MetaMetrics

National Lexile Study

Impact of Achieve3000 Literacy Usage on Student Reading Growth

2020-2021 SCHOOL YEAR

JUNE 2021

Foreward by Dr. Malbert Smith

As CEO, President, and Cofounder of MetaMetrics, an educational measurement and research organization dedicated to bringing meaning to measurement in education and, specifically, to developing scientific measures of student achievement, I am delighted to share my thoughts about Achieve3000 and the results of this year's National Lexile Study.

As a research scientist, I understand that studies like this one are absolutely critical in gauging the efficacy of a specific learning approach or solution. In order to know where you're going, and whether you're making progress toward getting there, you first need to know where you are right now. In the case of Achieve3000, their stated mission is to unlock potential and accelerate learning growth for every student.

Before we talk about whether they are succeeding in that mission, I'd like to take a step back. I think it's really important in large independent studies like this one to remember that we're just not talking about thousands of data points. We're talking about students—living, breathing, laughing, learning human students. That's why my company is called MetaMetrics, which literally means "beyond the metrics."

When I think of Achieve3000 Literacy, a few words come to mind. Differentiation is one. Acceleration is another. Culturally relevant content is three more. Achieve3000 was an edtech before we even called them that. For more than 21 years, they've been finding better ways to use technology to increase engagement and accelerate learning growth for students everywhere.

This National Lexile Study is a snapshot of how well they were able to do that in 2020-21. It's been a challenging time in education. No one saw the pandemic coming. It forced schools and districts to adapt very quickly to a "new normal." It wasn't easy for anybody. Kids had meltdowns. Parents expressed their frustration in viral videos. And educators took a deep breath and overcame incredible challenges to move forward.

Despite all of the challenges, a funny thing happened: kids continued to read and learn and grow. And kids who had access to online learning solutions like Achieve3000 Literacy did even better. They read. They learned. And they grew like crazy. I'm not going to get into the actual data. But what I can tell you is that year after year, studies like this tell us one thing: Achieve3000 Literacy really works.

Dr. Malbert Smith
President, MetaMetrics

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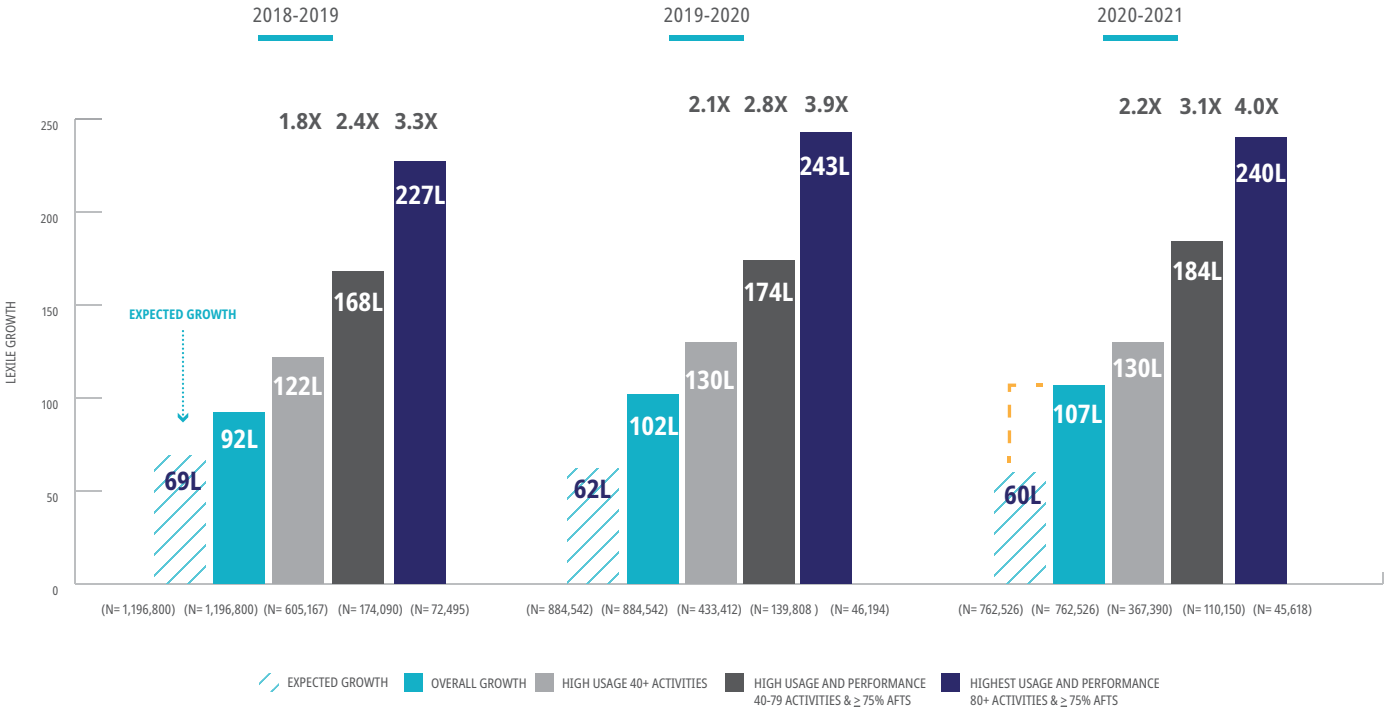
Executive Summary

On average, engaged students achieved 4X their expected reading growth.

This report is a continuation of the annual summative analysis exploring the impact of Achieve3000 Literacy usage on Lexile® growth and acceleration. In addition, it is a continuation of previous analyses designed to uncover the impact of the COVID pandemic on American schools.

- **Students of all racial and ethnic groups experienced strong acceleration when engagement was high.** As part of Achieve3000's commitment to diversity, equity, and inclusion this study includes the first-ever analysis of acceleration across racial and ethnic groups. While there are some variations, when highly engaged, students from all backgrounds experienced comparable rates of accelerated reading growth (See page 21).
- **Highly engaged learners achieved 3.6 to 4.4 times expected reading growth across all learning environments.** Schools responded to the pandemic in a variety of ways—some chose remote instruction while others brought students back full or part-time. Nationally, 42% of students and 35% of districts were learning from home most of the year. (See pages 12 and 13).
- **Despite limited access to online learning, engaged students obtained higher than expected Lexile growth.** On average, students gained 107L, which was 47L higher than their expected growth of 60L. The pandemic's impact resulted in 36% fewer students in the overall sample in comparison to the 2018-2019 school year. Students must remain active for 150 days to be included in the study, and this was not possible for many due to the many challenges families and schools have experienced this past year and a half (See below and page 18).

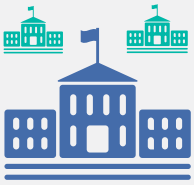


- **Highly engaged learners in specific student population groups attained at least 3X their expected reading growth.** Educators and families of students in need of additional supports were especially concerned about the impact unfinished learning might have on their students. Analyses for below-grade-level readers demonstrated 3.7X expected growth and students learning English as a new language achieved 3.2X expected growth. (See pages 23 and 25).
- **The percentage of students who were on track for college and career readiness increased from 23 to 36 percent.** Reading proficiency is one of the strongest indicators of success after high school. Using grade-level benchmarks developed by MetaMetrics, Achieve3000 Literacy provides educators with insight into how many of their students are progressing at a rate that they are "on track" to reach college-level reading proficiency by the end of 12th grade (1300L) (See page 28).

About the 2020-2021 Study

1,115 DISTRICTS

4,980 SCHOOLS



762,530 STUDENTS

50 STATES

(plus Washington, D.C. & 4 U.S. Territories)

49,200,000 TOTAL LOG-INS

31,200,000 LESSONS

AVERAGE EXPECTED READING GROWTH

60L

AVERAGE OVERALL GROWTH

107L

FOR ALL STUDENTS

Methodology

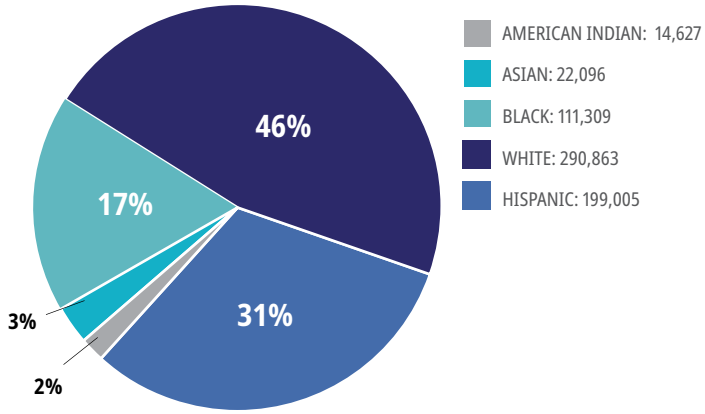
Sample Criteria and Description

The sample in this report includes students who were enrolled in grades 2 through 12 during the 2018-2019, 2019-2020, or 2020-2021 school years. The data includes English-only program usage and performance data. Students were included in the final sample if they met the following criteria:

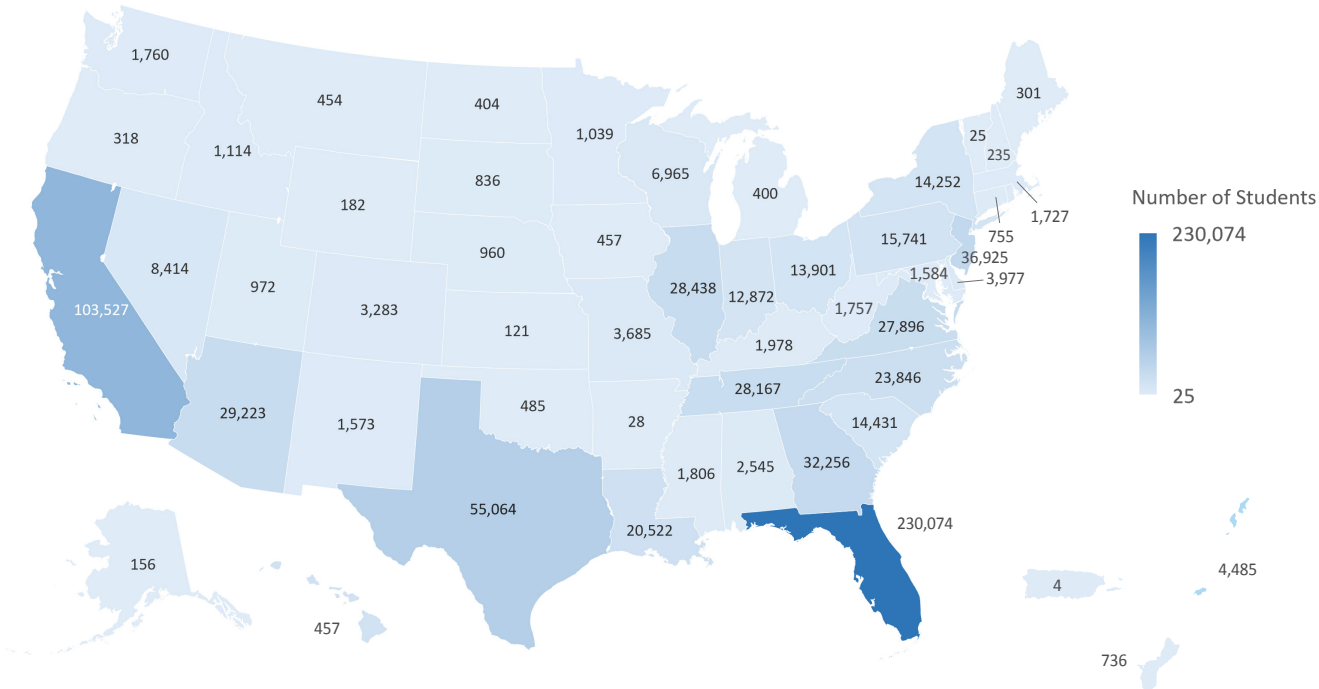
- Had a pre-test LevelSet™ Lexile reading measure
- Had an end-of-year Lexile® measure
- Completed one or more multiple-choice assessments
- Did not receive any manual Lexile adjustments
- Had at least 150 days between the pre-test LevelSet Lexile measure and the end-of-year Lexile measure

OVERVIEW OF 2020-2021 STUDENT DEMOGRAPHICS

*This data represents 60% of the entire sample.



