



Advancing achievement and equity:

Growing evidence from the Fresno Unified
School District Personalized Learning Initiative

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Introduction & purpose

Fresno Unified School District's Personalized Learning Initiative (PLI) aims to enable district teachers to support all their students in developing the attributes needed for success in a world that is rapidly changing, highly interconnected, and immersed in technology.

As described in the Year 1 PLI report, *Fresno Unified, the Futures Challenge and 21C Learning Design*, the attributes Fresno seeks for its graduates encompass:

- Academic mastery
- Adaptable problem solver
- Creative and adaptive learner
- Responsible and ethical decision maker
- Skilled communicator and collaborator
- Digitally literate citizen

PLI provides expanded access to devices and digital learning tools but is much broader than access to technology. To make sure every student experiences the kinds of learning opportunities that support development of the attributes needed for success, Fresno developed a pedagogical model designed to foster a culture where students collaborate and take ownership over their own learning, and there is a high expectation that all students can succeed. The PLI also includes supports for teachers working to implement that pedagogical model in the form of extensive professional learning opportunities.

Fresno Unified School District realized that implementing the kind of transformative educational change it envisioned is challenging and better conceptualized as a journey of continuous improvement rather than a one-time change. The district structured PLI as a series of learning cycles moving toward its aim, with continuous measurement of both practices and outcomes to enable the kinds of analysis and reflection needed to inform collective progress. The district entered into a partnership with Microsoft Education and California State University, Fresno, to support this work.

PLI began in the 2016–17 school year. The district’s chief academic officer asked all schools to provide at least two teacher volunteers for the first year of the initiative. The first cohort of 220 PLI teachers were chosen by lottery from among the 440 teachers who volunteered to be in the vanguard of PLI participants. A minimum of two teachers per school were accepted into the program and began experiencing the following PLI supports:

- Up to 20 hours of formal professional learning
- Informal professional learning through membership in online and site-based PLI learning communities
- Devices and digital tools for every student in their classroom
- Additional technology training and tech support from the district

Year 1 implementation and lessons learned

The Year 1 PLI report, *Fresno Unified, the Futures Challenge and 21C Learning Design*, was released in June of 2017 so that its findings would be available as the district and its schools were planning for the 2017–18 school year. Changes in their practice reported by Year 1 PLI teachers included:

- more use of collaborative learning in their classrooms;
- more intentional use of technology, especially for giving students rapid feedback;
- greater use of technology-enabled formative assessments; and
- use of digital tools to design learning activities.

For students in the classrooms of PLI teachers, the report’s findings included:

- more frequent use of technology in the classroom;
- more collaboration with other students around digital products such as documents, spreadsheets and presentations; and
- higher English language arts (ELA) scores on the district’s spring interim assessment.

Since that time, results on the California end-of-year state assessment, the Smarter Balanced Assessment Consortium (SBAC) tests, have become available, and a more sophisticated analytic model for examining achievement outcomes has been developed. This companion to the Year 1 report describes early findings with respect to SBAC scores and some exploratory analyses of mathematics learning software from Houghton Mifflin Harcourt (HMH) that has been adopted districtwide in some grades.

Early indicators of possible impacts on achievement

The design of PLI reflects an understanding that teachers and schools need time to learn new practices and that these practices must be put in place effectively before they can have the desired impacts on student achievement. For this reason, it would be unrealistic to expect large impacts on student achievement during the initiative’s first year. The analysis in this report does suggest that the PLI is having a significant impact on enhancing student outcomes at some grade levels, but it is too early to know if this impact will be sustained as the program expands. While withholding final judgment, it is important to get a sense as early as possible of whether PLI appears to be on the right track in terms of enhancing student achievement outcomes and closing gaps among different ethnic groups. At a minimum, we want to be confident that the initiative is not undermining student achievement or widening gaps between different student subgroups as it attempts to support other important outcomes

such as collaboration and creative thinking. The June 2017 Year 1 report presented reassuring data from the district’s spring interim assessments, but educators and the public are generally more concerned with student performance on mandated state achievement tests, the focus of this report.

In fall 2017 the California Department of Education provided Fresno Unified School District with its students’ spring 2017 scores on the Smarter Balanced Assessment Consortium tests. These data included scores for English language arts and for mathematics for grades 3 through 8 and for grade 11. We then began exploring this data to look for evidence with respect to the question of whether the combination of professional learning opportunities based on a pedagogical model and the provision of technology supports—the hallmarks of PLI—had any near-term impacts on student academic achievement in the initiative’s first year.

