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T3 Teach Plus: Two-Year Changes in Early Literacy Performance

This report examines the literacy performance of K-3 students receiving the T3 Teach Plus intervention prior to implementation (2016-17) and two years after implementation (2018-19). We also compare performance of students in T3 schools to students in matched comparison schools. Key findings include:

- In 2018-19, the fall-to-spring change in the number of correct responses from K-3 students in T3 schools and comparison schools did not significantly differ.
- Students in T3 and comparison schools had a significantly greater change in National Percentile Rank (NPR) in 2018-19 than in 2016-17; however, students in comparison schools had a greater change in NPR than students in T3 schools.
- In 2016-17, the Rate of Improvement (ROI) of students in comparison schools was significantly higher than students in T3 schools. However, by 2018-19, the ROI of students in T3 and comparison schools did not significantly differ.
- Students in T3 and comparison schools had significantly higher average Student Growth Percentiles (SGP) from 2016-17 to 2018-19 for students in the *Average, Below Average,* and *Well Below Average* categories. However, students in comparison schools had higher overall SGPs than students in T3 schools.
- In 2016-17, a higher percentage of students in comparison schools made minimum growth than students in T3 schools, but in 2018-19, a significantly higher percentage of students in T3 schools made minimum growth compared to students in comparison schools.
- In 2018-19, a significantly higher percentage of students in grades 1-3 in comparison schools were reading on grade level compared to students in grades 1-3 in T3 schools.

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Introduction

Teacher coaching is one of the strategies that the School District of Philadelphia (SDP) has implemented to meet the goal that all students read on grade level by age eight. In 2016-17, five K8 schools partnered with Teach Plus¹ to implement the T3 Teach Plus initiative (T3): McClure, Taylor, Lowell, Cayuga, and Comegys. T3 is a teacher leadership program to train experienced teachers to become teacher leaders and support teams of peers to improve student academic outcomes. Each teacher leader manages a grade-level team to improve instructional practices and outcomes for all of their students. Teacher leader participants receive individualized coaching along with cohortbased and cross-school professional development to develop them as instructional leaders. Additionally, Teach Plus coaches principals and district leaders in developing culture, systems, and structures for shared leadership, with the goal of building the capacity to replicate and sustain teacher leaders at the five T3 schools as they work with their K-3 teacher teams to use literacy data to drive decision-making and instruction.

This report examines student early literacy performance before (2016-17) and after (2018-19) the T3 Teach Plus initiative was implemented. To better understand whether changes in student early literacy performance between 2016-17 and 2018-19 were due in part to the T3 initiative, rather than changes that would naturally occur without an initiative, SDP's Office of Research and Evaluation (ORE) identified schools with similar characteristics as the five T3 schools and used them as a comparison group (see Appendix A for comparison school details). The relationship between student early literacy performance in 2016-17 was examined for schools with the T3 program and comparison schools.

Research Questions

All of the analyses described in this report examine the change in early literacy performance between 2016-17 and 2018-19 at T3 schools and comparison schools.

Six research questions that are aligned to the six available measures of early literacy growth and achievement guided the analyses:

AimswebPlus Performance

1. What was the change in average of number correct responses on the aimswebPlus assessment between 2016-17 and 2018-19 at T3 schools and comparison schools? How did changes at T3 schools compare to changes at comparison schools?

¹ Teach Plus is an organization that implements programs across the country designed to move teachers into leadership roles within their schools and districts to drive student success. To read more about Teach Plus visit their website: <u>https://teachplus.org/</u>.

- 2. What was the change in average National Percentile Rank (NPR) on the aimswebPlus assessment between 2016-17 and 2018-19 at T3 schools and comparison schools? How did changes at T3 schools compare to changes at comparison schools?
- 3. What was the change in the Rate of Improvement (ROI) of students on the aimswebPlus assessment in 2016-17 and 2018-19? How did changes at T3 schools compare to changes at comparison schools?
- 4. What was the change in the Student Growth Percentile (SGP) for each baseline performance group (*Well Below Average, Below Average, Average*) of students on the aimswebPlus assessment in 2016-17 and 2018-19? How did changes at T3 schools compare to changes at comparison schools?

Independent Reading Level Performance

- 5. What was the change in the percentage of students who demonstrated one year of growth in reading between at T3 schools and comparison schools? How did changes at T3 schools compare to changes at comparison schools?
- 6. What was the change in the percentage of students who performed on grade level between 2016-17 and 2018-19 at T3 schools and comparison schools? How did changes at T3 schools compare to changes at comparison schools?

These primary questions are addressed in six sections that each focus on a particular data point. There are two different sets of data points: aimswebPlus measures and Independent Reading Level measures (see details in the Methods section). Four data points derive from the aimswebPlus assessment and two from Independent Reading Levels.

Methods

Measures

To examine the potential impact of the T3 initiative on student early literacy, we compared student literacy performance of K-3 students in T3 schools in spring of the 2016-17 school year (prior to T3 implementation) to the literacy performance of K-3 students in T3 schools in spring of the 2018-19 school year (at the end of the second year of T3 implementation). We also compared the literacy performance of K-3 students attending the comparison schools at the same time points to examine whether the changes in literacy performance at comparison schools. To conduct our analysis, we examined changes in student performance on six data points from the 1) aimswebPlus assessment and 2) independent reading levels. The measures and data points are detailed below.

AimswebPlus

SDP uses aimswebPlus, a universal early literacy screening, benchmarking, and progressmonitoring tool from Pearson, to assess literacy proficiency in SDP for all K-5 students. In grades K-3, teachers score students' performance on each aimswebPlus assessment according to the number of cues students correctly identify in a 60-second period. Each grade level is administered one core assessment (in addition to other standardized measures) each fall, winter, and spring.

Core Assessments

For the analyses, we looked at student growth on the following assessments:

- The Kindergarten Letter Naming Fluency (LNF) assessment, which measures letter identification
- The first-grade **Nonsense Word Fluency (NWF)** assessment, which measures phonemic awareness;
- The second- and third-grade **Oral Reading Fluency (ORF)** assessment, which measures oral reading fluency

Key Data Points

For each of these three assessments, we looked closely at four key data points related to performance on the assessments.

- 1. **Number Correct (NC):** The number of cues correctly identified during the timed test.
- 2. **National Percentile Rank (NPR)**: A norm-referenced measure that compares students' raw scores to a national sample of students.
- 3. **Rate of Improvement (ROI)**: The number of points a student or group of students increased per week between assessment periods [i.e., (fall correct-spring correct)/number of weeks].
- 4. **Student Growth Percentile (SGP)**: SGP describes a student's ROI compared to other students in that national sample with a similar baseline performance.

Independent Reading Level Performance

Independent reading levels indicate how well students are able to read without the help of an adult. Students are assigned DRA-informed independent reading levels every quarter over the course of the school year. Teachers are instructed to use DRA2 scores in combination with observations, writing analysis, and running records to determine students' independent reading level.

Key Data Points

- 1. Measuring Minimum Growth: Minimum growth is defined as about one school years' (7.5 months) worth of reading improvement based on independent reading levels. Students' quarter 1 (Q1) independent reading levels are compared to their quarter 4 (Q4), to assess if each student made minimum growth. Appendix B provides more information about minimum growth goals.
- 2. **Measuring Grade Level Reading:** Based on their independent reading levels, students are placed into three tiers. Tier 1 is "At Target," Tier 2 is "Strategic Intervention," and Tier 3 is "Intensive Intervention." Students who are At Target are considered reading on grade level. Students who have been identified as benefitting from Strategic Intervention are reading slightly below grade level and require some targeted supplemental intervention aimed at

improving specific areas of reading deficiencies. Students who are classified as Intensive Intervention are reading significantly below grade level and require a considerable level of multifaceted support aimed at addressing multiple areas of reading deficiencies.

Identifying Matching Comparison Schools

We identified a comparison group of schools for the T3 schools by identifying schools that served similar students as the T3 schools. For each of the five T3 schools, a comparison school (what we call a "matched pair") was selected based on the following variables: grades served, Learning Network, Federal Accountability Designation,² percentage of economically disadvantaged students, percentage of students with Individualized Education Plans (IEPs), percentage of English Learners (ELs), percentage of Black/African American, Hispanic/Latinx, Asian, and White students, the percentage of K-2 students reading on grade level according to the aimswebPlus assessment in 2016-17, and the percentage of third-grade students scoring proficient or advanced on the 2016-17 PSSA-ELA (See Appendix A, Table A1 for a summary of all of the variables that were used for matching).

Student Sample

In 2016-17, 1,854 K-3 students attended T3 schools (Table 1). In 2018-19, 1,695 K-3 students attended T3 schools (see Appendix A, Table A2 for school level tables). In 2016-17, 1,498 K-3 students attended a comparison school. In 2018-19, 1,263 K-3 students attended a comparison school (see Appendix A, Table A3 for school level tables).

Croup	School Voor	Grade						
Group	School real	K	1	2	3	Total K-3		
T3 Schools (n=5)	2016-17	444	457	435	518	1,854		
	2018-19	382	454	430	429	1,695		
	Total	826	911	865	947	3,549		
Comparison	2016-17	328	406	387	377	1,498		
Schools	2018-19	305	332	283	343	1,263		
(n=5)	Total	633	738	670	720	2,761		

Table 1. Number of students included in the analysis by grade level

Between 2016-17 and 2018-19, 87% of K-3 students in T3 schools and 89% of K-3 students in comparison schools were economically disadvantaged (Table 2). Less than a quarter (17%) of K-3 students in T3 schools and K-3 students in comparison schools were classified as English Learners, and close to half of all K-3 students in identified as Black/African American (46% in T3 schools and 42% in comparison schools) or Hispanic/Latinx (43% in T3 schools and 48% in comparison schools).