GEOGRAPHIC DISTRIBUTION OF STUDENTS IN SAMPLE



Analysis

MetaMetrics first completed a descriptive analysis of the student sample and then ran two-tailed t-tests to determine the statistical significance of the differences between actual and expected Lexile growth. Statistical significance is defined as a p-value of less than .05, indicating a 95% level of confidence for the results found did not occur by chance. Throughout this study, MetaMetrics examines how students' performance, overall literacy growth, and rate of acceleration is impacted by a variety of factors, including race and ethnicity, English learner status, income level, and degree of engagement.

Many of the lessons in Achieve3000 Literacy include an embedded assessment (Step 3). Students' performance on this assessment is used to determine the just-right text, differentiated at 1 of 12 Lexile levels in English and 8 in Spanish, for each student. The study categorizes usage as the number of lessons a student has completed during the study period. Students must complete the assessment in order for the lesson to be counted.

STEP 1
BEFORE READING POLL

STEP 2
ARTICLE

STEP 3
MULTIPLE-CHOICE ASSESSMENT

STEP 4
AFTER READING POLL

STEP 5
THOUGHT QUESTION

Reporting Categories

This study focuses its examination of students' Lexile growth on implementation models with a minimum level of usage and performance, according to the number of lessons and the average score students attain on embedded assessments. Many of Achieve3000's lessons include an embedded assessment within Step 3 of the 5-Step Literacy Routine.

MetaMetrics completed sub-analyses for students who were on track to complete:

- 40+ lessons in a year,
- 40-79 lessons with a 75% average first-try score (AFTS), and
- 80+ lessons with a 75% average first-try score.

When the average first-try score is 75% or higher, it is an indication that the texts students read were properly targeted to their individual reading level and that their comprehension of the texts was optimal for growth in reading ability. Similarly, when students complete more activities, they have completed a higher quantity of work in the program. Completing one activity per week is considered a high level of usage; two per week is defined in this study as the highest level of usage.

Reporting Category Key

HIGHEST USAGE AND PERFORMANCE
*AFTS greater than or equal to 75% and on track to complete 80 lessons in a year (2+lessons/week)

HIGH USAGE AND PERFORMANCE
AFTS greater than or equal to 75% and on track to complete 40-79 lessons in a year (1-2 lessons/week)

HIGH USAGE
40+ lessons in a year (1+ lessons/week)

OVERALL GROWTH

EXPECTED GROWTH

*AFTS = Average First Try Score

Year-Over-Year Comparison of Usage and Performance

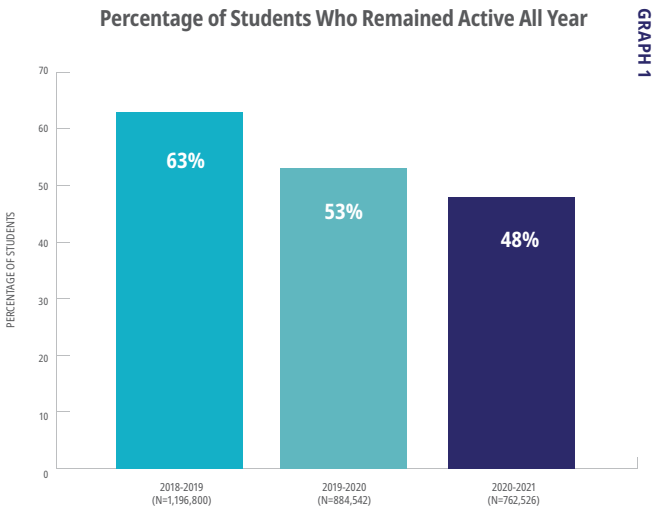
The number of licensed users who remained active all year dropped by 15% during the pandemic.

For the past five years, Achieve3000 has conducted annual studies of the usage and performance data of students engaging in Achieve3000 Literacy. The main focus of those studies was to examine the impact on students who had the opportunity to use the program for the majority of the school year. Therefore, students were excluded who did not have at least 150 days between their pre-test and final Lexile measure. The same filter was used in the present study for all three years studied.

As can be seen in **Graph 1**, a lower percentage of students met this threshold during the COVID-19 pandemic than before. This is likely due to the large number of students who were frequently learning from home and did not engage in or have access to online learning, or the additional attention and motivation that teachers in an in-class setting can provide.

The pandemic had a clear impact on the number of students who remained active for the entire school year.

GRAPH 1



While fewer students remained active all year, those who were active maintained levels of engagement similar to before the pandemic.

As can be seen in **Table 1**, on average, students in all three years completed more than 1 lesson per week and approached the high-performance benchmark of a 75% average-first-try score.

TABLE 1

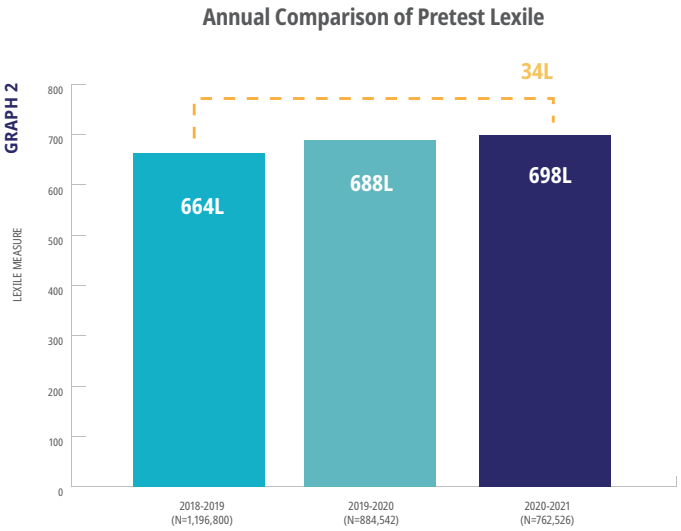
Year-Over-Year Comparisons

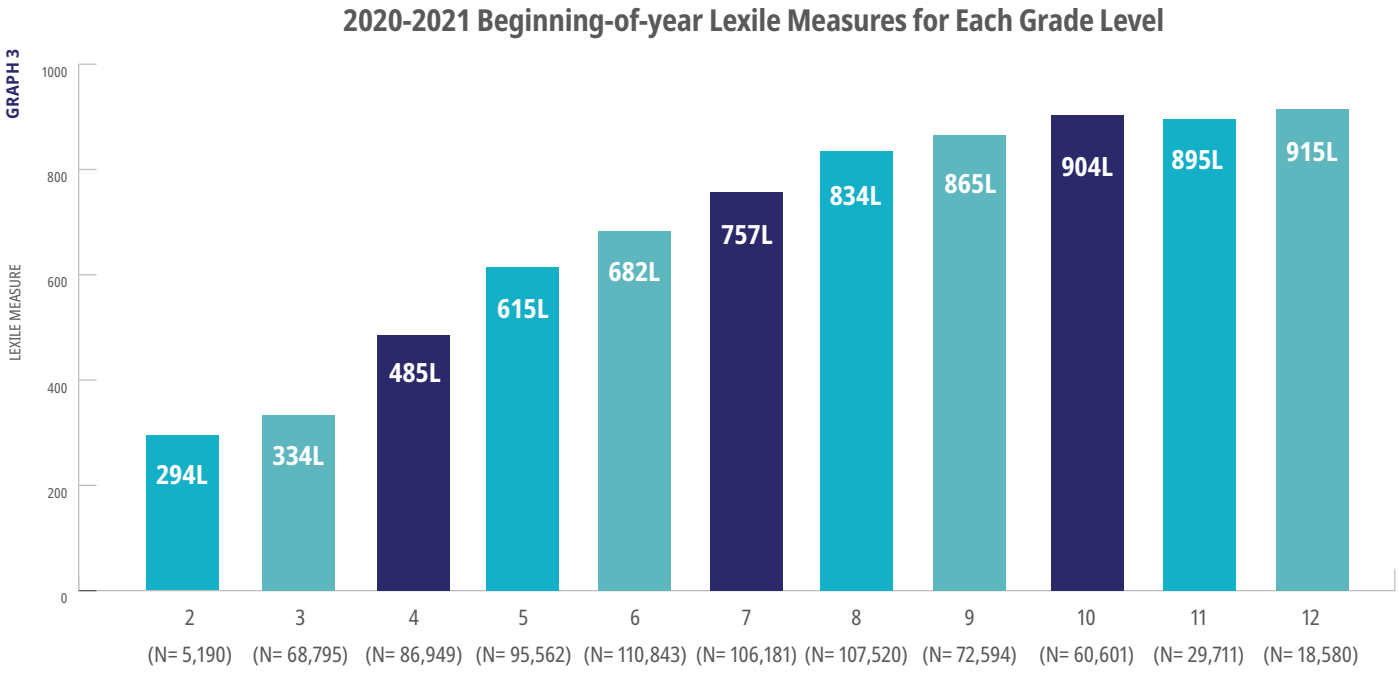
Year	N Count	Avg Logins per Week	Avg Lessons per Week	Average First-Try Score
2018 - 2019	1,196,800	1.7	1.3	70.1%
2019 - 2020	884,542	1.6	1.2	71.4%
2020 - 2021	762,526	1.7	1.2	70.7%

The average beginning-of-year reading level for students in this sample was 34L higher than it was before the pandemic.

As can be seen in **Graph 2**, pre-test Lexile was higher in the 2019-2020 and 2020-2021 school years compared to 2018-2019. This suggests that more capable readers were active for the entire year during the last two years than in 2018-2019.

Graph 3 shows that the pre-test Lexile measures increased with students' grade level. **Table 2** shows the pre-test Lexile measure by grade for the past 3 school years. As observed at the overall level, pre-test Lexiles were higher in the 2019-2020 and 2020-2021 school years than the 2018-2019 school year for each grade.





Year-Over-Year Comparison

TABLE 2

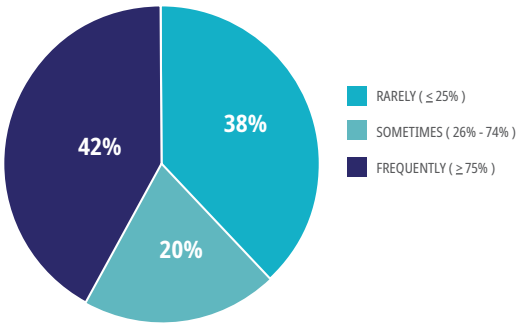
Grade	2018 - 2019		2019 - 2020		2020 - 2021	
	N Count	Pretest Lexile Mean	N Count	Pretest Lexile Mean	N Count	Pretest Lexile Mean
2	17,495	138.2	11,516	228.6	5,190	293.5
3	102,357	302.1	73,144	351.5	68,795	334.0
4	123,864	460.1	94,397	494.1	86,949	484.5
5	137,817	585.4	104,567	616.7	95,562	614.5
6	190,509	664.9	138,704	682.5	110,843	681.8
7	175,625	725.0	132,510	741.7	106,181	756.7
8	165,048	795.6	131,662	810.0	107,520	833.5
9	113,387	805.2	80,757	823.2	72,594	865.4
10	88,222	855.6	63,955	872.2	60,601	904.3
11	50,678	864.1	33,115	889.5	29,711	894.7
12	31,798	870.1	20,215	898.3	18,580	914.9

42% of students and 35% of districts were learning from home most of the year.

