RESEARCH REPORT

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The Impact of IXL Professional Development in Texas

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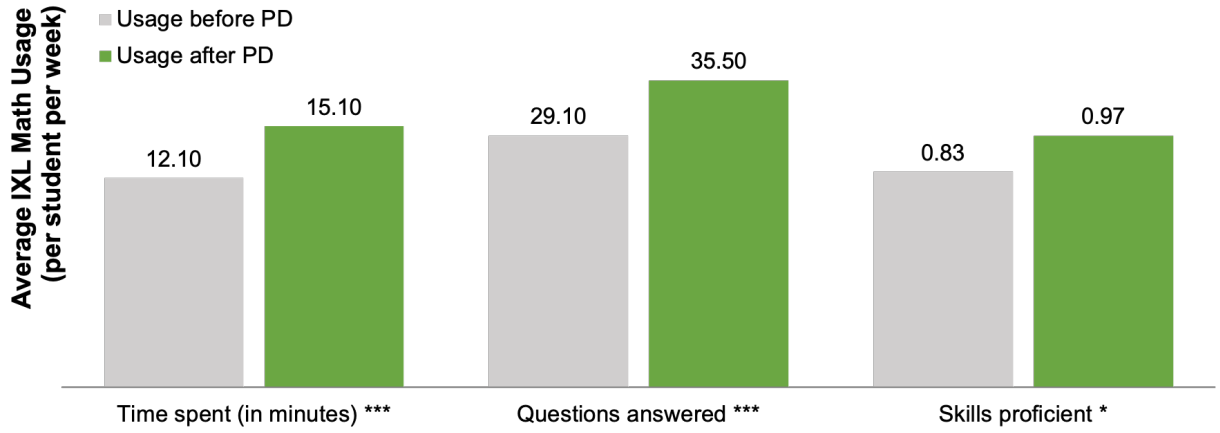
Executive Summary

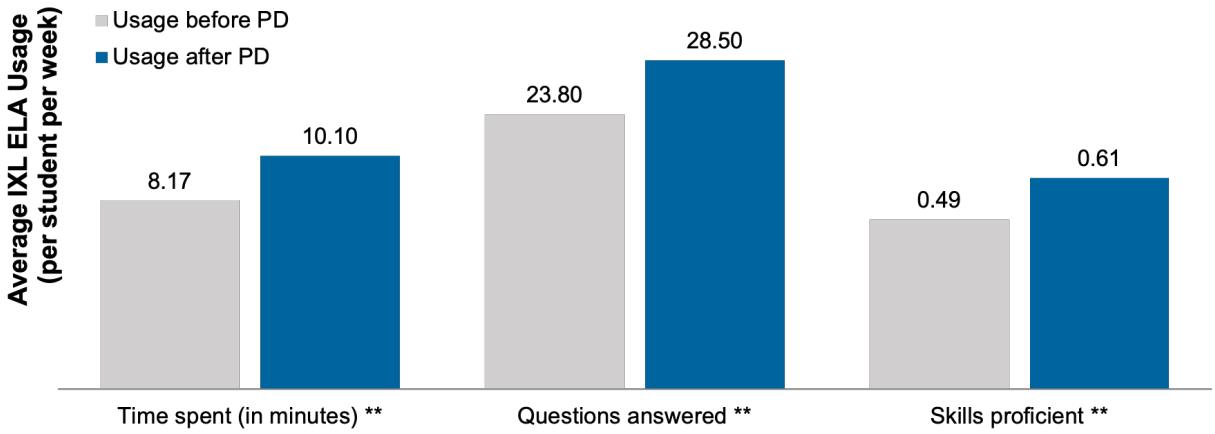
IXL is an end-to-end teaching and learning solution that engages learners in grades Pre-K through 12 with a comprehensive curriculum and personalized recommendations for meeting learning goals. IXL has been shown to have a significant positive impact on students' academic performance (e.g., IXL Learning, 2018; Schonberg, 2022; Schonberg, 2023). To help schools and districts maximize their IXL implementations, IXL offers a variety of highly engaging professional development (PD) packages, which promote engagement and boost student learning (IXL Learning, 2020). The District Success Package (DSP), IXL's most comprehensive PD package, is designed for districts and offers ongoing consultation, communications with district leaders, custom implementation support, and professional learning services.

