RESEARCH BRIEF

OCTOBER 2020

Real-Time Insights into the COVID Slide

Center for College & Career Readiness™

SPN Successful Practices Network

Executive Summary | by Ray McNulty and Kevin Baird

This study seeks to provide the first real-time insights into the actual impact of COVID-19 on student learning, the achievement gap, and the summer slide. As parents and educators around the country are trying to help children stay on track for graduation and success in college and careers, this research can help to guide decisions and allay some fears for our most vulnerable students. Using real-time data for more than 1 million students using Achieve3000 Literacy™, an online solution for literacy instruction in Grades 2-12, during the 2019 and 2020 school years, the data demonstrates:

- **Actual Learning Loss is Less Than Expected**
  The former analysis published in May 2020 projected the loss of potential learning gains to be 28% by June 1, under a worst-case scenario in which students experience no literacy growth during the pandemic. By extending our previous analysis using student data through June 1, students only experienced a 12% loss to their potential learning gains.

- **The Achievement Gap is Growing**
  Whereas the initial projection showed the achievement gap between students from low- and high-income schools could increase by as much as 18% during the school closures, the actual increase was only 3% with younger learners experiencing the greatest impact.

- **The COVID Slide is Real**
  Although, on average, students using Achieve3000 Literacy do not appear to have experienced the severe degree of learning loss projected by other studies, we did find that for students who did not engage in reading practice after school closures started this school year behind where they would have been during a normal school year. These students' reading assessments demonstrate a 20% loss in potential growth whereas even students who remained engaged after school closures experienced an 8% loss in potential growth.

| Recommendations

COVID-19 school closures during the 2019-2020 school year, and the continuing impact of COVID-19 on the 2020-2021 school year, have presented many challenges to schools and districts. Sustaining student learning even when students are not in the classroom and ensuring that students have equitable access to resources and support, are some of the challenges faced by schools. With this in mind, based on the conclusions of this study, we can offer a number of initial recommendations for how schools and districts can promote learning during periods of remote and hybrid instruction:

Catch-Up for Losses in Potential Learning

The COVID slide is evident, especially for students who became inactive during the school closures. Identifying the gaps from where students at the grade level should be and providing resources to close those gaps will be critical to make sure the majority of students make up for lost ground. Using a universal screener, such as LevelSet—an assessment that many schools allow students to take from home—can quickly identify students in need of additional support.

Encourage Student Participation

It can be easy for students to become disengaged through all the online learning options that their schools have implemented. Frequent contact by teachers through video conference, both in groups and one-on-one, can help ensure that students stay connected and engaged in their learning. In addition, using ed tech tools that incorporate teacher-led instruction can relieve some of the burden on teachers while providing students with additional opportunities to receive guided instruction.

Professional Development

Teachers must be provided with opportunities to learn best practices that will ensure instructional continuity for their students regardless of their learning environments. Important instructional strategies for schools and districts to focus on include: how to facilitate lessons that promote clarity and engagement, utilization of educational technology solutions to their full potential, differentiating instruction to meet the needs of all students, and empowering students' self-efficacy via goal-setting, peer-to-peer interaction, and real-time teacher feedback.

Mind the Achievement Gap

There is little doubt that remote learning is more challenging for our economically disadvantaged students, whether because of inadequate computing devices and internet or through lack of familial support due parents' work schedules. To prevent the achievement gap from widening, it is imperative to provide equal access to robust online learning resources via hot spots, free devices, direct technical support for parents, and learning software that can be accessed from multiple devices with online and offline access.

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Introduction

The widespread closure of American schools last spring, accompanied by a sudden and unprecedented shift to online learning for students and teachers around the country, suggests that student learning outcomes may have been profoundly impacted. In an earlier report (Achieve3000, 2020), we used real-time student reading data from 1.6 million students using Achieve3000 Literacy in the United States during the 2019-2020 school year through April 30 to project specific trajectories of student literacy growth through the end of the last school year. That analysis showed already present, measurable trends in students' usage and engagement with Achieve3000 Literacy before and after school closures from COVID-19, most notably drop-off in usage among a significant portion of the Achieve3000 user base.

This present study updates the previous analysis with usage and engagement data collected through July 1, 2020. In addition, data from beginning-of-year reading assessments were analyzed, offering one of the first glimpses into the actual magnitude of the losses in learning potential that have been caused by the COVID-19 pandemic.