Starting in October 2020, the Achieve3000 Literacy platform asked students to indicate if they were logging in from home or school each time they logged in. Nationally, 52.1% of all logins between October 2020 and May 2021 were reported to be from home. Students, or districts, were categorized as rarely logging in from home when 25% or less of their logins were from home. Conversely, they were categorized as frequently logging in from home when 75% or more of their logins were from home. The remaining students and districts were categorized as sometimes logging in from home. As shown in **Graph 6**, Lexile Growth was fairly consistent for students who rarely, sometimes, or frequently logged in from home, with highly engaged students achieving 3.6 to 4.4 times expected growth.

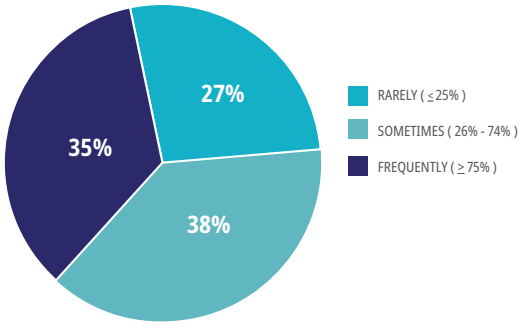
GRAPH 4

Percentage of Students Who Logged in Rarely, Sometimes, or Frequently from Home



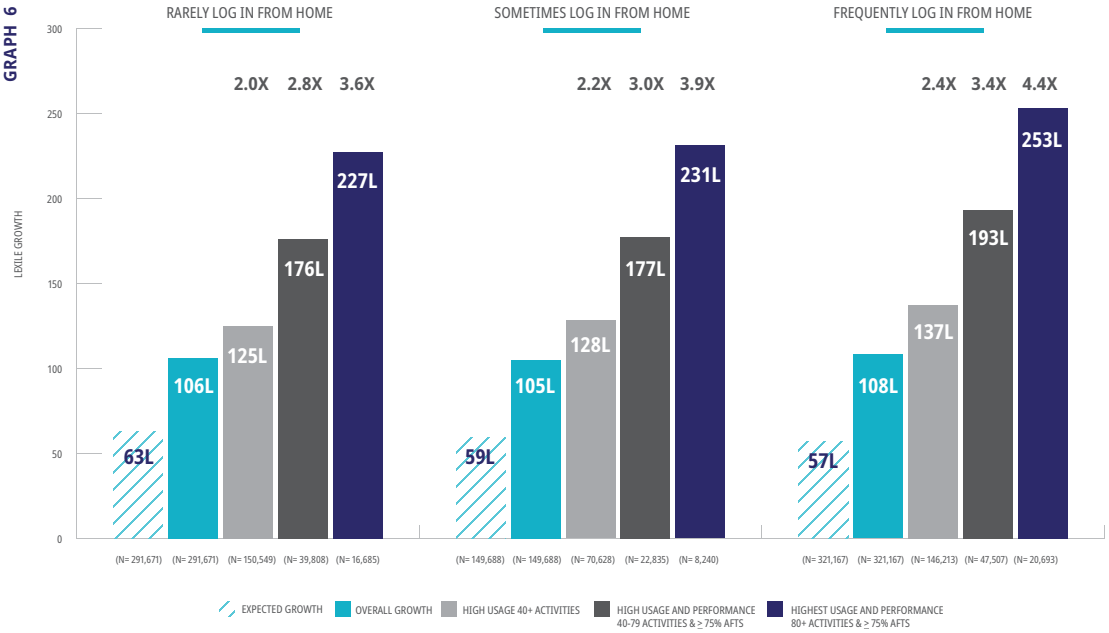
GRAPH 5

Percentage of Districts with Logins Rarely, Sometimes, or Frequently from Home



Highly engaged learners achieved 3.6 to 4.4 times expected reading growth across all learning environments.

GRAPH 6

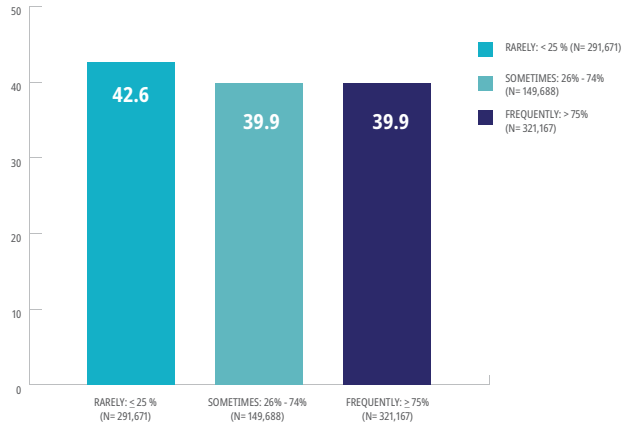


Note: In each learning environment, overall growth (ranging from 105L to 108L) exceeded expected growth (ranging from 57L to 63L), and these differences were statistically significant, $t > 156.76$, $p < 0.001$. However, expected growth was exceeded even more by students with 40+ activities (ranging from 125L to 137L), 40-79 activities & ≥ 75% AFTS (ranging from 176L to 193L), and 80+ activities & ≥ 75% AFTS (ranging from 227L to 253L), with these differences also statistically significant, $t > 205.87$, $p < 0.001$.

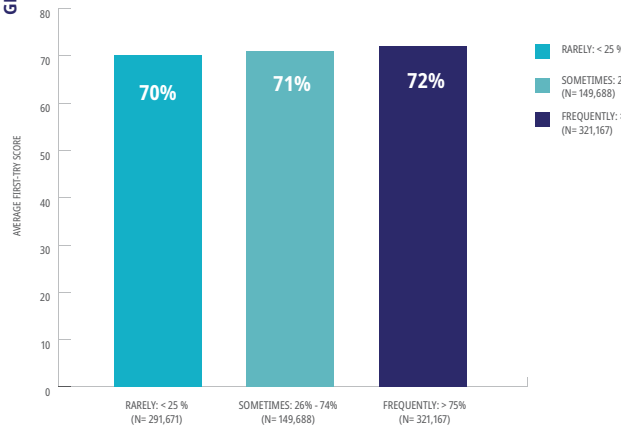
Student engagement remained nearly constant across all learning environments.

While students who spent more time learning in school completed 2.5 more lessons per year (See **Graph 7**) than students who spent most of their time at home, average performance was slightly higher for students at home (See **Graph 8**). This could be due to the fact that students had fewer distractions or more help when at home. Or it could be due to the possibility that students who were disciplined enough to maintain a strong learning routine at home tended to be more capable readers to begin with than students who remained active in traditional in-class environments. These results reinforce the importance of in-class instruction and motivation for students with lower reading abilities.

GRAPH 7

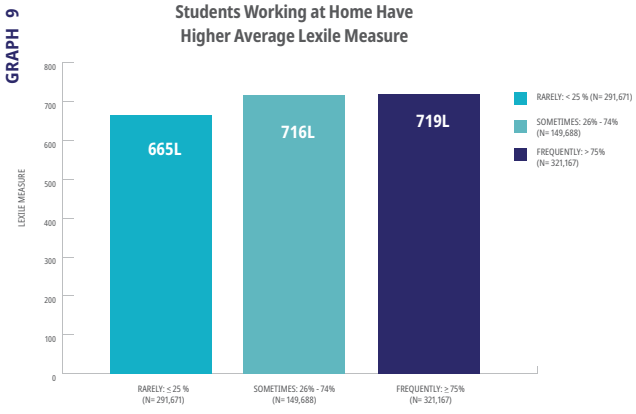


GRAPH 8

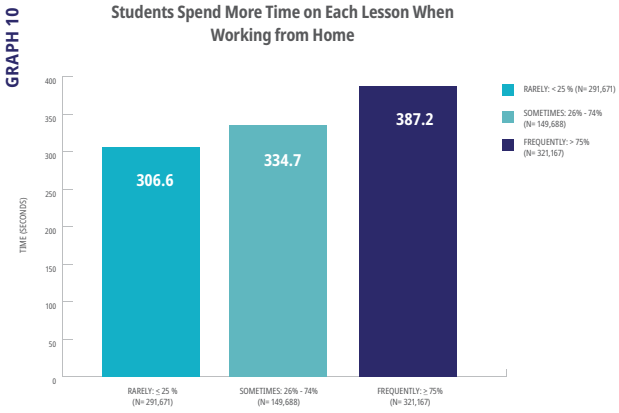


Consistent with this possibility, **Graph 9** shows that students who frequently or sometimes logged in from home did start the year with a higher pre-test Lexile measure than students who rarely logged in from home. Another possibility for the higher average first-try score is that in many instances the home environment may be more conducive to concentration, allowing students to focus more and better understand the content they are reading. Consistent with this possibility, **Graph 10** shows that students who frequently logged in from home did take more time — over a minute — to complete activities than students who rarely logged in from home.

GRAPH 9



GRAPH 10

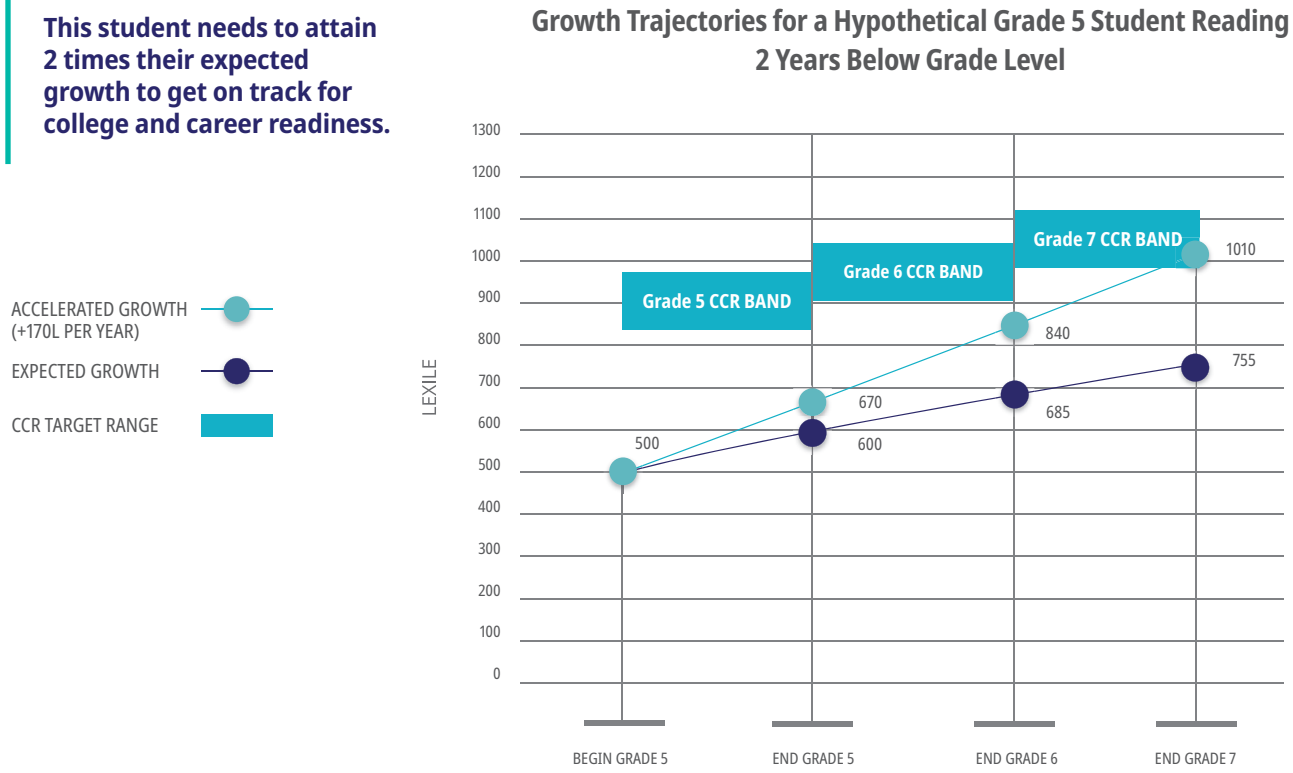


Levels of Acceleration Before and During the Pandemic

Why accelerated growth is important.

