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READ 180 at East High School, Rochester, New York

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Introduction

This report describes student academic outcomes associated with the implementation of two versions of *READ 180* at East High School, in Rochester, NY.[1] The school, which enrolls approximately 1,100 students organized into East Lower School (grades 6-8) and East Upper School (grades 9-12), was designated a "persistently failing school" by the State and placed in receivership in 2015. Several options are available to schools in receivership in New York, including closure, continuance as a charter school, subsumption under the State University system, or the establishment of an Educational Partnership Organization (EPO). East High chose the EPO option and entered into a partnership with the University of Rochester, which has continued throughout the ongoing receivership period.[2] As one component of its reform strategy, striving readers at East High engage with the *READ 180* platform, an intervention targeted at students who are performing two grade levels or more below their assigned grade. This study focuses on the 2016-17, 2017-18 and 2018-19 implementation years, and seeks to describe the correlational associations between *READ 180* usage and student reading development.[3]

Implementation Overview

The *READ 180* models and implementation strategies deployed at East High have changed considerably over time. During the 2016-17 school year students scoring at the below basic or basic levels on the *Reading Inventory* (*RI*) participated in *READ 180* Next Generation every other day. Students scoring as a Pre-Decoder, Beginning Decoder, and Developing Decoder on the *Phonics Inventory* (*PI*) also received *System 44* every other day. With the 2017-18 school year, students again participated every other day in *READ 180*, but East High adopted the latest version, *READ 180* Universal, a blended-learning version of *READ 180* with a flexible rotation strategy that includes both in-person and online instructional approaches. As with the prior year, students

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[1] The Rochester City School District enrolls approximately 26,000 pre-K-12 students in 31 elementary and 15 secondary schools. A majority of students are African American (53.1%), 32.7% are Hispanic, 9.6% are white, 2.0% are Asian, and 1.7% identify with other racial/ethnic groups. Approximately 86% of students are eligible for free/reduced-price lunch, and 14% have limited English proficiency.

[2] When interpreting potential *READ 180* impacts, it is important to bear in mind the many different simultaneous reforms taking place at East during this period.

[3] Given the very low reading levels among East students—on average over the past four years, fewer than 6% of students in grades 6-8 have scored at proficient levels on the NYS ELS assessments—virtually all of East's students have experienced *READ 180*.

scoring below basic and basic on the *RI and* below Advancing Decoder on the *PI* also received *System 44* every other day. With the 2018-19 school year, students engaged in *READ 180* Universal on a daily basis, while those scoring below basic or basic on the *RI* and below Advancing Decoder on the *PI* also engaged in *System 44* daily.[4] As we discuss our results, bear in mind that participation requirements for both *READ 180* and *System 44* increased substantially with the 2018-19 school year.

Participants

During the 2016-17 school year, 267 sixth through ninth grade students participated in *READ 180* Next Generation. During the 2017-18 academic year 218 students participated in *READ 180* Universal, as did 286 students in 2018-19 (see Table 1). Across all three years participating students were largely clustered in grades seven through nine. Reflecting the demographics of the school district, a majority of students were Black and roughly 30% were Hispanic. A majority were also male, and over three out of four were eligible for free/reduced-price lunch. Between 11 and 18% of students received special education services, and over one-quarter were limited English proficient in 2016-17 and 2017-18 as were just over 16% in 2018-19. Four out of every ten participating students were chronically absent during the 2016-17 school year, meaning they were absent over 10% of enrolled days, as were one out of three students during the 2017-18 and 2018-19 school years. It is important to note that inclusion in this study required that students did not change schools or drop out of school during the academic year.

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[4] We gathered this information from Larson, J., Rees, J., & Anderson, J. (2019). Doing the hard work in urban education: Designing a literacy program focused on students' assets and challenges.

Table 1. East High School *Read180* Student Background Characteristics

	2016-17 (n=267)	2017-18 (n=218)	2018-19 (n=286)
Grade			
% Sixth	2.2	5.5	12.2
% Seventh	34.8	29.4	32.5
% Eighth	35.2	29.8	23.1
% Ninth	27.7	35.3	32.2
Race/Ethnicity			
% Am Ind/Alaska Nat.	0.4	0.9	0.7
% Asian/Pac. Islander	3.7	5.1	3.1
% Black	57.3	52.3	59.1
% Hispanic	29.6	30.7	30.1
% White	9.0	11.0	7.0
% Female	45.7	47.2	42.0
% Free/Reduced-Price Lunch	83.5	77.1	80.8
% Special Education	15.4	17.4	11.5
% Limited English Proficient	25.1	25.2	16.4
% Chronically Absent (>10%)	41.2	33.7	33.9