² The Federal Accountability Designation are the designations from 2017-18.

	K-3 students in T3	K-3 students in	
Student Characteristic	Schools	Comparison Schools	
Student characteristic			
	(n = 3,549)	(n = 2,761)	
Gender			
Female	48%	49%	
Male	52%	51%	
Race/Ethnicity			
Asian	4%	2%	
Black/African American	46%	42%	
Hispanic/Latinx	43%	48%	
Multi-racial/Other	6%	6%	
White	1%	2%	
Socio-Economic Status			
Economically Disadvantaged	87%	89%	
Not Economically Disadvantaged	13%	11%	
English Learner Status			
English Learner	17%	17%	
Not an English Learner	83%	83%	
Special Education Status			
Students with IEPs	11%	14%	
Students without IEPs	89%	86%	

Table 2. Averag	e demographic	characteristics	across study ve	ears (2016-17	and 2018-19)
Table 2. Tiverag	e demographie	characteristics	across study y	cars (2010 17	and 2010 17)

Note: Each column displays the average of student in 2016-17 and 2018-19

During the baseline year (2016-17), prior to the implementation of T3, students attending T3 and comparison schools were performing similarly on measures of early literacy performance (Table 3). K-3 students attending T3 schools and K-3 students attending comparison only differed by three points on the number of correct responses from fall to spring. Similarly, the average National Percentile Rank (NPR) percentile change from fall to spring for students attending T3 schools and comparison schools only differed by two points. The baseline Rate of Improvement (ROI) on aimswebPlus for K-3 students attending T3 schools (0.95) and K-3 students attending comparison schools (1.04) differed by 0.09 points. Students attending comparison schools and attending T3 schools differed by 1- to 4-percentage points on the Student Growth Percentile (SGP). On Independent Reading Levels, the percentage of K-3 students attending T3 schools and students attending comparison schools who made minimum growth differed by 11 points and by six points on the Independent Reading Levels' Reading on Grade Level measure.

	0	1					
	K-3 students in T3	K-3 students in					
Baseline Data	Schools	Comparison Schools					
	(n = 3,549)	(n = 2,761)					
AimswebPlus: Number of Correct Respon	ises						
Change in Number Correct from Fall to Spring	34	37					
AimswebPlus: National Percentile Rank (NPR)						
Percentile Change from Fall to Spring	+3	+5					
AimswebPlus: Rate of Improvement (ROI)						
Rate of improvement	0.95	1.04					
AimswebPlus: Student Growth Percentile	es (SGP)						
Well Below Average	36%	40%					
Below Average	47%	51%					
Average	51%	52%					
Independent Reading Levels: Minimum G	rowth						
Percentage of students making minimum growth	56%	67%					
Independent Reading Levels: On Grade Level							
Percentage Point Change from Fall to Spring	10%	16%					

Table 3. Baseline (2016-17) literacy	data fo	r students	attending	Т3	schools	and co	mparison	schoo	ls
Table 5. Dasenne (2010 17	/ micracy	uata 10	1 students	attenuing	10	30110013	and co	mpanson	SC1100.	10

How to read this table: This table presents baseline (2016-17) data for students attending T3 schools and students attending comparison schools to look at similarities and differences at baseline. For example, on average, K-3 students attending T3 schools and K-3 students attending comparison schools had similar changes in the number of correct responses from fall to spring, 34 and 37 respectfully, resulting in a three-point average difference on the average number of correct responses. Similarly, the average National Percentile Rank (NPR) percentile change from fall to spring for students attending T3 schools and comparison schools was 3 and 5, respectively; demonstrating a two-point baseline difference between students enrolled in T3 and comparison schools on the aimswebPlus NPR.

Findings: AimswebPlus Performance

RQ1: What was the change in the average of number correct responses on the aimswebPlus assessment between 2016-17 and 2018-19 at T3 schools and comparison schools? How did changes at T3 schools compare to changes at comparison schools?

Each grade-level measure within the aimswebPlus assessment focuses on a different literacy skill. RQ1 focuses on the number of correct responses. For Kindergarten students, the number of correct responses represents the number of letters identified correctly in one minute. For first-grade students, number correct represents the number of nonsense words pronounced correctly in one minute. For second- and third-grade students, number correct represents the number of words read correctly on a grade-level passage in one minute.

Across all K-3 students attending T3 schools, there was not a significant difference between growth in 2016-17 and 2018-19.

On average, K-3 students in T3 schools demonstrated a 34-point increase in their number of correct responses from fall to spring in both 2016-17 and 2018-19 (Table 4); this was not a significant change (see Appendix E, Table E1 for statistical tests).

Kindergarten and first-grade students attending T3 schools' fall-to-spring growth was significantly higher in 2018-19 then in 2016-17, meaning that the Kindergarten and first-grade students in 2018-19 showed more growth than in 2016-17. For second-grade students in T3 schools, the change in the number of correct responses was significantly lower in 2018-19 then in 2016-17, and there was not a significant difference for third-grade students between 2016-17 and 2018-19.

Grade and Test	School Year	Number Assessed	Fall Number Correct	Spring Number Correct	Change in Number Correct	Difference
	2016-17	296	12	46	+34	
K-LNF	2018-19	360	13	51	+38	+4
1 - NWF	2016-17	347	24	55	+31	⊥ ⊑ *
1 - IN WI	2018-19	405	24	60	+36	
2-0PF	2016-17	316	38	73	+36	6*
2-0KF	2018-19	399	34	64	+30	-0
2 ODE	2016-17	374	58	94	+36	2
3-UKF	2018-19	410	56	90	+34	-2
Total K 2	2016-17	1,333	33	67	+34	0
TOTAL N-3	2018-19	1,574	32	66	+34	U

Table 4. Average number of correct responses on aimswebPlus in 2016-17 (baseline) and 2018-19 for students attending T3 schools by grade

* A statistically significant difference exists between the change in students in T3 schools' number of correct responses in 2016-17 and students in T3 schools' change in number of correct responses in 2018-19. (Independent t-test, p < 0.05)

Overall, there was a small but significant decrease in the change in number of correct responses for K-3 students in comparison schools between 2016-17 and 2018-19.

Students attending comparison schools demonstrated, on average, a 35-point increase in number of correct responses from fall to spring in 2016-17 and a 37-point increase from fall to spring in 2018-19. This means that they made slightly less growth in 2018-19 compared to 2016-17 (Table 5). Importantly, students in comparison schools overall had a lower average number of correct responses in fall 2018-19 than in fall 2016-17, which could be contributing to the overall lower growth for K-3 students attending comparison schools in 2018-19 than the growth made in 2016-17 (see Appendix E, Table E1 for statistical tests).

Although Kindergarten students' change in number of correct responses in comparison schools did not differ between 2016-17 and 2018-19, first-grade students had a significant increase from 2016-17 to 2018-19. Second- and third-grade students in comparison schools both followed the overall K-3 population pattern, as their growth was significantly lower in 2018-19 than 2016-17. This lower growth may have been in part due to a lower average number of correct responses in fall 2018-19 than in fall 2016-17.

Grade and Test	School Year	Number Assessed	Fall Number Correct	Spring Number Correct	Change in Number Correct	Difference
K-I NE	2016-17	273	13	47	+34	0
IX-LINI ^C	2018-19	293	11	45	+34	
1 NIME	2016-17	326	26	60	+34	. 7*
1-NWF	2018-19	296	20	61	+41	+/*
2 OPF	2016-17	292	37	74	+37	٤*
2-0KF	2018-19	254	31	62	+31	-0
2 ODE	2016-17	305	62	105	+43	7*
3-URF	2018-19	337	52	88	+36	- / *
Total K-2	2016-17	1,196	35	72	+37	_7*
I Utal K-S	2018-19	1,180	29	65	+35	-2*

Table 5. Average number of correct responses on aimswebPlus in 2016-17 (baseline) and 2018-19 for students attending comparison schools by grade

* A statistically significant difference exists between the change in students in comparison schools' number of correct responses in 2016-17 and students in comparison schools' change in number of correct responses in 2018-19. (Independent t-test, p < 0.05)

In 2018-19, the change in number of correct responses from fall to spring for students in T3 schools and for students in comparison schools did not significantly differ from each other.

In the baseline year prior to the beginning of T3 implementation (2016-17), students in comparison schools saw a statistically significant greater increase in the number of correct responses from fall to spring compared to students in the T3 schools (+37 compared to +34; Table 6). In 2018-19, there was no longer a significant difference between T3 students (+34) and comparison students (+35) in the number of correct responses from fall to spring. In other words, T3 school K-3 students' number of correct responses did not change between 2016-17 and 2018-19 (both +34), whereas students in comparison schools had a decrease from 2016-17 (+37) to 2018-19 (+35) (Table 6). See Appendix C for more information on the Independent samples *t*-test and Analysis of Variance (ANOVA) statistical tests used.

Group	School Year	Number Assessed	Change in Number Correct	Difference
T3 School Students	2016-17	1,333	+34	2*
Comparison School Students	2016-17	1,196	+37	-51
T3 School Students	School 2018-19 1,574 +34		1	
Comparison School Students	2018-19	1,180	+35	-1

Table 6. Average number of correct responses on aimswebPlus in 2016-17 (baseline) and 2018-19 for students attending T3 and comparison schools

*A statistically significant difference exists between the change in students in comparison schools' number of correct responses in 2016-17 and students in T3 schools' change in number of correct responses in 2016-17. (Independent t-test, p<0.05)

Note: T3 school K-3 students' number of correct responses did not change between 2016-17 and 2018-19 (both +34), whereas students in comparison schools had a decrease from 2016-17 (+37) to 2018-19 (+35), ANOVA: F(3, 5279) = 2.82, p = 0.09, $\eta^2 = 0.001$.