Several reports inside the Teacher Edition of Achieve3000 Literacy refer to students' overall and expected Lexile growth. Expected growth is based on MetaMetrics's proprietary formula (MetaMetrics, 2004), which considers the student's initial Lexile measure and the length of time from the student's beginning-of-year measure to the end-of-year measure. Overall growth is calculated by subtracting the student's beginning-of-year Lexile measure from her current or end-of-year Lexile measure. Accelerated growth is any growth above a student's expected growth. Achieve3000 is especially committed to making accelerated literacy growth possible for more students, especially below-grade-level readers. When we consider shifts in Lexile growth, it is important to remember that students who are performing below grade-level often need to double or triple their expected growth over the course of two to three years in order to achieve college and career readiness by high school graduation. (See chart below.)

This student needs to attain 2 times their expected growth to get on track for college and career readiness.

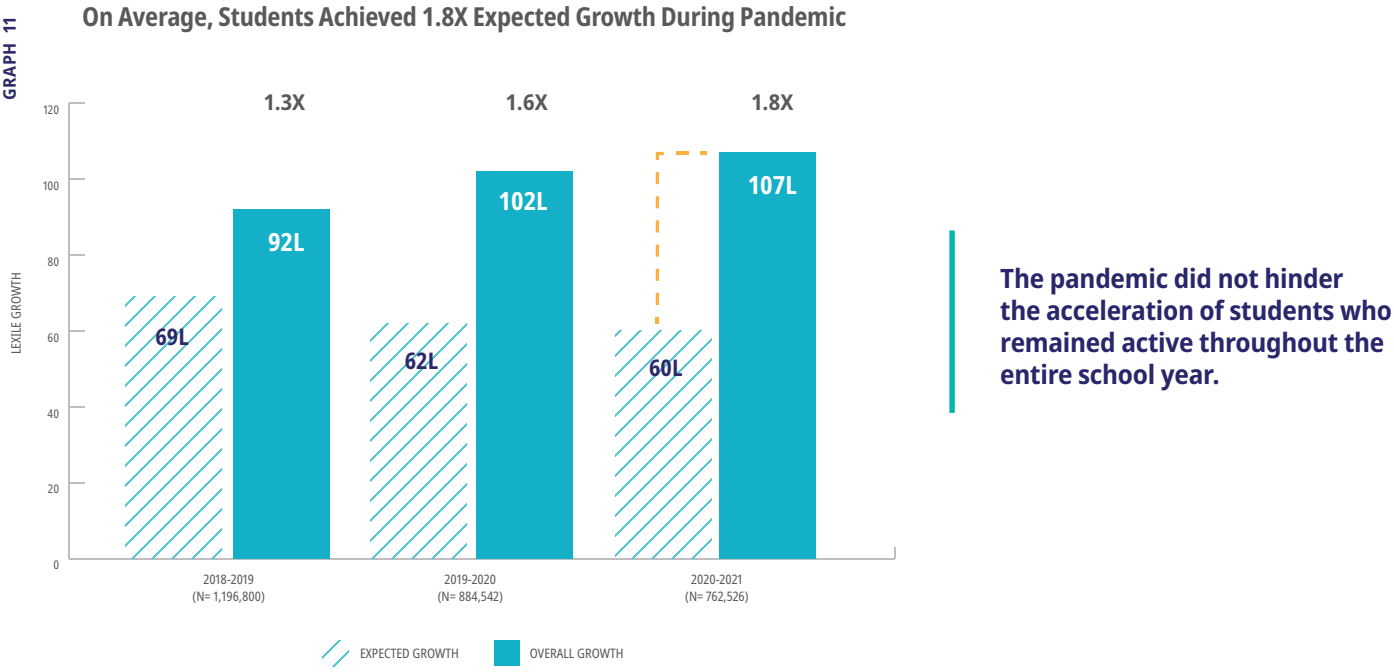


On average, engaged students achieved accelerated reading growth before and during the pandemic.

As can be seen in **Graph 11**, the average overall growth exceeded the average expected growth in each of the last three years. Consequently, the acceleration was greater than 1.0 times the expected growth in each year. A closer look, reveals that although expected growth was slightly lower in 2019-2020 and 2020-2021 compared to 2018-2019, overall growth was higher. Consequently, acceleration was also higher in 2019-2020 and 2020-2021 than in 2018-2019.

Note that higher acceleration is often observed for students with higher Lexile measures. Students with higher Lexile measures have lower expected growth that is relatively easier for them to meet or exceed when receiving articles targeted at their personal reading level. As previously reported, students in the 2019-2020 and 2020-21 school years started the year with higher pre-test Lexiles than students in the 2018-19 school year, and this may account for the higher acceleration observed in those two school years. Rather than concluding that students appear to be doing better during the COVID-19-impacted school years, it would be safer to conclude that the pandemic did not appear to hinder Lexile growth for students who remained active in the Achieve3000 Literacy program throughout the school year.

GRAPH 11



The pandemic did not hinder the acceleration of students who remained active throughout the entire school year.

Note: In 2020-2021, the average overall growth (107L) was greater than the expected growth (60L), and this difference was statistically significant, $t = 344.29$, $p < 0.001$.

Students exceeded expected growth at every grade level.

As can be seen in **Graph 12**, overall growth exceeded expected growth at all grade levels during the 2020-2021 school year. However, overall growth exceeded expected growth to the greatest extent in grades 9 to 12.

GRAPH 12

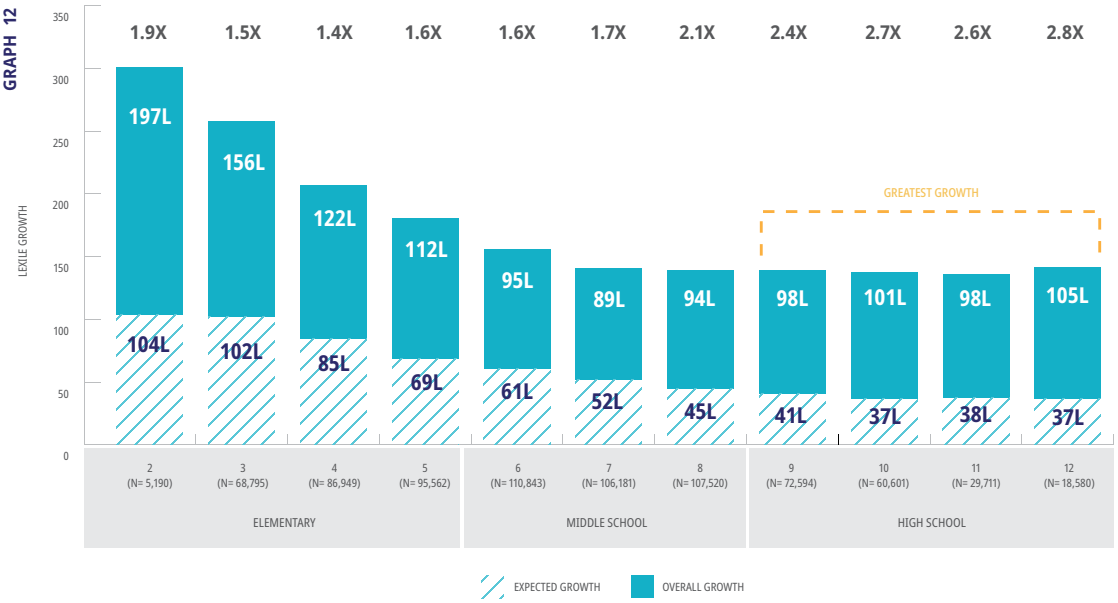


Table 3 shows that overall growth exceeds expected growth at each grade level across all 3 years. However, whereas acceleration remained relatively uniform across grade levels in the 2018-2019 school year, it tended to increase as grade level increased for the 2019-2020 and 2020-2021 school years. Again, rather than concluding that students in higher grades performed better during the pandemic-impacted school years, the higher acceleration may be due to having more capable students in the 2019-2020 and 2020-2021 samples.

Year-Over-Year Comparison

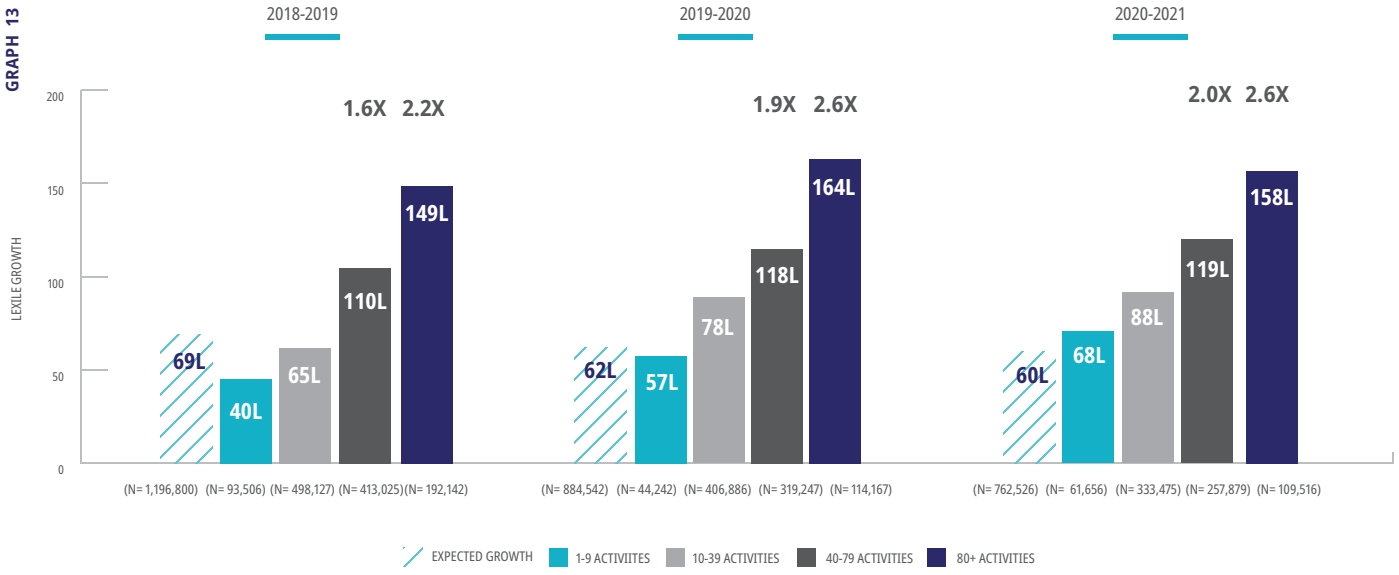
TABLE 3

Grade	2018 - 2019				2019 - 2020				2020 - 2021			
	N Count	Expected Lexile Growth Mean	Actual Lexile Growth Mean	Acceleration	N Count	Expected Lexile Growth Mean	Actual Lexile Growth Mean	Acceleration	N Count	Expected Lexile Growth Mean	Actual Lexile Growth Mean	Acceleration
2	17,495	135.1	170.7	1.3	11,516	124.4	211.0	1.7	5,190	104.2	197.2	1.9
3	102,357	115.1	141.1	1.2	73,144	104.6	150.5	1.4	68,795	102.2	156.0	1.5
4	123,864	94.9	121.6	1.3	94,397	86.7	121.8	1.4	86,949	84.7	122.0	1.4
5	137,817	78.4	112.2	1.4	104,567	70.3	110.2	1.6	95,562	69.4	112.0	1.6
6	190,509	67.7	89.5	1.3	138,704	61.4	95.5	1.6	110,843	60.7	94.8	1.6
7	175,625	60.1	78.3	1.3	132,510	54.6	88.7	1.6	106,181	52.3	89.2	1.7
8	165,048	52.0	77.9	1.5	131,662	47.5	90.1	1.9	107,520	44.6	94.0	2.1
9	113,387	50.3	67.7	1.3	80,757	46.6	89.6	1.9	72,594	40.8	97.6	2.4
10	88,222	45.3	69.6	1.5	63,955	41.9	90.4	2.2	60,601	37.5	101.0	2.7
11	50,678	43.9	57.1	1.3	33,115	39.5	81.0	2.1	29,711	38.4	98.4	2.6
12	31,798	42.4	53.1	1.3	20,215	38.2	79.1	2.1	18,580	36.6	105.0	2.9