To further evaluate the impact of IXL PD packages, specifically the DSP, we studied 995 public schools in the state of Texas that used IXL during the 2021-22 school year. Of these schools, 200 schools utilized the DSP, while 795 schools did not attend any IXL PD. The study showed that utilizing IXL's DSP had a positive impact on student engagement and academic achievement. For both math and English language arts (ELA), key findings include[1]:

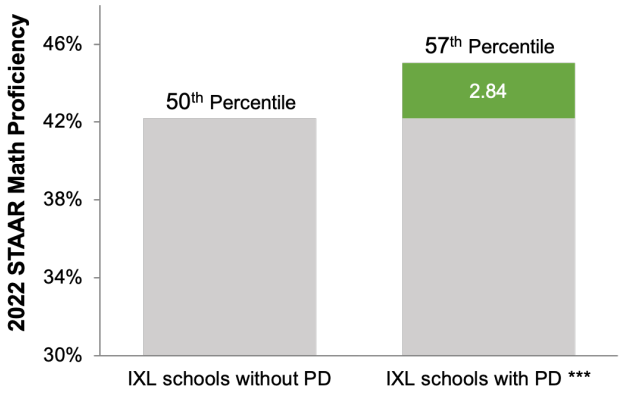
- **IXL PD promotes student engagement.** In schools that utilized the DSP, students spent more time on IXL, answered more questions, and reached proficiency in more skills.

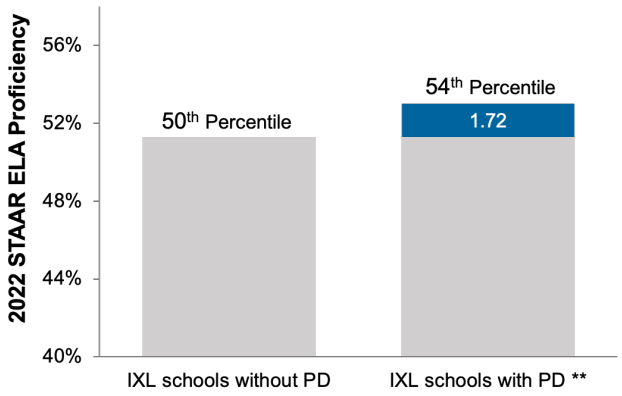


[1] *In all figures, * indicates statistical significance at the p < .05 level; ** indicates p < .01; and *** indicates p < .001*



- **IXL schools that participate in PD outperform comparable IXL schools without PD.** Schools that utilized the DSP had significantly higher proficiency rates on the state assessment than schools that did not receive IXL PD.





The Impact of IXL Professional Development in Texas

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. Deeply rooted in learning sciences research (see Bashkov et al., 2021), IXL engages each student in a personalized learning experience tailored to their working level. Numerous studies have consistently demonstrated the positive effects of IXL on student learning outcomes at various grade levels in different subjects across many states (see https://www.ixl.com/research).

To help schools and districts maximize their IXL implementations, IXL offers a variety of highly engaging professional development (PD) packages. Prior research shows that IXL PD can promote engagement and boost student learning (IXL Learning, 2020). As IXL's most comprehensive PD package, the District Success Package (DSP) is designed for districts with 25+ buildings and offers a combination of consultation and professional learning services to provide tailored and ongoing support. The package includes but is not limited to: launch consultation, strategic implementation planning, on-site professional learning sessions, attending district meetings, communication with district leaders, running various campaigns and contests, and data reviews. The DSP can help districts and their schools maximize engagement, optimize instruction, and achieve higher goals.