Methods

Measures

  ***READ 180* Usage.** Our primary indicator of *READ 180* usage is the number of segments students completed during the academic year. What constitutes a "segment" differs across the *READ 180* Next Generation and Universal programs. In *READ 180* Next Generation, segments are organized around topics (e.g. sports, art, careers, the law, etc.), and take about two hours to complete across multiple sessions. Further, student reading levels determine whether they complete the program sequentially or whether they are provided choice among topics. With *READ 180* Universal, each segment consists of *explore*, *reading*, *language*, *fluency*, *writing*, and *success* zones, and typically takes around 2.5-3 hours to complete, again, across multiple sessions. Additionally, Universal students start with the "Mindset Matters" segment and then choose which segment they move on to next. Given these differences, the recommended dosage of segment completion also differs across programs, where the recommended dosage is 10+ segments for Next Generation and 6+ segments for Universal. It is important to note that while the recommended number of segments differs, the recommended total sessions (100+) and total time (24+ hours) is similar across programs.

We use a continuous indicator of the number of segments students completed each academic year, as well as a trichotomized version that organizes students into three groups: students who completed one or two segments; students who completed between three and five segments; and those who completed six or more *READ 180* segments. During the 2016-17 school year, students completed an average of 4.56 segments. With the implementation of the new *READ 180* Universal in 2017-18, usage rates dipped somewhat to 3.65, then rose again to an average of almost 5 completed segments in 2018-19, when daily participation was required. Across all three years, the average number of segments completed falls well below the recommended dosage. In both 2016-17 and 2017-18, the average number of completed segments represents roughly 35-40% of the recommended dosage for their respective programs, while in 2018-19, the average completed segments represent approximately 55% of recommended dosage. These lower rates may stem from many causes, but recall that one in three East High students were chronically absent each year. Indeed, with *READ 180* Universal, chronically absent students experienced roughly 40 sessions during the 2017-18 school year, compared to an average of almost 52 sessions for students who were not chronically absent. We find the same pattern with the 2018-19 academic year: chronically absent students completed fewer than 60 sessions on average compared to over 70 sessions for students who were not chronically absent. Below we discuss models that account for student attendance rates.

Outcomes. The *Reading Inventory* (*RI*) is a computer-adaptive assessment designed to measure how well students read literature and expository texts of varying difficulties. It focuses on a broad set of skills, including: identifying details in a passage; identifying cause-and-effect relationships and sequence of events; drawing conclusions; and making comparisons and generalizations. During test administration, the computer adapts the test continually according to student responses. Performance on the *Reading Inventory* is reported as a Lexile (L) score. The higher a student's score, the more challenging material that student is likely to be able to read and understand. Scores can range from Beginning Reader (below 200L) to Advanced Reader (above 1700L). The analyses in this report use results from *RI* administrations for the same students in the fall and spring of each academic year.

We report student Lexile gains in three ways. We focus first on dummy indicators of whether students met their Lexile growth targets, which are based on their grade level and their fall *RI* Lexile score. Importantly, across all grades, students with lower fall *RI* scores are expected

to gain more reading skills during the school year.[5] The second type of *RI* outcome measures student reading growth as a proportion of expected yearly gains. With this metric, a value of 1 indicates that a student made one year of reading growth during the academic year—in other words, the growth expected based on the student's grade and fall *RI* score. A value of 0.5 indicates one-half year of growth (or only 50% of the expected growth), while a value of 2 indicates two years of reading growth in a single academic year, or reading development double the expected rate. The third set of outcomes are Lexile gain scores—each student's fall score subtracted from their spring score—which were standardized (z-scored) within grades and years to permit the reporting of gains in effect-size units. As we report below, the models that employ these different versions of the *RI* outcomes tell the virtually identical story of *READ 180* effectiveness at East High School.

Covariates. One concern is that students who complete more *READ 180* segments may have additional social and academic background characteristics that also positively influence their reading development. To partially address these concerns, we constructed a series of OLS regression models, which we describe below, that account for student grade, sex, race/ethnicity (a series of dummy variables indicating whether the student identified as Asian, Hispanic, or white, with Black students servings as the comparison group), special education, poverty and language status, the number of days between *RI* assessments, and whether the student was chronically absent (>10% of days missed).

Analytic Approach

This study uses several different approaches to explore correlational associations between *READ 180* participation and student reading development at East High School. We begin by describing usage patterns and the link between these patterns and students' initial (fall) *RI* scores using the trichotomized usage indicator described above. We then use this indicator to explore the

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[5] This is a finding that has been reported for decades across multiple assessments and contexts (see Dumont, H., & Ready, D.D. (2020). Do schools reduce or exacerbate inequality? How the associations between student achievement and achievement growth influence our understanding of the role of schooling. *American Educational Research Journal*, *57*(2), 728-774; Ready, D.D. (2013). Associations between student achievement and student learning: Implications for value-added school accountability models. *Educational Policy*, *27*(2), 92-120.) Explanations for the phenomenon are many, including simple mean reversion, psychometric properties of the assessments, or that fact that teachers may focus more on struggling readers. Whatever the cause, the *RI* expected growth targets account for this association, and assume larger growth among initially lower-scoring students.

associations between usage and: 1) the dichotomous measure of whether students met their *RI* growth target, and; 2) the continuous indicator of yearly *RI* growth conditioned on expected growth.

