



Measuring the Impact of IXL Math and IXL Language Arts in Florida Schools

Introduction

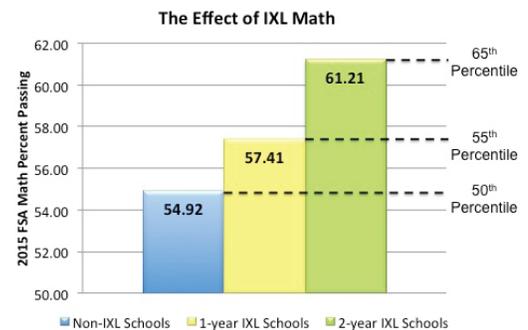
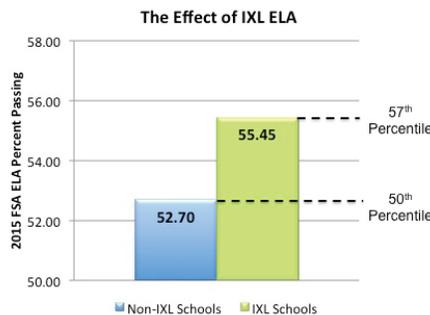
Previous research has shown that IXL can have significant impact at an individual school or district (Empirical Education, 2013). In this study, we explore IXL usage across an entire state; in this case, Florida. Examining such a wide collection of schools allows us to measure whether IXL schools perform better than non-IXL schools, as well as understand how usage of IXL can improve students' proficiency on state assessments.

Abstract

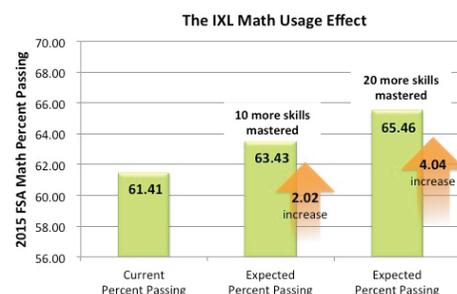
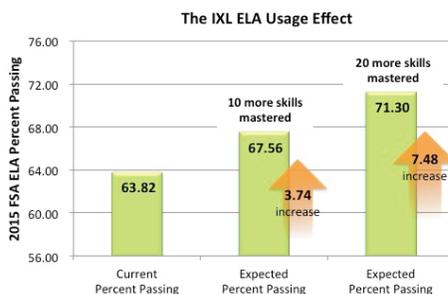
This study investigated hundreds of public schools in the state of Florida that used IXL Math or English Language Arts (ELA) between 2013 and 2015. We measured the impact of IXL Math and IXL ELA based on scores from the 2015 Florida Standards Assessments (FSA). Scores from the 2013 state standardized assessments were used to control for schools' prior performance. IXL usage by the schools in this study ranged from less than one hour per student, per academic year, to over 45 hours per student, per academic year. Even with the wide range in student usage, our researchers found strong positive correlation between IXL usage and school's performance on the FSA in both math and ELA. These results are statistically significant.

Key Findings

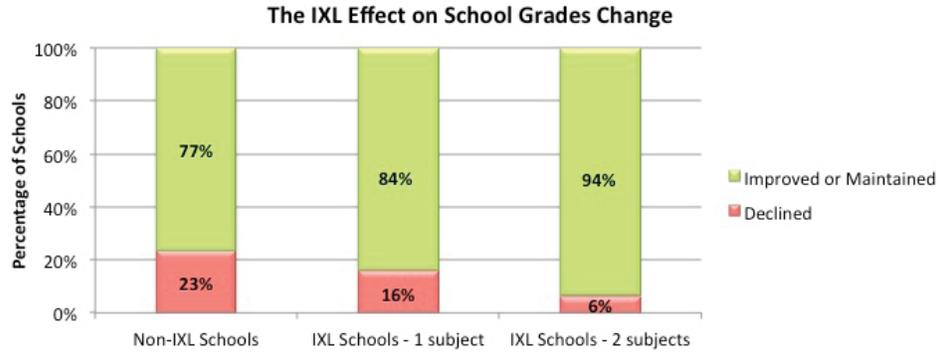
IXL schools performed better than non-IXL schools in both math and ELA. For math, schools that used IXL for two years performed better than schools that used IXL for only one year.