RQ2: What was the change in average National Percentile Rank (NPR) on the aimswebPlus assessment between 2016-17 and 2018-19 at T3 schools and comparison schools? How did changes at T3 schools compare to changes at comparison schools?

National Percentile Rank (NPR) allows for the comparison of a student's score with a national reference of scores of students in the same grade who were tested on the same content during the same timeframe. AimswebPlus provides norm-referenced information in the form of percentiles, which represent the percentage of students in the nationally representative sample who scored at or below a given score. Based on the number of correct responses, each student is assigned a percentile rank in the fall and in the spring. For example, a fall NPR of 23% indicates that, on average, students are performing better than 23% of the nationally-normed sample based on their number of correct responses that fall. Analyzing the change in students' performance based on their NPR frames student performance within the context of a national sample.

There was an increase in the fall-to-spring National Percentile Rank (NPR) change for K-3 students in T3 schools between 2016-17 and 2018-19.

The fall-to-spring NPR change of K-3 students in T3 schools significantly increased from 2016-17 (+3) to 2018-19 (+9) (Table 7). Kindergarten students attending T3 schools experienced the largest percentile point increase between 2016-17 to 2018-19 (+13). First-grade, second-grade, and third-grade students' attending T3 schools NPR significantly increased from 2016-17 to 2018-19 as well (see Appendix E, Table E2 for statistical tests).

Grade and	School	Number	Fall	Spring	Percentile	Difforonco
Test	Year	Assessed	Percentile	Percentile	Change	Difference
K-I NE	2016-17	296	32	41	+10	12 *
IX-LINI ^A	2018-19	360	20	43	+23	713
1 NIA/E	2016-17	347	31	32	+1	. 5*
1- IN VV F	2018-19	405	29	36	+6	+5
2 ODE	2016-17	316	29	28	-1	. 1*
2-0KF	2018-19	399	22	25	+3	+4
2 ODF	2016-17	374	29	31	+2	L 0*
3-URF	2018-19	410	24	28	+4	+2
TOTAL V 2	2016-17	1,333	30	33	+3	. 6*
IUIAL K-3	2018-19	1,574	24	33	+9	+0*

Table 7. Average National Percentile Rank (NPR) responses on aimswebPlus in 2016-17 (baseline) and 2018-19 for students attending T3 schools by grade

*A statistically significant difference exists between students in T3 schools' change in NPR in 2016-17 and students in T3 schools' change in NPR in 2018-19. (Independent t-test, p<0.05)

There was a significant increase in the change in the fall-to-spring NPR change for K-3 students in comparison schools between 2016-17 and 2018-19.

Students attending comparison schools experienced a similar change to their T3 counterparts: their fall-to-spring NPR percentile change significantly increased from 2016-17 (+5) to 2018-19 (+11) (Table 8). While Kindergarten, first-grade, and second-grade comparison students' NPR significantly increased between 2016-17 to 2018-19, third-grade comparison students' NPR did not significantly change (see Appendix E, Table E2 for statistical tests).

Grade and	School	Number	Fall	Spring	Percentile	Difforence
Test	Year	Assessed	Percentile	Percentile	Change	Difference
	2016-17	273	33	44	+11	. 0*
K-LNF	2018-19	293	17	36	+19	+0
1 NIA/E	2016-17	326	33	37	+4	. 0*
	2018-19	296	24	37	+13	+9
2 ODE	2016-17	292	28	29	+1	. 2*
2-0RF	2018-19	254	19	24	+4	+3
2-0PF	2016-17	305	31	36	+5	 1
3-0KF	2018-19	337	22	28	+6	
TOTALIZO	2016-17	1,196	31	36	+5	+6*
IUIAL K-3	2018-19	1,180	21	31	+11	+0*

Table 8. Average National Percentile Rank (NPR) responses on aimswebPlus in 2016-17 (baseline) and 2018-19 for students attending comparison schools by grade

*A statistically significant difference exists between students in comparison schools' change in NPR in 2016-17 and students in comparison schools' change in NPR in 2018-19. (Independent t-test, p<0.05)

Students in comparison schools had significantly higher fall-to-spring National Percentile Rank (NPR) percentile changes compared to students in T3 schools across both years.

K-3 students in T3 and comparison schools' fall-to-spring NPR change percentiles were significantly greater in 2018-19 than in 2016-17. This significant finding may be an artifact of fall NPR percentiles in 2016-17 and 2018-19 (see Appendix E, Table E2 for statistical tests). For both T3 and comparison schools, their fall NPR percentiles were significantly higher in 2016-17 than 2018-19, meaning that there was more room for improvement for both groups of students in 2018-19. However, for K-3 students' in T3 schools, their spring NPR percentile did not differ between 2016-17 and 2018-19 (both 33), whereas for students in comparison schools, their spring NPR percentile decreased from 2016-17 to 2018-19. This demonstrates that although students at T3 schools started out at lower percentiles in fall 2018-19 than in fall 2016-17, they ended up in the same percentile (33) in spring of both years, showing greater fall-to-spring NPR percentile change growth in 2018-19 than 2016-17. Although comparison students had smaller overall growth in their fall-to-spring NPR percentile change in 2016-17 compared to 2018-19, they still ended up with lower spring NPR percentiles in 2018-19 than in 2016-17.

Averaging across years, students attending comparison schools had a significantly greater fall-tospring NPR percentile change (+5 in 2016-17 and +11 in 2018-19) than students in T3 schools (+3 in 2016-17 and +9 in 2018-19) (Table 9). Although the source of these differences cannot be determined, it is important to recognize that the improvements in fall-to-spring NPR percentile change for comparison schools, was greater than that of T3 schools. See Appendix C for more information on the Independent samples *t*-test and Analysis of Variance (ANOVA) statistical tests used.

Crown	School	Number	Fall	Spring	Percentile	Difformance	
Group	Year	Assessed	Percentile	Percentile	Change	Difference	
T3 School	2016 17	1 2 2 2	20	22	1.2		
Students	2010-17	1,333	50	33	+3	2*	
Comparison	2016 17	1 106	21	26	. E	-2	
School Students	2010-17	1,190	51	30	+5		
T3 School	2010 10	1 574	24	22	10		
Students	2010-19	1,574	24	33	+9	2*	
Comparison	2010 10	1 1 0 0	21	21	. 11	-2	
School Students	2010-19	1,100	21	51	+11		

Table 9. Average National Percentile Rank (NPR) responses on aimswebPlus in 2016-17 (baseline) and 2018-19 for students attending T3 and comparison schools

* A statistically significant difference exists between the change in students in comparison schools' NPR in 2016-17 and 2018-19 and students in T3 schools' change in NPR in 2016-17 and 2018-19. (Independent t-test, *p*<0.05)

RQ3: What is the change in the Rate of Improvement (ROI) of students on the aimswebPlus assessment in 2016-17 and 2018-19? How did changes at T3 schools compare to changes at comparison schools?

Rate of Improvement (ROI) represents the average change in the number of correct responses that students experienced each week between their fall and spring assessment. ROI is calculated individually for each student and not compared to a national sample. For example, first grade students with an ROI of 1.12 means that between the fall and spring assessment they increased the number of words pronounced correctly on the NWF assessment by 1.12 each week. ROI analyzing student improve with the context of their own learning rather than within a national sample. It is important to note that because students take assessments at different times within the assessment window, ROI controls for the possible differences in learning that could be attributed to the varying length of time that may pass between assessment periods for different students.

K-3 students in T3 schools had significantly higher Rate of Improvement (ROI) in 2018-19 than in 2016-17.

Overall, students in T3 schools demonstrated a significant increase in their ROI between 2016-17 and 2018-19 (Figure 1). Students in T3 schools in Kindergarten and first-grade demonstrated significantly higher ROI in 2018-19 compared to 2016-17, while second-grade students had significantly lower ROI in 2018-19 compared to 2016-1). T3 third-grade students' ROI did not differ between 2016-17 and 2018-19. See Appendix B for more information on the Independent t-test statistical analysis used (see Appendix E, Table E3 for statistical tests).



Figure 1. Rate of Improvement (ROI) for students in T3 schools by grade from 2016-17 to 2018-19

*Statistically significant difference exists in the change between students in T3 schools' ROI in 2016-17 and students in T3 schools' ROI in 2018-19. (Independent t-test, *p*<0.05)

K-3 students in comparison schools had higher Rate of Improvement (ROI) in 2018-19 than in 2016-17.

Comparison school K-3 students' ROI was higher in 2018-19 than in 2016-17 (Figure 2). There was not a significant change in ROI for Kindergarten or third-grade students from 2016-17 to 2018-19. First-grade students in comparison schools saw a significant increase from 2016-17 to 2018-19, while second-grade students experienced a significant decrease (Figure 2) (see Appendix E, Table E3 for statistical tests).



Figure 2. Rate of Improvement (ROI) for students in comparison schools by grade from 2016-17 to 2018-19

*Statistically significant difference exists in the change between students in comparison schools' ROI in 2016-17 and students in comparison schools' ROI in 2018-19. (Independent t-test, p<0.05)

The ROI in 2018-19 did not differ between K-3 students attending T3 and comparison schools.

Although the ROI of students attending comparison schools was significantly greater in 2016-17 (1.04) than that of T3 school students' (0.95), by 2018-19, the total average ROI for students attending T3 schools (1.05) and students attending comparison schools (1.09) did not significantly differ from each other (Figure 3). This represents a significantly larger increase in ROI from 2016-17 to 2018-19 for T3 students compared to comparison students. See Appendix C for more information on the Independent samples *t*-test and Analysis of Variance (ANOVA) statistical tests used (see Appendix E, Table E3 for statistical tests).



