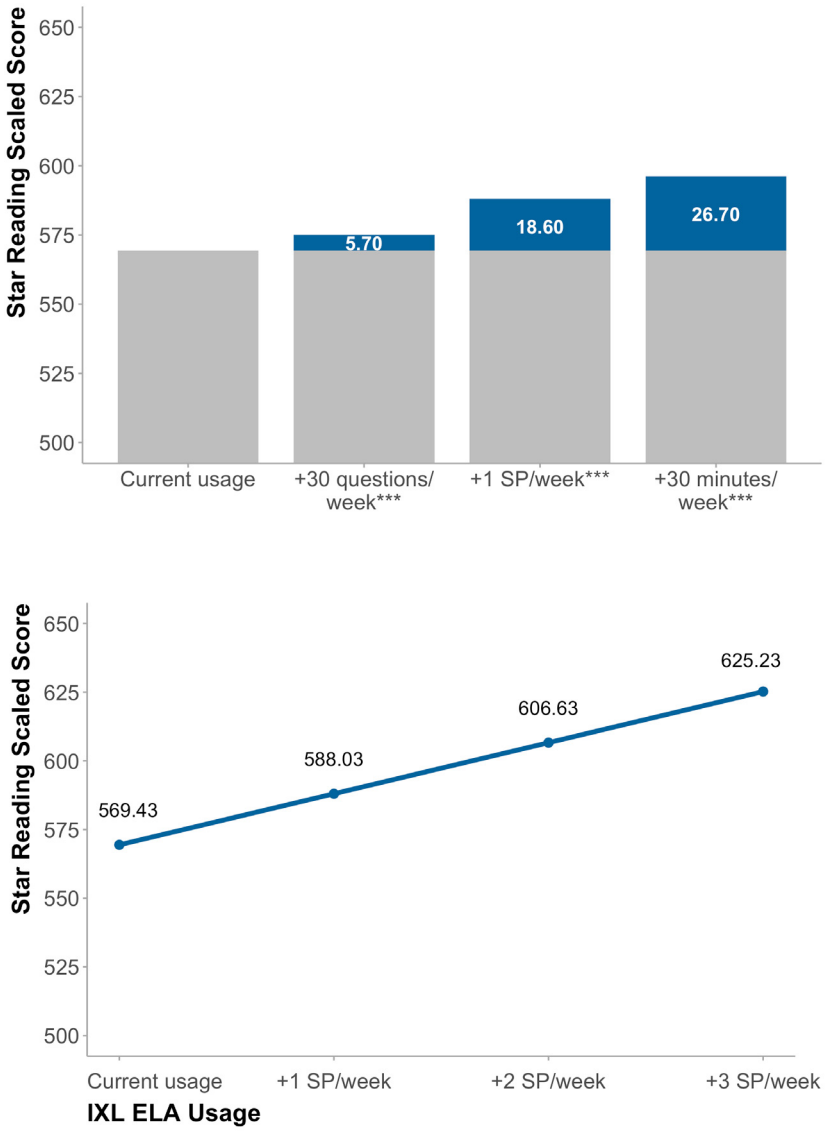


Figure 3. Expected usage effects of IXL ELA on Star Reading scaled score.

Note: SP/week = skills proficient per week.

STUDENT GROWTH PERCENTILE

As in the scaled score analysis, all IXL ELA usage metrics were positively and significantly associated with Star Reading SGP, controlling for grade level (see Tables C4-C6 in Appendix C for full model results). Based on these model coefficients and typical usage amounts, a student's Star Reading SGP would be expected to increase by 1.2 points for every additional 30 questions they answered on IXL each week (β = 0.05, $p < .001$), 3.1 points for each additional skill they reached proficiency in each week (β = 0.09, $p < .001$), or 4.8 points for every additional 30 minutes they spent using IXL each week (β = 0.07, $p < .001$; see Figure 4).