Mastery matters. If every student at a school completed just 20 more IXL skills during the school year, the school's proficiency rate on the FSA would increase by up to 7.48 points.



Ninety-four percent of schools with two IXL subjects and 84 percent of schools with one IXL subject improved or maintained their school grades (as assigned by the Florida Department of Education), compared to just 77 percent of non-IXL schools.



THE IXL EFFECT IN FLORIDA SCHOOLS

APRIL 30, 2016

Study Design

Our researchers wanted to determine the effect of IXL on student achievement at the school level, as measured by the percentage of students in the school meeting proficiency goals set by the state. To do this, we looked at state test results for schools before and after implementing IXL. We used schools not implementing IXL as a control.

This study adopted a pretest-posttest control group design, which evaluates the treatment effect by comparing the performance of the treatment group and the control group on the posttest, after adjusting for their performance on the pretest. The treatment group included schools that started using IXL in the 2013-14 or 2014-15 school years. The control group consisted of schools that did not use IXL in the 2012-13, 2013-14, or 2014-15 school years.

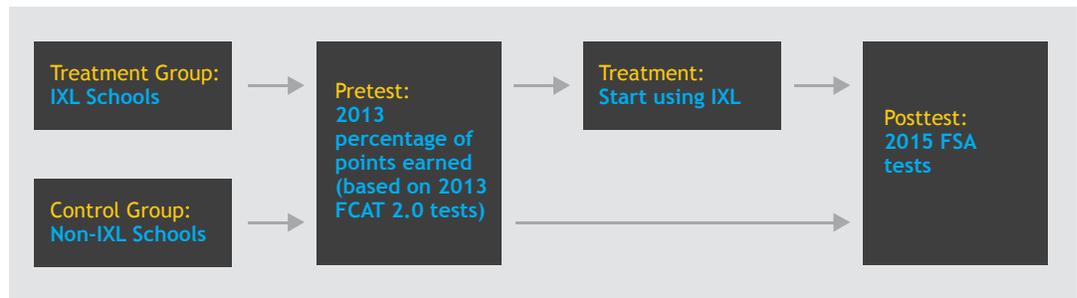


Figure 1. Study Design

The 2013 percentage of points earned, calculated by the Florida Department of Education based on the 2013 FCAT 2.0, was used as the pretest to determine a performance baseline for all schools. The FCAT 2.0 was the Florida state standardized test for public school students from 2011 to 2014. It measured student achievement on the Next Generation Sunshine State Standards and was administered to students in grades 3 through 10. The percentage of points earned is a percentage that reflects a school's overall academic performance level. The Florida Department of Education also assigns a letter grade of A, B, C, D, or F (referred to as school grades) based on a school's percentage of points earned. School grades provide a straightforward way to measure the performance of a school.

The FSA replaced the FCAT 2.0 in spring 2015 and was used as the posttest for this study. The FSA measures student achievement on the Florida state standards and was given to students in grades 3 through 8 for math and students in grades 3 through 10 for ELA. The Florida Department of Education used schools' 2015 FSA scores to calculate their 2015 percentage of points earned and their school grades.

Methodology

The study analyzed data from 4,293 Florida public schools, including both traditional public schools and charter schools. A total of 920 Florida public schools used IXL Math and/or IXL ELA between 2012 and 2015. As the number of students who practiced on IXL within a school ranged from a single classroom to the entire school, this study defined a school as an "IXL school" if the school started to use IXL in the 2013-14 or 2014-15 school years and if at least 25% of the students enrolled at the school practiced on IXL (see Appendix A for details on school selection and classification). Based on these criteria, the analysis included 168 schools using IXL Math and 55 schools using IXL ELA. IXL schools were comparable to the Florida state average in percentage of English language learners (ELL), school location, and percentage of charter schools (see Appendix B for details).

Two sets of data were used in this study: school performance data and IXL usage data. Our researchers obtained school performance data from the Florida Department of Education and the Institute of Education Science.

