

Research Brief: Study Island in Reading, Pennsylvania

ESSA Level of Research: Moderate Evidence (Quasi-Experimental)

Student scores and performance-level classifications (PLCs) on state tests are an important part of school accountability under federal and state government. When schools invest in programs like Edmentum's Study Island, they want to know that the programs work. In this study, we examine how using Study Island affects students' performance on a state test.

Key Term

Performance-Level Classification (PLC): Each student's test score is assigned a category that reflects the student's proficiency in the subject. Pennsylvania's state test classifies students as Below Basic, Basic, Proficient, or Advanced.

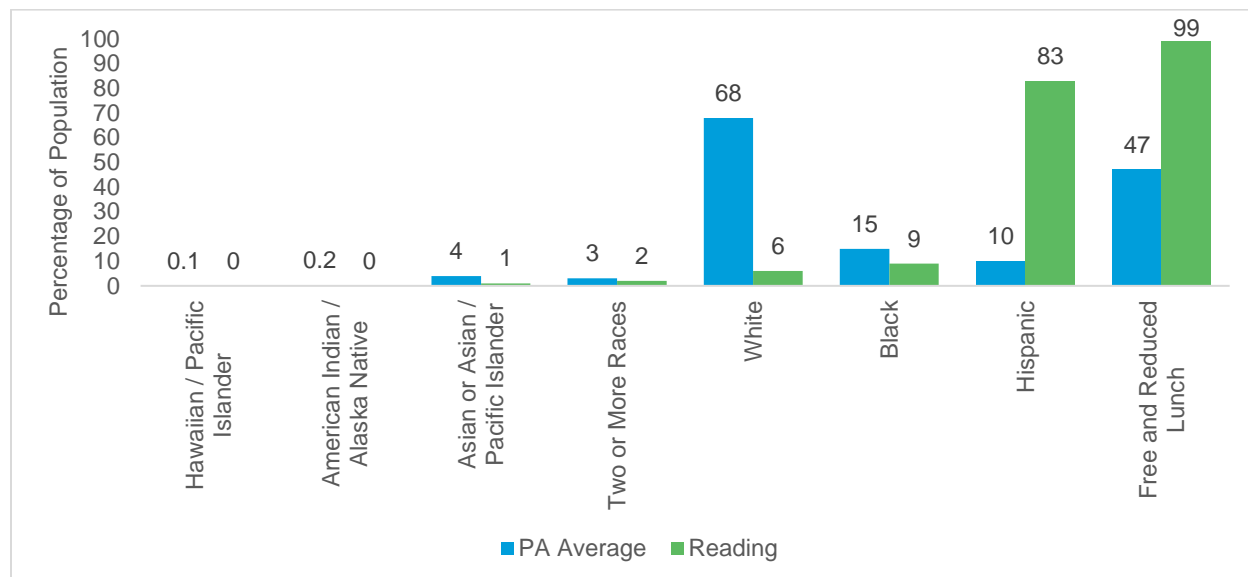
Key Findings

- Students in 5th grade who used Study Island earned statistically significantly higher state test scores in English language arts (ELA) than students who didn't use Study Island. These students used Study Island for an average of 23 minutes per week, for nine weeks.
- Students in 5th, 6th, and 7th grades who used Study Island earned statistically significantly higher state test scores in math and were more likely to achieve a higher PLC. These students used Study Island for an average of at least 24 minutes a week (in 5th and 7th grades), for at least six weeks (in 7th grade).
- For grades 4 through 7, in both ELA and math, there is a strong, statistically significant relationship between students' scores on Study Island Benchmarks and their later scores on the state test.

Background

Edmentum partnered with Reading School District (RSD) in Reading, Pennsylvania, for this Study Island research study. RSD is a large urban school district in southeastern Pennsylvania. Figure 1 compares Reading's student population to the Pennsylvania state averages.

Figure 1. RSD Student Demographics Compared to Pennsylvania Averages



Source of Data: National Center for Education Statistics Common Core of Data

RSD administers the Pennsylvania System of School Assessment (PSSA) every year to students in grades 3–8 for ELA and math, as well as grades 4 and 8 for science. The district uses Study Island to practice math and ELA skills and Study Island Benchmarks to measure students’ readiness for the PSSA.