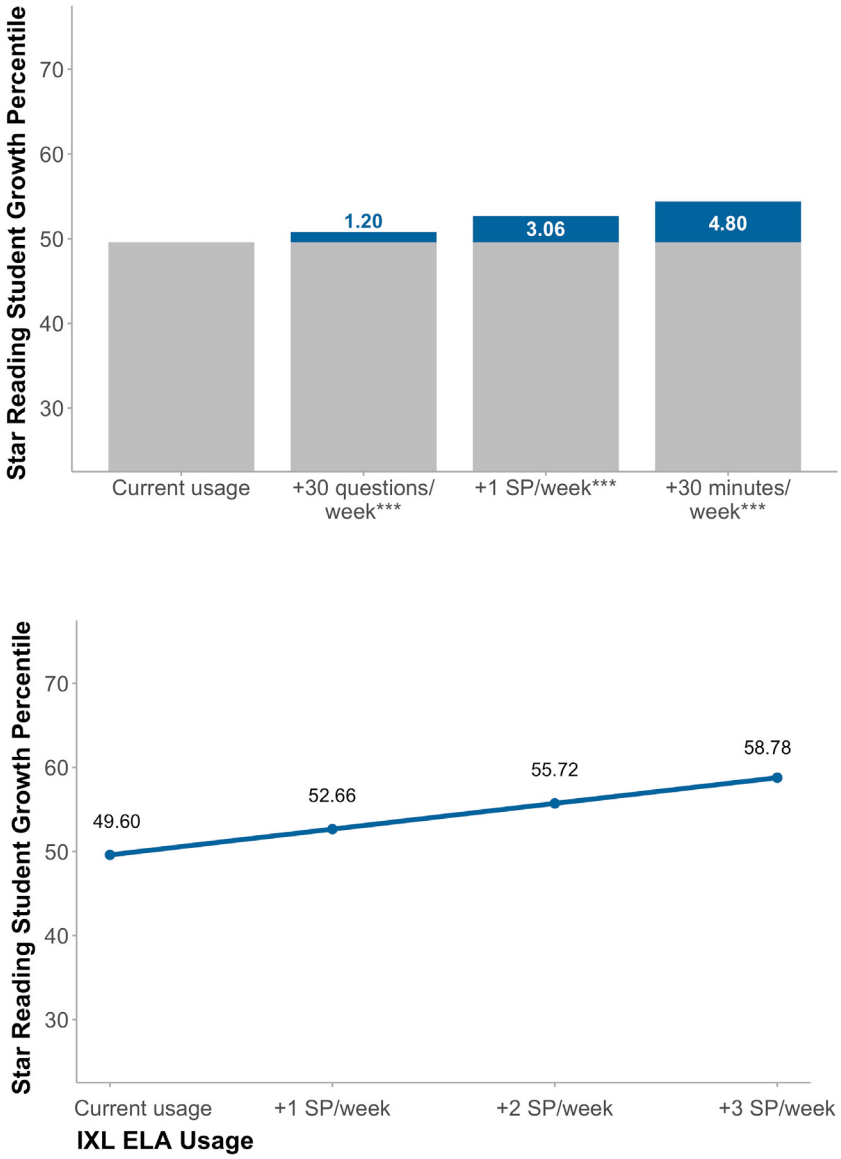


Figure 4. Expected usage effects of IXL ELA on Star Reading student growth percentile.
Note: SP/week = skills proficient per week.

Discussion and Recommendations

In this study, we investigated how IXL Math and ELA usage patterns among elementary and middle school students in one district related to their performance on the end-of-year Star Math or Star Reading assessment, respectively. Overall, we found that greater IXL usage was associated with larger performance gains, controlling for baseline performance and grade level.

Based on the results from these analyses, it is clear that any amount of weekly IXL usage should be beneficial to students. However, skills proficient per week is likely a more informative metric compared to questions answered and time spent overall. The latter two measures show *how much* students are using IXL, but they do not provide information about *how* students are using IXL. For example, a student who answers 30 questions across 30 different IXL skills has likely made little progress toward mastery of any specific content, whereas a student who answers 30 questions across two IXL skills is much more likely to have improved their mastery of the content in those two skills. For this reason, IXL's usage recommendation is that students aim to reach proficiency in two skills per week, and correspondingly, we recommend that educators focus on setting skill proficiency goals when working with students.

Prior research has shown that interventions are most effective when they are implemented with fidelity (e.g., Noell et al., 2002; see also Finney et al., 2021). Students' IXL usage in this district was, on average, close to IXL's usage recommendation of 2 SP/week (per subject; see Table 1). Correspondingly, IXL usage was related to significant achievement gains over the course of the school year, even after statistically controlling for baseline performance and grade level.