Our researchers used a linear regression model to calculate the IXL effect—i.e., the performance difference between IXL schools and non-IXL schools on the 2015 FSA, controlling for factors such as prior performance, school size, and location. We used another linear regression model to estimate the strength of association between IXL usage and school performance. We also calculated the Chi-square statistic and odds ratio to examine whether IXL schools were more likely to increase or maintain their school grades than non-IXL schools. (See Appendix C for an detailed explanation of the analytical methods.)

This form of analysis allowed us to answer three key questions:

- Did IXL schools perform better than non-IXL schools on the 2015 FSA?
- What is the association between IXL usage and school performance?
- Were IXL schools more likely to increase or maintain their school grades than non-IXL schools?

Results

Analysis of the data showed that IXL produced positive and statistically significant effects on student performance in both math and ELA, indicating there is a high probability that similar schools using IXL would achieve similar results. The effect of IXL was even larger when schools used both IXL Math and IXL ELA as opposed to just one IXL subject. Our analysis also showed a positive correlation between IXL usage and school performance. In particular, 20 additional skills mastered per student, per school year, would result in a 7 percent increase on a school's percent passing in ELA and a 4 percent increase in math on the 2015 FSA. In addition, a significantly higher percentage of IXL schools improved or maintained their school grades than non-IXL schools from 2013 to 2015.

The Efficacy of IXL ELA

The use of IXL ELA showed a statistically significant effect on schools' 2015 FSA performance in ELA across grades 3 to 8 (see Appendix D, Table 2 for details).

The adjusted percent passing¹ was 52.70 for non-IXL schools and 55.45 for IXL schools. The 2.75 percent difference corresponds to a percentile gain of 7 points in school rankings. That is, if an average non-IXL school (at the 50th percentile) had used IXL ELA for at least one school year, the school's percent passing would be expected to increase 2.75 percent, putting the school at the 57th percentile.

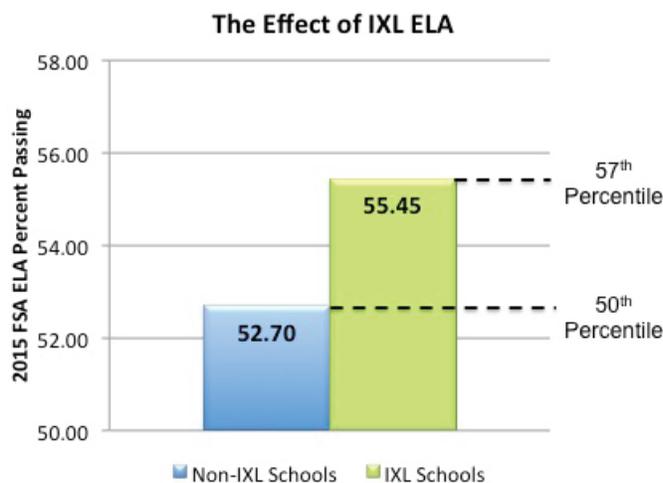


Figure 2. The Effect of IXL ELA on 2015 FSA ELA Percent Passing

¹ Percent passing: the percentage of students in a school that achieve a scale score at or above the passing score for each assessment. The passing score is the minimum scale score in achievement level 3 for each grade and subject.

Figure 3 shows a positive and statistically significant association between the usage of IXL ELA and 2015 FSA ELA test performance. In this study, the usage of IXL ELA was measured by the average number of ELA skills mastered by each student within a school year. The analysis suggested that, for IXL schools, if every student mastered 10 more IXL ELA skills in a school year, the school could expect a 3.74 point increase on the percent passing on the 2015 FSA ELA tests. If every student mastered 20 more IXL ELA skills, a 7.48 point increase would be expected.