Study Design

With data from the state of Texas, the purpose of this study was to evaluate the impact of IXL PD, specifically the DSP, on student engagement and academic performance in math and ELA. The study adopted a quasi-experimental pretest-posttest control group design to compare the academic performance of IXL schools that utilized the DSP (i.e., IXL schools with PD) to that of IXL schools that did not receive any IXL PD (i.e., IXL schools without PD). The study examined student engagement and learning during the 2021-22 school year and accounted for baseline performance in spring 2021 and key demographic variables (see Figure 1).

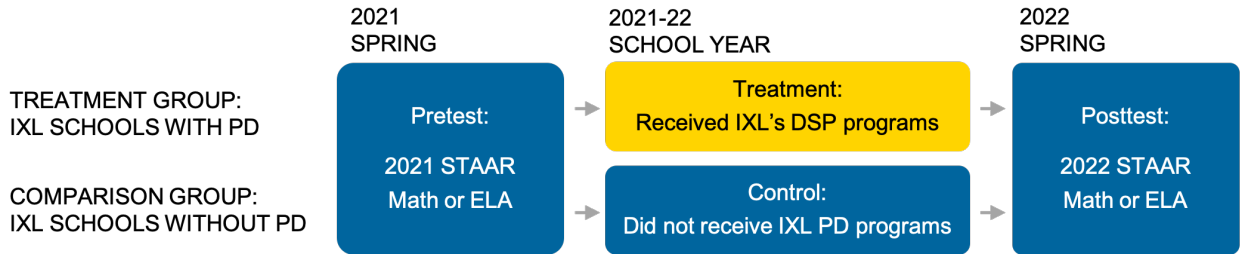


Figure 1. Study Design

Students' engagement was measured by IXL usage metrics described in more detail in a later section. Their academic performance was measured by the State of Texas Assessment of Academic Readiness (STAAR), a summative assessment program that includes end-of-grade assessments in math and ELA for students in grades 3 through 8. *Proficiency rate*—the percentage of students with *Meets Grade Level* or *Masters Grade Level* classification on STAAR—was used as the main achievement measure in each subject in a given school year. More information about STAAR can be found on the STAAR homepage.

Methodology

RESEARCH QUESTIONS

The present study aimed to examine the following research questions for math and ELA separately:

1) Does IXL PD have a positive impact on student engagement as measured by IXL usage? In other words, did schools' IXL usage increase after PD?

2) Does IXL PD have a positive impact on student learning outcomes? Specifically, compared to IXL schools without PD, did IXL schools with PD perform better on the state assessment?

DATA SOURCES AND PARTICIPANTS

Data from three sources were used in this study: school assessment data, school demographic data, and IXL usage data and PD records. To obtain school assessment data, we retrieved the annual school report card from the Texas Department of Education. We focused on math and ELA proficiency rates on STAAR in school years 2020-21 (as the pretest) and 2021-22 (as the posttest).

We also obtained school demographic background variables from the Texas Department of Education, including school grade level (i.e., elementary, middle, junior high, high school, or elementary/secondary), school size (i.e., number of students), student gender distribution, student race/ethnicity distribution, and percentage of economically disadvantaged students. Other demographic variables, including school location (i.e., city, suburb, town, or rural), school Title I status, and student-teacher ratio, were retrieved from the website of the National Center for Education Statistics (https://nces.ed.gov/ccd/schoolsearch/).

We retrieved IXL usage data and PD attendance records from IXL's internal database. For IXL usage, we obtained product usage indicators (e.g., the amount of time spent on IXL Math) for each school during the 2021-22 school year. When students use IXL, they complete practice problems organized within academic skills. 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. In this study, we obtained three main usage indicators, namely the amount of time spent on IXL, the number of questions answered, and the number of skills in which students reached proficiency (i.e., "skills

proficient"). IXL PD attendance records indicated the date(s) when a district or a school participated in PD. If a district utilized the DSP, all of its schools were considered IXL schools with PD[2].

We studied 995 public schools in Texas that used IXL Math and/or IXL ELA during the 2021-22 school year and had complete assessment and demographic data. Among the 941 schools that used IXL Math, 188 attended DSP, and 753 did not attend any PD. Among the 855 IXL ELA schools, 185 attended DSP, and 670 did not attend any PD.