Finally, these results provide strong support for the idea that IXL can truly help every student. IXL had a significant impact on students' SGP—the more students used IXL, the greater their academic growth compared to peers with a similar achievement history. IXL is an impactful learning platform for grade-level practice, enrichment, and remediation, and it supports students' engagement with their own learning no matter their starting point.

References

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Appendix A: Demographics

Table A. Grade distributions for IXL Math and IXL ELA usage analyses

	IXL Math students	IXL ELA students
Pretest and posttest	*n* = 7,808	*n* = 10,989
Fall 2021 scaled score	575.67 (143.66)	523.73 (304.60)
Spring 2022 scaled score	662.62 (133.66)	613.96 (294.06)
Spring 2022 SGP	52.31 (29.08)	49.44 (29.95)
Demographics (*N* students)		
Grade level		
1	--	500 (4.6%)
2	1,549 (19.8%)	1,587 (14.4%)
3	1,594 (20.4%)	1,685 (15.3%)
4	1,596 (20.4%)	1,623 (14.8%)
5	1,506 (19.3%)	1,598 (14.5%)
6	1,563 (20.1%)	1,630 (14.8%)
7	--	1,209 (11.0%)
8	--	1,157 (10.5%)

Note. Numbers in parentheses for pretest and posttest show standard deviations.

Appendix B: Full Results of Math Regression Analyses

Table B1. Effects of IXL Math questions answered on end-of-year Star Math scaled score

Predictor	*b*	*SE*	95% CI	β	*t*	*p*
(Intercept)	650.08	3.36	643.43 – 656.65	-0.02	193.278	<.001
Grade: 3[1]	-0.08	2.26	-4.53 – 4.34	0.00	-0.037	.971
Grade: 4[1]	11.06	2.58	5.97 – 16.10	0.08	4.285	<.001
Grade: 5[1]	1.74	2.97	-4.12 – 7.54	0.01	0.587	.557
Grade: 6[1]	-7.06	3.22	-13.44 – -0.76	-0.05	-2.189	.029
Scaled score (pretest)[2]	0.82	0.01	0.80 – 0.84	0.88	105.223	<.001
Questions answered on IXL Math[3]	**0.13**	**0.01**	**0.10 – 0.16**	**0.05**	**8.934**	**<.001**

Note. Dependent variable: Scaled score on end-of-year (May 2022) Star Math assessment. *b* = unstandardized regression coefficient, *SE* = standard error, CI = confidence interval, β = standardized regression coefficient.
[1]Dummy coded; grade 2 as reference group. [2]Grand-mean centered. [3]Average weekly amount.

Table B2. Effects of IXL Math skills proficient on end-of-year Star Math scaled score

Predictor	*b*	*SE*	95% CI	β	*t*	*p*
(Intercept)	642.45	3.50	635.54 – 649.29	-0.05	183.588	<.001
Grade: 3[1]	4.04	2.27	-0.42 – 8.47	0.03	1.781	.075
Grade: 4[1]	15.71	2.61	10.56 – 20.81	0.12	6.023	<.001
Grade: 5[1]	7.43	3.02	1.45 – 13.34	0.06	2.458	.014
Grade: 6[1]	-0.52	3.28	-7.02 – 5.90	0.00	-0.157	.875
Scaled score (pretest)[2]	0.81	0.01	0.79 – 0.82	0.87	102.085	<.001
IXL Math Skills Proficient[3]	**7.25**	**0.61**	**6.06 – 8.44**	**0.06**	**11.963**	**<.001**

Note. Dependent variable: Scaled score on end-of-year (May 2022) Star Math assessment. *b* = unstandardized regression coefficient, *SE* = standard error, CI = confidence interval, β = standardized regression coefficient.
[1]Dummy coded; grade 2 as reference group. [2]Grand-mean centered. [3]Average weekly amount.