Student comparability

A simple comparison of spring 2017 scores for PLI and non-PLI students would be insufficient to make the case that any differences should be attributed to the PLI. For example, even before PLI began, it could be the case that students who had a PLI teacher in 2016–17 and those who did not differed in ways related to their achievement test scores. The Year 1 report compared interim assessment results for PLI and non-PLI students after adjusting for student attendance, ethnicity, gender, grade, homelessness, special education status, and low-income status. But even though the two groups of students were similar in terms of these background characteristics, they may have differed with respect to their prior achievement. By examining SBAC scores from the previous year (2015–16) for students with and without a PLI teacher in 2016–17, we were able to see whether students who did not have a PLI teacher in 2016–17 and those who did were equivalent in terms of prior achievement, which is the strongest single predictor of the next year’s achievement test score.

Relationship between having a PLI teacher and achievement

Using the 2016 SBAC scores as well as student background variables (gender, ethnicity, English learner status, participation in special education, and eligibility for free or reduced-price lunch), we built a model testing whether having a PLI teacher was associated with higher scores on the spring 2017 SBAC for each grade and subject area. The model also accounted for the fact that students were clustered within schools. Figures 1 and 2 show the PLI and non-PLI students’ 2017 Math and English Language Arts SBAC scores after adjusting for differences in prior achievement.¹

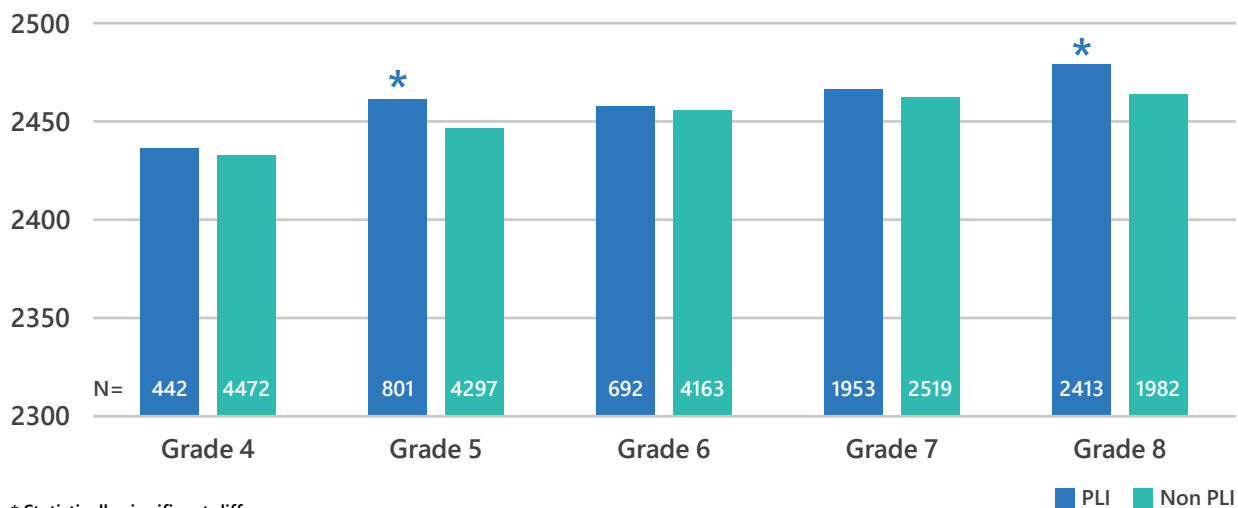
After adjusting for prior achievement and a large number of student characteristics, the Math SBAC scores in grades 5 and 8 were higher for students with PLI teachers than for those without PLI teachers. In other elementary grades, the Math SBAC scores were equivalent

¹ Because there is no SBAC testing in grade 2 or grade 10, we were unable to test the equivalence of PLI and non-PLI 3rd graders or of PLI and non-PLI 11th graders. For this reason, these grades were not included in the SBAC achievement analyses.

for students of PLI and non-PLI teachers. For language arts, there was a positive PLI effect for grades 4, 5 and 8. A negative effect was found in grade 6 and no significant difference in grade 7.

Overall, these findings for the first year of a new initiative aimed at enhancing instruction are very encouraging. The difference between SBAC scores for PLI and non-PLI students was statistically significant in 6 of the 10 subject-area/grade-level combinations in the analysis. And in all but one of the significant differences, students with a PLI teacher performed better than those without one relative to their achievement level the prior year.