ANALYTIC APPROACH

To examine the impact of IXL PD on student engagement, we performed a series of paired sample *t*-tests to compare schools' IXL usage before and after attending DSP sessions during the 2021-22 school year. For example, if a school participated in multiple DSP sessions across several months (e.g., October 2021, November 2021, and February 2022), IXL usage before PD was calculated for the month prior to their first DSP session (e.g., September 2021) and IXL usage after PD was calculated for the month after their last DSP session (e.g., March 2022). Because before- *and* after-PD usage measures are required for this analysis, we dropped schools where DSP sessions occurred during the very first and/or very last month of the school year. As a result, we had 135 IXL Math schools with PD and 122 IXL ELA schools with PD in this particular analysis.

To examine the impact of IXL PD on student academic performance, we first conducted one-to-one propensity score matching without replacement using the *MatchIt* package (Ho et al., 2011) in *R* (R Core Team, 2021) as a preprocessing step prior to analysis. A *propensity score* is the probability that a school would be "assigned" to the treatment (i.e., IXL with PD) group over the comparison group (i.e., IXL without PD) and is calculated using a combination of demographic characteristics (i.e., covariates). In the absence of random assignment, propensity scores can be used to match comparison schools to treatment schools and create equivalent treatment and comparison groups. Using propensity score matching allows us to compare the performance of pairs of PD and non-PD IXL schools that are extremely similar to each other. For the 188 IXL Math schools with PD, 188 comparison schools were identified from 753 IXL Math schools without PD in the state. Similarly, for the 185 IXL ELA schools with PD, 185 comparison schools were identified from 670 IXL ELA schools without PD. After matching, the resulting treatment and comparison groups had very similar demographic characteristics (see Tables in Appendix A). Absolute standardized mean differences after matching for all covariates were below the cutoff of 0.25 (WWC, 2022).

We then ran a multiple regression model to compare the posttest performance (i.e., 2022 assessment proficiency rates) of the matched IXL schools with PD and IXL schools without PD, taking into account prior performance (i.e., 2021 assessment proficiency rates) and demographic variables. The main predictor of interest here was a binary dummy-coded indicator of whether a school received PD (1 = Yes) during the 2021-22 school year.

Following What Works Clearinghouse guidelines (WWC, 2022), each effect is accompanied by a statistical significance test with a probability (*p*) value and a measure of effect size. The *p*-value is

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[2] *The study focused on the District Success Package (DSP), so schools that attended basic PD were removed from analysis.*

the probability of observing the current or more extreme data, assuming the tested effect is zero (Cohen, 1994). As such, the smaller the *p*-value, the less likely it is that the observed result occurred at random, with *p*-values less than .05 considered statistically significant. Effect size is reported using Cohen's *d* or Hedges' *g*, measuring the model-adjusted (i.e., estimated) mean difference between treatment and comparison groups on an outcome measure in unadjusted (i.e., observed) standard deviation units (WWC, 2022). For research in the education field, effect sizes between 0.05 and 0.20 would be considered medium, and effect sizes of 0.20 or higher would be considered quite large (Kraft, 2020; Lipsey et al., 2012). We also estimated the corresponding percentile gain based on effect size, where applicable. Percentile gain is the expected change in treatment schools' percentile rank relative to comparison schools at the 50th percentile.

Results

IMPACT OF PD ON STUDENT ENGAGEMENT

IXL Math

We found that the average amount of time spent on IXL, the average number of questions answered, and the average number of skills proficient all significantly increased after schools attended IXL PD (See Figure 2). The paired sample *t*-tests we conducted were significant with $p < .05$ and had large effect sizes ranging from .22 to .35. See Table B1 in Appendix B for detailed results.