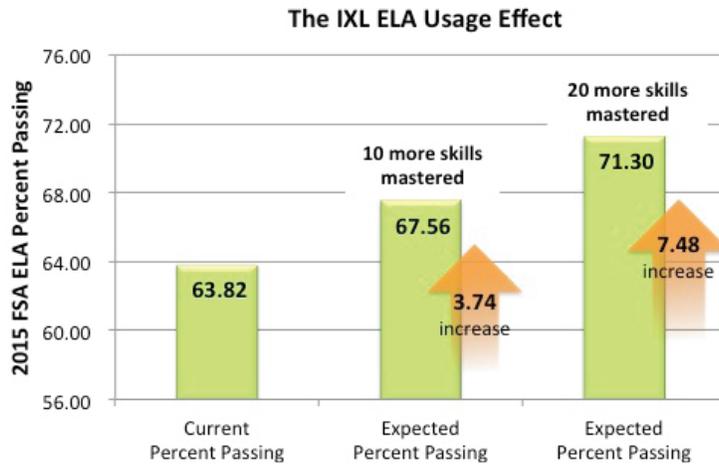


Figure 3. The IXL ELA Usage Effect on 2015 FSA ELA Percent Passing

The Efficacy of IXL Math

The use of IXL Math also showed a statistically significant effect on schools' 2015 FSA performance in math across grades 3 to 8 (see Appendix D, Table 2 for details).

The adjusted percent passing was 54.92 for non-IXL schools, 57.41 for schools that used IXL for one school year, and 61.21 for schools for schools that used IXL for two school years. For 1-year IXL schools, the 2.49 percent difference corresponds to a 5 point percentile gain in school rankings. For 2-year IXL schools, the 6.30 percent difference corresponds to a percentile gain of 15 points. That is, if an average non-IXL school (at the 50th percentile) had used IXL Math for two school years, the school's percent passing would be expected to increase 6.30 percent, putting the school at the 65th percentile.

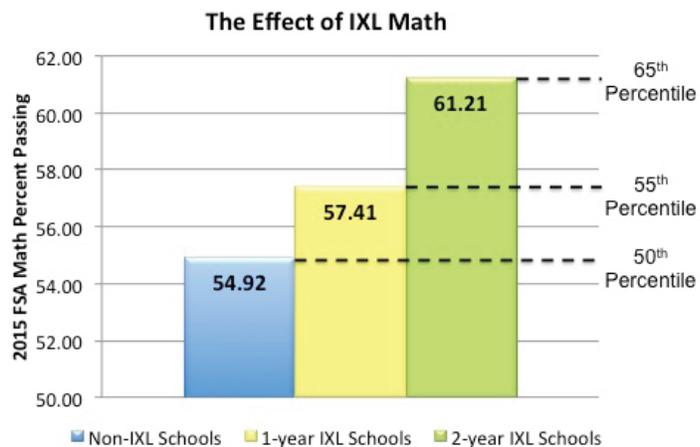


Figure 4. The Effect of IXL Math on 2015 FSA Math Percent Passing

Figure 5 shows a positive and statistically significant association between the usage of IXL Math and 2015 FSA math performance. In this study the usage of IXL Math was measured by the average number of math skills mastered by each student within a school year. The analysis suggested that, for IXL schools, if every student mastered 10 more IXL Math skills within a school year, the school could expect a 2.02 point increase on the percent passing on the 2015 FSA Math tests. If every student mastered 20 more IXL Math skills, the school could expect a 4.04 point increase.