Figure 3. Rate of Improvement (ROI) for students in T3 schools and students in comparison schools

*Statistically significant difference exists between students in comparison schools' ROI in 2016-17 and students in T3 schools' ROI in 2016-17. (Independent t-test, *p*<0.05)

RQ4: What was the change in the Student Growth Percentile (SGP) for students in each baseline performance group (*Well Below Average, Below Average, and Average*) on the aimswebPlus assessment in 2016-17 and 2018-19? How did changes at T3 schools compare to changes at comparison schools?

Student Growth Percentile (SGP) analyzes the rate of students' fall-to-spring aimswebPlus growth compared to a nationally normed sample of students who had a similar fall performance. The SGP sorts student performance into five percentile categories based on their fall percentile rank (NPR): *Well Below Average* (1-10%), *Below Average* (11-25%), *Average* (26-75%), *Above Average* (75-89%), and *Well Above Average* (90-99%).³ SGP frames growth within the context of these performance levels to allow for a more representative picture of student growth. For example, SDP Kindergarten students grouped in the *Well Below Average* category who had a fall-to-spring SGP of 60% improved their aimswebPlus performance at a faster rate than 60% of students nationally who had a similar fall performance to them.

³ Data on students attending T3 and comparison schools with SGP in Above Average and Well Above are not included in the report due subgroups having fewer than 15 students.

There was a significant increase in the Student Growth Percentile (SGP) of K-3 students in T3 schools in the *Well Below Average, Below Average*, and *Average* categories.

K-3 students in T3 schools had significantly higher SGP averages in the *Well Below Average, Below Average,* and *Average* categories in 2018-19 than in 2016-17 (See Table 10). During the 2018-19 school year, K-3 students in T3 schools in the *Average* category improved their aimswebPlus performance at a faster rate than 57% of their peers nationally, those in the *Below Average* category improved at a faster rate than 56% of their peers nationally, and those in the *Well Below Average* category improved at a faster rate than 49% of their peers nationally (see Appendix D, Table D1 for numbers of students assessed in each SGP group, see Appendix E, Table E4 for statistical tests).

Kindergarten T3 students in the *Well Below Average* and *Below Average* categories had significantly higher SGP averages in 2018-19 compared to 2016-17 (Table 10). First-grade students in T3 schools had significantly higher SGP averages in the *Well Below Average, Below Average,* and *Average* category. Second-grade students in T3 schools had significantly higher SGP averages in the *Well Below Average* category. Third-grade students' SGP did not significantly differ between 2016-17 and 2018-18 (see Appendix E, Table E4 for statistical tests).

Grade	School Year Total # assessed		Well Below Average (1-10%)	Below Average (11-25%)	Average (26-74%)
	2016-17	296	38%	50%	59%
K	2018-19	360	60%	63%	61%
	SGP Diffe	rence	22*	13*	2
	2016-17	347	26%	43%	47%
1	2018-19	405	42%	54%	56%
	SGP Diffe	rence	16*	11*	9*
	2016-17	316	32%	46%	44%
2	2018-19	399	40%	50%	51%
	SGP Diffe	rence	8*	4	7
	2016-17	374	43%	49%	53%
3	2018-19	410	48%	56%	57%
	SGP Diffe	rence	5	7	4
	2016-17	1333	36%	47%	51%
К-З	2018-19	1574	49%	56%	57%
	SGP Diffe	rence	13*	9*	6*

Table 10. Student Growth Percentiles (SGP) for students in T3 schools by grade from 2016-17 to 2018-19

There was a significant increase in the Student Growth Percentile (SGP) of K-3 students in comparison schools in the *Well Below Average, Below Average*, and *Average* categories.

K-3 students in comparison schools had significantly higher SGP averages in the *Well Below Average, Below Average*, and *Average* categories in 2018-19 than in 2016-17 (Table 11). In 2018-19, K-3 students in comparison schools in the *Average* category improved their aimswebPlus performance at a faster rate than 63% of their peers nationally, students in comparison schools in the *Below Average* category improved at a faster rate than 59% of their peers nationally, and students in comparison schools in the *Well Below Average* category improved at a faster rate than 46% of their peers nationally (see Appendix D, Table D2 for numbers of students assessed in each SGP group, see Appendix E, Table E4 for statistical tests).

First-grade students in comparison schools in the *Well Below Average, Below Average, and Average* category had significantly higher SGP averages in 2018-19 compared to 2016-17 (Table 11). Second-grade and third-grade students in comparison schools had significantly higher SGP averages in the *Average* category. Kindergarten students' SGP did not significantly differ between 2016-17 and 2018-18 (see Appendix E, Table E4 for statistical tests).

Grade	School Year	Total # assessed	Well Below Average (1-10%)	Below Average (11-25%)	Average (26-74%)
	2016-17	273	48%	52%	58%
K	2018-19	293	52%	58%	59%
	SGP Diffe	erence	4	6	1
	2016-17	326	31%	44%	52%
1	2018-19	296	46%	60%	66%
	SGP Diffe	erence	15*	16*	14*
	2016-17	292	39%	59%	43%
2	2018-19	254	42%	56%	61%
	SGP Diffe	erence	3	-3	18*
	2016-17	305	44%	51%	55%
3	2018-19	337	45%	61%	65%
	SGP Diffe	erence	1	10%	10*
	2016-17	1196	40%	51%	52%
K-3	2018-19	1180	46%	59%	63%
	SGP Diffe	erence	6*	8*	11*

Table 11. Student Growth Percentiles (SGP) for students in comparison schools by grade from 2016-17 to 2018-19

Students attending comparison schools had higher SGP compared to students attending T3 schools in 2016-17 and 2018-19.

In 2016-17, K-3 students in comparison schools had significantly higher SGP averages in the *Well Below Average* category than students attending T3 schools (Table 12). This significant difference indicates that students in comparison schools in the *Well Below Average* category were improving at a faster rate than students in T3 schools in the *Well Below Average* category prior to the implementation of the T3 initiative. Although K-3 students in comparison schools in the *Below Average* and *Average* categories had higher SGP averages than students attending T3 schools, the differences were not statistically significant (see Appendix E, Table E4 for statistical tests).

In 2018-19, K-3 students in comparison schools had significantly higher SGP in the *Average* category than students attending T3 schools (Table 12). This significant difference means that students in comparison schools in the *Average* category were improving at a faster rate than students in T3 schools after the implementation of the T3 initiative. Although K-3 students in comparison schools had higher SGP averages in the *Below Average* categories than students attending T3 schools and students in T3 schools had higher SGP averages in the *Below Average* categories than students attending comparison schools, the differences were not statistically significant. See Appendix C for more information on the Independent samples *t*-test used (see Appendix E, Table E4 for statistical tests).

School Year	Schools	Well Below Average (1-10%)	Below Average (11-25%)	Average (26-74%)
	T3 schools	36%	47%	51%
2016-17	Comparison schools	40%	51%	52%
	SGP Difference	4%*	4%	1%
	T3 schools	49%	56%	57%
2018-19	Comparison schools	46%	59%	63%
	SGP Difference	-3%	3%	6%*

Table 12. Student Growth Percentiles (SGP) for students in T3 and comparison schools from 2016-17 to 2018-19

Findings: Independent Reading Levels

RQ5: What was the change in the percentage of students who demonstrated one year of growth in reading at T3 schools and comparison schools? How did changes at T3 schools compare to changes at comparison schools?

A K-3 student's independent reading level represents the level of text complexity that he or she can read and understand without the help of an adult. We compare student independent reading levels from Quarter 1 (Q1) and Quarter 4 (Q4) to determine whether each student has made minimum growth. Minimum growth is the amount of growth a student should make in about one school year (or 7.5 months – September through June). These growth goals are not based on a student's grade level, but on that student's baseline (Q1) independent reading level. Analyzing minimum growth allows us to see student reading improvement without grade level factors. See Appendix B for minimum growth goals.

There was a significant increase in the percentage of K-3 students attending T3 schools meeting their minimum growth goal from 2016-17 to 2018-19.

In 2016-17, 56% of K-3 students in T3 schools met their minimum growth goal compared to 67% in 2018-19. This represents a statistically significant 11-percentage point increase from 2016-17 (pre) to 2018-19 (post) (Table 13). The increases in the percentage of Kindergarten, first-grade, second-grade, and third-grade students in T3 schools who made their minimum growth from 2016-17 to 2018-19 were all also significantly higher in 2018-19 than in 2016-17 (See Table E5 in Appendix E for statistical tests).

There was a significant decrease in the percentage of K-3 students at comparison schools meeting their minimum growth goal from 2016-17 to 2018-19.

In 2016-17, 67% of K-3 students in comparison schools met their minimum growth goal, while 61% met their minimum growth goal in 2018-19, representing a statistically significant six-percentage point decrease from 2016-17 to 2018-19 (Table 13). When breaking it out by grade, there was a significant decrease in the percentage of Kindergarten and second-grade students in comparison schools who made their minimum growth in 2018-19 compared to 2016-17. However, the decrease in first-grade and third-grade was not statistically significant (See Table E5 in Appendix E for statistical tests).

	Stu	dents in T3	Schools	Students in Comparison Schools				
		(n = 3,36	56)	(n = 2,598)				
	% Making		Percentage	% Ma	aking	Percentage Point		
	Minimun	1 Growth	Doint Change	Minimun	n Growth	Chango		
Grade	2016-17	2018-19	I Unit Change	2016-17	2018-19	Change		
K	42%	57%	+15	60%	46%	-14*		
1	58%	66%	+7*	62%	66%	4		
2	58%	72%	+15*	75%	65%	-10*		
3	65%	73%	+8*	72% 65%		-7		
Total K-3	56%	67%	+11*	67%	61%	-6*		

Table 13. Percentage of students making their minimum growth goal in 2016-17 (baseline) and 2018-19 for students attending T3 and comparison schools by grade

*A statistically significant difference exists between the percentage of students making minimum growth in 2016-17 and in 2018-19 (chi-square, p < 0.05).