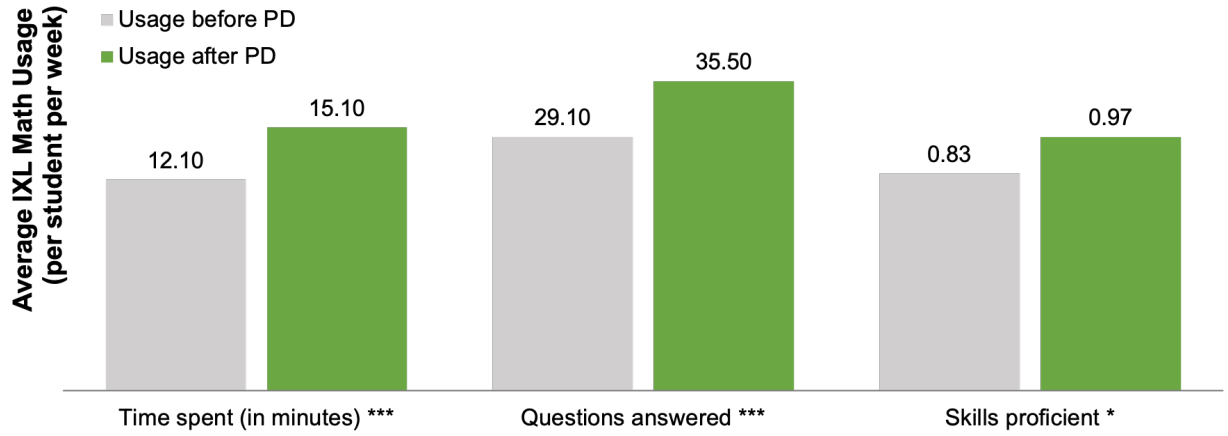

Figure 2. The impact of PD on IXL Math usage[3]

[3] *In order to show results in a single figure, the three usage indicators are not presented with the same scale (same for Figure 3).*

IXL ELA

Similarly, we found that the average amount of time spent on IXL, the average number of questions answered, and the average number of skills proficient all significantly increased after schools received PD (See Figure 3). The paired sample *t*-tests we conducted were significant with $p < .01$ and had large effect sizes ranging from .25 to .30. See Table B2 in Appendix B for detailed results.

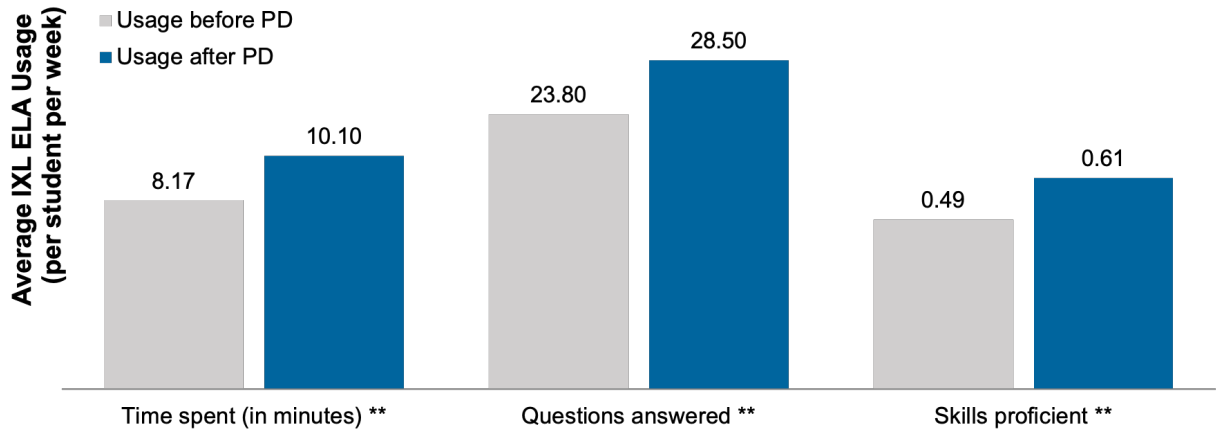

Figure 3. The impact of PD on IXL ELA usage

IMPACT OF PD ON STUDENT ACADEMIC ACHIEVEMENT

Math

We found that IXL Math schools with PD (as part of the DSP) outperformed comparable non-PD IXL Math schools on the 2022 STAAR in math. Specifically, the proficiency rate was close to three percentage points higher for IXL Math schools with PD relative to IXL schools without PD (Figure 4). The estimated treatment effect for PD was positive and statistically significant ($b = 2.84$, $p < .001$; see Table C1 in Appendix C for full model results). The effect size (Hedges' *g*) was 0.17, which corresponds to a percentile gain of seven points.