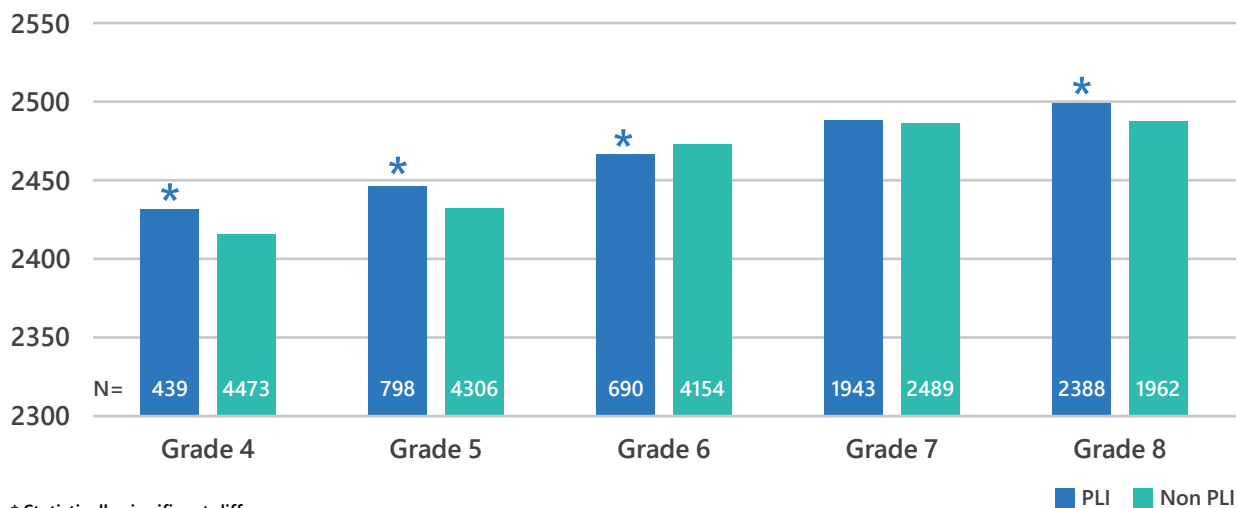
Figure 1: Math achievement of PLI and non-PLI students



* Statistically significant difference

Notes: 2017 SBAC Score, FUSD. Adjusted for 2016 SBAC score, ethnicity, gender, homelessness, ELL status, special education designation, attendance, school climate, parent education level, had an ELA PLI teacher, and accounting for school-level differences. No comparative data for grades 1, 2 and 9–12.

Figure 2: English language arts achievement of PLI and non-PLI students



* Statistically significant difference

Notes: 2017 SBAC Score, FUSD. Adjusted for 2016 SBAC score, ethnicity, gender, homelessness, ELL status, special education designation, attendance, school climate, parent education level, had an ELA PLI teacher, and accounting for school-level differences. No comparative data for grades 1, 2 and 9–12.

Because the statistical models controlled for prior achievement as well as other student characteristics known to predict achievement gains, we can be confident that the observed PLI advantages are not just a matter of having different kinds of students in the two groups. However, there may be other factors confounded with PLI participation. For example, it may be the case that more capable or more energetic teachers volunteered for PLI and that the students of these teachers would have shown better achievement gains even if their teachers did not participate in PLI. Future analyses will explore this possibility further to try to rule out teacher differences for any apparent PLI effects.