Research Questions

We approached this study with the following research questions:

1. How did RSD students use Study Island during the 2016–2017 school year?
2. Were there significant differences in the PSSA state test scores between students who used Study Island and those who did not—and between students who used Study Island more and those who used it less?
3. Was there a significant relationship between PSSA performance-level classification and use of Study Island practice?
4. How did RSD students use and perform on Study Island Benchmarks during the 2016–2017 school year?
5. Was there a significant relationship between student scores on Study Island Benchmarks and their scores on summative, end-of-year PSSA state tests? If so, does the significant relationship between scores remain after accounting for a student’s previous PSSA performance?

Data

We examined student-level data from 17 RSD schools: 13 elementary schools and four middle schools. All these schools were Study Island partners during the 2016–2017 academic year. The district provided student-level demographic information and PSSA data from the previous two years’ testing periods (spring 2016 and spring 2017). These data were matched to Edmentum’s internal Study Island data using student IDs.

Key Term

Student-Level Data: Scores and usage information from individual students.

Edmentum’s focus on student-level data sets our research studies apart from other studies that often rely on data at the school or district level. This more granular level of data helps us follow research best practices by seeing how Study Island affects individual students.

Results

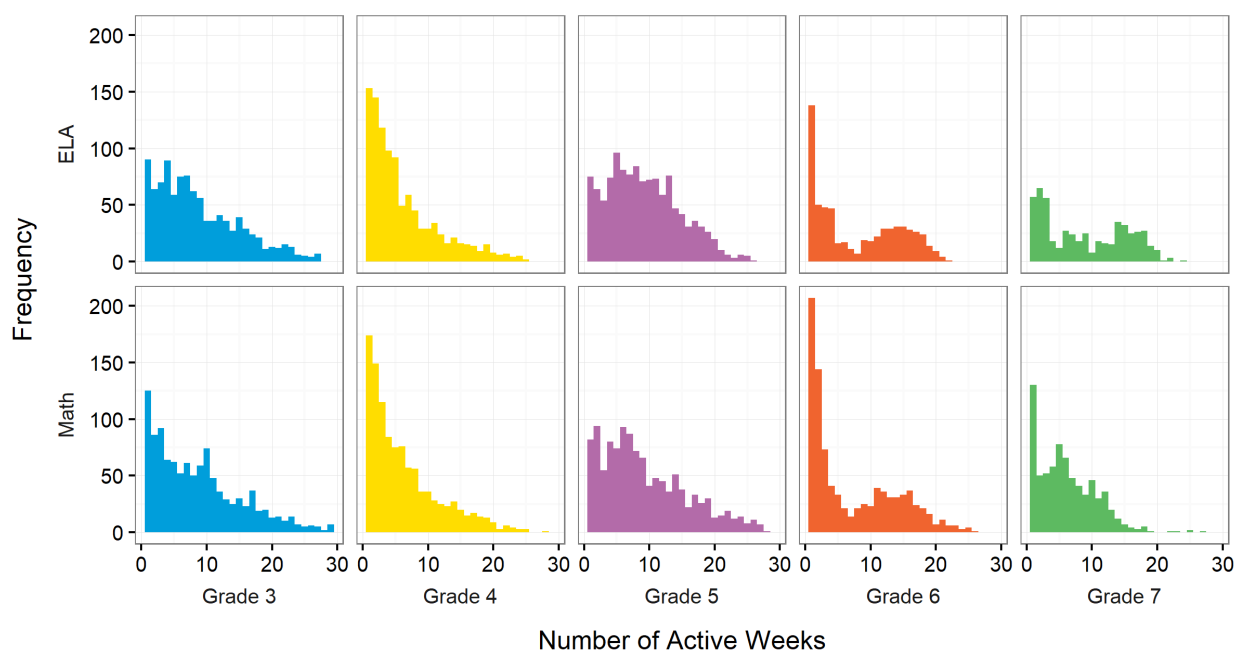
Question 1: Use of Study Island

In general, usage across the district is strong. About 75% of students in 3rd–7th grade are using Study Island in at least one subject. Fifth-grade math students spent the most time overall answering practice questions. Across the school year, they averaged about four hours and 366 questions per student. Third-grade math and ELA and fifth-grade ELA also showed patterns of relatively consistent use. Figure 2 shows the distribution of active weeks by subject and grade.