Sample and Methodology

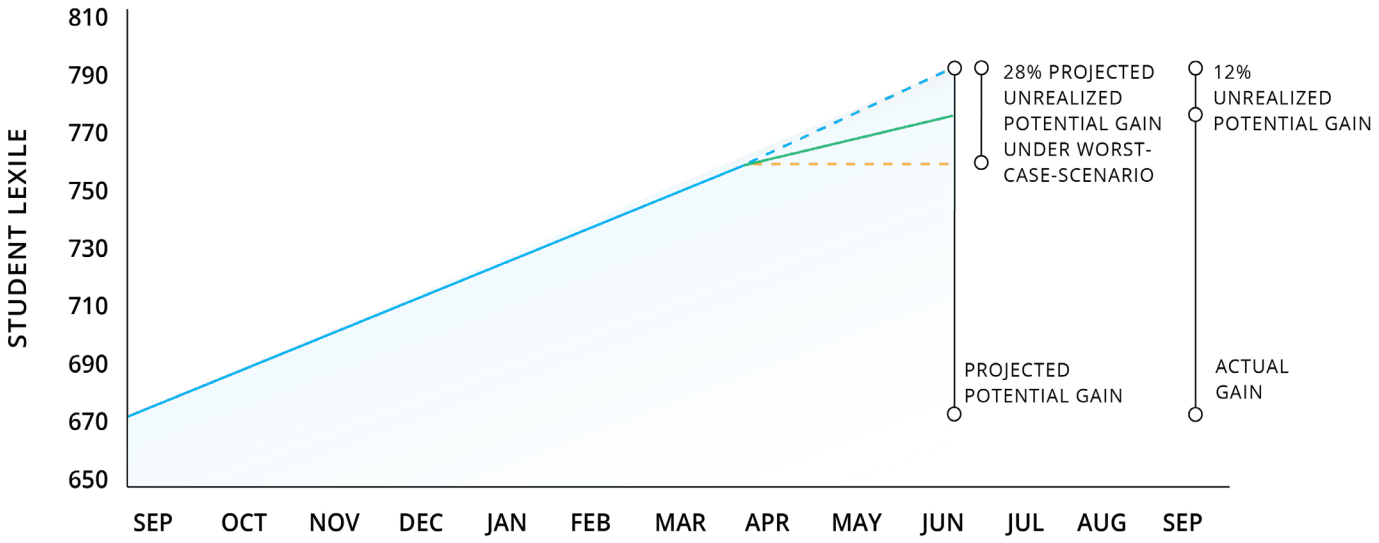
Achieve3000 Literacy for grades 2-12 uses the LevelSet™ assessment tool and a proprietary software engine to determine student reading ability on an ongoing basis. This system uses a Bayesian scoring algorithm to produce repeated measures of students' reading abilities. The Bayesian approach uses prior scores to refine each new estimate of achievement to improve the accuracy of measurement as students learn. Student Lexile® measures are updated monthly.

To be included in this report, students had to be in the United States and using the English edition of Achieve3000 Literacy prior to March 15, 2020. To compare students' projected and actual Lexile Growth through the end of the school year, students were required to have a LevelSet pretest at the beginning of the 2019-2020 school year to serve as a baseline Lexile measure; and a second Lexile measure during the 2019-2020 school year at least 90 days after the pre-test but before March 15. At the end of the school year, students normally take a LevelSet posttest. However, because of the pandemic, many students did not take the post-test at the end of the 2019-2020 school year. For these students, their latest Lexile measure was used as their end-of-year measure. Growth trajectories are calculated linearly using each student's pre-test as the starting point and a later Lexile measure as the end point.

A subset of students who had completed both a post-test Lexile measure at the end of the 20192020 school year as well as a pre-test Lexile measure through September 25 of the 2020-2021 school year was used to examine loss in potential learning over the summer.

Results | Overall Loss in Reading Growth

Graph 1: Predicted reading growth for students using Achieve3000 Literacy (2019-2020)



Actual Growth for Active Users Pre-Closure represents the actual growth rate of students using Achieve3000 Literacy during the 2019-2020 school year, through March 15.

Potential Growth for Active Users Pre-Closure represents the predicted learning gains for students using Achieve3000 Literacy for the remainder of the school year if schools had not closed.

Halted Growth for Non-Active Users Post-Closures represents predicted growth for students who do not continue using Achieve3000 Literacy after the school closures. It shows a 28% loss of potential Lexile growth because of the school closures.

Actual Growth for Active and Non-Active Users Post-Closure represents the average actual growth rate after March 15 for all students who used Achieve3000 Literacy prior to school closures.