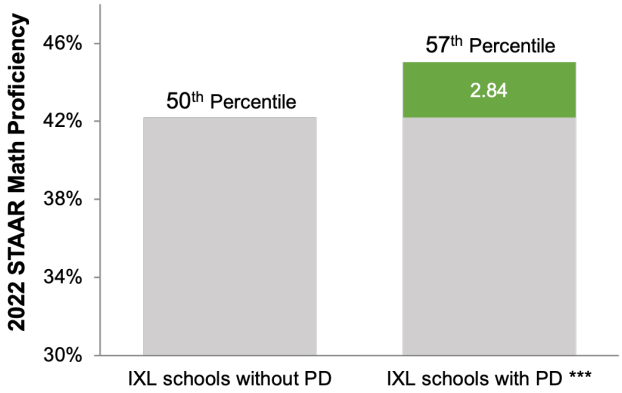

Figure 4. The impact of PD on math performance

ELA

We found that IXL ELA schools with PD (as part of the DSP) outperformed comparable non-PD IXL ELA schools on the 2022 STAAR in ELA. Specifically, the proficiency rate was close to two percentage points higher for IXL ELA schools with PD relative to IXL schools without PD (Figure 5). The estimated treatment effect for PD was positive and statistically significant (b = 1.72, p = .005; see Table C2 in Appendix C for full model results). The effect size (Hedges' g) was 0.11, which corresponds to a percentile gain of four points.

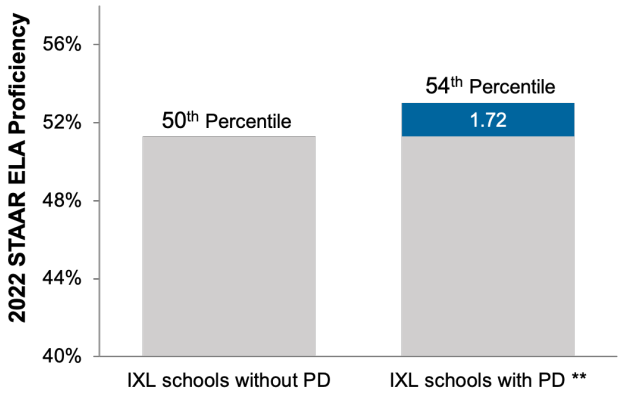

Figure 5. The impact of PD on ELA performance

Conclusion

The study indicated that IXL's District Success Package (DSP) had a positive impact on student engagement and learning outcomes. After attending PD, as part of the DSP, schools experienced a significant increase in IXL usage for both math and ELA. Not surprisingly, when compared to those that did not receive IXL PD, schools that participated in the DSP had significantly higher proficiency rates on the state assessment for both math and ELA. In sum, we encourage districts to invest in IXL's PD packages, especially the DSP that we examined in this study, to boost student engagement and learning with IXL.

It is important to note that the positive effects of professional learning examined in this study are on top of the learning benefits of IXL implementation, as here we studied only IXL schools (with and without PD). Previous studies (e.g., Schonberg, 2023) have shown that IXL is a highly effective way to boost student learning: schools using IXL consistently outperform non-IXL schools on state assessments. The focus of this study was to investigate the extent to which PD can elevate IXL implementation for even better results. IXL's PD packages are designed to empower teachers and district administrators even more with the knowledge, skills, and resources needed to effectively use IXL's platform, integrate it into their buildings, and make data-informed decisions to support and promote student learning. For districts and schools that utilize both IXL *and* its PD packages, we expect to see positive differences in learning and achievement above and beyond the already notable general impact of IXL. When teachers learn how to make the most of IXL in their classrooms and administrators understand how to use data to monitor implementation and track growth through PD, schools and districts can optimize their IXL implementation and maximize student growth as shown in this study. With increased engagement and usage, educators will see greater achievement among all of their students.