We also constructed a series of OLS regression models that used the three *RI* outcomes described above. For each of the three outcomes, we created separate models with a continuous indictor of *READ 180* segment completion as the primary predictor, as well as dummy variable versions of the trichotomized usage indicator (medium and high segment completion compared to low completion). All models control for initial (fall) *RI* scores. We run all models both unadjusted as well as adjusted for the student social and academic background covariates described above. For the regressions focused on the dichotomous indicator of whether students met their *RI* growth target, we employed a linear probability approach. Logistic regression models suggested similar patterns of *READ 180* effectiveness, but given that the linear probability estimates are easier to interpret, we do not report the logistic odds ratios here.

Results

READ 180 Usage Patterns and Initial Reading Achievement

Table 2 indicates that, as one might expect, students who completed more segments also engaged in more *READ 180* sessions during the year. But note that within each of the three segment completion categories, the number of *READ 180* sessions increased across each of the three implementation years. For example, students who completed between three and five segments averaged just over 38 sessions during the 2016-17 academic year, but this same category of students engaged in over 64 sessions on average during the 2018-19 school year. Importantly, among students who completed more segments, the average length of each session was also longer.

Table 2 further indicates that students with lower Lexile scores in the fall engaged somewhat more with the program during the academic year. Students who completed six or more segments during the 2016-17 academic year had fall *RI* scores that were almost 80 points below those of their peers who completed between three and five segments. Because mean Lexile scores are associated with grade levels, these differences across usage groups may partly reflect differential usage by grade. To address this, the table also includes Lexile scores standardized (z-scored) within grades. In the 2016-17 academic year, medium-completion students had fall Lexile scores slightly (0.14 *SD*s) above their low-completion peers, while high-completion students had

fall Lexile scores moderately (and significantly) below their medium-completion peers (*ES* = -0.36; *p*<.05). During the 2017-18 school year low- and medium completion students had quite similar fall *RI* scores. Compared to these students, high-completion students again had initial *RI* scores over 70 points lower, or one-quarter standard deviations lower on the within-grade standardized scores (though the small sample sizes render the differences non-significant). We find the almost identical pattern during the 2018-19 school year, with comparable fall *RI* scores among low- and medium completion students, and relatively lower initial scores among high-completion students. But again, given the small sample sizes, these differences are statistically non-significant.

Table 2. Number of Sessions, Average Time per Session, and Student Fall *RI* Scores by Segment Completion

	Low (1-2) Segments Completed	Medium (3-5) Segments Completed	High (6+) Segments Completed
2016-17	*n*=75	*n*=121	*n*=71
Number of Sessions	31.3	38.3**	47.8***
Avg. Minutes/Session	12.9	14.9**	16.3***
Fall 2016 *RI* Score	567.4	598.2	519.7
(*SD*)	(258.4)	(237.8)	(234.7)
Within-grade z-scored	-0.01	0.139	-0.225
(*SD*)	(1.06)	(0.95)	(0.96)
2017-18	*n*=98	*n*=87	*n*=33
Number of Sessions	39.0	51.5***	63.4***
Avg. Minutes/Session	13.9	16.6**	21.8***
Fall 2017 *RI* Score	646.7	644.1	577.9
(*SD*)	(191.8)	(181.5)	(191.5)
Within-grade z-scored	0.03	0.05	-0.24
(*SD*)	(1.01)	(0.96)	(1.01)
2018-19	*n*=91	*n*=102	*n*=93
Number of Sessions	46.9	64.4***	88.2***
Avg. Minutes/Session	13.8	15.5**	17.4***
Fall 2018 *RI* Score	745.3	743.8	700.6
(*SD*)	(196.2)	(189.1)	(188.4)
Within-grade z-scored	0.07	0.07	-0.14
(*SD*)	(1.01)	(1.00)	(0.99)

**p<.01; ***p<.001. Note: all significance tests compared to low segment completion group.

Usage, Initial Achievement, and Reading Growth

Table 3 indicates the links between *READ 180* segment completion and our dichotomous indicator of whether students met or exceeded their Lexile growth targets, overall for each year and separately by grade. During the 2016-17 school year, three out of four students who completed six or more segments met or exceeded their growth target compared to only 61.3% of students who completed only one or two segments ($p<.10$). With the 2017-18 school year, 72.4% of students completing between three and five segments met or exceeded the expected Lexile growth targets compared to 59.2% of students who completed only one or two *READ 180* segments ($p<.10$). We find a similar (though statistically non-significant) advantage for high compared to low completers that year. This positive link between segment completion and Lexile growth was stronger during the 2018-19 school year, when 72.5% of students completing three to five segments met their Lexile growth target ($p<.01$), as did 80.6% of students completing six or more segments ($p<.001$), compared to only 51.6% of students who completed one or two segments. These results are consistent with our understanding of recommended dosage, where a greater percentage of students met or exceeded their Lexile growth target as the number of segments completed approached the recommended dosage. Appendix A presents similar analyses conducted separately for student subgroups, and supports the notion of stronger associations between *READ 180* usage and *RI* growth during the 2018-19 school year.