Note: In 2020-2021, each grade's average overall growth (median = 101.0L) was greater than the expected growth (median = 52.3L), and these differences were all statistically significant, $t > 43.02$, $p < 0.001$.

Students who completed 40+ lessons achieved more than 1.5X their expected growth.

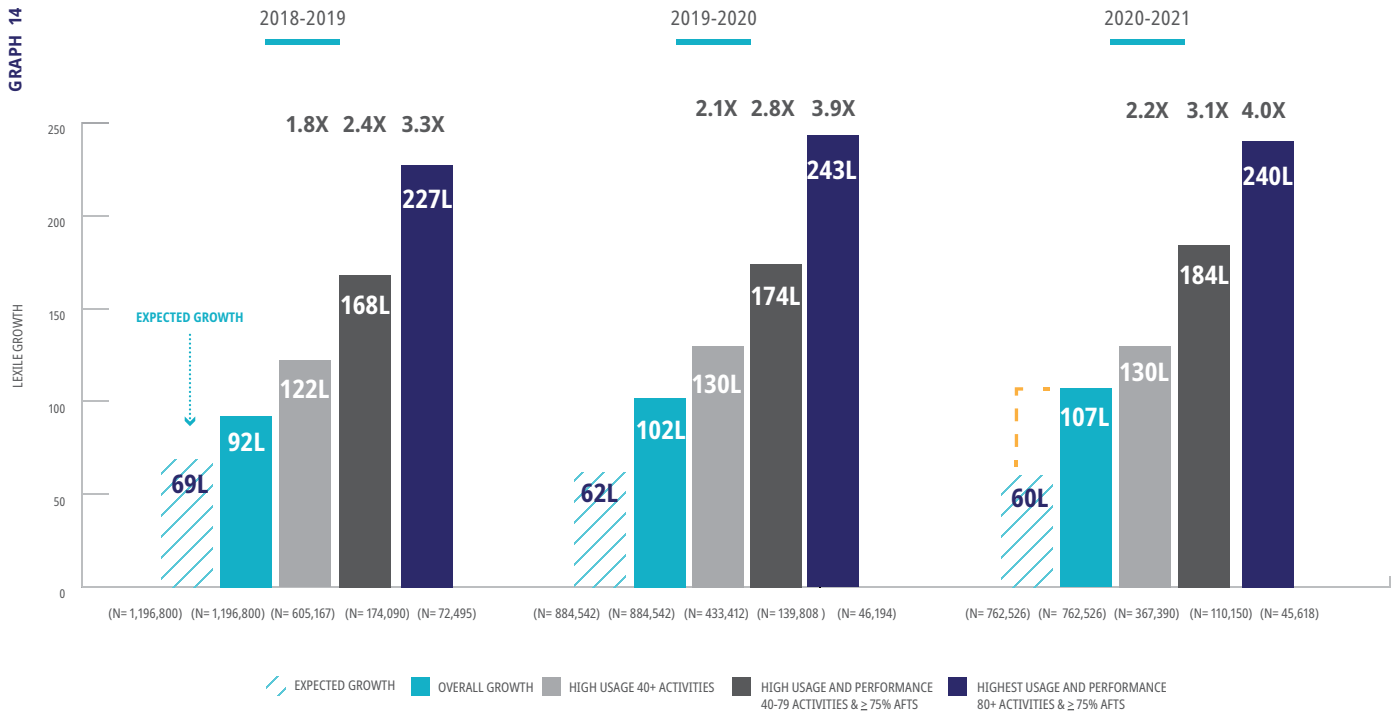
Lexile growth was further examined to determine how students' usage and performance affects their literacy growth. Specifically, the high and highest usage categories defined above. As shown in **Graph 13**, Lexile growth increased as the number of activities completed increased, and this pattern was consistent across years. Clearly, when students engage in learning, they make reading progress.



Note: In 2020-2021, expected growth (60L) was exceeded by students with 1-9 activities (68L), 10-39 activities (88L), 40-79 activities (119L), and 80+ activities (158L), and these differences were all statistically significant, $t > 49.09$, $p < .001$.

Highly engaged students maintained high levels of acceleration during the pandemic.

As shown in **Graph 14**, the overall growth of students with both high usage and performance far exceeded expected growth, and this pattern was consistent across years. Indeed, acceleration for students with high usage and performance ranged from 2.4X to 3.1X across years, and acceleration for students with the highest usage and performance ranged from 3.3X to 4.0X across years.



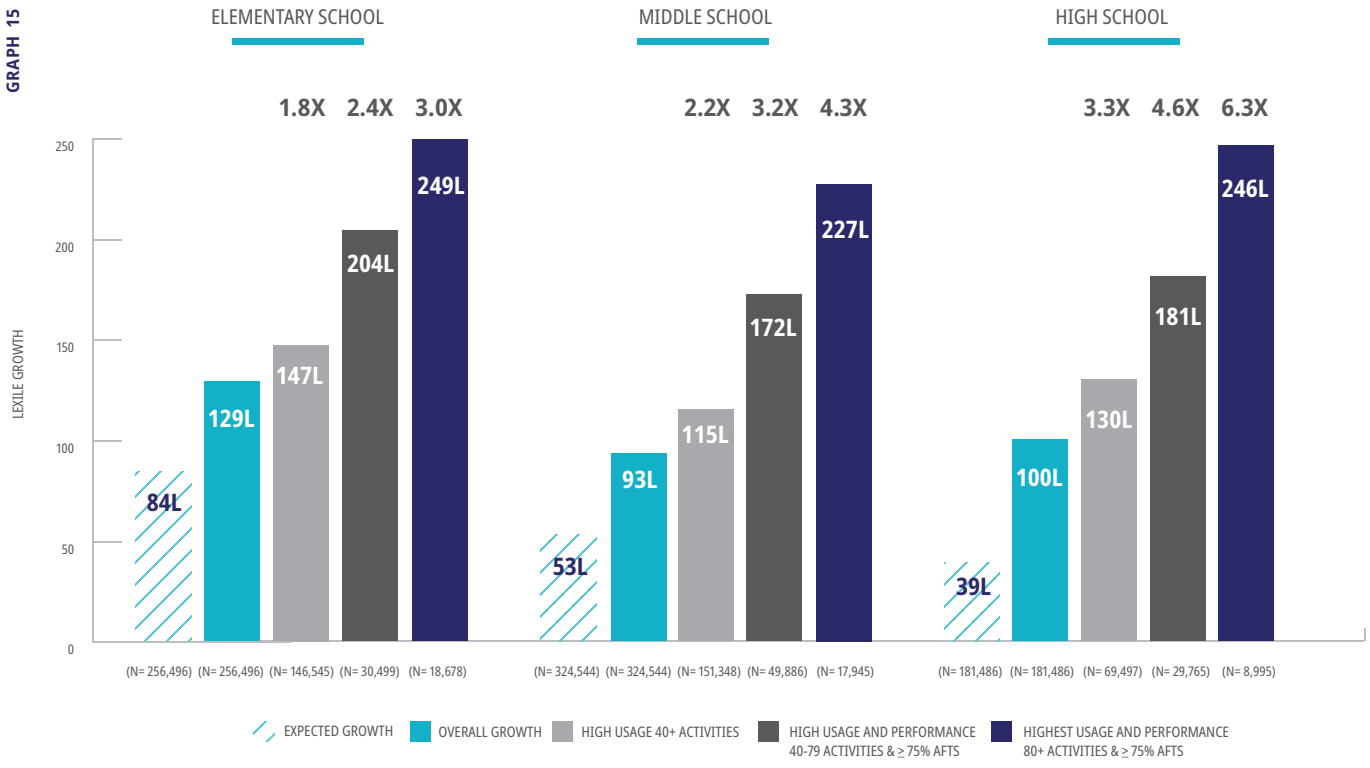
Note: In 2020-2021, expected growth (60L) was exceeded by students with 40+ activities (130L), 40-79 activities & ≥ 75% AFTS (184L), and 80+ activities & ≥ 75% AFTS (240), with these differences all statistically significant, $t > 456.75$, $p < 0.001$.

Every school level had higher levels of acceleration during the pandemic.

As shown in **Graph 15**, overall growth exceeded expected growth the most for students with the highest usage and performance within Achieve3000, and this pattern held true across school levels. As shown in **Table 4** (please see page 20), in all three school years, acceleration increased in tandem with higher levels of usage and performance at each school level.

> **Students in the upper grades demonstrate as much growth as younger students despite having lower levels of expected growth.**

GRAPH 15



Note: In 2020-2021 at each school level, overall growth (ranging from 93L to 129L) exceeded expected growth (ranging from 39L to 84L), and these differences were statistically significant, $t > 187.14$, $p < 0.001$. However, expected growth was exceeded even more by students with 40+ activities (ranging from 115L to 147L), 40-79 activities & ≥ 75% AFTS (ranging from 172L to 204L), and 80+ activities & ≥ 75% AFTS (ranging from 227L to 249L), with these differences also statistically significant, $t > 242.66$, $p < 0.001$.