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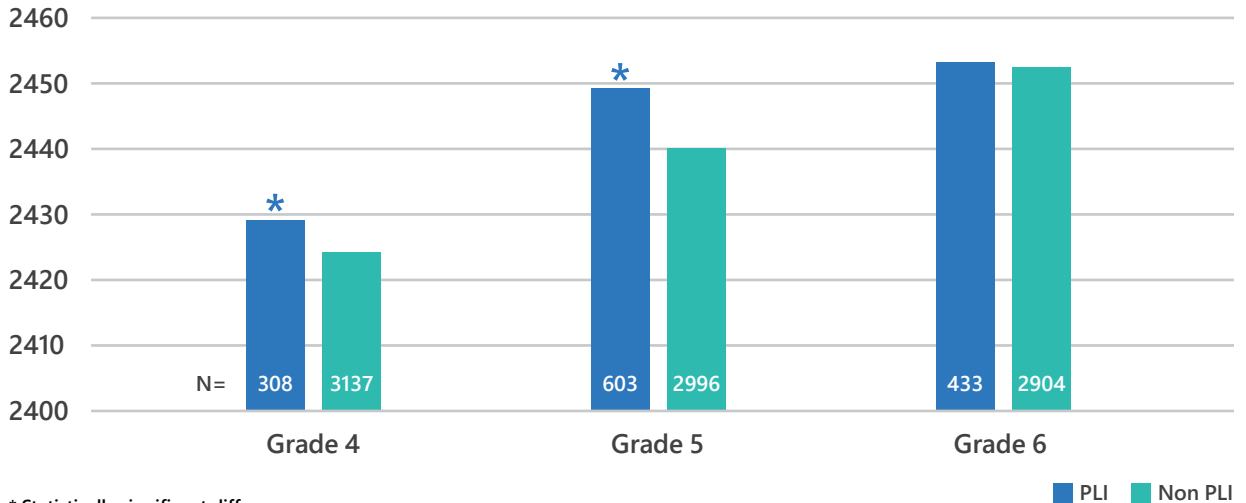
PLI and achievement gaps

Fresno's PLI aims to support all the district's students with the competencies needed to succeed in the 21st century, including proficiency in the math and language arts competencies that are the foundations for academic success. Although valuable, the contribution to higher average test scores shown above would be unsatisfying if students from subgroups that historically have had lower scores on achievement tests were not profiting from PLI. Our next set of analyses looked at SBAC scores for different ethnicities.

Because the number of PLI students of a given ethnicity varied markedly across grade (for example, there were 190 African American students with a PLI teacher who took the English Language Arts SBAC in grade 7 but just 43 in grade 6), a simple comparison of PLI and non-PLI students' scores averaged across grades would be misleading. We therefore looked at the SBAC score difference between PLI and non-PLI students within each grade and for those ethnic groups for which there were at least 100 students in each of the two groups being compared. This sample size criterion was met for Hispanic students in all five grades, for White students in three grades, for African American students in two grades, and for Asian students in two grades.

At the elementary school level, English Language Arts SBAC scores were significantly higher for PLI than for non-PLI Hispanic students in grades 4 and 5 but not in grade 6. In elementary mathematics, PLI Hispanic students had higher scores than non-PLI Hispanic students in grade 5 and scores for Hispanic students with PLI and non-PLI teachers were equivalent in grades 4 and 6. In no case did non-PLI Hispanic students score significantly higher than their PLI counterparts.

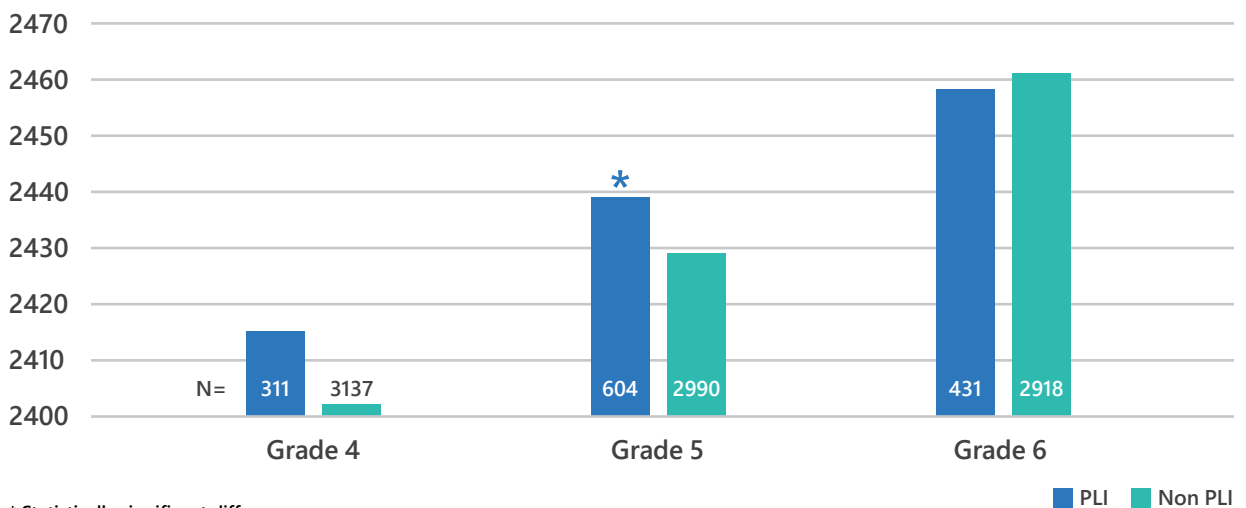
Figure 3: Elementary ELA achievement for Hispanic students with and without PLI teachers



* Statistically significant difference

Notes: 2017 SBAC Score, FUSD. SBAC scores adjusted for 2016 SBAC score, ethnicity, gender, homelessness, ELL status, special education designation, attendance, school climate, parent education level, had an ELA PLI teacher, and accounting for school-level differences.