Table 3. Percent Meeting or Exceeding *RI* Growth Standards by *READ 180* Segment Completion and Grade

	Low (1-2) Segments Completed	Medium (3-5) Segments Completed	High (6+) Segments Completed
2016-17			
OVERALL	**61.3** **(*n*=75)**	**63.6** **(*n*=121)**	**76.1~** **(*n*=71)**
Sixth Grade	50.0 (*n*=4)	100.0 (*n*=1)	0.0 (*n*=1)
Seventh Grade	50.0 (*n*=22)	60.9 (*n*=46)	88.0** (*n*=25)
Eighth Grade	70.0 (*n*=40)	65.2 (*n*=46)	62.5 (*n*=8)
Ninth Grade	55.6 (*n*=9)	64.3 (*n*=28)	73.0 (*n*=37)
2017-18			
OVERALL	**59.2** **(*n*=98)**	**72.4~** **(*n*=87)**	**66.7** **(*n*=33)**
Sixth Grade	100.0 (*n*=5)	100.0 (*n*=4)	100.0 (*n*=3)
Seventh Grade	64.1 (*n*=39)	81.0 (*n*=21)	50.0 (*n*=4)
Eighth Grade	43.2 (*n*=37)	55.6 (*n*=18)	40.0 (*n*=10)
Ninth Grade	70.6 (*n*=17)	72.7 (*n*=44)	81.3 (*n*=16)
2018-19			
OVERALL	**51.6** **(*n*=91)**	**72.5**** **(*n*=102)**	**80.6*** *** **(*n*=93)**
Sixth Grade	100.0 (*n*=7)	86.7 (*n*=15)	84.6 (*n*=13)
Seventh Grade	52.0 (*n*=25)	71.4 (*n*=35)	75.8~ (*n*=33)
Eighth Grade	34.4 (*n*=32)	60.0~ (*n*=25)	66.8~ (*n*=9)
Ninth Grade	59.3 (n=27)	77.8 (n=27)	86.8* (n=38)

~*p*<.10; ***p*<.01; ****p*<.001.
Note: all significance tests compared to low segment completion group.

We also examined student *RI* growth using a continuous measure of actual gains as a proportion of expected gains (see Table 4). Recall that with this metric, a value of 1 indicates one year of growth (the expected norm), 0.5 represents one-half year of growth, while 2 indicates two years of growth in a single school year. During the 2016-17 academic year, gains among low-completion students were 33% above national norms, while students in the medium- and high-completion groups exhibited roughly 1.5 years of gain, or gain that was on average 50% above

what was expected. With the 2017-18 year, gains among low-completion students were at roughly the national average; medium-completion students gained 1.24 years during the academic year; and high-completion students gained 1.5 years during the school year. Given the small sample sizes, however, the between-group differences in 2016-17 and 2017-18 are not statistically significant. As above in Table 3, the strongest evidence of *READ 180* benefits is found with the 2018-19 school year, when gains among low-completion students mirrored national averages, while medium-completion students gained 65% above national norms ($p<.10$), and *high-completion students made roughly two years of RI gains in a single school year* ($p<.01$). Appendix B breaks down these results using narrower segment-completion bands.

Table 4. Years of *RI* Growth by *READ 180* Segment Completion and Grade

	Low (1-2) Segments Completed	Medium (3-5) Segments Completed	High (6+) Segments Completed
2016-17			
OVERALL	**1.33**	**1.55**	**1.53**
	(*n=75*)	**(*n=121*)**	**(*n=71*)**
Sixth Grade	-0.48	0.78	-2.17
	(*n=4*)	(*n=1*)	(*n=1*)
Seventh Grade	1.32	1.38	1.84
	(*n=22*)	(*n=46*)	(*n=25*)
Eighth Grade	1.60	1.45	1.35
	(*n=40*)	(*n=46*)	(*n=8*)
Ninth Grade	0.94	2.02	1.45
	(*n=9*)	(*n=28*)	(*n=37*)
2017-18			
OVERALL	**1.09**	**1.24**	**1.50**
	(*n=98*)	**(*n=87*)**	**(*n=33*)**
Sixth Grade	2.77	1.65	2.45
	(*n=5*)	(*n=4*)	(*n=3*)
Seventh Grade	1.25	2.03	1.40
	(*n=39*)	(*n=21*)	(*n=4*)
Eighth Grade	0.62	0.67	1.08
	(*n=37*)	(*n=18*)	(*n=10*)
Ninth Grade	1.28	1.06	1.62
	(*n=17*)	(*n=44*)	(*n=16*)
2018-19			
OVERALL	**0.97**	**1.65~**	**1.98****
	(*n=91*)	**(*n=102*)**	**(*n=93*)**
Sixth Grade	2.76	2.59	2.82
	(*n=7*)	(*n=15*)	(*n=13*)
Seventh Grade	0.97	1.78	1.83
	(*n=25*)	(*n=35*)	(*n=33*)
Eighth Grade	0.47	1.10	1.03
	(*n=32*)	(*n=25*)	(*n=9*)
Ninth Grade	1.05	1.46	2.05
	(n=27)	(n=27)	(n=38)

$\sim p<.10$; **$p<.01$
Note: all significance tests compared to low segment completion group.