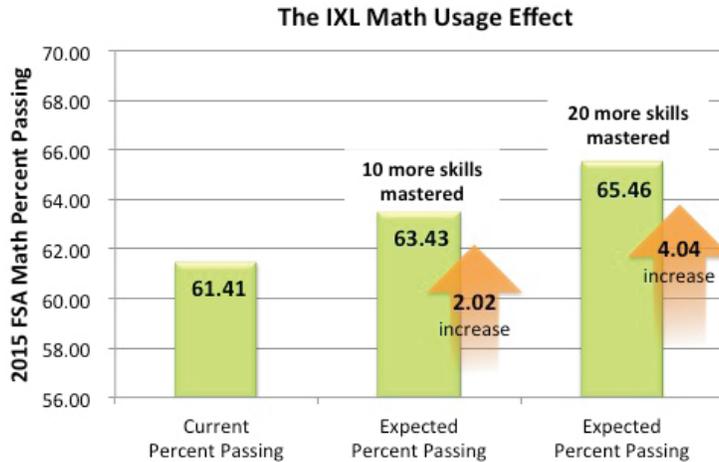


Figure 5. The IXL Math Usage Effect on 2015 FSA Math Percent Passing

The Effect of Using One IXL Subject versus Two IXL Subjects

Figure 6 shows the effect of using one IXL subject versus two IXL subjects on schools' 2015 percentage of points earned (see Appendix D, Table 3 for details). IXL schools that used only one subject outperformed non-IXL schools by 1.93 points, which is statistically significant and corresponds to a percentile gain of 4 points. For IXL schools that used two subjects, a 3.72 point difference was observed. This difference is also statistically significant and corresponds to a percentile gain of 10 points. That is, if an average non-IXL school (at the 50th percentile) had used both IXL Math and IXL ELA, the school's percentage of points earned would be expected to increase 3.72 percent, putting the school at the 60th percentile.

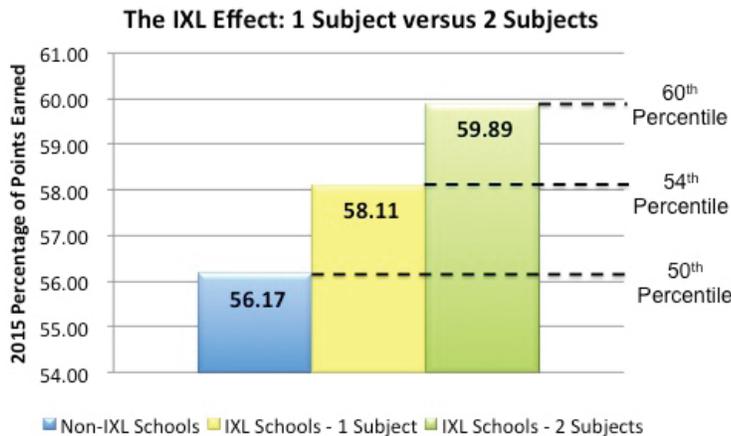


Figure 6. The IXL Effect on 2015 Percentage of Points Earned

Figure 7 shows the percentages of non-IXL schools and IXL schools that received A, B or C, and D or F school grades in 2013 and 2015 (see Appendix D, Table 4 for details). The percentage of non-IXL schools that received an A increased 3% (i.e., from 32% to 35%) from 2013 to 2015. The percentage of IXL schools that received an A increased about 10% (i.e., from 44% to 55% for IXL schools with one subject and from 44% to 53% for IXL schools with two subjects) from 2013 to 2015.

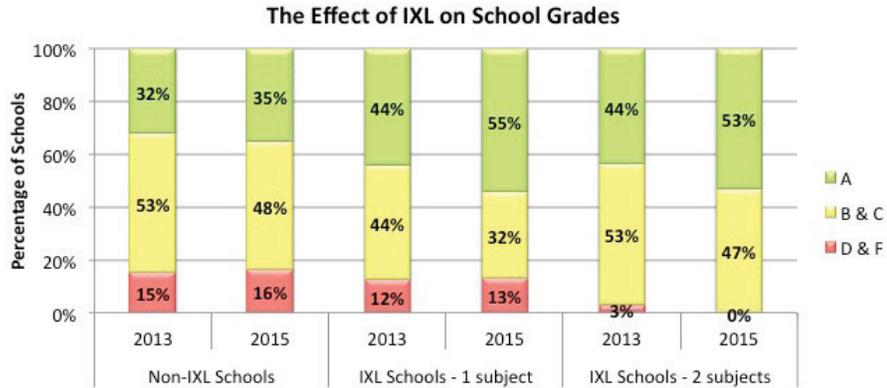


Figure 7. The Effect of IXL on School Grades

Our researchers also looked at the number of schools that improved, maintained, or declined in school grades from 2013 to 2015. Schools that moved up at least one category (e.g., B to A, D to B, etc.) or received the same grade from 2013 to 2015 are labeled “improved or maintained.” Schools that moved down at least one category (e.g., A to B, B to D, etc.) from 2013 to 2015 are labeled “declined.” As shown in Figure 8, the percentage of schools that improved or maintained their school grades was 77% for non-IXL schools, 84% for IXL schools with one IXL subject, and 94% for IXL schools with two IXL subjects. A significantly higher percentage of IXL schools improved or maintained their school grades than non-IXL schools from 2013 to 2015 (see Appendix D, Table 5 for details). In particular, IXL schools who used one IXL subject are 1.65 times more likely to improve or maintain their school grades than non-IXL schools. IXL schools who used two IXL subjects are 4.56 times more likely to improve or maintain their school grades than non-IXL schools.