Figure 4: Elementary math achievement for Hispanic students with and without PLI teachers

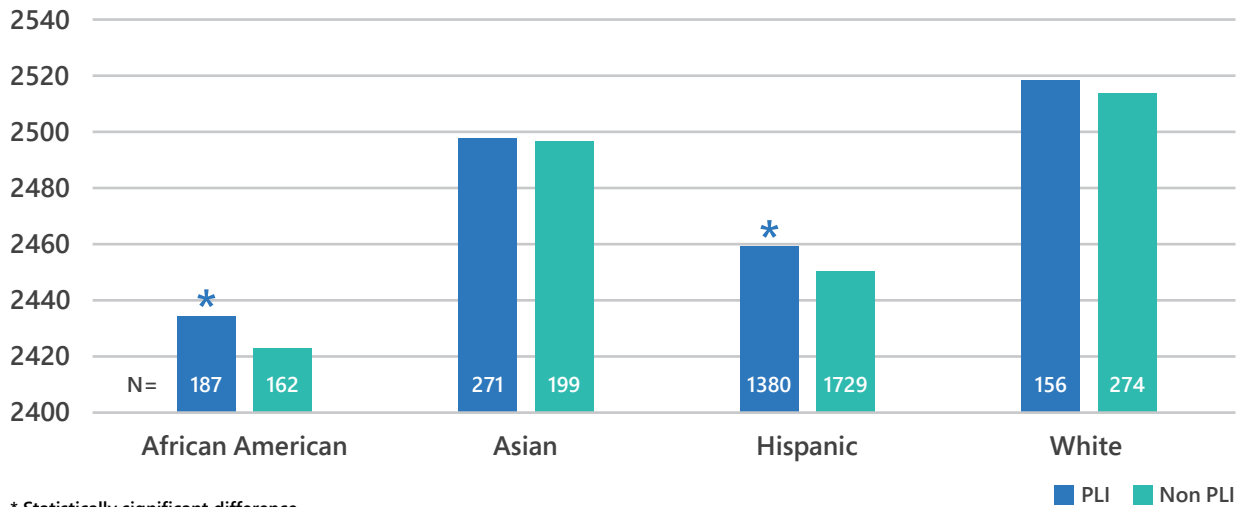


* Statistically significant difference

Notes: 2017 SBAC Score, FUSD. SBAC scores adjusted for 2016 SBAC score, ethnicity, gender, homelessness, ELL status, special education designation, attendance, school climate, parent education level, had an ELA PLI teacher, and accounting for school-level differences.

At the middle school level, there were enough students in each of the four main ethnic groups in both PLI and non-PLI classes to examine performance in both grades 7 and 8. Middle school average math SBAC scores by PLI status for each ethnic group (counting the two grades equally in the average) are shown for English language arts in Figure 5 and for mathematics in Figure 6.

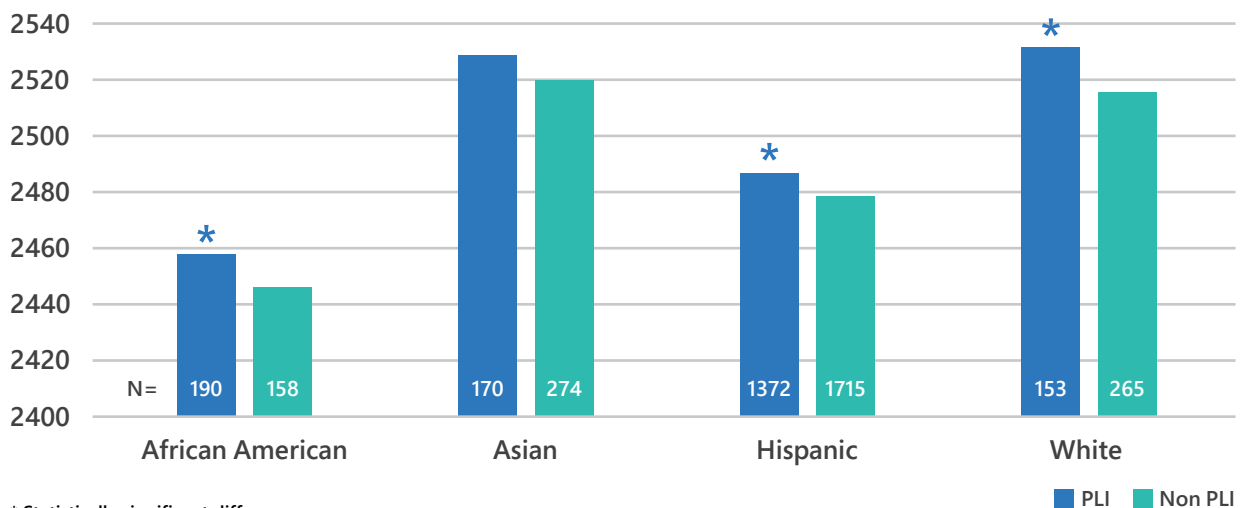
Figure 5: Middle school mathematics scores by ethnic group and PLI status