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Appendix A: Baseline Equivalence after Propensity Score Matching

Table A1. Standardized Mean Difference (SMD) in Achievement and Demographics between PD (Treatment) and Non-PD (Comparison) IXL Math Schools after Propensity Score Matching

	IXL Math		SMD
	Comparison	Treatment	
# of schools	188	188	
Pretest and posttest			
Posttest - 2022 Math % proficient	35.48 (17.77)	37.69 (16.41)	-
Pretest - 2021 Math % proficient	28.08 (17.66)	26.70 (16.92)	0.080
Grade-level characteristics			
Gender: % male	51.22 (2.56)	51.46 (5.56)	0.056
Race: % Hispanic/Latino	63.44 (26.43)	67.67 (29.26)	0.152
% Economically disadvantaged	71.48 (25.39)	72.12 (25.51)	0.025
School size	627.95 (257.77)	596.88 (233.14)	0.126
Student-teacher ratio	14.39 (2.09)	14.04 (2.07)	0.168
Title 1 schools	164	164	<0.001
Locale			0.218
City	163	166	
Suburb	6	8	
Town	18	10	
Rural	1	4	
School grade level			0.067
Elementary	120	118	
Elementary/Secondary	2	1	
Middle	60	63	
Junior high	6	6	

Note. Numbers in parentheses show standard deviations. Descriptives reported in the table are averaged across schools with complete data.

Table A2. Standardized Mean Difference (SMD) in Achievement and Demographics between PD (Treatment) and Non-PD (Comparison) IXL ELA Schools after Propensity Score Matching

	IXL ELA		SMD
	Comparison	Treatment	
# of schools	185	185	
Pretest and posttest			
Posttest - 2022 ELA % proficient	49.30 (15.08)	50.09 (15.12)	-
Pretest - 2021 ELA % proficient	35.37 (15.59)	33.74 (15.68)	0.104
Grade-level characteristics			
Gender: % male	51.19 (2.70)	51.47 (5.60)	0.062
Race: % Hispanic/Latino	61.30 (25.71)	67.29 (29.43)	0.217
% Economically disadvantaged	70.70 (24.44)	71.90 (25.40)	0.048
School size	630.24 (261.19)	596.62 (227.22)	0.137
Student-teacher ratio	14.44 (2.15)	14.00 (1.99)	0.214
Title 1 schools	167	162	0.086
Locale			0.151
City	161	163	
Suburb	5	8	
Town	11	10	
Rural	8	4	
School grade level			0.027
Elementary	115	115	
Elementary/Secondary	1	1	
Middle	60	61	
Junior high	9	8	

Note. Numbers in parentheses show standard deviations. Descriptives reported in the table are averaged across schools with complete data.

Appendix B: Impact of PD on Student Engagement

Table B1. **IXL Math Usage Before and After PD and Paired Sample T-Test Results**

Weekly IXL Usage	before PD	after PD	*df*	*t*	*p*	Cohen's *d*
Time spent (in minutes)	12.10	15.10	134	4.09	< .001	.35
Questions answered	29.10	35.50	134	3.58	< .001	.31
Skills proficient	0.83	0.97	134	2.57	0.011	.22

Table B2. **IXL ELA Usage Before and After PD and Paired Sample T-Test Results**

Weekly IXL Usage	before PD	after PD	*df*	*t*	*p*	Cohen's *d*
Time spent (in minutes)	8.17	10.10	121	3.31	0.001	.30
Questions answered	23.80	28.50	121	2.72	0.008	.25
Skills proficient	0.49	0.61	121	3.18	0.002	.29