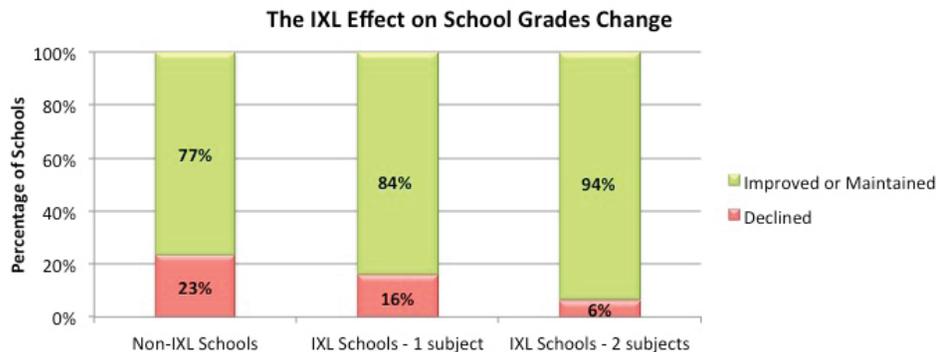


Figure 8. The IXL Effect on School Grades Change from 2013 to 2015

Reference

Empirical Education. (2013). *A Study of Student Achievement, Teacher Perceptions, and IXL Math*. Retrieved from <https://www.ixl.com/research/IXL-Research-Study-2013.pdf>

What Works Clearinghouse (2014). *What Works Clearinghouse procedures and standards handbook (Version 3.0)*. Retrieved from http://ies.ed.gov/ncee/wwc/pdf/reference_resources/wwc_procedures_v3_0_standards_handbook.pdf

Appendix A: IXL School Identification

This study determined if a school is an IXL school based only on the number of students using IXL. Because a school may choose to use one IXL subject (i.e., Math or ELA) or both subjects for one year or longer, this study defined schools as IXL schools for each IXL subject and for each school year separately.

For a certain IXL subject within a certain school year, a school is considered to be using IXL if: 1) the school has an active IXL account for at least half of a school year on this subject within this school year, and 2) at least 25% of the enrolled students have practiced on IXL within this school year.

For a certain subject, a school is identified as an IXL school if the school: 1) used IXL for this subject within the 2013-14 school year and/or within the 2014-15 school year, and 2) did not use IXL for this subject within the 2012-13 school year.

For a certain subject, a school is identified as a non-IXL school if the school did not use IXL for this subject within the 2012-13, 2013-14, or 2014-15 school years.

**Appendix B:
Schools’
Background
Information**

Table 1 shows the background information for all public schools in Florida and for IXL schools. A total of 55 and 168 schools were identified as IXL schools for IXL ELA and IXL Math, respectively. The average 2013 percentage of points earned and 2015 FSA percent passing indicate that IXL schools performed better than the state average.

Table 1. Background information for state and IXL schools

	State	IXL Schools IXL ELA	IXL Schools IXL Math
# of schools	4,293	55	168
Average 2013 percentage of points earned	62.83	66.45	64.45
2015 FSA ELA percent passing	55%	64%	-
2015 FSA Math percent passing	54%	-	61%
% of English language learners	9%	5%	8%
% of schools in cities	39%	21%	18%
% of schools in suburbs	40%	49%	58%
% of schools in towns	9%	8%	8%
% of schools in rural areas	12%	23%	16%
% of charter schools	14%	11%	20%