* Statistically significant difference

Notes: 2017 SBAC Score, FUSD. Average of grade 7 and grade 8 average scores adjusted for 2016 SBAC score, ethnicity, gender, homelessness, ELL, special education, attendance, school climate, parent education level, had a math PLI teacher, and accounting for school level differences.

Figure 6: Middle school English language arts scores by ethnic group and PLI status



* Statistically significant difference

Notes: 2017 SBAC Score, FUSD. Average of grade 7 and grade 8 average scores adjusted for 2016 SBAC score, ethnicity, gender, homelessness, ELL, special education, attendance, school climate, parent education level, had a math PLI teacher, and accounting for school level differences.

At the individual grade level, the effect of PLI was significantly positive for African American, Hispanic, and Asian students in grade 8 mathematics; in grade 7 PLI did not make a significant difference for any ethnic group's math achievement. In English language arts, the PLI effect was significantly positive for African American, Asian, Hispanic, and White students in grade 8. Again, PLI did not make a significant difference for any ethnic group in grade 7 English language arts achievement.

The data described above suggest that in those cases where there were adequate data to do a statistical analysis for a student ethnic group, PLI students had higher adjusted SBAC

scores than non-PLI students in about half of the grade level and subject combinations and equivalent scores in the others. Clearly, having a PLI teacher did not have an adverse impact for any ethnic group, and the findings for African American and Hispanic students suggest that the initiative holds promise for addressing the achievement gap for the district's under-represented minorities.

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How might PLI be influencing student achievement?

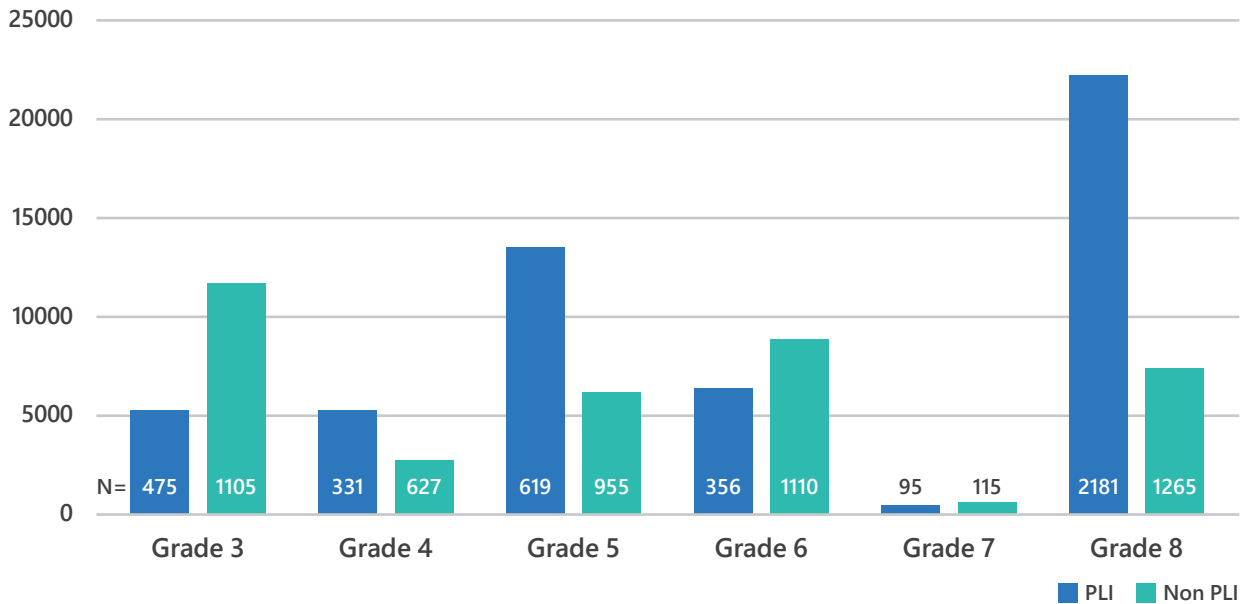
The SBAC results above are encouraging but at the same time lead to more questions. How do teacher and school involvement in PLI turn into improvements in student achievement? Are there ways the PLI program could be improved to further enhance student achievement and other desired outcomes?