Key Term

Active Week: A week when a student answered at least one practice question in Study Island.

Figure 2: Distribution of Active Weeks by Subject and Grade



Question 2: Relationship Between Study Island and the PSSA

Users vs. Non-Users

For this study, we needed to make sure that any differences we saw between Study Island users and non-users was due to students’ use of Study Island, not to natural differences in their ability. To analyze ELA and math results, we used a statistical technique called *propensity score matching* (PSM) to compare students’ 2016 and 2017 PSSA scores. We performed PSM if we had both 2016 and 2017 scores for a group of students, allowing us to compare students of the same ability in 4th–7th grades. (Third-graders didn’t have 2016 scores to use.)

Key Terms

User: A student who answered at least one practice question in Study Island.

Non-User: A student who did not answer any Study Island practice questions.

Figure 3 shows the relationship between use of Study Island and ELA PSSA scores. Here, we see higher average scores for Study Island users than for non-users with a similar ability level. **Study Island users in 5th grade earned significantly higher scores on the ELA PSSA than students of a similar ability who did not use Study Island.** These students used Study Island for an average of 23 minutes per week for nine weeks.

Figure 3: Average Scores on the ELA PSSA for Study Island Users Compared to Non-Users. (The baseline of 600 shown here is the lowest possible score on the ELA PSSA.)