OLS Regressions

This next section presents the results of our OLS regressions, which explore the extent to which the descriptive associations discussed above hold once we account for the social and academic backgrounds of the students who completed more *READ 180* segments. As outcomes, our first set of models employ a continuous measure of students' actual *RI* gains as a proportion of their expected gains. The results in Table 5 mirror those presented above in Table 4, with no

statistically significant associations between *READ 180* segment completion and yearly *RI* growth during the 2016-17 and 2017-18 academic years. But again, as in Table 4, columns 1 and 2 of Table 5 suggests that during 2018-19, each additional segment completed was associated with learning gains equal to 10% of an academic year ($p<.001$), and on an adjusted basis, almost 9% of an academic year ($p<.01$).[6] Columns 3 and 4 indicate that compared to students who completed only one or two segments, those who completed three to five segments gained almost 70% of an academic year more ($p<.05$), while students who completed six or more segments gained almost one full year more ($p<.001$). Once we adjust for the full host of student social and academic background covariates, the medium-to-low segment difference is no longer significant. But recall the very small samples sizes involved in these subgroup comparisons: 91 students in the low-completion group and 102 in the medium-completion group. Indeed, the 37.8% of-a-year learning advantage for medium compared to low segment completion is substantively quite important, although statistically non-significant. The high- compared to low-segment-completion group advantage, however, remains statistically significant, and suggests that high-completion students gained an additional 70% of a year more compared to their low-completion peers ($p<.05$).

Table 6 presents the results of OLS regressions that use standardized (z-scored) gain scores as outcomes in order to establish the link between *READ 180* usage and student learning in effect size units. Mirroring the findings presented in Table 5 above, we find few significant *READ 180* estimates in either the 2016-17 or 2017-18 school years. Only the adjusted linear segment completion (Column 2) estimate for 2016-17 is even marginally significant ($p<.10$), indicating a roughly 0.03 *SD* average increase in reading gains for each additional segment completed, holding all other measured student attributes constant. These limited results are not altogether unsurprising, given that, on average, students were receiving less than 50% of the recommended dosage. However, again as we did in Table 5, we find stronger correlational evidence of a link between *READ 180* usage and reading growth during the 2018-19 school year. Specifically, both the adjusted and unadjusted Model 1 estimates (Columns 1 and 2) suggest that each additional segment completed was associated with an almost 0.04 *SD* increase in *RI* gains. Put another way, an

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[6] Interpreting this in terms of raw Lexile gains is complicated by the associations between initial *RI* scores and *RI* growth. The models here adjust for the linear associations between initial status and *RI* growth, but it is unclear the extent to which this relationship in the published expected RI growth norms is linear (it likely is not). Keeping this consideration in mind, the fully adjusted models suggest that each additional segment completed is associated with a roughly five Lexile point yearly gain.

increase of 10 segments completed was associated with a sizable 0.40 *SD* increase in *RI* growth. More concretely, both the adjusted and unadjusted Model 2 estimates for 2018-19 indicate that students who completed three to five segments, and those who completed six or more segments, gained over one-third standard deviation more than their peers who completed only one or two segments. These results are consistent with the recommended dosage of segments completed (9+), where students receiving a greater percentage of the recommended dosage gained more than their peers who completed a much smaller percentage.

Linear probability models. We also ran a series of linear probability models similar to those presented immediately above, but with a dummy outcome indicating whether the student met their expected Lexile growth target (see Table 7). The unadjusted estimate in Column 1 suggests that each additional *READ 180* segment completed during the 2016-17 academic year was associated with an almost two percentage point increase in the probability students met their expected Lexile growth target ($p<.05$). The estimate increases slightly in the fully adjusted model (Column 2). The series of models in Columns 3 and 4 indicate that compared to their peers who completed only one or two segments, students who completed six or more segments were almost 16 percentage points more likely to meet their Lexile growth target ($p<.05$). Here again, the estimate increases in the fully adjusted model to an 18.4 percentage point advantage for high segment completion. We find little evidence of *READ 180* impacts during the 2017-18 year, when usage rates were lowest. Column 3 suggests a marginally significant estimate for medium compared to low segment completion ($p<.10$), but the estimate is no longer significant in the fully adjusted model (Column 4).