"Although the actual growth since school closures falls below the potential growth mark for active users, the blued dotted line, it's still far above the trajectory for non-active students, represented by the yellow-dotted line. Many students could have lost up to 28% of their potential reading gains by the end of last school year. In comparison, students engaged with Achieve3000 Literacy through the end of last school year experienced only a 12% loss of their potential gains." -Kevin Baird, Chief Academic Officer

In **Graph 1**, the solid blue line represents the rate of growth exhibited by students using Achieve3000 Literacy during the 2019-2020 school year up to March 15 (n = 1,007,262). If students engaged in Achieve3000 Literacy at the same level as before the closure, they could continue growing at the same rate as before. Thus, in a previous report (Achieve3000, 2020), Lexile growth trajectories were projected to June 1 linearly using the daily Lexile growth rate exhibited up to March 15.

At the time of school closures, a worst-case prediction for the remainder of the school year was for no additional growth to occur, which is represented by the yellow dotted line. This could be seen as a conservative worst-case scenario, as it is possible students could have actually regressed if they did not engage at all in schoolwork for the remainder of the school year.

For students who were engaged with Achieve3000 Literacy during the 2019-2020 school year, the difference between the Potential Growth for Active Users Post-Closure (blue dotted line) and the Halted Growth for Non-Active Users Post-Closure (yellow dotted line) represents the growth that could have been lost as a result of the pandemic. Based on these projections, the unrealized literacy growth could have been as high as 28% for many students.

Fortunately, on average, this worst-case projection appears to have been largely avoided when examining actual data collected from students through June 2020. The solid green line represents the average rate of growth up to June 1 exhibited by all students who had used Achieve3000 Literacy prior to school closures.

Although the average growth since school closures falls below the Potential Growth for Active Users Post-Closure (blue dotted line), it falls well above the Halted Growth for Non-Active Users Post-Closure (yellow dotted line). On average, 12% of the potential gains in Lexile growth were unrealized, as opposed to 28% in the projected worst-case scenario depicted above.

> *Many students could have lost up to 28% of their potential reading gains by the end of last school year. In comparison, students engaged with Achieve3000 Literacy through the end of last school year experienced only a 12% loss of their potential gains.*

| Lexile Growth Post-School Closures

To examine the impact of usage of Achieve3000 Literacy on student Lexile growth through the end of June, we examined the final Lexile measure before and after school closures across four categories listed below.

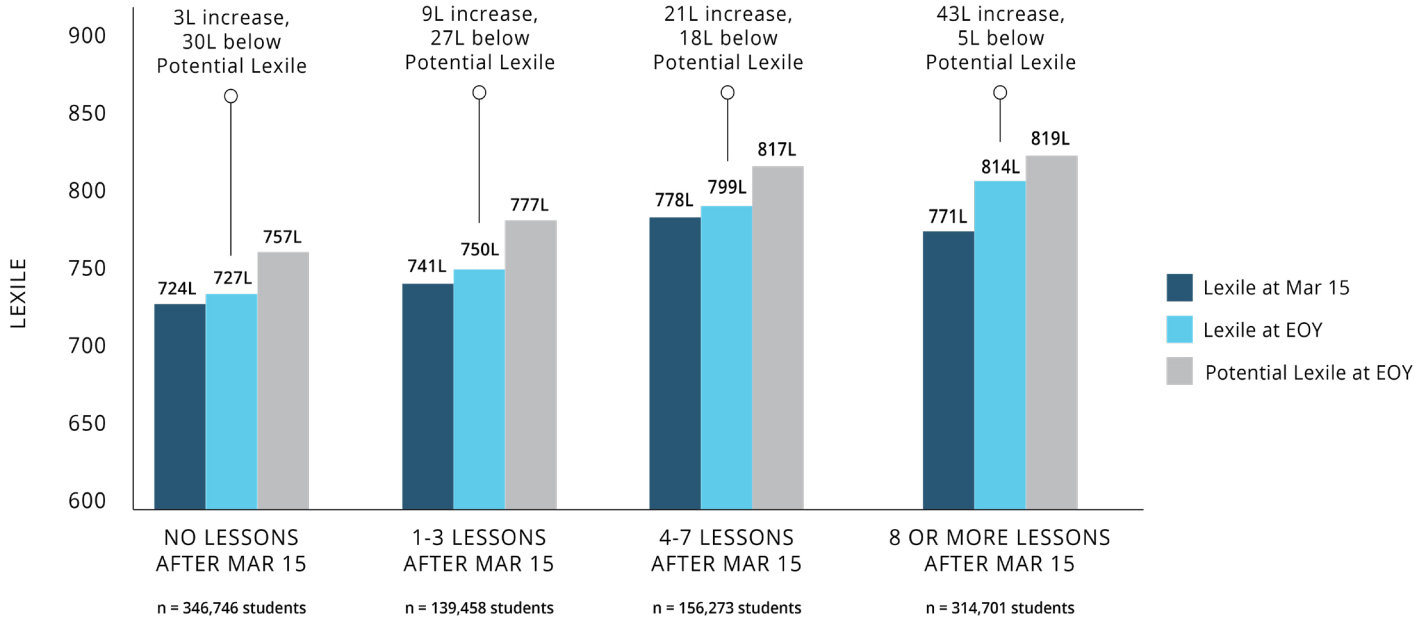
1. Students who did not complete any lessons after March 15
2. Students who completed between one and three lessons since March 15
3. Students who completed four to seven lessons since March 15
4. Students who completed eight or more lessons since March 15