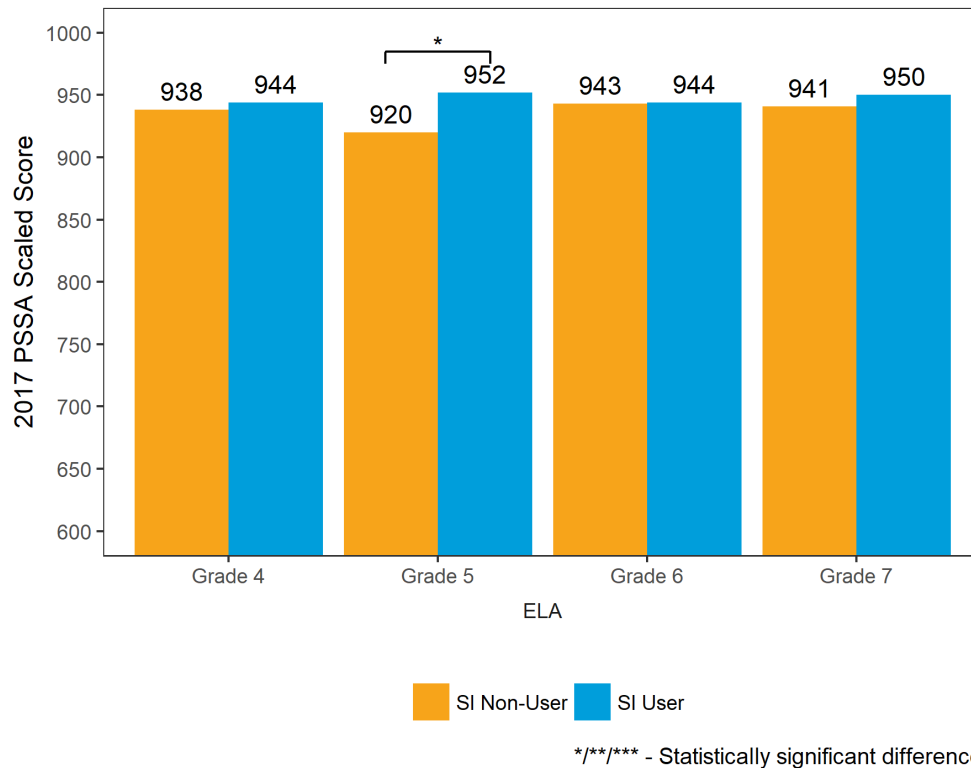
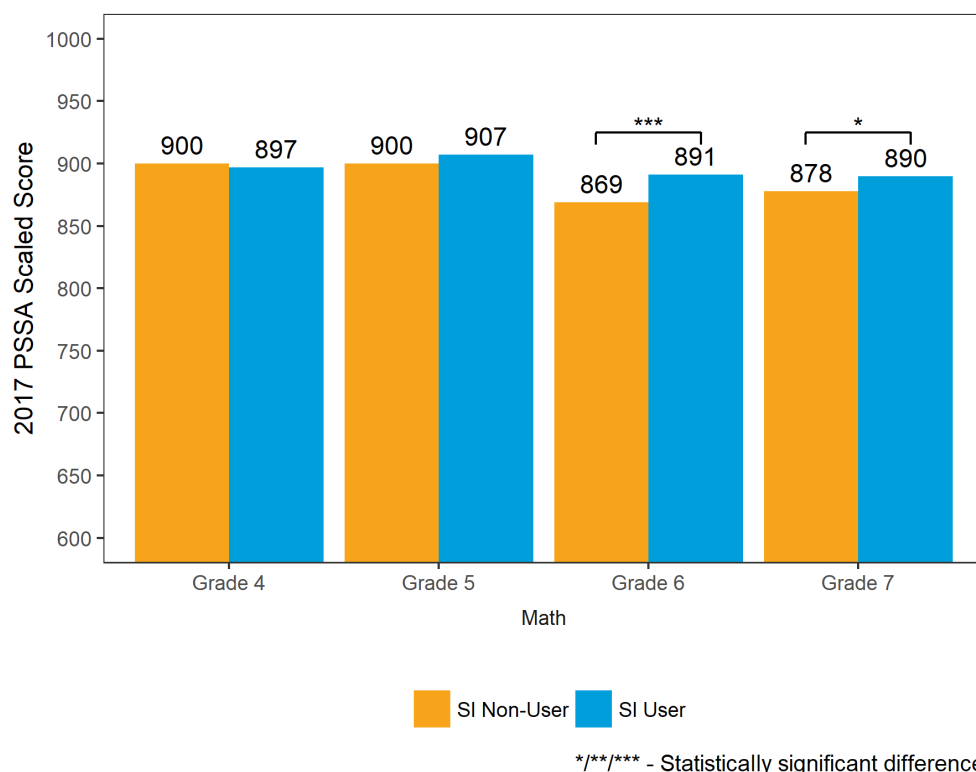


Figure 4 shows the results for math. Students who use Study Island have generally higher scale scores on the math PSSA than students of a similar ability who don't use Study Island. Fourth grade is the exception, with Study Island users earning a slightly lower average score than non-users. **Study Island users in 6th and 7th grade earned significantly higher scores on the math PSSA than students of a similar ability who did not use Study Island.** Sixth-graders used Study Island for an average of 28 minutes per week for seven weeks; seventh-graders used Study Island for an average of 24 minutes per week for six weeks.

Figure 4: Average Scores on the Math PSSA for Study Island Users Compared to Non-Users. (The baseline of 600 shown here is the lowest possible score on the math PSSA.)



High Usage vs. Low Usage

Because so many students in RSD use Study Island, we did not have many non-users to match with PSM. Therefore, we decided to look at use of Study Island in terms of high use versus low use. We classified students as high users, low users, or in between and excluded the “in between” students from this analysis.

The cutoff for being in the high-user group varied for each grade and subject. Table 1 shows these cutoffs.