Table B3. Effects of IXL Math usage time on end-of-year Star Math scaled score

Predictor	*b*	*SE*	95% CI	β	*t*	*p*
(Intercept)	648.09	3.44	641.29 – 654.80	0.00	188.650	<.001
Grade: 3[1]	-0.42	2.26	-4.86 – 4.00	0.00	-0.185	.853
Grade: 4[1]	8.50	2.58	3.43 – 13.54	0.06	3.297	.001
Grade: 5[1]	-1.97	2.95	-7.79 – 3.79	-0.01	-0.669	.504
Grade: 6[1]	-11.28	3.21	-17.62 – -5.00	-0.08	-3.510	<.001
Scaled score (pretest)[2]	0.82	0.01	0.80 – 0.83	0.88	105.620	<.001
Time spent (min.) on IXL Math[3]	**0.56**	**0.05**	**0.45 – 0.66**	**0.06**	**10.776**	**<.001**

Note. Dependent variable: Scaled score on end-of-year (May 2022) Star Math assessment. *b* = unstandardized regression coefficient, *SE* = standard error, CI = confidence interval, β = standardized regression coefficient.
[1]Dummy coded; grade 2 as reference group. [2]Grand-mean centered. [3]Average weekly amount.

Table B4. Effects of IXL Math questions answered on Star Math student growth percentile

Predictor	*b*	*SE*	95% CI	β	*t*	*p*
(Intercept)	44.40	1.30	41.83 – 46.96	-0.11	34.040	<.001
Grade: 3[1]	1.89	1.03	-0.12 – 3.90	0.06	1.838	.066
Grade: 4[1]	4.36	1.02	2.36 – 6.36	0.15	4.270	<.001
Grade: 5[1]	3.16	1.04	1.12 – 5.19	0.11	3.044	.002
Grade: 6[1]	4.62	1.03	2.61 – 6.63	0.16	4.503	<.001
Questions answered on IXL Math[2]	**0.06**	**0.01**	**0.05 – 0.08**	**0.10**	**8.567**	**<.001**

Note. Dependent variable: Scaled score on end-of-year (May 2022) Star Math assessment. *b* = unstandardized regression coefficient, *SE* = standard error, CI = confidence interval, β = standardized regression coefficient.
[1]Dummy coded; grade 2 as reference group. [2]Average weekly amount.

Table B5. Effects of IXL Math skills proficient on Star Math student growth percentile

Predictor	*b*	*SE*	95% CI	β	*t*	*p*
(Intercept)	42.48	1.31	39.90 – 45.04	-0.14	32.463	<.001
Grade: 3[1]	3.13	1.02	1.13 – 5.12	0.11	3.072	.002
Grade: 4[1]	5.33	1.02	3.34 – 7.33	0.18	5.239	<.001
Grade: 5[1]	4.14	1.04	2.11 – 6.18	0.14	3.989	<.001
Grade: 6[1]	5.74	1.03	3.73 – 7.74	0.20	5.594	<.001
IXL Math Skills Proficient[2]	**3.07**	**0.29**	**2.51 – 3.63**	**0.12**	**10.736**	**<.001**

Note. Dependent variable: Scaled score on end-of-year (May 2022) Star Math assessment. *b* = unstandardized regression coefficient, *SE* = standard error, CI = confidence interval, β = standardized regression coefficient.
[1]Dummy coded; grade 2 as reference group. [2]Average weekly amount.

Table B6. Effects of IXL Math usage time on Star Math student growth percentile

Predictor	*b*	*SE*	95% CI	β	*t*	*p*
(Intercept)	43.90	1.34	41.27 – 46.52	-0.08	32.846	<.001
Grade: 3[1]	1.78	1.02	-0.22 – 3.79	0.06	1.739	.082
Grade: 4[1]	3.25	1.03	1.23 – 5.28	0.11	3.151	.002
Grade: 5[1]	1.49	1.05	-0.56 – 3.55	0.05	1.423	.155
Grade: 6[1]	2.76	1.05	0.70 – 4.82	0.09	2.628	.009
Time spent (min.) on IXL Math[2]	**0.24**	**0.02**	**0.19 – 0.29**	**0.12**	**9.573**	**<.001**

Note. Dependent variable: Scaled score on end-of-year (May 2022) Star Math assessment. *b* = unstandardized regression coefficient, *SE* = standard error, CI = confidence interval, β = standardized regression coefficient.
[1]Dummy coded; grade 2 as reference group. [2]Average weekly amount.