After two years of T3 implementation, a higher percentage of K-3 students in T3 schools reached their minimum growth goals than students in comparison schools (67% and 61%, respectively).

A significantly higher percentage of K-3 students in comparison schools met their minimum growth goal in 2016-17 (67%) compared to K-3 students in T3 schools (56%) (Table 14). However, in 2018-19, after two years of T3 implementation, a significantly higher percentage of K-3 students in T3 schools met their minimum growth goal (67%) when compared to K-3 students in comparison schools (61%). See Appendix C for more information on the Chi-square statistical analysis.

Table 14. Percentage of students making their mini	num growth goal i	in 2016-17 (baseline) and 2018-19 for
students attending T3 and comparison schools			

School Years	Students in T3 Schools (n = 3,366)	Students in Comparison Schools (n = 2,598)
	% Making Minimum Growth	% Making Minimum Growth
2016-17	56%	67%*
2018-19	67%*	61%

*A statistically significant difference exists between the percentage of students making minimum growth in 2016-17 in 2018-19. (chi-square, p < 0.05)

RQ6: What was the change in the percentage of students who performed on grade level between 2016-17 and 2018-19 at T3 schools and comparison schools? How did changes at T3 schools compare to changes at comparison schools?

Students who are reading on grade level are most likely to continue to read on grade level over the course of their schooling. The School District of Philadelphia tracks students who are reading at/above or below grade level. Those students who are reading below grade level are eligible for additional services to help them reach their goal of reading on grade level. Analyzing the percentage of students reading on grade level allows us to understanding student performance by grade level.

At each grade level, there was an increase in the percentage of grades 1-3 students in T3 schools reading on grade level from fall to spring in both 2016-17 and 2018-19.

During the 2016-17 school year, the percentage of first-, second-, and third-grade students in T3 schools reading on grade level (according to independent reading level) increased by 10 percentage points from fall to spring (Table 15). In 2018-19, the percentage of first-, second-, and third-grade students in T3 schools reading on grade level increased by 13 percentage points from fall to spring. Overall, this represents a statistically significant increase in the change in the percentage of T3 students reading on grade level from fall to spring. However, when broken out by grade level, the percentage point differences in growth of first-grade, second-grade, and third-grade students in T3 schools are not significant (See Table E6 in Appendix E for statistical tests).⁴

Grade	School Year	Number Assessed	Fall Percent on Grade Level	Spring Percent on Grade Level	Percentage Point Change	Percentage Point Difference
1	2016-17	406	30%	32%	+2	±1.
1	2018-19	436	20%	25%	+6	+4
2	2016-17	400	17%	33%	+16	† 3
2	2018-19	416	17%	36%	+19	+3
2	2016-17	503	27%	37%	+10	+1
5	2018-19	423	26%	40%	+14	
TOTAL K-2	2016-17	1,309	25%	35%	+10	±2*
IUIAL K-5	2018-19	1,275	21%	34%	+13	т.)

Table 15. Percentage of students reading on grade level in 2016-17 (baseline) and 2018-19 for students attending T3 schools by grade

⁴ The District considers all kindergarten students to be reading on grade level ("At Target") in Quarter 1, as they have not attended enough school to read "below grade level." For this reason, kindergarten students were removed from this analysis.

*A statistically significant difference exists between the percentage point change of students in T3 schools reading on grade level from fall to spring in 2016-17 and the percentage point change of students in T3 schools' reading on grade level from fall to spring in 2018-19 (Chi-square, p < 0.05).

There was a decrease in the percentage of grades 1-3 students in comparison schools reading on grade level between spring 2017 and spring 2019.

There was a non-significant decrease in the change in the percentage of first-, second-, and thirdgrade students in comparison schools reading on grade level from fall to spring 2016-17 (+16%) compared to the change from fall to spring in 2018-19 (Table 16). There was also a non-significant increase in the percentage of first-, second-, and third-grade students in comparison schools reading on grade level in the spring from 2016-17 to 2018-19. However, there was a significant decrease in second-grade students' fall-to-spring growth in 2016-17 compared to 2018-19 (10 percentage points).

Grade	School Year	Number Assessed	Fall Percent on Grade Level	Spring Percent on Grade Level	Percentage Point Change	Percentage Point Difference
1	2016-17	355	25%	29%	+4	16
	2018-19	320	21%	31%	+10	+0
2	2016-17	360	17%	46%	+29	1.0*
	2018-19	274	18%	37%	+19	-10*
2	2016-17	362	27%	42%	+15	0
3	2018-19	337	30%	36%	+6	- 9
Total K 2	2016-17	1,077	23%	39%	+16	F
I Utal K-S	2018-19	931	23%	35%	+11	-5

Table 16. Percentage of students reading on grade level in 2016-17 (baseline) and 2018-19 for students attending comparison schools by grade

*A statistically significant difference exists between the percentage point change of students in comparison schools reading on grade level from fall to spring in 2016-17 and the percentage point change of students in comparison schools reading on grade level from fall to spring in 2018-19 (Chi-square, *p* <0.05).

A significantly higher percentage of grades 1-3 students in comparison schools were reading on grade level compared to students in T3 schools in 2016-17 and 2018-19.

A significantly higher percentage of K-3 students in comparison schools were reading on grade level in 2016-17 and 2018-19 compared to K-3 students in T3 schools (Table 17). See Appendix C for more information on the Chi-square statistical analysis (See Table E6 in Appendix E for statistical tests).

Group	School Year	Number Assessed	Fall Percent on Grade Level	Spring Percent on Grade Level	Percentage Point Change
T3 School Students	2016-17	1,309	25%	35%	10%
Comparison School Students	2016-17	1,077	23%	39%	16%
T3 School Students	2018-19	1,275	21%	34%	13%
Comparison School Students	2018-19	931	23%	35%	11%

Table 17. Percentage of students reading on grade level in 2016-17 (baseline) and 2018-19 for students attending T3 and comparison schools

Conclusions

Overall, the six measures of early literacy tell a mixed and nuanced story of the T3 program and the performance of K-3 students attending T3 schools and comparison schools in 2016-17 and 2018-19. One metric (minimum growth) showed students attending T3 schools outperforming students in comparison schools, three metrics (NPR, SGP, reading on grade level) showed that students in comparison schools were outpacing students in T3 schools, and two metrics (change in number of correct responses, ROI) found no differences between the two school types during the 2018-19 year. A key to understanding these mixed results are the similarities and differences between students attending T3 schools and comparison schools during the 2016-17 baseline year.

The change in the number of correct responses on the aimswebPlus assessments from fall to spring did not result in significant differences between students in T3 schools and comparison schools in 2018-19 (two years into implementation). However, in 2016-17 (the baseline year) students in comparison schools saw a statistically greater increase in the change in number of correct responses from fall to spring compared to students in the T3 schools. To fully interpret the results of the change in the number of correct responses, it is important to look at the initial number of correct responses in the fall and spring. In 2016-17, students in comparison schools had higher average fall (35) and spring (72) number correct responses, and in 2018-19 students in comparison schools had lower average fall (29) and spring (65) number correct responses than students attending T3 schools in 2016-17 and 2018-19. This suggests that the T3 program may have contributed to preventing students in T3 schools experiencing as large of a decrease in performance that students in comparison schools experienced from 2016-17 to 2018-19.

Both K-3 students at T3 schools and at comparison schools had a significant increase in their National Percentile Rank (NPR) from 2016-17 to 2018-19; however, students attending comparison schools had significantly higher fall-to-spring NPR change in scores than students attending T3

schools. It is critical to interpret this result in the context of the fall NPR and spring NPR that create the fall-to-spring NPR change score. In 2016-17, both students at T3 schools and comparison schools had higher fall NPR than in 2018-19. While, T3 students' spring NPR did not differ between 2016-17 and 2018-19, comparison students' spring NPR was five points greater in 2016-17 than in 2018-19. This indicates that although students attending comparison schools had greater growth in 2018-19 than in 2016-17, they started out with far lower fall NPR in 2018-19, and still had lower spring NPR in 2018-19 than in 2016-17. Keeping this in mind, although students in comparison schools ended 2018-19 (spring NPR 2018-19) with lower spring NPR than in 2016-17, and with lower spring NPR than T3 students in both years.

Both K-3 students at T3 schools and at comparison schools had significantly higher Rates of Improvement (ROI) in 2018-19 than in 2016-17. Although in 2016-17 (baseline) students attending comparison schools had significantly higher ROI than students at T3 schools, by 2018-19, ROI did not significantly differ between schools. Like with the number of correct responses, it is possible that students attending T3 schools *caught up* with the ROI of their comparison school counterparts by 2018-19 after performing significantly lower than students at comparison schools in 2016-17.

K-3 students at T3 schools and at comparison schools in the *Well Below Average, Below Average,* and *Average* categories had significantly higher Student Growth Percentiles (SGP) in 2018-19 than in 2016-17. **However, students attending comparison schools had higher SGP in most categories than students attending T3 schools in both years.** In 2016-17, K-3 students in comparison schools in the *Well Below Average* category had significantly higher SGP averages than students attending T3 schools. Although K-3 students in comparison schools had higher SGP averages in the *Below Average* and *Average* categories than students attending T3 schools, the differences were not statistically significant. In 2018-19, K-3 students in comparison schools in the *Average* category had significantly higher SGP averages than students attending T3 schools. Although K-3 students in comparison schools in the *Average* category had significantly higher SGP averages than students attending T3 schools. Although K-3 students in comparison schools in the *Average* category had significantly higher SGP averages than students attending T3 schools. Although K-3 students in comparison schools in the *Below Average* category had higher SGP averages than students attending T3 schools. Although K-3 students in comparison schools in the *Below Average* category had higher SGP averages than students attending T3 schools. Although K-3 students in comparison schools in the *Below Average* category had higher SGP averages in the *Well Below Average* category than students attending comparison schools, the differences were not statistically significant.