Table 1. Minimum Use to Qualify for the High-Use Group

Subject	Grade	Number of Active Weeks	Total Time in Minutes
ELA	4	8	135
	5	12	284
	6	14	231
	7	14	245
Math	4	8	141
	5	12	283
	6	12	237
	7	8	190

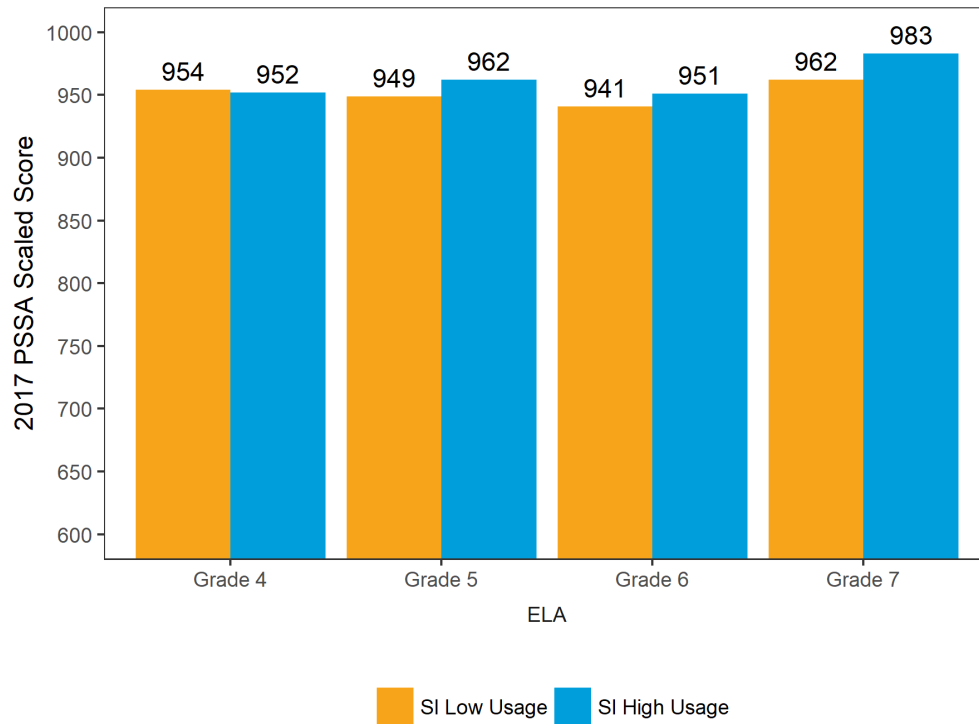
Key Terms

High User: A student who is in the 70th percentile or above for both total time *and* active weeks in Study Island.

Low User: A student who is below the 70th percentile for both total time *and* active weeks in Study Island.

After sorting students into these groups, we used PSM to compare their PSSA results. Figure 5 shows the results for ELA. While high users generally earned higher scores than low users (except for 4th grade), these differences are not statistically significant.

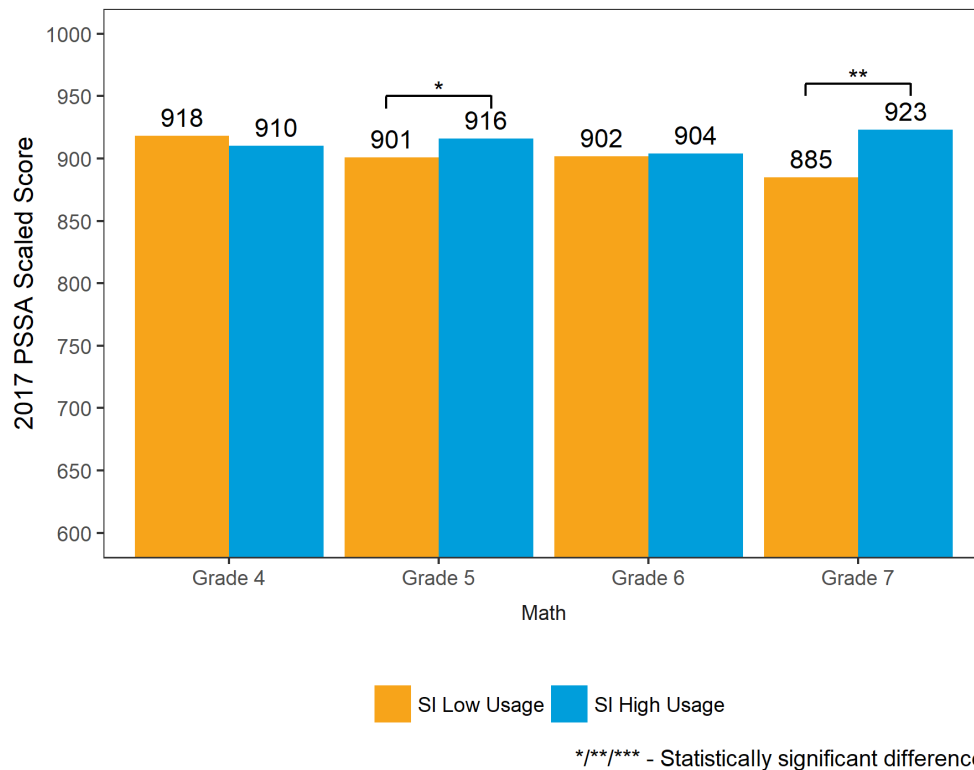
Figure 5. Average Scores on the ELA PSSA for Study Island High Users Compared to Low Users