Graph 2 shows that students who did not complete any lessons after school closures experienced almost no Lexile growth in that time. Conversely, students who completed 8 or more lessons since school closures experienced a Lexile growth of 43L, which is nearly as much growth as their potential growth had schools not closed.

The Lexile growth for students with 0-3 lessons completed since March 15 should be interpreted with caution. Most of these students did not receive a Lexile adjustment after March 15 because of lack of activity. Thus, we lack estimates of these students' reading ability based on assessments at the end of the school year. It is possible they had growth in reading ability between March 15 and the end of the school year that was not measured in the Achieve3000 system. However, it can be safely assumed that lack of use of Achieve3000 Literacy during this period, when all formal instruction from schools was handled online, if there was instruction at all, is likely indicative of lack of formal learning opportunities.

Students who remained engaged with Achieve3000 Literacy through the end of last school year realized nearly all of their potential literacy growth had schools not closed.

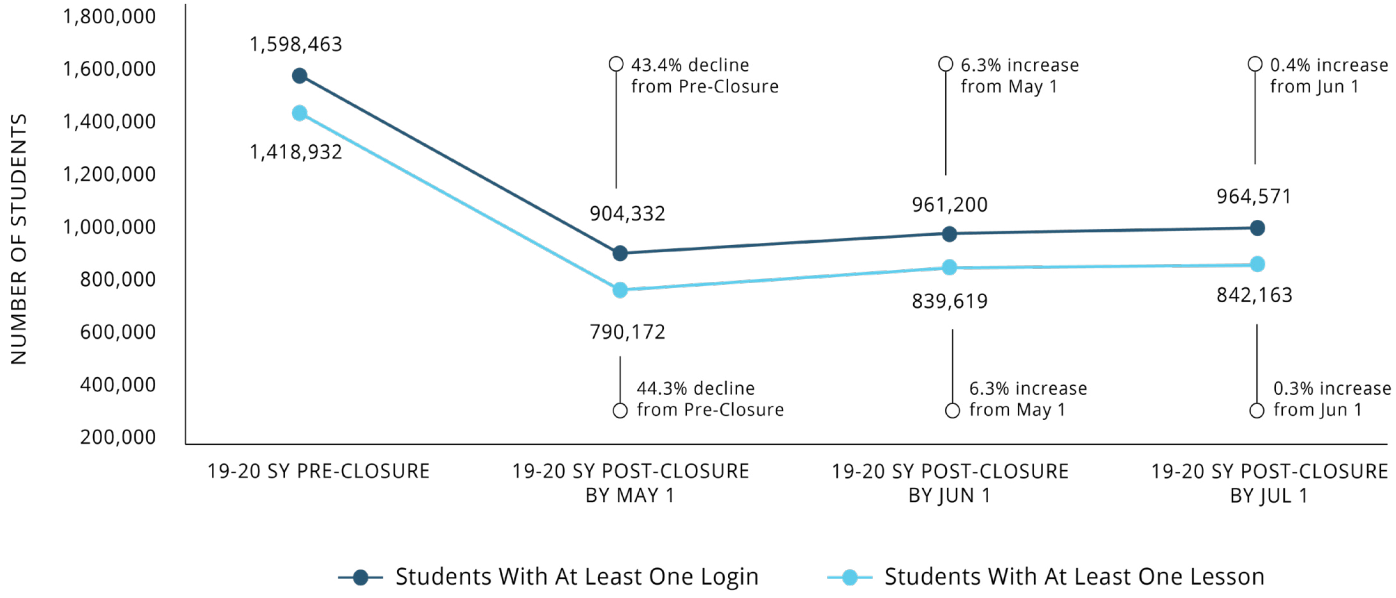
Graph 2: Pre-test and end-of-year Lexile measures by # of lessons completed post-closure



| Student Usage Pre- Versus Post-School Closures

In our previous paper, which analyzed usage through April 30, we found that the number of students logging in dropped by 43% post-closure, and the number of students completing lessons dropped by 44% post-closure. As can be seen in **Graph 3**, the number of students logging in and completing lessons increased slightly from April to June 2020. Thus, it appears that the majority of schools who decided to use Achieve3000 Literacy as part of their home-based learning initiatives did so by the end of April.