In 2018-19 a significantly higher percentage of K-3 students in T3 schools reached their minimum growth goals than students in comparison schools. In 2018-19, students attending T3 schools had the same percentage of students making minimum growth as the percentage of students in comparison schools making minimum growth in 2016-17 (67%). Although there was an 11-percentage point increase in the percentage of K-3 students attending T3 schools meeting their minimum growth goal from 2016-17 to 2018-19, there was a six-percentage point decrease in the percentage of K-3 students at comparison schools meeting their minimum growth goal from 2016-17 to 2018-19, there was a six-percentage point decrease in the percentage of K-3 students at comparison schools meeting their minimum growth goal from 2016-17 to 2018-19. Although it is important to recognize that there was an increase in the percentage of students attending T3 schools meeting their minimum

growth goal, the decrease in percentage of students attending comparison schools meeting their minimum growth goal is similarly staggering.

A significantly higher percentage of K-3 students in comparisons schools were reading on grade level than students in T3 schools in 2016-17 and 2018-19. There was an increase in the percentage of first through third grade students in T3 schools reading on grade level from fall to spring in both 2016-17 and 2018-19, whereas, there was a decrease in the percentage of first through third grade students in comparison schools reading on grade level between 2016-17 and 2018-19.

In conclusion, the six measures of early literacy show a varied and complex story of the T3 program and the performance of K-3 students attending T3 schools and comparison schools in 2016-17 and 2018-19. Although in many cases in 2016-17 (baseline) students in comparison schools are outperforming their T3 peers, by 2018-19, there was little or no difference between the two groups.

Appendix A: Sample

Table A1. TeachPlus ar	d comparison so	chool characteristics, 201	16-2017, by matched pair

Teach	School	Grades	Learning	Federal	ELS	%	% of	%	%	%	%	%	%	PSSA
Plus	Name	Served	Network	Designation	Cohort	Econ.	Students	EL	Black	Hispanic	Asian	White	Reading	- ELA:
			2016-17			Disadv.	with an						at Grade	%
							IEP						Level	Prof/
													(K-2)	Adv
Yes	Comegys	K-8	Network	CSI	1	83%	12%	0%	93%	1%	0%	2%	24%	0%
			12											
No	Longstreth	K-8	Network	Non-	3	80%	11%	1%	93%	1%	0%	3%	0%	0%
			10	Designated										
Yes	Cayuga	K-5	Network	Non-	1	78%	14%	18%	24%	65%	1%	4%	48%	0%
			11	Designated										
No	Cramp	K-5	Network	Non-	1	86%	15%	28%	14%	76%	0%	2%	25%	2%
			11	Designated										
Yes	Lowell,	K-4	Network	Non-	1	72%	10%	19%	62%	14%	15%	1%	31%	12%
			7	Designated										
No	Catharine	K-5	Network	CSI	3	71%	16%	12%	79%	4%	9%	2%	71%	19%
			12											
Yes	McClure	K-5	Network	Non-	2	80%	9%	17%	30%	62%	1%	1%	29%	0%
			11	Designated										
No	Sheridan	K-4	Network	Non-	1	88%	13%	14%	25%	63%	1%	3%	31%	0%
			5	Designated										
Yes	Taylor	K-5	Network	Non-	1	77%	11%	27%	19%	71%	1%	0%	0%	0%
			11	Designated										
No	Sheppard	K-4	Network	Non-	1	80%	13%	37%	5%	89%	1%	1%	20%	0%
			3	Designated										

School Namo	School Voor		Total			
School Name	School real	K	1st	2nd	3rd	Totai
Cayuga School	2016-17	82	68	58	76	284
Cayuga School	2018-19	53	80	61	64	258
Comegys, Benjamin B.	2016-17	49	63	59	67	238
School	2018-19	49	44	54	55	202
Lowell, James R.	2016-17	134	143	130	175	582
School	2018-19	123	150	143	121	537
McClure, Alexander K.	2016-17	92	98	99	107	396
School	2018-19	89	100	95	106	390
Taylor, Bayard School	2016-17	87	85	89	93	354
	2018-19	68	80	77	83	308
Total		826	911	856	947	3,549

Table A2. TeachPlus students by school year

Table A3. Comparison students by school year

School Namo	School Voor		Total			
School Name	School Tear	K	1st	2nd	3rd	IUtai
Catharine, Joseph	2016-17	71	89	88	84	332
School	2018-19	67	71	59	83	280
Cramp, William	2016-17	62	70	84	83	299
School	2018-19	54	78	73	77	282
Longstreth, William	2016-17	42	57	53	50	202
C. School	2018-19	43	43	24	34	144
Sheppard, Isaac A.	2016-17	28	34	34	29	125
School	2018-19	34	34	23	25	116
Sheridan, Philip H.	2016-17	125	156	128	131	540
School	2018-19	107	106	104	124	441
Tota	al	633	738	670	720	2,761

Appendix B: Minimum Growth Chart



Understanding Minimum Growth Goals

Using Independent Reading Levels Grades K-3

Baseline Independent Reading Level	On Track to Goal	On Track to Goal	Growth Target
Quarter 1	Quarter 2	Quarter 3	Quarter 4
PR	A	В	С
А	А	В	С
В	С	D	E
С	D	E	F
D	E	F	1
E	F	н	1
F	Î	1	1
G	I	J	K
н	J	J	K
I.	L.	к	L
1	ĸ	L	L
к	L	L	М
L	м	N	0
M	N	0	0
N	0	Р	Р
0	Р	Р	Q
Р	Q	Q	R
Q	R	R	S
R	S	S	Т
S	т	T	U

Appendix C: Statistical Analysis

Three types of statistical analyses were conducted in order to examine if there are statistically significant differences between the literacy performance of students in T3 schools and students in comparison schools. These statistical tests were Chi-Square Tests of Independence, Independent Samples *t*-tests, and Analysis of Variance (ANOVA).

Chi-Square Tests of Independence

Chi-Square Tests of Independence provides information about where there is a relationship between two categorical variables. Categorical variables are variables that are different from each other, but there is not an inherent order to the categories. For example, the percentage of students meeting their minimum growth goal is a categorical variable because it is a percentage of the number of students meeting a target – a distinct category out of 100% - it is not an average of multiple scores.

The chi-square applies the average values or scores of groups of participants in different categories. For example, students in T3 schools in 2016-17, students in T3 schools in 2018-19, students in comparison schools in 2016-17, and students in comparison schools in 2018-19 are four distinct categories. Their categories can be arranged as a two by two format.

The typical output for the Chi-Square has this format: X^2 (degrees of freedom, N = sample size) = chi-square value, p = p-value, or an example from this report: $X^2(1, N = 3366) = 43.12$, p < .001.

The first symbol in the output is X^2 or a chi-square; this X^2 denotes that this this the output of a chi-square-test.

The first value in the parentheses immediately following the X^2 symbol are the degrees of freedom. The degrees of freedom represent the number of columns of data minus the number of parameters needed to conduct the analysis (typically subtracting one) and the number of rows of data minus the number of parameters needed to conduct the analysis (typically subtracting one) multiple times each other. In this case that would be a degree of freedom of 1.

The second symbol is the N or sample size symbol. The value immediately following the N symbol is the number of participants in the sample. In the current example, the sample size is 3,336 students.

The third value is the chi-square statistic value. The X^2 -statistic value describes how much of a difference exist between the values observed and what we might expect if there were no relationship in the population. The X^2 -statistic value in this output is 43.12. A larger value generally indicates there is a real relationship.

The third symbol is a p or the symbol denoting a p-value. The p-value is the probability that the difference between the four percentages occurred by random chance. General conventions consider that if the p-value is greater than 0.05 than the differences between the percentages occurred by random chance; whereas, when X^2 -tests produce a p-values below 0.05, it is generally considered that the values are not due to random chance, but represent statistically significant difference. In this example, the p-value is less than 0.001, and therefore, the four percentages are considered statistically significantly different from each other.

Independent Samples t-tests

An Independent Samples *t*-tests compares the average scores or values of two independent groups, when those scores or values are continuous or have an intuitive order to them. For example, students' rate of improvement (ROI) scores are continuous. An average ROI of 1.04 is meaningfully higher than an average ROI of .96. The Independent Samples *t*-test examines whether the difference between the two average scores is significantly different.

A typical output for the Independent Samples *t*-test has this format: t(degrees of freedom) = t-value, p = p-value, Cohen's d = Cohen's d-value, or an example from this report: t(5281) = 3.25, p = 0.001, Cohen's d = 0.13.

The first symbol in the output is *t*; this *t* denotes that this this the output of a *t*-test.

The first value in the parentheses immediately following the *t* symbol are the degrees of freedom. The degrees of freedom represent the sample size or number of participants' data included in the analysis, after subtracting the number of parameters needed to conduct the analysis (typically subtracting one from the total sample size for Independent Samples *t*-tests). In the current example, the sample size is 5,282 students, and therefore the degrees of freedom are 5,281.

The second value is the *t*-statistic value. The *t*-statistic value describes the size of the difference of the average scores of the two groups after accounting for the variation in the individual scores of all students included in the analysis. The *t*-statistic value in this output is 3.25.

The second symbol is a *p* or the symbol denoting a *p*-value. The *p*-value is the probability that the difference between the two average scores occurred by random chance. General conventions consider that if the *p*-value is greater than 0.05 than the differences between the two average scores occurred by random chance; whereas, when *t*-tests produce a *p*-values below 0.05, it is generally considered that the two values are not due to random chance, but represent statistically significant difference. In this example, the *p*-value is 0.0001, and therefore, the two scores are considered statistically significantly different from each other.