As with the regression results presented in Tables 5 and 6, the most consistent *READ 180* estimates in Table 7 come from the 2018-19 school year, the second year of *READ 180* Universal implementation, during which students participated every day. On an unadjusted basis, each additional segment completed was associated a 2.4 percentage point increase in the probability students met their Lexile growth targets ($p<.001$), with a slightly reduced estimate of 1.8 percentage points in the fully adjusted models ($p<.01$). Column 3 indicates that students who completed between three and five segments were almost 21 percentage points more likely to meet their growth target ($p<.001$), while students who completed six or more segments were over 28 percentage points more likely to meet their Lexile growth target ($p<.001$), both compared to

students who completed only one or two segments. Both estimates decrease in the fully adjusted model in terms of both magnitude and the level of statistical significance.

Table 5. *READ 180* Segment Completion and Yearly *RI* Gains

	(1) Model 1 (unadjusted)	(2) Model 1 (adjusted)	(3) Model 2 (unadjusted)	(4) Model 2 (adjusted)
2016-17 (*n*=267)				
Segments Completed	0.052	0.044	--	--
Medium Seg. Completed	--	--	0.164	0.032
High Seg. Completed	--	--	0.273	0.076
Fall *RI* Score	0.374***	0.318**	0.359**	0.302**
Constant	1.244***	0.878	1.334***	1.003
R²	0.048**	0.188***	0.043**	0.184***
2017-18 (*n*=218)				
Segments Completed	0.027	0.020	--	--
Medium Seg. Completed	--	--	0.011	0.061
High Seg. Completed	--	--	0.145	0.233
Fall *RI* Score	0.014	-0.027	0.011	-0.030
Constant	1.117***	1.558**	1.094***	1.571**
R²	0.003	0.161**	0.007	0.162**
2018-19 (*n*=286)				
Segments Completed	0.101***	0.085**	--	--
Medium Seg. Completed	--	--	0.694*	0.378
High Seg. Completed	--	--	1.021***	0.707*
Fall *RI* Score	0.012	-0.052	-0.005	-0.055
Constant	1.033***	0.099	0.957***	0.121
R²	0.047**	0.149***	0.045**	0.138***

~*p*<.10; **p*<.05; ***p*<.01; ****p*<.001. Outcome is yearly *RI* growth rate, where 1 = one year of growth (expected annual growth rate); 2= two years of growth; 0.5 = one-half year of growth. Low segment completion indicates 1-2 segments completed; medium category indicates 3-5 segments completed; high category indicates six or more segments completed. Fall *RI* Lexile scores are standardized (z-scored) within grades and years. Fully adjusted models additionally account for student grade, sex, race/ethnicity, special education, poverty and language status, number of days between assessments, chronic absences (>10% of days missed).

Table 6. *READ 180* Segment Completion and Lexile Point Gains

	(1) Model 1 (unadjusted)	(2) Model 1 (adjusted)	(3) Model 2 (unadjusted)	(4) Model 2 (adjusted)
2016-17 (*n*=267)				
Segments Completed	**0.023**	**0.034~**	--	--
Medium Seg. Completed	--	--	**0.125**	**0.135**
High Seg. Completed	--	--	**0.196**	**0.188**
Fall *RI* Score	-0.287***	-0.323***	-0.293***	-0.332***
Constant	-0.105	-0.461	-0.109	-0.427
R²	0.094***	0.242***	0.094***	0.238***
2017-18 (*n*=218)				
Segments Completed	**0.020**	**0.017**	--	--
Medium Seg. Completed	--	--	**0.073**	**0.072**
High Seg. Completed	--	--	**0.274**	**0.181**
Fall *RI* Score	-0.348*	-0.389***	-0.351***	-0.392***
Constant	-0.075	0.096	-0.071	0.102
R²	0.134***	0.237***	0.138***	0.238***
2018-19 (*n*=286)				
Segments Completed	**0.039***	**0.041***	--	--
Medium Seg. Completed	--	--	**0.335***	**0.251~**
High Seg. Completed	--	--	**0.338***	**0.316***
Fall *RI* Score	-0.384***	-0.404***	-0.395***	-0.407***
Constant	-0.193*	-0.920*	-0.229*	-0.915*
R²	0.189***	0.233***	0.187***	0.221***

~p<.10; **p<.01; ***p<.001. Low segment completion indicates 1-2 segments completed; medium category indicates 3-5 segments completed; high category indicates six or more segments completed. Fall *RI* Lexile scores and Lexile gain scores are standardized (z-scored) within grades and years. Fully adjusted models additionally account for student grade, sex, race/ethnicity, special education, poverty and language status, number of days between assessments, chronic absences (>10% of days missed).