*/**/*** - Statistically significant difference

Figure 6 shows the results for math. **Fifth-grade and seventh-grade high users earned significantly higher scores on the math PSSA than students of a similar ability who used Study Island less.**

Figure 6. Average Scores on the Math PSSA for Study Island High Users Compared to Low Users



Question 3: Relationship Between Study Island and PSSA Performance Level

Students' PLCs are arguably more important than exact scores. Schools want to see students achieving at the Proficient and Advanced levels. Because PLCs form such an important part of school accountability, we used PSM to analyze how using Study Island impacts students' PLC.

Users vs. Non-Users

Figure 7 compares PLCs in ELA for users and non-users. In 5th and 7th grades, Study Island users are more often working at the Proficient or Advanced level. However, these differences are not statistically significant.

Figure 7. Performance-Level Classification, Users vs. Non-Users, ELA

Blue = User Orange = Non-User Number inside circle = percent of students within group

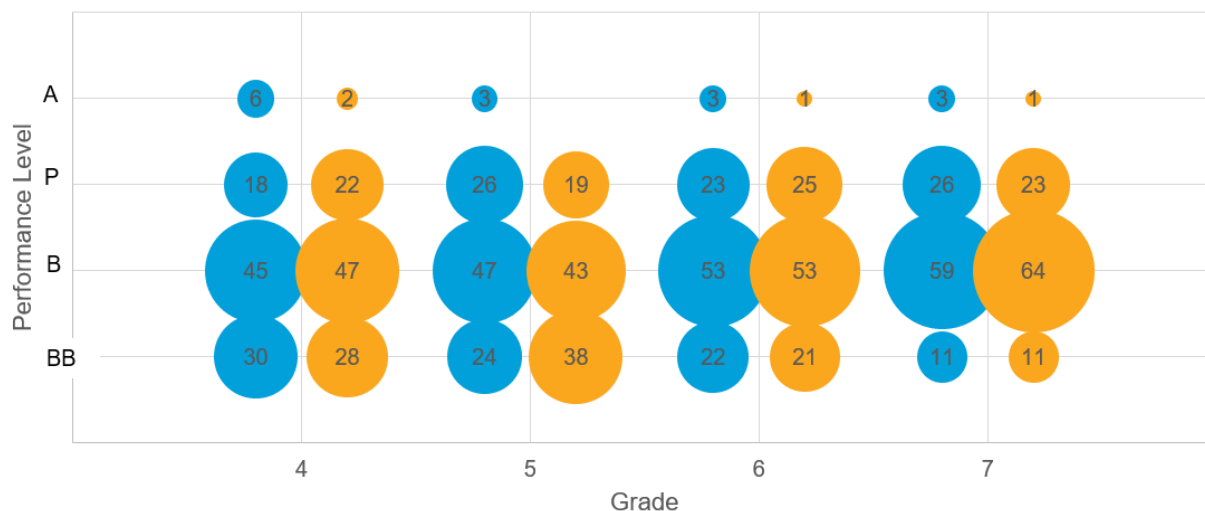
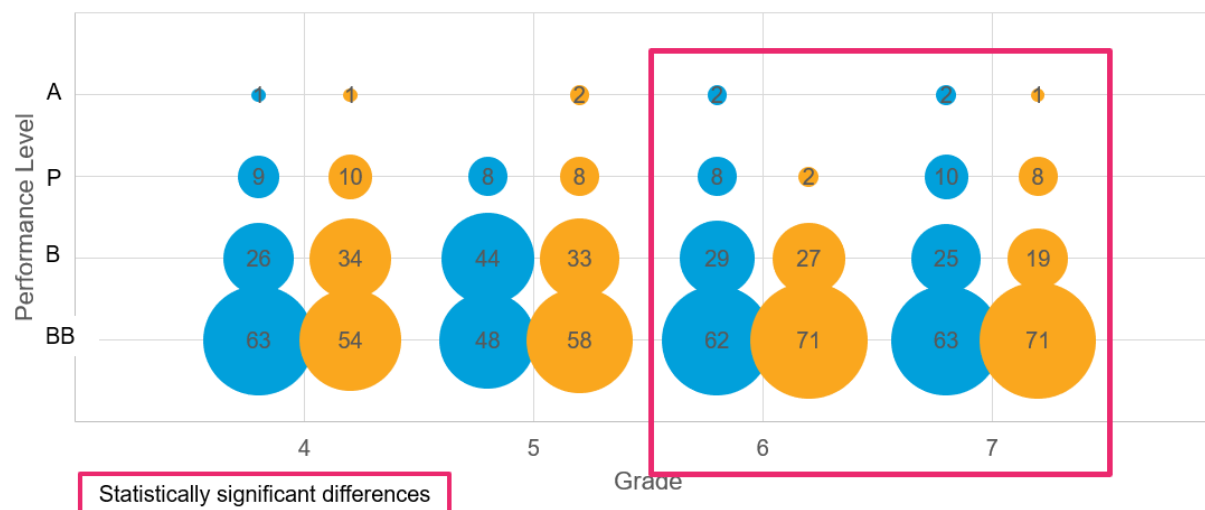