The third symbol is an effect size estimate. Effect sizes are quantitative measures of the size of the difference between the average scores being compared. The effect size used in the current example is Cohen's *d*. Cohen's *d* effect size indicates the standardized difference between two means and is most appropriate for presenting the effect size of *t*-tests. Cohen's *d*-values of about 0.8 are considered larger effect sizes, values of about 0.5 are considered medium effect sizes, and values of about 0.2 are considered small effect sizes. In the current example, the Cohen's *d*-value is 0.13, which is smaller than the value of the small effect size and indicates that the differences between the average value of the two scores are less than two standard deviations different from each other. Therefore, in the current example, the effect size is extremely small, and the significant *p*-value should be interpreted with caution.

Analysis of Variance (ANOVA)

An Analysis of Variance (ANOVA) compares the average scores or values of three or independent groups, when those scores or values are continuous or have an intuitive order to them. For example, students' rate of improvement (ROI) scores are continuous. An average ROI of 1.04 is

meaningfully higher than an average ROI of .96. The ANOVA examines whether the difference between the three or more average scores is significantly different.

A typical output for the Independent Samples *t*-test has this format: *F*(degrees of freedom between groups, degrees of freedom within group) = *F*-value, p = p-value, $\eta^2 < \eta^2$ -value, or an example from this report: *F*(3, 5279) = 2.82, p = 0.09, $\eta^2 = 0.001$.

The first symbol in the output is *F*; this *F* denotes that this this the output of an ANOVA.

The first value in the parentheses immediately following the *F* symbol are the degrees of freedom between groups or the degrees of freedom for the numerator. The degrees of freedom between groups represent the number of groups of average values included in the analysis after subtracting the parameters needed to conduct the analysis. In this case, there are four average values being compared (students in T3 schools in 2016-17, students in T3 schools in 2018-19, students in comparison schools in 2016-17, and students in comparison schools in 2018-19), a value of one is subtracted for the parameters to conduct the analysis, leaving 3 as the first value.

The second value of the degree of freedom within group or the degrees of freedom for the denominator represent the sample size or number of participants' data included in the analysis, after subtracting the degrees of freedom between groups. In the current example, the sample size is 5,282 students, subtracted by the 3 (degrees of freedom between groups) and therefore the degrees of freedom within group are 5,279.

The third value is the *F*-statistic value. The *F*-statistic value describes the size of the difference of the average scores of the three or more groups after accounting for the variation in the individual scores of all students included in the analysis. The *F*-statistic value in this output is 2.82.

The second symbol is a *p* or the symbol denoting a *p*-value. The *p*-value is the probability that the difference between the three or more average scores occurred by random chance. General conventions consider that if the *p*-value is greater than 0.05 than the differences between the two average scores occurred by random chance; whereas, when *F*-tests produce a *p*-values below 0.05, it is generally considered that the values are not due to random chance, but represent statistically significant difference. In this example, the *p*-value is 0.09, and therefore, the four scores are not considered significantly different from each other.

The third symbol is an effect size estimate. Effect sizes are quantitative measures of the size of the difference between the average scores being compared. The effect size used in the current example is a partial eta-squared: η^2 . The partial eta-squared effect size indicates the proportion of the variance that is explained by the particular variables and is most appropriate for presenting the effect size of *F*-tests. The partial eta-squared of about 0.14 are considered larger effect sizes, values of about 0.6 are considered medium effect sizes, and values of about 0.1 are considered small effect sizes. In the current example, the partial eta-squared-value is 0.001, which is smaller than the value of the small effect size and indicates that the four variables in total do not account for a noticeable amount of the variance. Therefore, in the current example, the effect size is extremely small, and the significant *p*-value should be interpreted with caution.

Appendix D: AimswebPlus Student Growth Percentile Groups

Grade	School Year	Total # assessed	Well Below Average (1-10%)	Below Average (11- 25%)	Average (26-74%)	Above Average (75-89%)	Well Above Average (90%-99%)
ĸ	2016-17	296	95	75	87	24	15
К	2018-19	360	191	55	106	7	1
1	2016-17	347	106	75	139	16	11
L	2018-19	405	142	98	125	22	18
2	2016-17	316	110	59	123	19	5
2	2018-19	399	188	79	114	13	5
2	2016-17	374	126	86	135	24	3
5	2018-19	410	179	80	126	19	6
Total	2016-17	1333	437	295	484	83	34
K-3	2018-19	296	700	312	471	61	30

Table D1. Number of students in Student Growth Percentiles (SGP) for students in T3 schools by grade

Table D2. Number of students in Student Growth Percentiles (SGP) for students in comparison schools

Grade	School Year	Total # assessed	Well Below Average (1-10%)	Below Average (11- 25%)	Average (26-74%)	Above Average (75-89%)	Well Above Average (90-99%)
V	2016-17	273	82	60	98	22	11
К	2018-19	293	168	53	66	5	1
1	2016-17	326	91	69	129	25	12
1	2018-19	296	131	63	80	11	11
2	2016-17	292	115	49	101	20	7
	2018-19	254	136	50	55	10	3
2	2016-17	305	95	69	117	16	8
5	2018-19	337	161	60	102	8	6
Total	2016-17	1196	383	247	445	83	38
K-3	2018-19	1180	596	226	303	34	21

Table D3. Student Growth Percentiles (SGP) for students in T3 and comparison schools from 2016-17 to 2018-19

Schools	School Year	Number Assessed	Well Below Average (1-10%)	Below Average (11-25%)	Average (26-74%)
T3 schools	2016-17	437	36%	47%	51%
Comparison	2016-17	700	40%*	51%	52%
T3 schools	2018-19	383	49%	56%	57%
Comparison	2018-19	596	46%	59%	63%*

Appendix E: Statistical Tests

Group	Grade	Statistical Test
T3 Schools	Total K-3	<i>t</i> (2905) = 0.22, <i>p</i> = 0.83, Cohen's <i>d</i> = 0.003
	K	<i>t</i> (654) = 3.05, <i>p</i> = 0.002, Cohen's <i>d</i> = 0.24
	1	<i>t</i> (750) = 2.35, <i>p</i> = 0.02, Cohen's <i>d</i> = 0.19
	2	<i>t</i> (713) = 3.76, <i>p</i> < 0.001, Cohen's <i>d</i> = 0.28
	3	<i>t</i> (782) = 1.25, <i>p</i> = 0.21, Cohen's <i>d</i> = 0.08
Comparison Schools	Total K-3	<i>t</i> (2374) = 2.01, <i>p</i> = 0.04, Cohen's <i>d</i> = 0.08
	K	<i>t</i> (564) = 0.61, <i>p</i> = 0.54, Cohen's <i>d</i> = 0.05
	1	<i>t</i> (620) = 3.32, <i>p</i> = 0.001, Cohen's <i>d</i> = 0.26
	2	<i>t</i> (544) = 3.70, <i>p</i> < 0.001, Cohen's <i>d</i> = 0.31
	3	<i>t</i> (640) = 3.50, <i>p</i> < 0.001, Cohen's <i>d</i> = 0.27
Group	Year	Statistical Test
T3 Schools and	2016-17	<i>t</i> (2,527) = 3.36, <i>p</i> = 0.001, Cohen's <i>d</i> = 0.13
Comparison Schools	2018-19	<i>t</i> (2,552) = 1.32, <i>p</i> = 0.18,Cohen's <i>d</i> = 0.05

Table E1. aimswebPlus: Number of Correct Responses statistical tests

Group	Grade	Statistical Test
	Total K-3	<i>t</i> (2905) = 3.36, <i>p</i> < 0.001, Cohen's <i>d</i> = 0.20
	К	<i>t</i> (654) = 7.23, <i>p</i> < 0.001, Cohen's <i>d</i> = 0.57
T3 Schools	1	<i>t</i> (750) = 3.19, <i>p</i> = 0.001, Cohen's <i>d</i> = 0.23
	2	<i>t</i> (713) = 4.11, <i>p</i> < 0.001, Cohen's <i>d</i> = 0.31
	3	<i>t</i> (782) = 2.15, <i>p</i> = 0.032, Cohen's <i>d</i> = 0.15
	Total K-3	<i>t</i> (2374) = 7.05, <i>p</i> < 0.001, Cohen's <i>d</i> = 0.29
	К	<i>t</i> (564) = 3.92, <i>p</i> < 0.001, Cohen's <i>d</i> = 0.33
Comparison Schools	1	<i>t</i> (620) = 5.36, <i>p</i> < 0.001, Cohen's <i>d</i> = 0.43
	2	<i>t</i> (544) = 3.37, <i>p</i> = 0.001, Cohen's <i>d</i> = 0.28
	3	<i>t</i> (640) = 0.87, <i>p</i> = 0.39, Cohen's <i>d</i> = 0.07
Group	Data Point	Statistical Test
		Higher NPR in 2018-19 than in 2016-17: <i>F</i> (1,
T2 schools and	Fall to	5279) = 112.95, $p < 0.001$, $\eta^2 = 0.021$
Comparison schools	Fall to Spring	Higher NPR in Comparison schools than T3
Comparison schools	Spring	schools: $F(1, 5279) = 13.54$, $p < 0.001$, $\eta^2 =$
		0.003
Т3	Fall	<i>t</i> (2905) = 6.71, <i>p</i> < 0.001, Cohen's <i>d</i> = 0.23
	Spring	<i>t</i> (2095) = 0.37, <i>p</i> = 0.71, Cohen's <i>d</i> = 0.001
Comparison	Fall	<i>t</i> (2374) = 10.25, <i>p</i> < 0.001, Cohen's <i>d</i> = 0.33
Comparison	Spring	<i>t</i> (2374) = 4.27, <i>p</i> < 0.001, Cohen's <i>d</i> = 0.17