Implicit in the PLI model are several assumptions about the mechanisms for improving student outcomes. One is that training teachers in instructional strategies that are student-centered and collaborative will result in more use of those practices, which will in turn engender higher levels of student academic engagement and interest that turn into greater achievement. A second is that by providing greater access to computing devices and technology supports for PLI classrooms, the initiative gives students greater access to effective learning activities. We turn now to a consideration of the second of these sets of hypothesized relationships.

During the 2016–17 school year, the Fresno Unified School District was rolling out Houghton Mifflin Harcourt (HMH) math software to grades 3–8. At the same time, every student in a PLI teacher's classroom received access to a personal computing device. In principle, the math software and PLI initiatives should have supported each other—that is, one would expect higher levels of HMH software use in the classes of PLI math teachers because of the improved technology access (directly) and potentially (indirectly) because of the teacher's increased interest in and confidence using technology.

Using system log data provided by HMH, we undertook an analysis to see if this was in fact the case. Over 6,000 Fresno students used the HMH math software. As shown in Figure 7, students in PLI classrooms completed more of the homework assignments within HMH software than did students in non-PLI classes, with the highest number of HMH assignments completed in grade 8.

Figure 7: Total number of math software assignments completed by PLI and non-PLI students

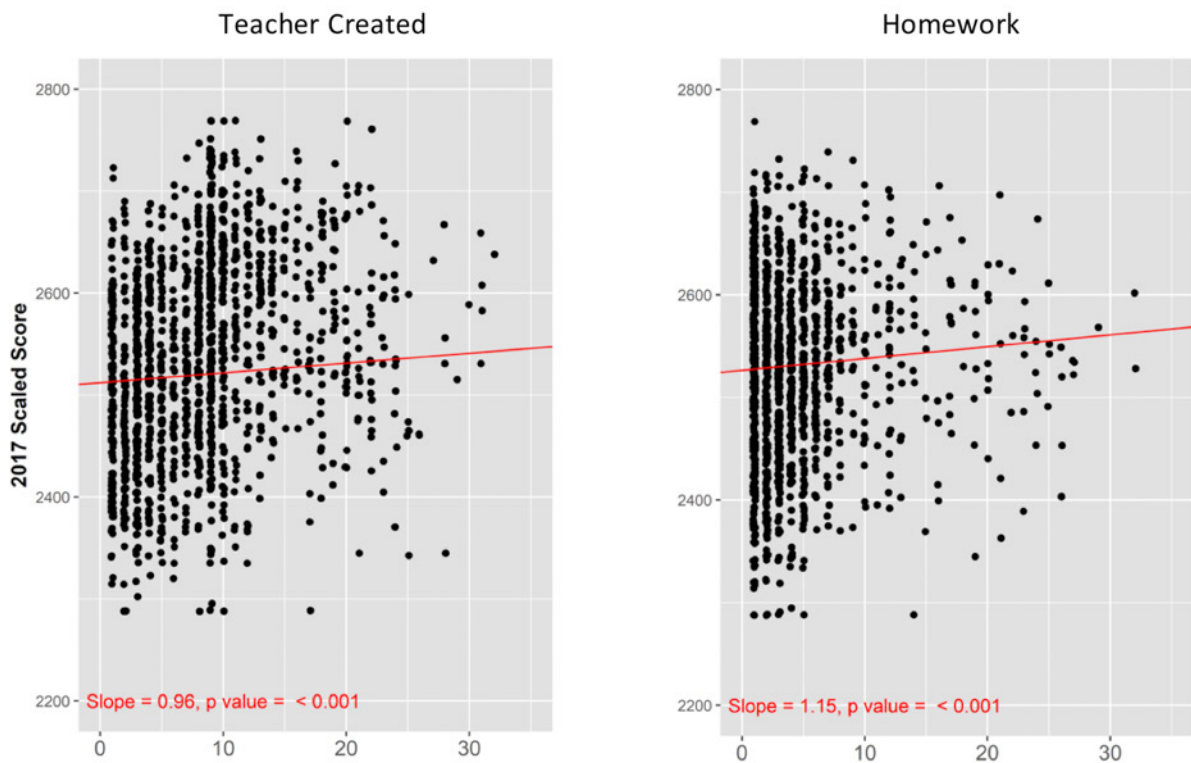


These data suggest that the enhanced technology access in PLI teachers' classrooms is being leveraged to support math learning. The next question, of course, is whether greater use of the HMH software is associated with higher achievement on the SBAC Math test. Another set of analyses looked at this question. Overall, a modest association between number of HMH assignments completed and math achievement was found, but the degree of association varied by grade, with the strongest positive relationship in grade 8 (where HMH software was used more extensively than in other grades).

Examination of the HMH data for different assignment types in relation to SBAC Math scores revealed that among the three commonly performed types of assignments completed by students (Homework, Tests & Quizzes, and Teacher-Created Assignments), the relationship with SBAC scores was strongest for Teacher-Created Assignments and Homework, as shown in Figure 8. PLI leaders promoted the use of Teacher-Created Assignments because it allows teachers to directly differentiate instruction for individual students.

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Figure 8: PLI students and HMH assignments (Grade 8): average improvement in score for each additional assignment completed



Source Explanation: Each point represents a student. Y axis is 2017 SBAC Math Scaled Scores, X axis is the total number of HMH assignments completed. The red line is the best fit line representing the association between the number of assignments completed and the SBAC scores. It was obtained from a linear regression model with the 2017 SBAC scores as the dependent variable and the total number of assignments completed as the independent variable, adjusted for 2016 SBAC Scaled Scores, ethnicity, gender, homelessness, ELL status, special education designation, whether the PLI teacher was a math teacher, attendance percent, and school climate.