Appendix C. Impact of PD on Student Achievement

Table C1. The Effect of IXL PD on 2022 STAAR Math Proficiency

Predictor	*b*	*SE*	95% CI	β	*t*	*p*
(Intercept)	42.19	1.51	39.22 – 45.16	.30	27.92	< .001
Pretest - 2021 STAAR Math proficiency[1]	0.75	0.03	0.69 – 0.82	.76	22.23	< .001
% Gender: male[1]	0.01	0.09	-0.17 – 0.20	.00	0.15	.880
% Race/ethnicity: White[1]	0.22	0.02	0.18 – 0.25	.35	12.25	< .001
% Economically disadvantaged[1]	-0.14	0.03	-0.20 – -0.09	-.21	-5.12	< .001
School size[1]	0.01	0.00	0.00 – 0.01	.09	3.00	.003
Student-teacher ratio[1]	0.20	0.22	-0.23 – 0.62	.02	0.90	.369
Title I[2]	-2.50	1.67	-5.79 – 0.79	-.15	-1.49	.136
School location: city[3]	3.89	2.01	-0.05 – 7.83	.23	1.94	.053
School location: suburb[3]	1.77	1.44	-1.07 – 4.60	.10	1.23	.221
School location: town[3]	-2.35	3.25	-8.73 – 4.04	-.14	-0.72	.470
School grade level: elem./secondary[4]	-9.68	4.42	-18.38 – -0.99	-.57	-2.19	.029
School grade level: middle[4]	-8.73	0.94	-10.58 – -6.88	-.51	-9.27	< .001
School grade level: junior high[4]	-8.81	2.17	-13.09 – -4.53	-.51	-4.05	< .001
IXL PD (DSP)	2.84	0.74	1.39 – 4.29	.08	3.85	< .001

Note. b = unstandardized regression coefficient, *SE* = standard error, CI = confidence interval, β = standardized regression coefficient, SP/week = skills proficient per week (i.e., the average number of skills in which students reached proficiency each week).

[1] Mean-centered;

[2] Dummy coded; non-Title I schools as reference group.

[3] Dummy coded; rural schools as reference group.

[4] Dummy coded; elementary schools as reference group.

Table C2. The Effect of IXL PD on 2022 STAAR ELA Proficiency

Predictor	*b*	*SE*	95% CI	β	*t*	*p*
(Intercept)	51.28	1.27	48.78 – 53.79	.05	40.27	< .001
Pretest - 2021 STAAR ELA proficiency[1]	0.83	0.04	0.76 – 0.90	.86	22.96	< .001
% Gender: male[1]	0.11	0.08	-0.04 – 0.26	.03	1.44	.150
% Race/ethnicity: White[1]	0.11	0.01	0.09 – 0.14	.21	7.88	< .001
% Economically disadvantaged[1]	-0.11	0.03	-0.16 – -0.06	-.18	-4.19	< .001
School size[1]	0.00	0.00	0.00 – 0.00	.00	-0.14	.887
Student-teacher ratio[1]	0.26	0.19	-0.11 – 0.63	.04	1.36	.174
Title I[2]	1.21	1.37	-1.49 – 3.91	.08	0.88	.379
School location: city[3]	-0.60	1.66	-3.87 – 2.67	-.04	-0.36	.718
School location: suburb[3]	1.33	1.34	-1.31 – 3.97	.09	0.99	.322
School location: town[3]	0.29	1.75	-3.14 – 3.72	.02	0.17	.868
School grade level: elem./secondary[4]	0.92	4.40	-7.73 – 9.56	.06	0.21	.835
School grade level: middle[4]	-4.99	0.73	-6.43 – -3.55	-.33	-6.81	< .001
School grade level: junior high[4]	-5.02	1.53	-8.03 – -2.02	-.33	-3.29	.001
IXL PD (DSP)	1.72	0.60	0.53 – 2.91	.06	2.85	.005

Note. b = unstandardized regression coefficient, *SE* = standard error, CI = confidence interval, β = standardized regression coefficient, SP/week = skills proficient per week (i.e., the average number of skills in which students reached proficiency each week).

[1] Mean-centered;

[2] Dummy coded; non-Title I schools as reference group.

[3] Dummy coded; rural schools as reference group.

[4] Dummy coded; elementary schools as reference group.