Appendix C: Full Results of ELA Regression Analyses

Table C1. Effects of IXL ELA questions answered on end-of-year Star Reading scaled score

Predictor	*b*	*SE*	95% CI	β	*t*	*p*
(Intercept)	577.64	7.33	563.41 – 591.97	-0.08	78.801	<.001
Grade: 2[1]	41.27	6.48	28.55 – 53.95	0.14	6.367	<.001
Grade: 3[1]	30.26	6.53	17.42 – 43.03	0.10	4.632	<.001
Grade: 4[1]	26.27	6.78	12.92 – 39.50	0.09	3.876	<.001
Grade: 5[1]	24.85	7.01	11.04 – 38.52	0.08	3.546	<.001
Grade: 6[1]	27.88	7.23	13.61 – 41.98	0.09	3.855	<.001
Grade: 7[1]	-10.62	11.67	-33.27 – 12.07	-0.04	-0.910	.366
Grade: 8[1]	17.43	11.85	-5.57 – 40.45	0.06	1.471	.146
Scaled score (pretest)[2]	0.88	0.01	0.87 – 0.89	0.91	146.558	<.001
Questions answered on IXL ELA[3]	**0.19**	**0.03**	**0.13 – 0.25**	**0.03**	**6.240**	**<.001**

Note. Dependent variable: Scaled score on end-of-year (May 2022) Star Math assessment. *b* = unstandardized regression coefficient, *SE* = standard error, CI = confidence interval, β = standardized regression coefficient.
[1]Dummy coded; grade 1 as reference group. [2]Grand-mean centered. [3]Average weekly amount.

Table C2. Effects of IXL ELA skills proficient on end-of-year Star Reading scaled score

Predictor	*b*	*SE*	95% CI	β	*t*	*p*
(Intercept)	555.31	7.51	540.74 – 570.00	-0.12	73.987	<.001
Grade: 2[1]	41.16	6.44	28.51 – 53.76	0.14	6.388	<.001
Grade: 3[1]	36.60	6.50	23.81 – 49.31	0.12	5.628	<.001
Grade: 4[1]	36.53	6.78	23.17 – 49.75	0.12	5.390	<.001
Grade: 5[1]	39.11	7.06	25.19 – 52.86	0.13	5.542	<.001
Grade: 6[1]	42.00	7.27	27.65 – 56.15	0.14	5.781	<.001
Grade: 7[1]	5.86	11.66	-16.78 – 28.55	0.02	0.503	.617
Grade: 8[1]	31.76	11.81	8.84 – 54.72	0.11	2.690	.009
Scaled score (pretest)[2]	0.87	0.01	0.86 – 0.88	0.90	141.328	<.001
IXL ELA Skills Proficient[3]	**18.61**	**1.42**	**15.82 – 21.38**	**0.06**	**13.129**	**<.001**

Note. Dependent variable: Scaled score on end-of-year (May 2022) Star Math assessment. *b* = unstandardized regression coefficient, *SE* = standard error, CI = confidence interval, β = standardized regression coefficient.
[1]Dummy coded; grade 1 as reference group. [2]Grand-mean centered. [3]Average weekly amount.

Table C3. Effects of IXL ELA usage time on end-of-year Star Reading scaled score

Predictor	*b*	*SE*	95% CI	β	*t*	*p*
(Intercept)	575.35	7.32	561.14 – 589.67	-0.07	78.564	<.001
Grade: 2[1]	40.58	6.47	27.87 – 53.24	0.14	6.267	<.001
Grade: 3[1]	27.90	6.53	15.07 – 40.68	0.09	4.270	<.001
Grade: 4[1]	22.96	6.78	9.61 – 36.20	0.08	3.384	.001
Grade: 5[1]	20.47	7.01	6.67 – 34.16	0.07	2.920	.004
Grade: 6[1]	21.75	7.27	7.43 – 35.92	0.07	2.993	.003
Grade: 7[1]	-17.11	11.89	-40.19 – 6.01	-0.06	-1.439	.155
Grade: 8[1]	9.88	12.09	-13.58 – 33.37	0.03	0.817	.416
Scaled score (pretest)[2]	0.88	0.01	0.87 – 0.89	0.91	146.409	<.001
Time spent (min.) on IXL ELA[3]	**0.89**	**0.11**	**0.68 – 1.09**	**0.04**	**8.440**	**<.001**

Note. Dependent variable: Scaled score on end-of-year (May 2022) Star Math assessment. *b* = unstandardized regression coefficient, *SE* = standard error, CI = confidence interval, β = standardized regression coefficient.
[1]Dummy coded; grade 1 as reference group. [2]Grand-mean centered. [3]Average weekly amount.