Year-Over-Year Comparison

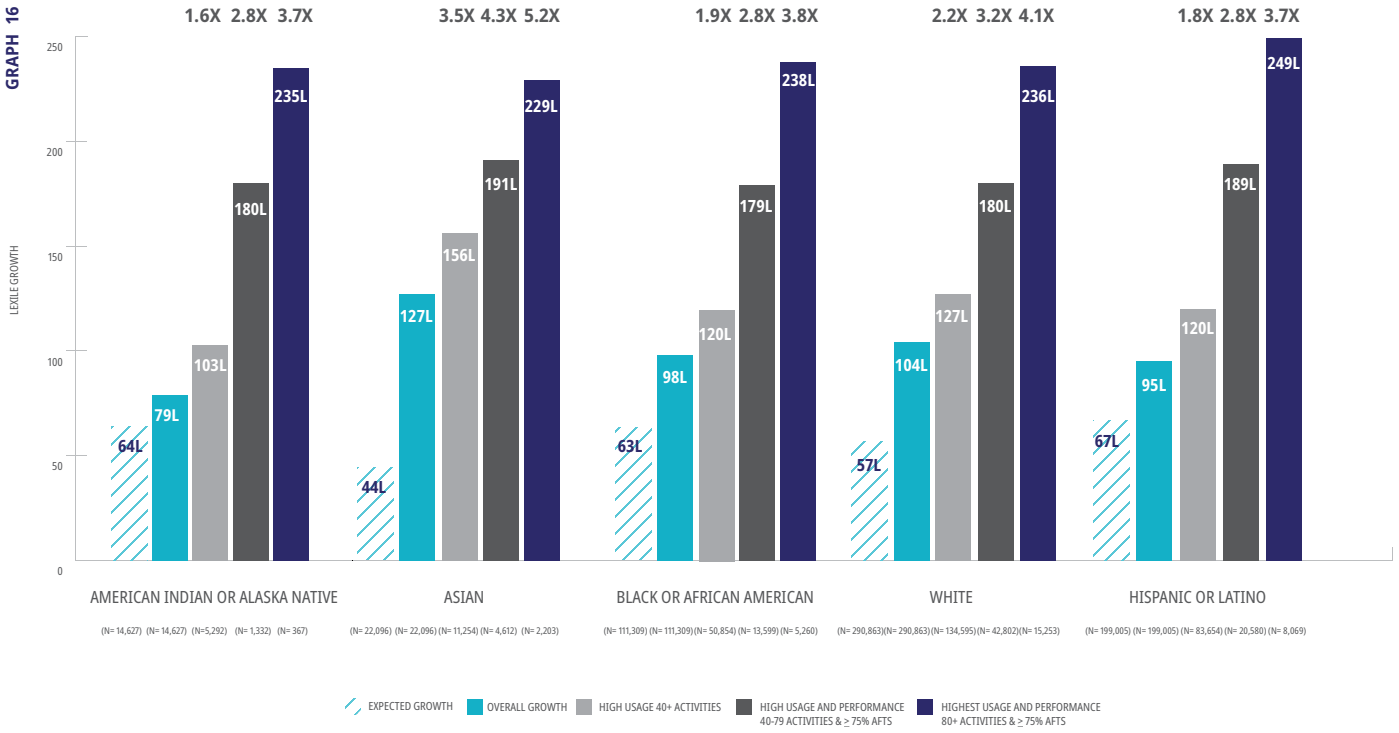
School Level		2018 - 2019			2019 - 2020			2020 - 2021		
		N Count	Lexile Growth Mean	Acceleration	N Count	Lexile Growth Mean	Acceleration	N Count	Lexile Growth Mean	Acceleration
Elementary School	Expected Growth	381,533	96.2	--	283,624	86.8	--	256,496	84.1	--
	Actual Growth	381,533	125.7	1.3	283,624	128.5	1.5	256,496	128.9	1.5
	High Usage 40+ Activities	224,667	147.5	1.5	172,675	146.9	1.7	146,545	146.8	1.7
	High Quantity, High Quality	41,849	205.7	2.1	43,241	188.1	2.2	30,499	204.0	2.4
	Highest Quantity, High Quality	25,148	253.9	2.6	20,259	249.5	2.9	18,678	248.8	3.0
Middle School	Expected Growth	531,182	60.3	--	402,876	54.6	--	324,544	52.6	--
	Actual Growth	531,182	82.2	1.4	402,876	91.5	1.7	324,544	92.7	1.8
	High Usage 40+ Activities	267,189	110.1	1.8	186,123	117.8	2.2	151,348	114.5	2.2
	High Quantity, High Quality	86,643	159.5	2.6	64,563	165.1	3.0	49,886	172.4	3.3
	Highest Quantity, High Quality	33,466	215.3	3.6	19,085	233.9	4.3	17,945	227.3	4.3
High School	Expected Growth	284,085	46.7	--	198,042	43.0	--	181,486	38.9	--
	Actual Growth	284,085	64.8	1.4	198,042	87.3	2.0	181,486	99.6	2.6
	High Usage 40+ Activities	113,311	99.6	2.1	74,614	121.3	2.8	69,497	129.9	3.3
	High Quantity, High Quality	45,598	148.0	3.2	32,004	171.3	4.0	29,765	181.4	4.7
	Highest Quantity, High Quality	13,881	204.9	4.4	6,850	251.0	5.8	8,995	246.3	6.3

TABLE 4

Acceleration for Specific Student Populations

Students attained similar levels of acceleration across racial and ethnic groups.

Students were identified by race and/or ethnicity based on information that was available in Achieve3000 Literacy. As race and/or ethnicity information was only provided for 60% of the sample, results should be interpreted with caution, as these reporting groups may be under-representative and, therefore, not highly generalizable. As shown in **Graph 16**, across all racial and ethnic groups, overall growth exceeded expected growth most in students with the highest usage and performance.



Note: In 2020-2021 for each race/racial and ethnicity group, overall growth (ranging from 79L to 127L) exceeded expected growth (ranging from 44L to 67L), and these differences were statistically significant, $t > 17.77$, $p < 0.001$. However, expected growth was exceeded even more by students with 40+ activities (ranging from 103L to 156L), 40-79 activities & ≥ 75% AFTS (ranging from 179L to 191L), and 80+ activities & ≥ 75% AFTS (ranging from 229L to 249L), with these differences also statistically significant, $t > 36.39$, $p < 0.001$.

Table 5 shows that, for each race and ethnicity, acceleration increased as student engagement increased across all 3 years.

Racial/Ethnic Groups		2018 - 2019			2019 - 2020			2020 - 2021		
		N Count	Lexile Growth Mean	Acceleration	N Count	Lexile Growth Mean	Acceleration	N Count	Lexile Growth Mean	Acceleration
American Indian or Alaska Native	Expected Growth	27,735	74.4	--	22,860	66.7	--	14,627	64.0	--
	Actual Growth	27,735	66.6	0.9	22,860	80.7	1.2	14,627	79.3	1.2
	High Usage	12,163	94.8	1.3	8,597	108.8	1.6	5,292	102.6	1.6
	High Usage, High Performance	2,332	163.3	2.2	2,037	174.3	2.6	1,332	180.2	2.8
	Highest Usage, Highest Performance	904	221.7	3.0	567	245.5	3.7	367	234.7	3.7
Asian	Expected Growth	30,555	54.0	--	21,840	50.7	--	22,096	44.4	--
	Actual Growth	30,555	116.7	2.2	21,840	123.0	2.4	22,096	127.3	2.9
	High Usage	16,504	147.0	2.7	11,732	154.4	3.0	11,254	155.7	3.5
	High Usage, High Performance	6,577	172.5	3.2	4,912	176.9	3.5	4,612	191.2	4.3
	Highest Usage, Highest Performance	2,998	229.3	4.2	2,100	242.0	4.8	2,203	228.8	5.2
Black or African American	Expected Growth	176,205	71.9	--	120,322	65.6	--	111,309	63.5	--
	Actual Growth	176,205	76.6	1.1	120,322	95.9	1.5	111,309	98.0	1.5
	High Usage	84,077	106.6	1.5	58,470	121.5	1.9	50,854	120.4	1.9
	High Usage, High Performance	19,431	159.4	2.2	15,826	175.4	2.7	13,599	178.8	2.8
	Highest Usage, Highest Performance	8,184	216.3	3.0	5,189	248.5	3.8	5,260	237.9	3.7
White	Expected Growth	388,096	64.6	--	299,649	57.7	--	290,863	56.8	--
	Actual Growth	388,096	91.2	1.4	299,649	100.8	1.7	290,863	104.0	1.8
	High Usage	193,509	120.5	1.9	141,563	128.5	2.2	134,595	127.1	2.2
	High Usage, High Performance	63,785	164.9	2.6	51,410	171.0	3.0	42,802	179.7	3.2
	Highest Usage, Highest Performance	21,969	220.9	3.4	13,579	237.8	4.1	15,253	236.4	4.2
Hispanic or Latino	Expected Growth	321,231	75.8	--	232,501	68.3	--	199,005	67.1	--
	Actual Growth	321,231	83.3	1.1	232,501	95.2	1.4	199,005	95.5	1.4
	High Usage	150,705	111.8	1.5	101,615	122.9	1.8	83,654	120.0	1.8
	High Usage, High Performance	35,912	164.9	2.2	28,122	177.3	2.6	20,580	189.1	2.8
	Highest Usage, Highest Performance	14,384	222.8	2.9	8,545	241.5	3.5	8,069	249.4	3.7

TABLE 5

Highly engaged below-grade-level readers achieved 3.7X expected growth.

Students were designated as below-grade-level readers based on the fall percentile corresponding to their pre-test LevelSet Lexile measures. For the purposes of this analysis, below-grade-level readers were defined as performing at or below the 35th percentile. During the 2020-2021 school year, 75% of the analytic sample fell under the 35th percentile. As shown in **Graph 17**, even for below-grade-level readers, overall growth exceeded expected growth the most for students with the highest levels of usage and performance.

Below-grade-level readers who completed 1 activity each week achieved 1.7X their expected growth.

GRAPH 17

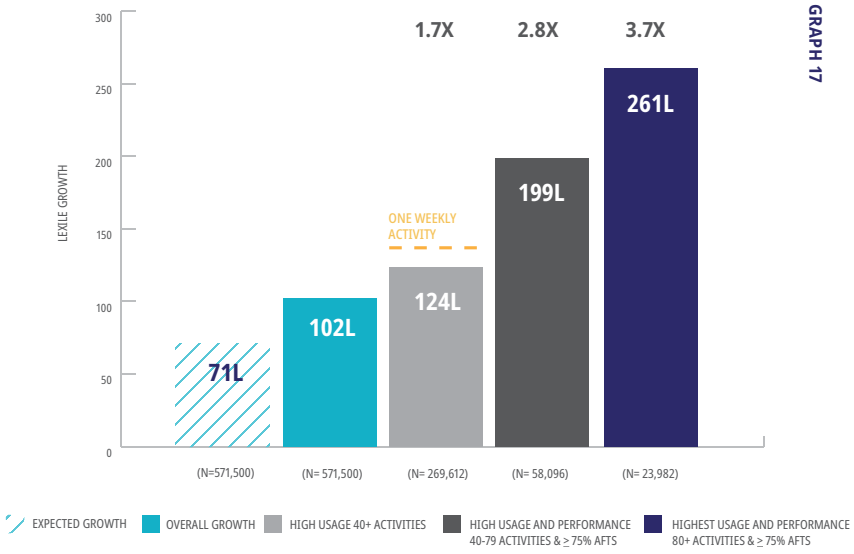


Table 6 shows that, for below-grade-level readers, acceleration increased as the quality and quantity of usage increased across all 3 years.

Year-Over-Year Comparison

TABLE 6

Below-Grade-Level Readers	2018 - 2019			2019 - 2020			2020 - 2021		
	N Count	Lexile Growth Mean	Acceleration	N Count	Lexile Growth Mean	Acceleration	N Count	Lexile Growth Mean	Acceleration
Expected Growth	952,438	78.2	--	681,980	71.8	--	571,500	71.1	--
Overall Growth	952,438	89.4	1.1	681,980	98.3	1.4	571,500	102.0	1.4
High Usage 40+ Activities	477,555	118.2	1.5	329,196	124.6	1.7	269,612	124.5	1.8
High Usage , High Performance	104,969	175.1	2.2	78,405	186.2	2.6	58,096	199.2	2.8
Highest Usage , Highest Performance	45,259	234.8	3.0	25,871	259.7	3.6	23,982	261.2	3.7

Note: In 2020-2021 for below-grade-level readers, overall growth (102L) exceeded expected growth (71L), and this difference was statistically significant, $t = 196.53$, $p < 0.001$. However, expected growth was exceeded even more by students with 40+ activities (124L), 40-79 activities & ≥ 75% AFTS (199L), and 80+ activities & ≥ 75% AFTS (261L), with these differences also statistically significant, $t > 297.17$, $p < 0.001$.