Conclusions

We are encouraged by early indications that PLI can contribute to the growth of important competencies for all learners and may even support the narrowing of achievement gaps.

Building on findings from Year 1, Fresno's SBAC scores and HMH data provide further evidence of the success of the PLI pedagogical model as implemented in Year 1. In addition, the analyses comparing the PLI impacts for students of different ethnic backgrounds found no evidence of adverse effects. Fresno Unified's PLI continues to support teachers in implementing the PLI pedagogical model through provision of extensive professional learning opportunities.

Although encouraged by these successes, we acknowledge that there are several caveats to keep in mind when reflecting on the findings. One such caveat relates to the self-selection of teachers into the PLI group and any potential bias this may have introduced. As part of our research, we attempted to conduct a sub-analysis to determine whether the PLI teacher sample differed from Fresno teachers as a whole in terms of their ability to advance student growth in ELA and math as demonstrated by their students' achievement gains in prior years

of Smarter Balanced testing. However, we were unable to perform this analysis because of the small number of teachers in the PLI at any one grade level. As the PLI teacher sample grows, we will examine teacher equivalency in future iterations of the work.

Another potential caveat relates to the entanglement of multiple factors, such as other school and grade-level initiatives and practices with PLI. For example, it appears that PLI classrooms made more use of HMH software than non-PLI classrooms in some grades, especially grade 8, but not in others. It is hard to say to what extent the higher use of HMH in PLI classes should be attributed to PLI professional development and supports for technology access as opposed to other activities around math curriculum and instruction.

Moving forward, we will be able to aggregate data across multiple student cohorts to increase the robustness of our samples. We will also work to refine and expand our measures for evaluating PLI impact on student outcomes in all the student attributes the district seeks to develop. In addition, we will deepen our exploration of the experiences of students and teachers involved with PLI. There is still much to be learned about the competencies that students develop through personalized learning approaches. How and in what ways does the PLI help students develop a growth mindset, bring creativity and critical thinking to problem solving, and increase their sense of ownership over their own learning? For teachers, what elements of the professional learning opportunities are most important, and to what extent can they be effectively scaled through digital tools? Finally, we need to learn how we can reliably bring about positive change in Fresno schools with our improvement cycle approach—not only to build knowledge about the supports and conditions needed for schools that have yet to embark on PLI, but also to support more consistent PLI implementation at all grade levels and in all subject areas.