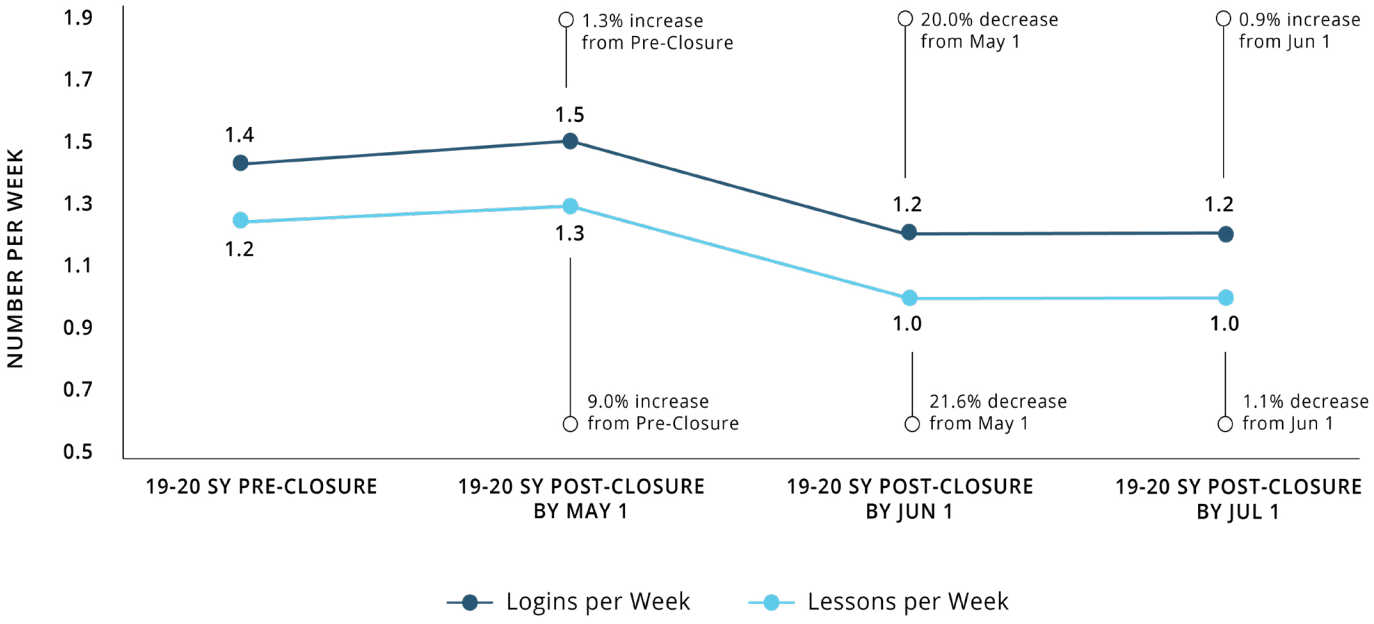
Graph 3: Number of students using Achieve3000 Literacy pre- and post-school closure



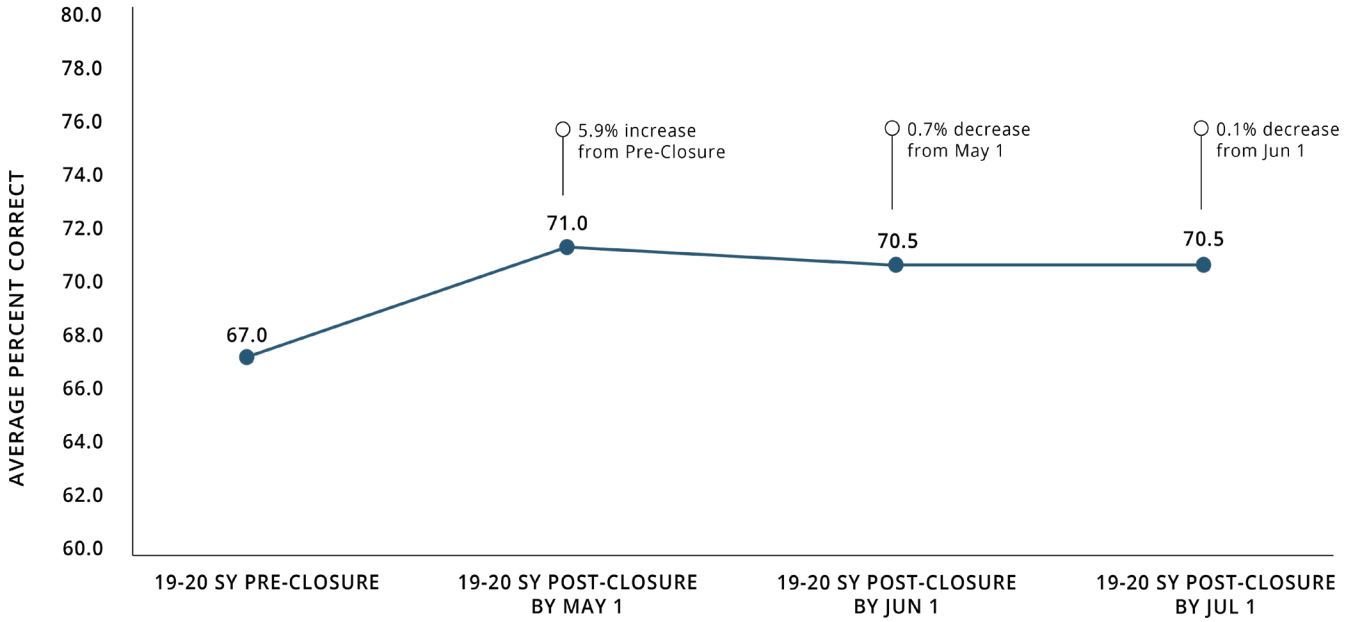
We also re-examined three indicators of active usage: logins per week, lessons per week, and average first-try score[1]. **Graph 4** shows that both average weekly logins and average weekly lessons dropped slightly from April to June. The drop-off is consistent with the normal pattern at the end of the school year. However, in **Graph 5**, the higher average first-try score in April, and the fact that this higher level was essentially maintained in May and June, could indicate a direct effect of using the program from home. For example, it is possible that students performed better at home because they had more time to complete the activities, had fewer distractions, and found the familiarity of Achieve3000 Literacy reassuring.