Table 7. *READ 180* Segment Completion and the Probability of Meeting Lexile Growth Expectations

	(1) Model 1 (unadjusted)	(2) Model 1 (adjusted)	(3) Model 2 (unadjusted)	(4) Model 2 (adjusted)
2016-17 (*n*=267)				
Segments Completed	0.019*	0.024*	--	--
Medium Seg. Completed	--	--	0.015	0.030
High Seg. Completed	--	--	0.158*	0.184*
Fall *RI* Score	0.051~	0.056~	0.052~	0.056~
Constant	0.578***	0.396	0.614***	0.465~
R^2	0.024*	0.115**	0.027~	0.114*
2017-18 (*n*=218)				
Segments Completed	0.000	-0.005	--	--
Medium Seg. Completed	--	--	0.132~	0.071
High Seg. Completed	--	--	0.081	-0.002
Fall *RI* Score	0.024	0.007	0.024	0.007
Constant	0.665***	0.894***	0.591***	0.834***
R^2	0.002	0.167**	0.019	0.171**
2018-19 (*n*=286)				
Segments Completed	0.024***	0.018**	--	--
Medium Seg. Completed	--	--	0.209**	0.131~
High Seg. Completed	--	--	0.283***	0.199**
Fall *RI* Score	-0.028	-0.048~	-0.032	-0.047
Constant	0.565***	0.355~	0.519***	0.357~
R^2	0.056***	0.151***	0.071***	0.153***

~p<.10; *p<.05; **p<.01; ***p<.001. Outcome is a dummy variable indicating whether students met their expected Lexile growth target during the academic year. Low segment completion indicates 1-2 segments completed; medium category indicates 3-5 segments completed; high category indicates six or more segments completed. Fall *RI* Lexile scores are standardized (z-scored) within grades and years. Fully adjusted models additionally account for student grade, sex, race/ethnicity, special education, poverty and language status, number of days between assessments, chronic absences (>10% of days missed).

Alternative Model Specifications

To explore the extent to which the link between *READ 180* participation and reading growth varied across student social and academic characteristics, we created interaction terms between both the continuous and trichotomized usage measures and fall *RI* scores, language and special education status, and poverty status. None of these interactions were significant for any year. This is not surprising given the relatively small samples, particularly the small sub-group sample sizes associated with some of the student demographic characteristics. We also explored whether receiving *READ 180* for two consecutive years was associated with increased reading growth above and beyond that associated with gains during individual school years and found that it was not. In other words, there were only additive effects rather than multiplicative effects of two consecutive years of participation. Lastly, we combined the 2017-18 and 2018-19 cohorts and reran the OLS and linear probability models. None of the *READ 180* estimates were statistically significant.

Conclusions

The results described above provide some evidence of the effectiveness of *READ 180* at East High School, particularly during the 2018-19 academic year. During this final implementation year, we consistently found that students who completed more *READ 180* segments experienced stronger reading growth. More specifically, on an unadjusted basis, students who completed between three and five *READ 180* segments during the 2018-19 school year experienced 1.7 years of *RI* gains, while students who completed six or more segments exhibited *RI* gains that were equivalent to two years of academic growth during that single academic year. Put another way, compared to students who completed only one or two segments, the probabilities that medium- and high-segment-completion students met their Lexile growth targets were roughly 20 and 30 percentage points greater, respectively. Expressed in effect size units—a common way to measure program impacts—medium- and high-levels of engagement were associated with roughly one-third standard deviation greater Lexile gains on an unadjusted basis. With all three outcome metrics, the effects are somewhat smaller on an adjusted basis. These results were consistent across students regardless of race/ethnicity, free/reduced-price lunch eligibility, attendance, gender, and language and special education status.

It is important to stress that these may be conservative estimates, as the vast majority of students in all three implementation years did not receive the recommended *READ 180* dosages. On average, students received less than 50% of the recommended dosage for their respective *READ 180* programs. Even during the second year of *READ 180* Universal implementation, when students participated daily (2018-19), and *RI* growth was most strongly related to segment completion, participation rates were still far below what is recommended. For example, the unadjusted models suggest that students who completed six or more segments gained skills at double the rate of students who completed only one or two segments. But even these "high-completion" students received only 88% of the recommended *READ 180* dosage. In sum, these results tell a consistent (although not necessarily causal) story; students who received a greater percentage of the recommended dosage gained more than their peers who received smaller dosages.

Limitations

The obvious caveat with these analyses is that the implementation and resulting data cannot identify the causal impact of *READ 180* on student reading development. Because virtually all students at East High participated in the implementation, no within-school comparison students were available, meaning the results provided here are suggestive only. Moreover, the fact that the lowest performing readers also participated in *System 44*, and that participation requirements doubled with the 2018-19 school year, further complicate efforts to identify a clean link between *READ 180* and student reading development. However, the OLS regressions did adjust for many of the student characteristics associated with *READ 180* segment completion, notably initial reading ability and school attendance rates, and special education and language minority status. A final consideration is the small within-year sample sizes. Many of the differences reported as non-significant may actually be substantively important. However, the lack of precision related to the limited statistical power hampers our ability to identify statistically significant between-group differences.