Highly engaged advanced readers achieved 13.1X expected growth.

Students were designated as advanced readers based on the fall percentile corresponding to their pre-test LevelSet Lexile measures. For the purposes of this analysis, advanced readers were defined as performing at the 75th percentile or above. During the 2020-2021 school year, 7% of the analytic sample were performing at or above the 75th percentile. As shown in **Graph 18**, among advanced readers, overall growth exceeded expected growth the most for students with the highest levels of usage and performance.

Students who completed 1 lesson per week achieved 9.4X their expected reading growth.

GRAPH 18

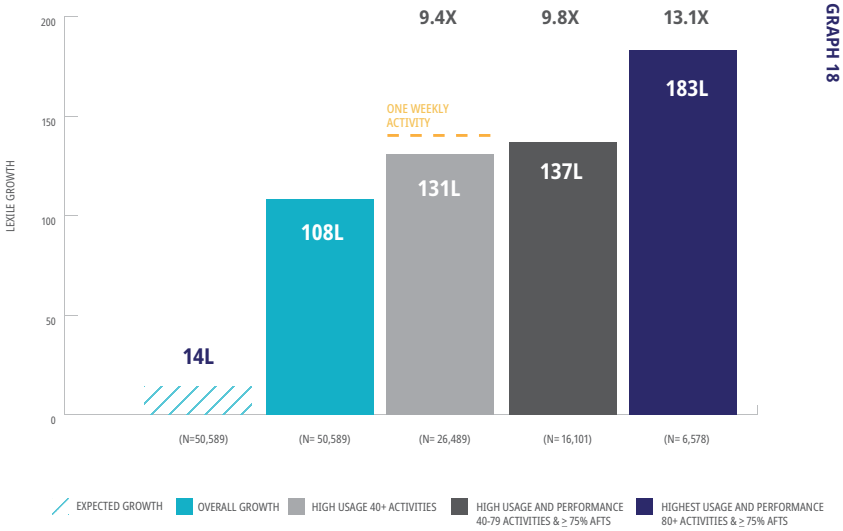


Table 7 shows that, for advanced readers, acceleration increased as engagement increased across all 3 years.

Year-Over-Year Comparison

TABLE 7

Advanced Readers	2018 - 2019			2019 - 2020			2020 - 2021		
	N Count	Lexile Growth Mean	Acceleration	N Count	Lexile Growth Mean	Acceleration	N Count	Lexile Growth Mean	Acceleration
Expected Growth	54,702	15.9	--	48,071	15.2	--	50,589	13.8	--
Overall Growth	54,702	83.4	5.2	48,071	104.5	6.9	50,589	108.1	7.8
High Usage	29,362	115.6	7.3	25,126	132.0	8.7	26,489	131.4	9.5
High Usage & Performance	18,327	130.5	8.2	16,993	132.2	8.7	16,101	137.2	9.9
Highest Usage, Highest Performance	6,284	186.0	11.7	5,174	192.6	12.7	6,578	183.2	13.2

Note: In 2020-2021 for advanced readers, overall growth (108L) exceeded expected growth (14L), and this difference was statistically significant, $t = 207.08$, $p < 0.001$. However, expected growth was exceeded even more by students with 40+ activities (131L), 40-79 activities & ≥ 75% AFTS (137L), and 80+ activities & ≥ 75% AFTS (183L), with these differences also statistically significant, $t > 244.09$, $p < 0.001$.

Highly engaged students learning English as a new language achieved 3.2X expected growth.

Students were identified as English learners (EL) based on information that was available in the Achieve3000 system. These results should be interpreted with caution, as these reporting groups may be under-representative and, therefore, not highly generalizable. As shown in **Graph 19**, even within English learners, overall growth exceeded expected growth most in students with the highest usage and performance.

Students learning English who completed one lesson each week achieved 1.5X their expected reading growth.

GRAPH 19

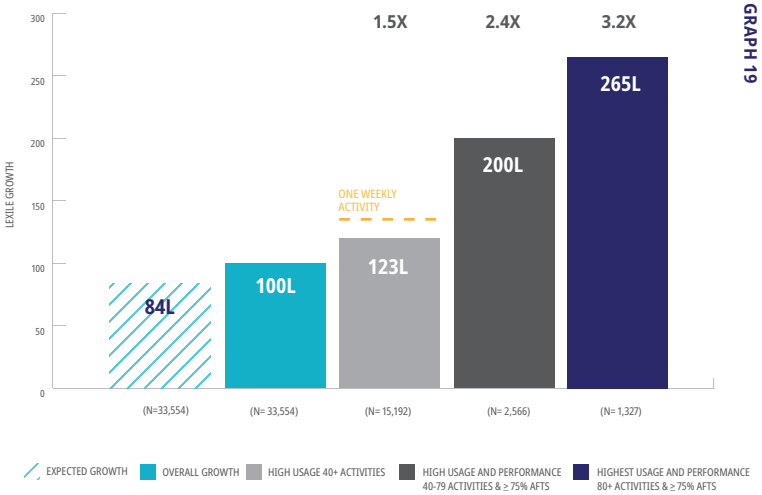


Table 8 shows that, for English language learners, acceleration increased as the quality and quantity of usage increased across all 3 years.

Year-Over-Year Comparison

TABLE 8

English Language Learners	2018 - 2019			2019 - 2020			2020 - 2021		
	N Count	Lexile Growth Mean	Acceleration	N Count	Lexile Growth Mean	Acceleration	N Count	Lexile Growth Mean	Acceleration
Expected Growth	85,430	94.0	--	49,228	83.9	--	33,554	84.1	--
Actual Growth	85,430	97.2	1.0	49,228	102.8	1.2	33,554	99.6	1.2
High Usage	39,278	123.8	1.3	21,751	129.0	1.5	15,192	123.4	1.5
High Usage, High Performance	7,336	177.5	1.9	4,489	191.9	2.3	2,566	200.1	2.4
Highest Usage, Highest Performance	2,715	245.8	2.6	1,490	277.3	3.3	1,327	265.4	3.2

Note: In 2020-2021 for English learners, overall growth (100L) exceeded expected growth (84L), and this difference was statistically significant, $t = 23.91$, $p < 0.001$. However, expected growth was exceeded even more by students with 40+ activities (123L), 40-79 activities & ≥ 75% AFTS (200L), and 80+ activities & ≥ 75% AFTS (265L), with these differences also statistically significant, $t > 52.69$, $p < 0.001$.

Highly engaged students eligible for free and reduced lunch programs achieved 5.1X expected growth.

Students were identified as eligible for free and reduced lunch based on information that was available in the Achieve3000 system. As eligibility for free or reduced lunch programs was only provided for 2% of the sample, results should be interpreted with caution, as these reporting groups may be under-representative and, therefore, not highly generalizable. As shown in **Graph 20**, for students who are eligible for free or reduced lunch programs, overall growth exceeded expected growth most by students with the highest quality and quantity of Achieve3000 usage.

Students eligible for free and reduced lunch programs achieved 2.5X their expected reading growth after completing one lesson each week.

GRAPH 20

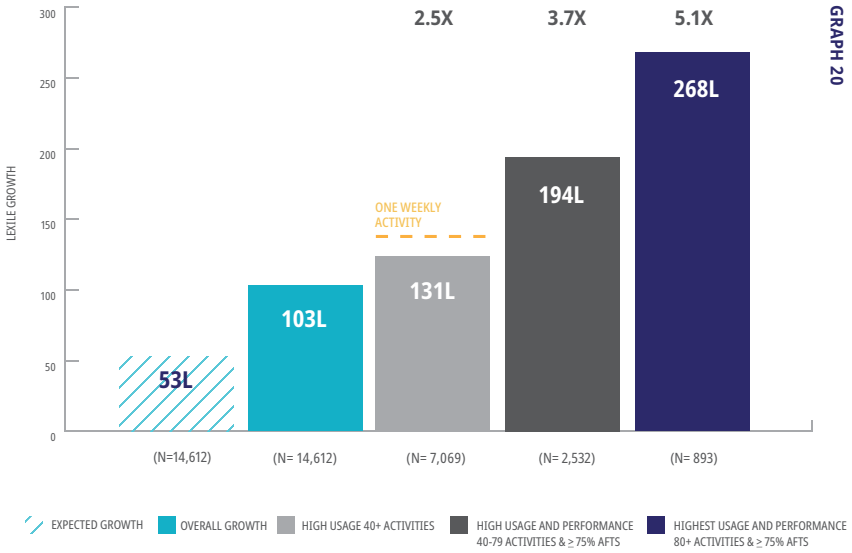


Table 9 shows that, for students eligible for free or reduced lunch programs, acceleration increased as engagement increased across all 3 years.

Year-Over-Year Comparison

TABLE 9

Students Eligible for Free or Reduced Lunch Programs	2018 - 2019			2019 - 2020			2020 - 2021		
	N Count	Lexile Growth Mean	Acceleration	N Count	Lexile Growth Mean	Acceleration	N Count	Lexile Growth Mean	Acceleration
Expected Growth	71,109	72.0	--	41,044	64.8	--	14,612	53.2	--
Actual Growth	71,109	81.6	1.1	41,044	95.5	1.5	14,612	102.5	1.9
High Usage	34,347	112.5	1.6	17,407	126.7	2.0	7,069	131.1	2.5
High Usage & Performance	9,120	161.0	2.2	4,954	181.8	2.8	2,532	193.6	3.6
Highest Usage, Highest Performance	2,636	205.4	2.9	1,471	253.7	3.9	893	267.8	5.0

Note: In 2020-2021 for students eligible for free or reduced lunch programs, overall growth (103L) exceeded expected growth (53L), and this difference was statistically significant, $t = 49.82$, $p < 0.001$. However, expected growth was exceeded even more by students with 40+ activities (131L), 40-79 activities & ≥ 75% AFTS (194L), and 80+ activities & ≥ 75% AFTS (268L), with these differences also statistically significant, $t > 67.06$, $p < 0.001$.

College and Career Readiness

How college and career readiness is measured in Achieve3000 Literacy

It's useful to think of college and career readiness as a journey. Since expectations have shifted toward a more rigorous outcome, it is critical to understand that, for many students, it will take two or three years to reach college and career readiness reading levels. Because we know a student's expected growth, and we know the approximate Lexile measure students need to attain to be prepared for the reading demands of the workforce and college coursework, we can make a prediction about whether or not a student is or isn't "on track" to reach 1300L by the end of their school career, depending on their grade level and current Lexile measure. Students who are in the two "Not on Track" categories are not meeting the college and career readiness targets for their grade level and are not expected to reach the 1300L level by the end of high school without significant intervention and acceleration. Students in the two "On Track" categories are meeting grade-level targets and can be expected to read at or above 1300L by the time they graduate as long as they continue to achieve expected or greater growth every year.