[1] *The term "average first-try score" refers to the score students achieve on the assessments that are embedded in each lesson. Students are given multiple attempts on each item in the assessments, but only their answers on first attempts are counted. The recommended target for average first-try score is 75%.*

Graph 4: Logins per week and lessons completed per week pre- and post-school closure



Graph 5: Student performance pre- and post-school closure

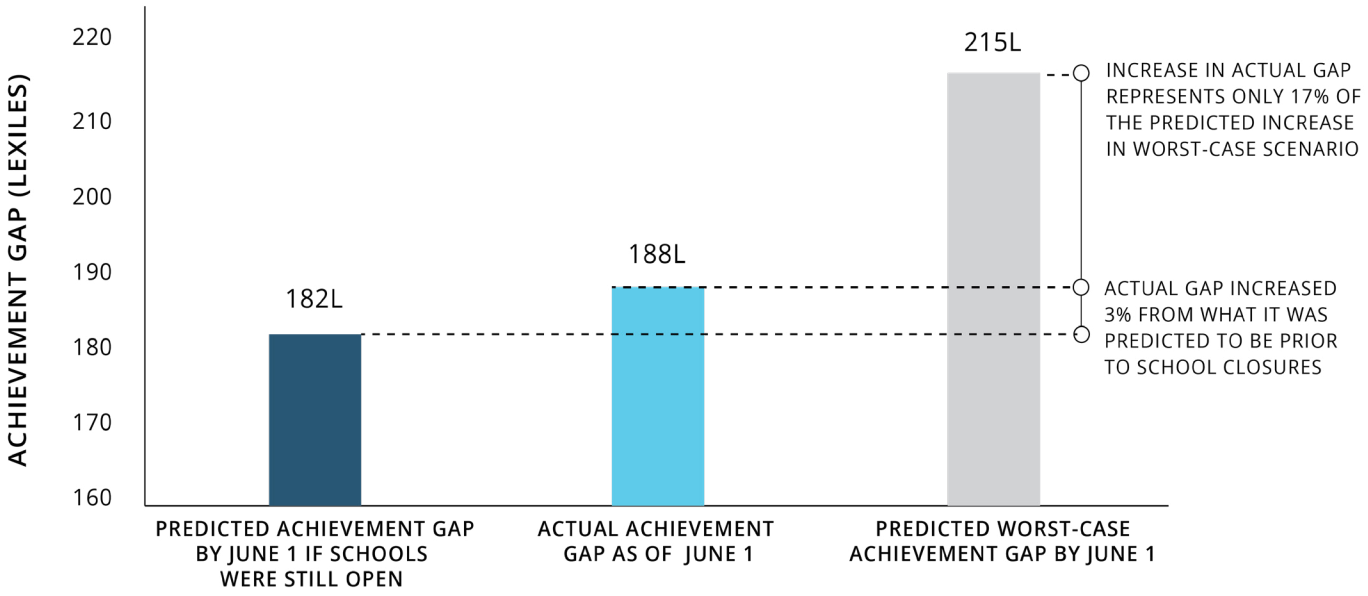


| Impact of Potential Learning Loss on The Achievement Gap

In a previous report (Achieve3000, 2020), we projected the achievement gap that would likely have occurred by the end-of-year if there were no school closures and students completed the school year as normal (the dark blue bar in Graph 6). We also projected the achievement gap in a worst-case scenario (the gray bar in Graph 6), in which we assumed that students in the high-income school category would achieve their full potential Lexile growth from March 15 through the end of the school year, while students in the low-income school category would have no growth beyond the school closures. The achievement gap under this worst-case scenario was 18% larger than the achievement gap projected under the assumption of no school closures.