**Appendix C:
Analytical
Methods**

A linear regression model was used to calculate the IXL effect (i.e. the performance difference between IXL schools and non-IXL schools), after adjusting for schools’ prior academic performance (i.e., 2013 percentage of points earned), school size (i.e., the number of enrolled students), percentage of English language learners, school type (i.e., charter school or traditional public school), and school location (i.e., city, suburb, town, or rural). To assist in the interpretation of IXL effect, we reported statistical significance, effect size, and percentile gain. Statistical significance, also referred to as *p*-value, is the probability that the IXL effect is zero. A small *p*-value (e.g., less than 0.05) indicates strong evidence that the IXL effect is not zero. Effect size is the mean difference in standard deviation units and is known as Hedges’ *g*. In this study, effect size is computed using adjusted mean and unadjusted standard deviations. Percentile gain is the expected change in percentile rank for an average non-IXL school if the school had used IXL. It is calculated based on the effect size. More details about these analytical methods can be found in What Works Clearinghouse (2014).

We used another linear regression model to estimate the strength of association between IXL usage and school performance. This regression model was very similar to the one described above, but with the inclusion of the IXL usage (i.e., the averaged number of skills a student mastered within a school year) in the model and exclusion of non-IXL schools in the sample.

We also calculated the Chi-square statistic and odds ratio to examine the relationship between IXL usage and school grades change from 2013 to 2015. A significant Chi-square value (p -value < 0.05) indicates IXL schools were more likely to increase or maintain their school grades than non-IXL schools from 2013 to 2015. The corresponding odds ratio quantifies how much more likely IXL schools increased or maintained their school grades than non-IXL schools.

Appendix D:
Data Tables

Table 2. The Efficacy of IXL ELA and Math

Values	ELA	Math	
		1-year	2-year
# of IXL Schools	55	97	71
# of Non-IXL Schools	2,517	2,745	
IXL Effect	2.75*	2.49*	6.30***
Effect Size	0.17	0.12	0.38
Percentile Gain	6.64%	4.76%	14.66%
Adjusted Average 2015 FSA Percent Passing for IXL schools	55.45%	57.41%	61.21%
Adjusted Average 2015 FSA Percent Passing for Non-IXL schools	52.70%	54.92%	

Note: *: significant at .05 level. **: significant at .01 level. ***: significant at 0.001 level.

Table 3. The Efficacy of Using One IXL Subject or Two IXL Subjects

Values	1 IXL Subject (ELA or Math)	2 IXL Subjects (ELA and Math)
# of IXL Schools	157	32
# of Non-IXL Schools	2,828	
IXL Effect	1.93**	3.72*
Effect Size	0.09	0.25
Percentile Gain	3.72%	9.73%
Adjusted Average 2015 Percentage of Points Earned for IXL schools	58.11	59.89
Adjusted Average 2015 Percentage of Points Earned for Non-IXL schools	56.17	

Note: *: significant at .05 level. **: significant at .01 level. ***: significant at 0.001 level.

Table 4. Number of Schools with School Grades in A, B & C, and D & F Categories

Schools	Year	A		B & C		D& F		Total	
		N	%	N	%	N	%	N	%
IXL Schools (1 subject)	2013	68	44%	67	44%	19	12%	154	100%
	2015	84	55%	50	32%	20	13%	154	100%
IXL Schools (2 subjects)	2013	14	44%	17	53%	1	3%	32	100%
	2015	17	53%	15	47%	0	0%	32	100%
Non-IXL Schools	2013	900	32%	1,484	53%	422	15%	2,806	100%
	2015	995	35%	1,354	48%	457	16%	2,806	100%

Table 5. Schools with “Improved or Maintained” and “Declined” School Grades

Schools	# (%) of Schools That Improved or Maintained	# (%) of Schools That Declined	Chi-square	Odds Ratio
IXL Schools (1 subject)	130 (84%)	24 (16%)	4.93*	1.65
Non-IXL Schools	2,152 (77%)	654 (23%)		
IXL Schools (2 subjects)	30 (94%)	2 (6%)	5.18*	4.56
Non-IXL Schools	2,152 (77%)	654 (23%)		

Note: *: significant at .05 level.