Given these limitations, more robust experimental and quasi-experimental studies are clearly warranted to provide contemporary evidence of the extent to which *READ 180* helps all students achieve reading proficiency. That being said, these results clearly suggest that fidelity of

implementation is critical: students who received a greater percentage of the recommended dosage consistently gained more than those students who received smaller dosages.

Appendix A

Table A1. Percent of Black Students Meeting or Exceeding *RI* Growth Standards by *READ 180* Segment Completion

	Low (1-2) Segments Completed	Medium (3-5) Segments Completed	High (6+) Segments Completed
2016-17	71.4 (*n*=42)	63.6 (*n*=66)	82.2 (*n*=45)
2017-18	51.9 (*n*=54)	76.1* (*n*=46)	71.4 (*n*=14)
2018-19	57.4 (*n*=47)	64.1 (*n*=64)	86.0** (*n*=57)

~p<.10; ***p*<.01; ****p*<.001.
Note: all significance tests compared to low segment completion group.

Table A2. Percent of Hispanic Students Meeting or Exceeding *RI* Growth Standards by *READ 180* Segment Completion

	Low (1-2) Segments Completed	Medium (3-5) Segments Completed	High (6+) Segments Completed
2016-17	40.7 (*n*=27)	61.1 (*n*=36)	68.8~ (*n*=16)
2017-18	62.1 (*n*=29)	59.3 (*n*=27)	63.6 (*n*=11)
2018-19	43.2 (*n*=37)	80.8** (*n*=26)	69.6* (*n*=23)

~p<.10; ***p*<.01; ****p*<.001.
Note: all significance tests compared to low segment completion group.

Table A3. Percent of Free/Reduced-Price Lunch Students Meeting or Exceeding *RI* Growth Standards by *READ 180* Segment Completion

	Low (1-2) Segments Completed	Medium (3-5) Segments Completed	High (6+) Segments Completed
2016-17	57.1 (*n*=63)	63.0 (*n*=100)	75.0* (*n*=60)
2017-18	59.3 (*n*=81)	71.0 (*n*=62)	64.0 (*n*=25)
2018-19	54.7 (*n*=75)	69.8* (*n*=86)	82.9* (*n*=70)

~p<.10; ***p*<.01; ****p*<.001.
Note: all significance tests compared to low segment completion group.

Table A4. Percent of English Language Learners Meeting or Exceeding *RI* Growth Standards by *READ 180* Segment Completion

	Low (1-2) Segments Completed	Medium (3-5) Segments Completed	High (6+) Segments Completed
2016-17	41.2 (*n*=17)	56.3 (*n*=32)	61.1 (*n*=18)
2017-18	38.9 (*n*=18)	75.0* (*n*=24)	56.8 (*n*=13)
2018-19	43.8 (*n*=16)	81.8* (*n*=11)	70.0 (*n*=20)

*~p<.10; **p<.01; ***p<.001.*
Note: all significance tests compared to low segment completion group.

Table A5. Percent of Special Education Students Meeting or Exceeding *RI* Growth Standards by *READ 180* Segment Completion

	Low (1-2) Segments Completed	Medium (3-5) Segments Completed	High (6+) Segments Completed
2016-17	68.4 (*n*=19)	53.8 (*n*=13)	88.9 (*n*=9)
2017-18	58.8 (*n*=17)	50.0 (*n*=18)	33.3 (*n*=3)
2018-19	47.1 (*n*=17)	75.0 (*n*=4)	66.7 (*n*=12)

*~p<.10; **p<.01; ***p<.001.*
Note: all significance tests compared to low segment completion group.

Table A6. Percent of Chronically Absent Students Meeting or Exceeding *RI* Growth Standards by *READ 180* Segment Completion

	Low (1-2) Segments Completed	Medium (3-5) Segments Completed	High (6+) Segments Completed
2016-17	57.6 (*n*=33)	56.9 (*n*=51)	73.1 (*n*=26)
2017-18	55.8 (*n*=43)	70.4 (*n*=27)	75.0 (*n*=4)
2018-19	45.9 (*n*=37)	81.3** (*n*=32)	85.7** (*n*=28)

*~p<.10; **p<.01; ***p<.001.*
Note: all significance tests compared to low segment completion group.

Appendix B

<u>Table B1</u>. Years of *RI* Growth by *READ 180* Segment Completion

	Segments Completed					
	One	Two	Three	Four	Five	Six +
2016-17	1.20	1.43	1.13	1.70	1.83	1.53
	(n=32)	(n=43)	(n=41)	(n=46)	(n=34)	(n=71)
2017-18	0.96	1.21	1.20	1.08	1.40	1.50
	(n=45)	(n=53)	(n=37)	(n=20)	(n=30)	(n=33)
2018-19	0.94	0.97	1.69	1.39	1.82	1.98
	(n=42)	(n=49)	(n=44)	(n=27)	(n=31)	(n=93)

No differences significant at the $p<.10$ level.