Table C4. Effects of IXL ELA questions answered on Star Reading student growth percentile

Predictor	*b*	*SE*	95% CI	β	*t*	*p*
(Intercept)	50.47	1.55	47.47 – 53.49	0.11	32.633	<.001
Grade: 2[1]	1.53	1.53	-1.47 – 4.53	0.05	1.001	.317
Grade: 3[1]	-0.38	1.52	-3.35 – 2.60	-0.01	-0.247	.805
Grade: 4[1]	-2.79	1.53	-5.79 – 0.20	-0.09	-1.829	.067
Grade: 5[1]	-5.79	1.53	-8.78 – -2.79	-0.19	-3.786	<.001
Grade: 6[1]	-3.40	1.53	-6.39 – -0.41	-0.11	-2.228	.026
Grade: 7[1]	-12.19	2.28	-16.61 – -7.76	-0.41	-5.342	<.001
Grade: 8[1]	-5.67	2.29	-10.11 – -1.22	-0.19	-2.476	.016
Questions answered on IXL ELA[2]	**0.04**	**0.01**	**0.02 – 0.05**	**0.05**	**5.009**	**<.001**

Note. Dependent variable: Scaled score on end-of-year (May 2022) Star Math assessment. *b* = unstandardized regression coefficient, *SE* = standard error, CI = confidence interval, β = standardized regression coefficient.
[1]Dummy coded; grade 1 as reference group. [2]Average weekly amount.

Table C5. Effects of IXL ELA skills proficient on Star Reading student growth percentile

Predictor	*b*	*SE*	95% CI	β	*t*	*p*
(Intercept)	48.07	1.56	45.04 – 51.11	0.09	30.858	<.001
Grade: 2[1]	1.37	1.53	-1.62 – 4.35	0.05	0.896	.370
Grade: 3[1]	0.18	1.51	-2.78 – 3.14	0.01	0.120	.904
Grade: 4[1]	-1.95	1.52	-4.94 – 1.03	-0.07	-1.283	.200
Grade: 5[1]	-4.58	1.53	-7.58 – -1.59	-0.15	-3.000	.003
Grade: 6[1]	-2.44	1.52	-5.42 – 0.54	-0.08	-1.601	.109
Grade: 7[1]	-11.11	2.25	-15.48 – -6.74	-0.37	-4.932	<.001
Grade: 8[1]	-5.09	2.26	-9.46 – -0.71	-0.17	-2.255	.027
IXL ELA Skills Proficient[2]	**3.06**	**0.33**	**2.42 – 3.69**	**0.09**	**9.393**	**<.001**

Note. Dependent variable: Scaled score on end-of-year (May 2022) Star Math assessment. *b* = unstandardized regression coefficient, *SE* = standard error, CI = confidence interval, β = standardized regression coefficient.
[1]Dummy coded; grade 1 as reference group. [2]Average weekly amount.

Table C6. Effects of IXL ELA usage time on Star Reading student growth percentile

Predictor	*b*	*SE*	95% CI	β	*t*	*p*
(Intercept)	50.27	1.54	47.28 – 53.28	0.14	32.601	<.001
Grade: 2[1]	1.40	1.53	-1.60 – 4.39	0.05	0.913	.361
Grade: 3[1]	-0.84	1.52	-3.82 – 2.14	-0.03	-0.552	.581
Grade: 4[1]	-3.47	1.53	-6.47 – -0.46	-0.12	-2.262	.024
Grade: 5[1]	-6.69	1.54	-9.70 – -3.68	-0.22	-4.355	<.001
Grade: 6[1]	-4.63	1.54	-7.66 – -1.60	-0.15	-3.000	.003
Grade: 7[1]	-13.51	2.33	-18.04 – -8.98	-0.45	-5.786	<.001
Grade: 8[1]	-7.18	2.35	-11.74 – -2.62	-0.24	-3.054	.003
Time spent (min.) on IXL ELA[2]	**0.16**	**0.02**	**0.11 – 0.21**	**0.07**	**6.447**	**<.001**

Note. Dependent variable: Scaled score on end-of-year (May 2022) Star Math assessment. *b* = unstandardized regression coefficient, *SE* = standard error, CI = confidence interval, β = standardized regression coefficient.
[1]Dummy coded; grade 1 as reference group. [2]Average weekly amount.