Using student usage and engagement data through July 1 from schools categorized as either high- or low-income schools (n=467,193), we can now evaluate the actual end-of-year achievement gap (the light blue bar in Graph 6). Although the gap did widen, it did not grow to the extent feared in the worst-case scenario. Specifically, the actual end-of-year achievement gap was only 3% larger than the achievement gap projected under the assumption of no school closures.

Graph 6: Potential and actual achievement gap between students from low- and high-income schools

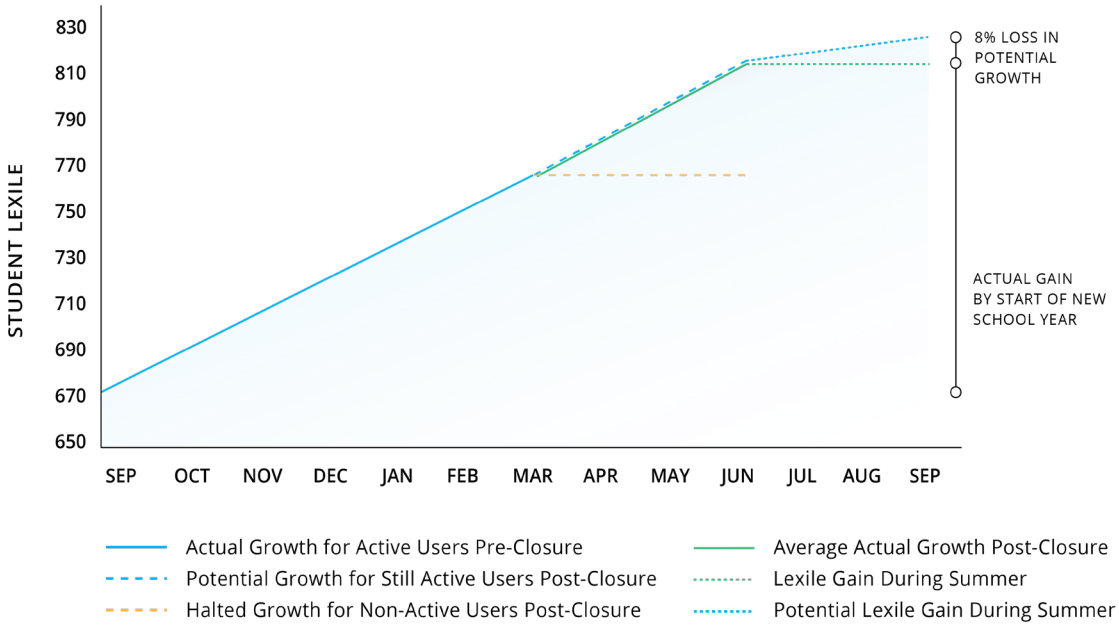


| Impact of COVID-19 at the Start of the New School Year

With the start of the 2020-2021 school year, many returning students of Achieve3000 Literacy have already completed a LevelSet assessment. As such, we can begin to explore the lingering impact of COVID-19 on students as they start the new school year. We divided these students into two groups: 1) those who had sufficient activity in the program during the school closures to receive an updated Lexile on or after May 1st (n = 141,698); and 2) those with no activity in the program after March 15 and until the pre-test in the new school year (n = 112,050).

Graph 7 displays the data for the first group. The solid blue line represents students' actual growth during the 2019-2020 school year prior to school closures. The yellow dashed line represents a worse-case scenario of no additional growth after school closures. The blue dashed line represents their potential growth up to the end of the school year if they had continued growing at the same rate as before, while the dotted blue line represents the change in Lexile that would be expected over the summer[2]. The actual change in Lexile is represented by the solid green line, which represents students' Actual Growth from March 15 to the end of the school year, and the dotted green line, which shows the actual change in Lexile over the summer. The good news is that these students maintained virtually the same rate of Lexile growth through the end of the school year. This can be attributed to their continued activity in Achieve3000 during school closures, which amounted to an average of 1.4 lessons per week completed during this time. However, these students' experienced a halt in Lexile Growth over the summer. The gap between their actual and potential Lexile measures at the start of the 2020-2021 school year represents an 8% loss in potential growth, or the equivalent of about 31 days of learning.