Figure 8 shows the results for math. **Sixth- and seventh-grade students who use Study Island are significantly more likely to achieve a higher PLC on the math PSSA than students of a similar ability who don't use Study Island.**

Figure 8. Performance-Level Classification, Users vs. Non-Users, Math

Blue = User Orange = Non-User Number inside circle = percent of students within group



High Usage vs. Low Usage

Figure 9 compares PLCs in ELA for high users and low users. The differences shown here are not statistically significant.

Figure 9. Performance-Level Classification, High Users vs. Low Users, ELA

Blue = High Users Orange = Low Users Number inside circle = percent of students within group

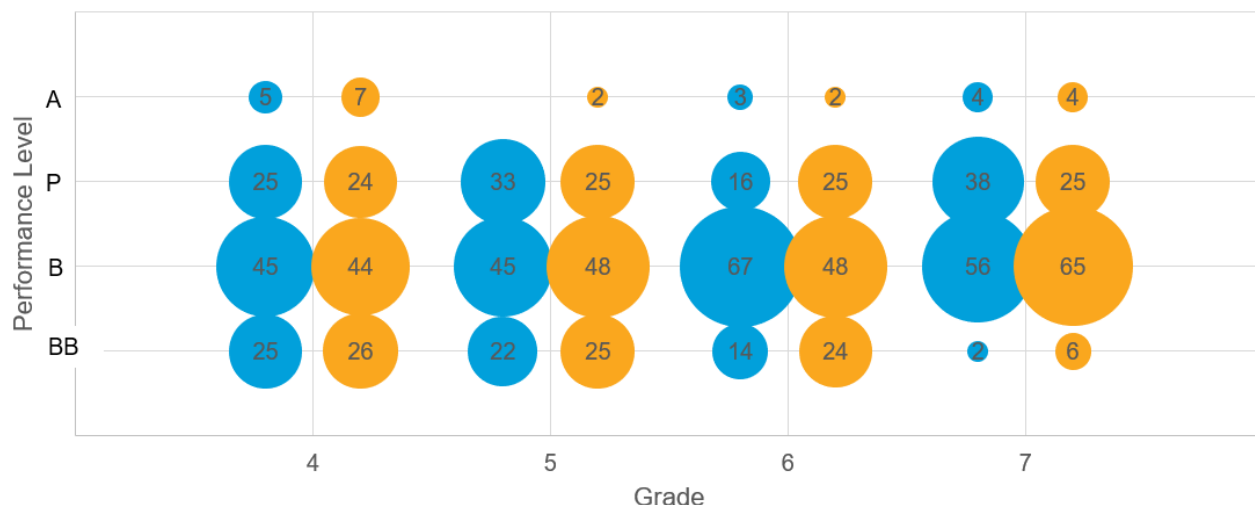
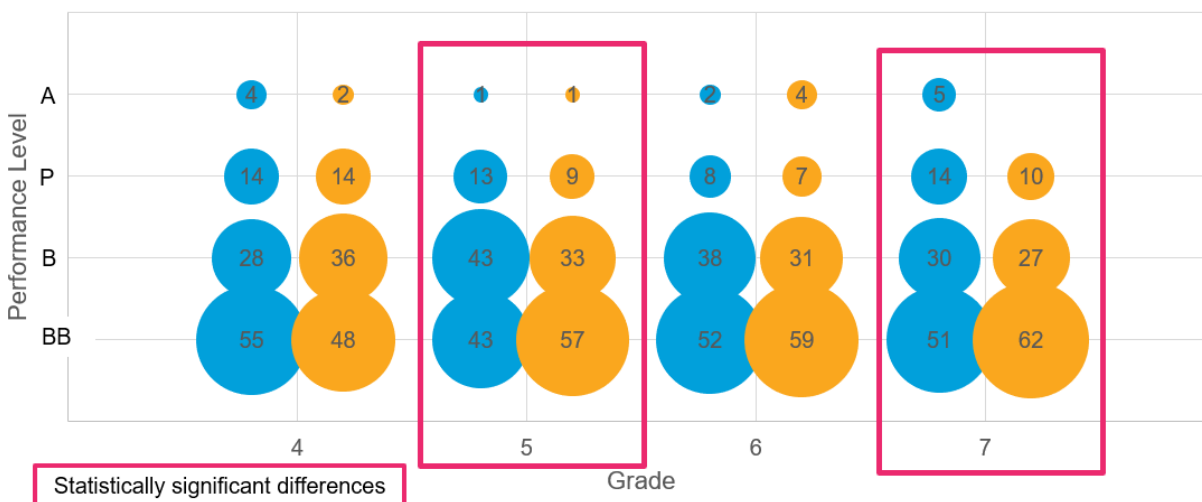


Figure 10 shows the results for math. **Fifth-grade and seventh-grade high users are significantly more likely to achieve a higher PLC on the math PSSA than students of a similar ability who use Study Island less.**

Figure 10. Performance-Level Classification, High Users vs. Low Users, Math

Blue = High Users Orange = Low Users Number inside circle = percent of students within group



Question 4: Use of Study Island Benchmarks

Across all subjects and grades, 94% of students use Study Island Benchmarks and answer 43% of questions correctly. The strongest use is in fifth-grade ELA and third-grade math, which both have 95% of students taking the Benchmarks.

Question 5: Relationship Between Study Island Benchmarks and the PSSA

For all subjects and grades, we found statistically significant correlations between students' performance on Study Island Benchmarks and performance on the PSSA.

Students' scores on Study Island Benchmarks reliably predict their later scores on the PSSA.

When looking at students' test scores, the strongest predictor of how students will perform this year is how they performed last year. To further investigate the relationship between Study Island Benchmark scores and PSSA scores, we removed students' 2016 PSSA scores from our analysis. When we did this, we still found small and medium-sized correlations between students' performance on Study Island Benchmarks and the 2017 PSSA.

Conclusions

Using Study Island and Study Island Benchmarks helps RSD students prepare for the PSSA. When students use Study Island more, answer more questions, and spread their time across more active weeks, we often see positive differences in students' scores and PLCs. In this study, Study Island made statistically significant positive impacts in 5th grade ELA and in 5th, 6th, and 7th grade math.