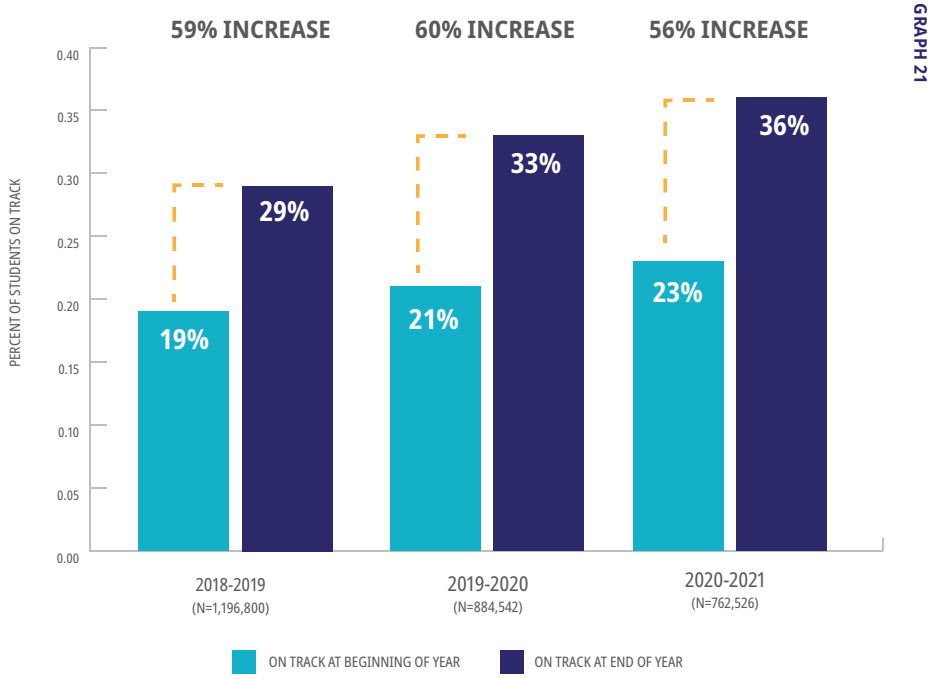
COLLEGE AND CAREER READINESS PROFICIENCY RANGES				
	NOT ON TRACK		ON TRACK	
Grade	Falls Far Below	Approaches	Meets	Exceeds
1	BR115 and Below	BR110 to 185L	190L – 530L	535L and Above
2	150L and Below	155L – 415L	420L – 650L	665L and Above
3	265L and Below	270L – 515L	520L – 820L	825L and Above
4	385L and Below	390L – 735L	740L – 940L	945L and Above
5	500L and Below	505L – 825L	830L – 1010L	1015L and Above
6	555L and Below	560L – 920L	925L – 1070L	1075L and Above
7	625L and Below	630L – 965L	970L – 1120L	1125L and Above
8	660L and Below	665L – 1005L	1010L – 1185L	1190L and Above
9	775L and Below	780L– 1045L	1050L – 1260L	1265L and Above
10	830L and Below	835L – 1075L	1080L – 1335L	1340L and Above
11/12	950L and Below	955L – 1180L	1185L – 1385L	1390L and Above

Year-over-year, more students reached grade-level reading expectations for college and careers.

To evaluate growth in College and Career Readiness (CCR), students' initial CCR was based on their pre-test LevelSet whereas their end-of-year CCR was based on their post-test LevelSet or last monthly Lexile-adjustment. As shown in **Graph 21**, there was similar growth in college and career readiness across the school years. Specifically, in the 2018-2019 school year, the percentage of students who were on track increased from fall to spring from 19 to 29 percent (reflecting a 59 percent increase, with an additional 131,112 more students being on track by the end of the year). In the 2019-2020 school year, the percentage of students who were on track increased from fall to spring from 21 to 33 percent (reflecting a 60 percent increase, with an additional 109,322 more students being on track by the end of the year). In the 2020-2021 school year, the percentage of students who were on track increased from fall to spring from 23 to 36 percent (reflecting a 56 percent increase, with an additional 98,285 more students being on track by the end of the year).

98,285 students got on track for college and career readiness during the 2020-2021 school year.

GRAPH 21

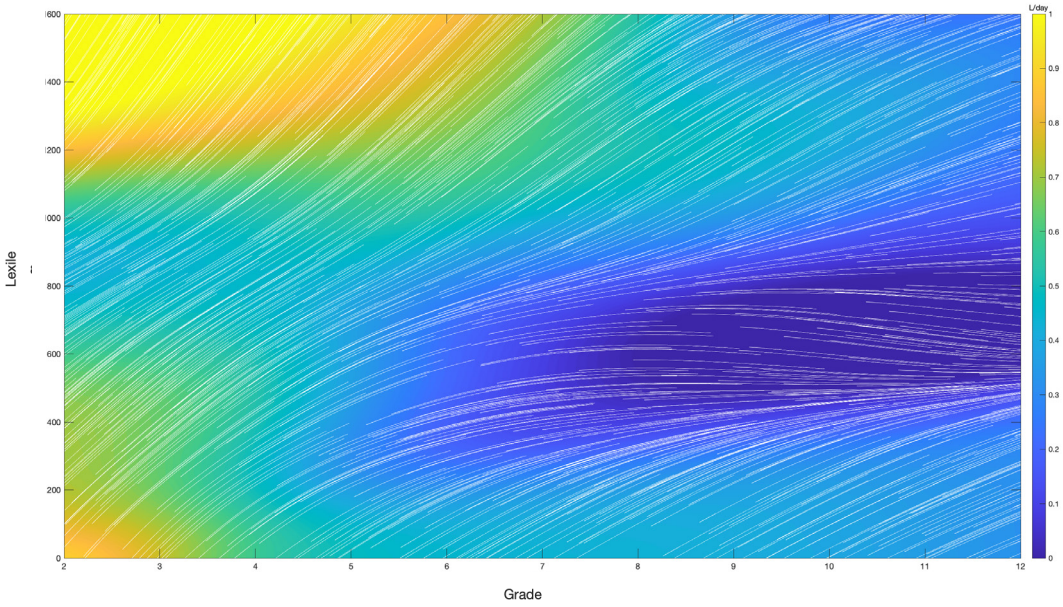


Engagement Is Essential

Given the large number of students and usage behaviors captured in the analytical data file, MetaMetrics used machine learning techniques — specifically neural network modeling — to develop models of Lexile growth. Anybody who has spent time in a classroom knows that one of the primary struggles faced by educators is keeping their students engaged in tasks that are conducive to learning. The following analyses seek to estimate students' degree of engagement while using Achieve3000's solutions based on their usage behavior, and demonstrate the positive relationship between engagement and literacy growth.

In their initial 'status-only' model, MetaMetrics considered only two factors: Lexile level and grade. As can be seen in **Graph 22**, this simple model shows a divergence of trajectories in the predicted reading growth rate according to a students' grade level and Lexile measure. For example, a fourth-grade student with a reading measure of 600L is expected to gain approximately .5L each day. Following the white lines within the heat map shows this student is likely to stay on track for college and career readiness, attaining a 1600L by the time they graduate high school. Conversely, a student in fourth grade with a reading measure of 400L is not predicted to exceed a reading measure of 900L by high school graduation. This is commonly known as the Matthew effect which asserts that the rich-get-richer and the poor-get-poorer. The Matthew effect has been written about in academic literature with regards to education and reading in particular (Stanovich, 2009). The Achieve3000 dataset provides an example of this particular phenomenon—wherever the heatmap gets "hotter" going up the y-axis (Lexile), the Matthew effect is observed.

GRAPH 22



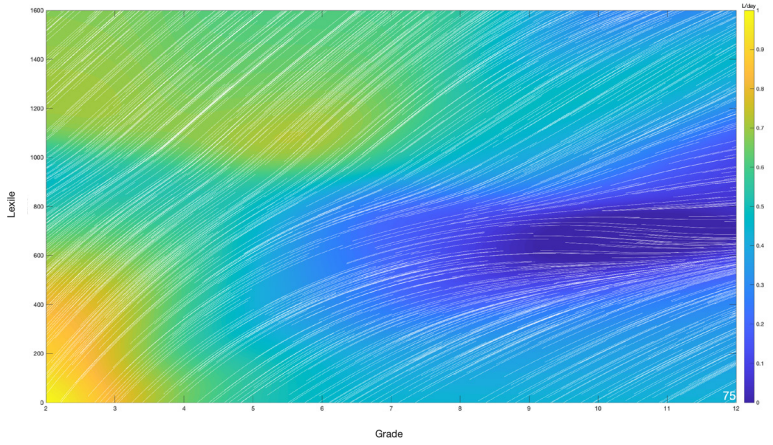
Impact of the COVID pandemic on the Matthew effect

MetaMetrics conducted the same analysis using data from the 2018-2019 school year and found the Matthew effect also present that year. But for 2020-2021, the Matthew effect is more starkly present in the upper grades between the lower ability and higher ability students. In other words, the COVID pandemic seems to have increased the Matthew effect fact for some groups of students. However, this is based on cross-sectional data, and the dynamics of the 2020-2021 academic year are unlikely to be repeated.

In a second model, MetaMetrics included 12 more dimensions reflecting student usage of various features of Achieve3000 Literacy, such as the number of *Lessons, Activities, Reading Connections,* and *Thought Questions* completed each day, as well as the percent of time students spent using enrichment, intervention, and language scaffolds.

These additional data points dramatically increased the predictive power of the model. In fact, when comparing the percent of reading growth variation that was explained in the initial 'status-only' model where only grade and Lexile level were included (17%) and to the variation that was explained after students' level of engagement with Achieve3000's literacy solutions was accounted for (27%), it can be concluded that adding usage behavior within Achieve3000's products increases the amount of explainable variation by 57 percent.

How do we measure the impact of engagement on reading growth?



GRAPH 23

The two models described above allowed MetaMetrics to represent students' engagement with Achieve3000 Literacy solutions by normalizing the variance in predicted growth due to usage behaviors relative to predicted growth according to status only on a scale of 0 to 100. MetaMetrics called this a student's engagement score. For example, a student with an engagement score of 25 places their additional predicted reading growth due to their usage profile at the 25th percentile among students with a similar grade and Lexile. **Graph 23** demonstrates the predicted reading growth rates for students with relatively high engagement scores of 75. When compared to the status only model (See Graph 23 above), we observe rather high predicted growth rates, with some hypothetical students predicted to grow at rates above 0.8L per day. Engagement scores of 90 can sometimes yield predicted reading growth rates over 1L per day!

Based on these analyses, MetaMetrics was able to develop a metric for engagement that captures the link between usage behaviors and reading growth and concluded that engagement was more predictive of reading growth than status within Achieve3000 Literacy.

Conclusion and Recommendations

The 2020-21 National Lexile Study demonstrated, as previous independent national studies have done, that Achieve3000 Literacy is an effective way to accelerate learning growth across all races, racial and ethnicities, grade levels, and learning profiles, including English learners, below-grade-level readers, and advanced readers. In spite of the school closures, this year's results are consistent with previous reports in that students at every level achieved higher than expected Lexile growth. Recommendations include:

- **Culturally relevant content is an effective way to inspire, engage, and motivate diverse learners.** As the country becomes increasingly diverse, the need for content and instruction that is reflective and inclusive of students from different backgrounds is an essential aspect of providing equitable access to education for all. This study showed that many students were not engaged during the pandemic. Re-engaging them will be the key to ensuring that they can make up for unfinished learning. Culturally relevant content can help re-engage students.
- **Technology-enabled instruction allows all students to learn at their own pace and in their own way.** Based on the analyses of students' usage, performance, and growth across learning environments, it's clear that the pandemic and the sudden shift to remote instruction allowed students the flexibility to learn in ways that worked best for them. Going forward, students will benefit greatly if schools and districts can continue to provide them with personalizedand adaptive learning opportunities.
- **Providing tools to accelerate growth will be essential in helping to address unfinished learning.** Many studies have shown that students are likely to come back to school in the fall with some degree of unfinished learning. Differentiated instructional solutions like Achieve3000 Literacy can help students catch up and get on track for success after graduation.

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2020-2021 National Lexile Study
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