Group	Grade	Statistical Test
	Total K-3	<i>t</i> (2905) = 4.49, <i>p</i> < 0.001, Cohen's <i>d</i> = 0.16
	K	<i>t</i> (654) = 5.55, <i>p</i> < 0.001, Cohen's <i>d</i> = 0.44
T3 Schools	1	<i>t</i> (750) = 4.37, <i>p</i> < 0.001, Cohen's <i>d</i> = 0.32
	2	<i>t</i> (713) = 2.00, <i>p</i> = 0.046, Cohen's <i>d</i> = 0.15
	3	<i>t</i> (782) = 1.25, <i>p</i> = 0.21, Cohen's <i>d</i> = 0.10
	Total K-3	<i>t</i> (2373) = 1.95, <i>p</i> = 0.052, Cohen's <i>d</i> = 0.09
	K	<i>t</i> (564) = 1.61, <i>p</i> = 0.11, Cohen's <i>d</i> = 0.13
Comparison Schools	1	<i>t</i> (619) = 5.67, <i>p</i> < 0.001, Cohen's <i>d</i> = 0.44
	2	<i>t</i> (544) = 2.09, <i>p</i> = 0.037, Cohen's <i>d</i> = 0.19
	3	<i>t</i> (640) = 1.71, <i>p</i> = 0.088, Cohen's <i>d</i> = 0.21
Group	Year	Statistical Test
	2016-17	<i>t</i> (5281) = 3.25, <i>p</i> = 0.001, Cohen's <i>d</i> = 0.13
T3 schools and	2018-19	<i>t</i> (2752) = 1.39, <i>p</i> = 0.16, Cohen's <i>d</i> = 0.06
Comparison schools	2016-17 to	<i>t</i> (5281) = 10.54, <i>p</i> <0.001, Cohen's <i>d</i> = 0.06
	2018-19	

Table E3. aimswebPlus: Rate of Improvement statistical tests

Group	Grade	SGP Category	Statistical Test
		Well Below Average	<i>t</i> (1135) = 7.26, <i>p</i> < 0.001, Cohen's <i>d</i> = 0.48
	Total K-3	Below Average	<i>t</i> (605) = 3.68, <i>p</i> < 0.001, Cohen's <i>d</i> = 0.32
		Average	<i>t</i> (953) = 3.08, <i>p</i> = 0.002, Cohen's <i>d</i> = 0.23
		Well Below Average	<i>t</i> (284) = 5.90, <i>p</i> < 0.001, Cohen's <i>d</i> = 0.77
	К	Below Average	<i>t</i> (128) = 2.78, <i>p</i> = 0.006, Cohen's <i>d</i> = 0.49
		Average	<i>t</i> (191) = 0.38, <i>p</i> = 0.70, Cohen's <i>d</i> = 0.04
		Well Below Average	<i>t</i> (246) = 4.31, <i>p</i> < 0.001, Cohen's <i>d</i> = 0.08
T3 Schools	1	Below Average	<i>t</i> (171) = 2.77, <i>p</i> = 0.006, Cohen's <i>d</i> = 0.43
		Average	<i>t</i> (262) = 2.40, <i>p</i> = 0.017, Cohen's <i>d</i> = 0.29
		Well Below Average	<i>t</i> (296) = 2.53, <i>p</i> = 0.012, Cohen's <i>d</i> = 0.30
	2	Below Average	<i>t</i> (136) = 0.92, <i>p</i> = 0.36, Cohen's <i>d</i> = 0.15
		Average	<i>t</i> (235) = 1.82, <i>p</i> = 0.07, Cohen's <i>d</i> = 0.23
	3	Well Below Average	N/A
		Below Average	<i>t</i> (164) = 1.55, <i>p</i> = 0.12, Cohen's <i>d</i> = 0.23
		Average	<i>t</i> (259) = 1.01, <i>p</i> = 0.31, Cohen's <i>d</i> = 0.12
		Well Below Average	<i>t</i> (977) = 3.13, <i>p</i> = 0.002, Cohen's <i>d</i> = 0.23
	Total K-3	Below Average	<i>t</i> (471) = 3.05, <i>p</i> = 0.002, Cohen's <i>d</i> = 0.28
		Average	<i>t</i> (746) = 3.18, <i>p</i> < 0.001, Cohen's <i>d</i> = 0.40
		Well Below Average	<i>t</i> (248) = 0.93, <i>p</i> = 0.35, Cohen's <i>d</i> = 0.12
	К	Below Average	<i>t</i> (111) = 1.09, <i>p</i> = 0.28, Cohen's <i>d</i> = 0.21
		Average	<i>t</i> (162) = 0.96, <i>p</i> = 0.92, Cohen's <i>d</i> = 0.04
Comparison		Well Below Average	<i>t</i> (220) = 3.87, <i>p</i> < 0.001, Cohen's <i>d</i> = 0.51
Schools	1	Below Average	<i>t</i> (130) = 3.30, <i>p</i> = 0.001, Cohen's <i>d</i> = 0.58
5010013		Average	<i>t</i> (207) = 3.81, <i>p</i> < 0.001, Cohen's <i>d</i> = 0.52
		Well Below Average	<i>t</i> (249) = 0.78, <i>p</i> = 0.44, Cohen's <i>d</i> = 0.10
	2	Below Average	<i>t</i> (97) = 0.59, <i>p</i> = 0.56, Cohen's <i>d</i> = 0.11
		Average	<i>t</i> (154) = 3.87, <i>p</i> < 0.001, Cohen's <i>d</i> = 0.64
		Well Below Average	<i>t</i> (254) = 0.23, <i>p</i> = 0.82, Cohen's <i>d</i> = 0.03
	3	Below Average	<i>t</i> (127) = 1.83, <i>p</i> = 0.07, Cohen's <i>d</i> = 0.33
		Average	<i>t</i> (217) = 2.32, <i>p</i> = 0.02, Cohen's <i>d</i> = 0.33

Table E4a. aimswebPlus: Student Growth Percentile statistical tests

Group	Year	SGP Category	Statistical Test
		Well Below Average	<i>t</i> (818) = 2.25, <i>p</i> = 0.025, Cohen's <i>d</i> = 0.14
	2016-17	Below Average	<i>t</i> (540) = 1.42, <i>p</i> = 0.16, Cohen's <i>d</i> = 0.14
T2 achoola		Average	<i>t</i> (927) = 0.74, <i>p</i> = 0.46, Cohen's <i>d</i> = 0.03
15 schools	2018-19	Well Below Average	<i>t</i> (1294) = 1.30, <i>p</i> = 0.22, Cohen's <i>d</i> = 0.06
Comparison		Below Average	<i>t</i> (536) = 1.36, <i>p</i> = 0.18, Cohen's <i>d</i> = 0.11
schools			Average
30110013	2016-17	Well Below Average	<i>t</i> (1701) = 2.06, <i>p</i> = 0.04, Cohen's <i>d</i> = 0.10
	and	Below Average	<i>t</i> (1078) = 1.78, <i>p</i> = 0.08, Cohen's <i>d</i> = 0.10
	2018-19	Average	<i>t</i> (2114) = 0.29, <i>p</i> = 0.80, Cohen's <i>d</i> < 0.001

Table E4b. aimswebPlus: Student Growth Percentile statistical tests

Table E5. Independent R	eading Levels: M	linimum Growth	Goal statistical tests

Group	Grade	Statistical Test
T3 Schools	Total K-3	Chi-square $X^2(1, N = 3,366) = 43.12, p < 0.001$
	К	Chi-square $X^2(1, N = 782) = 18.32, p < 0.001$
	1	Chi-square $X^2(1, N = 842) = 4.66, p = 0.03$
	2	Chi-square <i>X</i> ² (1, N = 816) = 19.17, <i>p</i> < 0.001
	3	Chi-square $X^2(1, N = 926) = 6.49, p = 0.01$
Comparison Schools	Total K-3	Chi-square $X^2(1, N = 2,598) = 13.20, p < 0.001$
	К	Chi-square X ² (1, N = 590) = 12.26, <i>p</i> < 0.001
	1	Chi-square $X^2(1, N = 675) = 0.99, p = 0.32$
	2	Chi-square $X^2(1, N = 634) = 7.13, p = 0.008$
	3	Chi-square $X^2(1, N = 699) = 3.79, p = 0.052$
T3 Schools and	2016-17	Chi-square <i>X</i> ² (1, N= 1,381) =40.5, <i>p</i> <.001
Comparison Schools	2018-19	Chi-square <i>X</i> ² (1, N= 1,648) =13.5, <i>p</i> <.001

Table E6. Independent Reading Levels: Performed on Grade Level statistical tests

Group	Grade	Statistical Test
T3 Schools	Total 1-3	Chi-square $X^2(2, N = 2,584) = 6.44, p = .04$
	1	Chi-square $X^2(2, N = 842) = 5.30, p = .07$
	2	Chi-square $X^2(2, N = 816) = 3.37, p = .19$
	3	Chi-square $X^2(2, N = 926) = 1.46, p = .49$
Comparison Schools	Total 1-3	Chi-square $X^2(2, N = 2,008) = 3.18, p = .20$
	1	Chi-square $X^2(2, N = 675) = 3.00, p = .22$
	2	Chi-square $X^2(2, N = 634) = 9.44, p = .009$
	3	Chi-square $X^2(2, N = 699) = 3.21, p = .20$
Group	Year	Statistical Test
T3 Schools and	2016-17	Chi-square X^2 (2, N = 2,206) = 11.97, $p = 0.03$
Comparison Schools	201718	Chi-square <i>X</i> ² (2, N= 2,386) = 11.96, <i>p</i> = 0.03