Graph 7: Actual versus Projected Lexile of Active Users through to the Start of the 2020-2021 School Year

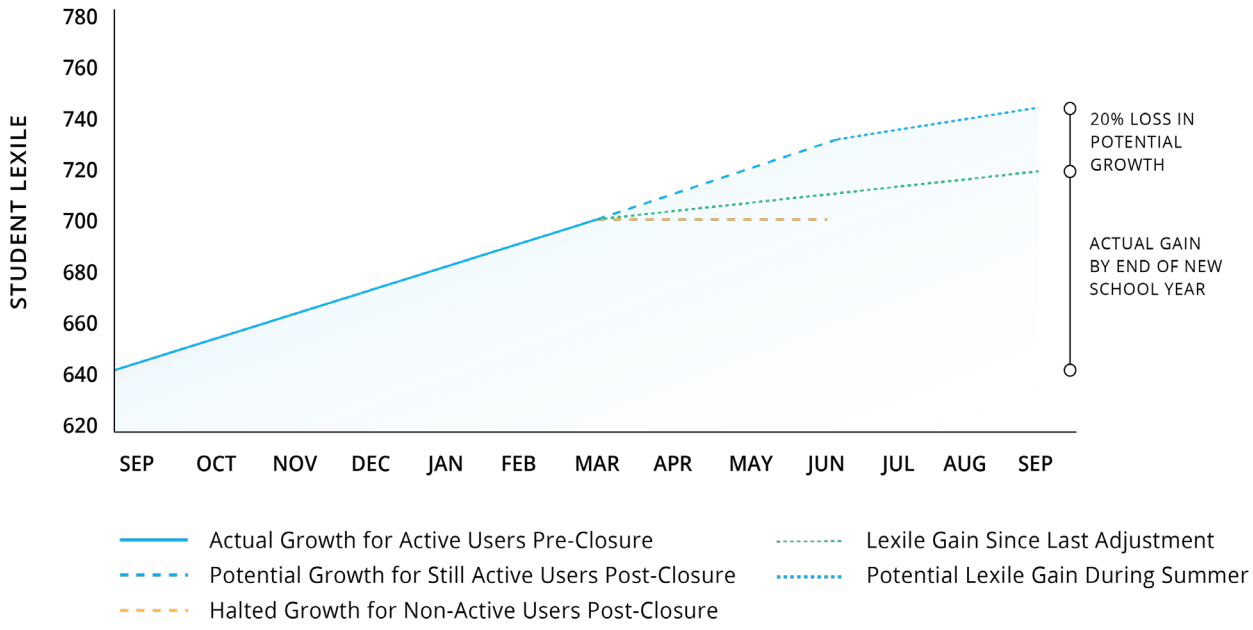


[2] *We recently completed analysis of Lexile change during the summer months for students using Achieve3000 Literacy and found that student Lexile measures typically grow by 8% over the summer months. We attribute this to an enduring impact of Achieve3000 Literacy usage.*

Graph 8 displays the Lexile data for students in the second group: those with no activity in Achieve3000 Literacy during the COVID-19 school closures. The solid blue line represents students' actual growth prior to school closures. The yellow dashed line represents the worst-case scenario of no additional growth after school closures. The blue dashed line represents their potential growth up to the end of the school year had there been no COVID-19 related school closures, whereas the blue dotted line represents their potential growth throughout the summer break to the beginning of the 2020-2021 school year, using the same assumption of 8% growth. Unlike the students in the previous analysis, however, these students became inactive and thus their Lexile measures could not be updated after March 15. In other words, their actual Lexile growth trajectory through the end of the 2019-2020 school year is unknown, as is their Lexile change over the summer. Yet, since we have their pre-test Lexile from the 2020-2021 school year, we can plot their change in Lexile from March 15 to the pre-test, which is the dotted green line. Comparing these students' actual Lexile at the start of the 2020-2021 school year to their potential Lexile, it is evident students experienced a 20% loss in potential growth. This is the equivalent of 73 days of learning.

From these analyses, we conclude that the impact of the COVID-19 closures depends on the amount of engagement in learning activities, in our case with Achieve3000 Literacy, during the school closure period last school year. Even with strong engagement, the COVID-19 pandemic appears to have caused a small loss in potential learning by the start of the 2020-2021 school year, as evidenced by the gap shown in Graph 7. However, Graph 8 demonstrates that lack of engagement in learning activities more than doubled the impact of the pandemic, resulting in 2.4 times the loss in potential learning.

Graph 8: Actual versus Projected Lexile of Inactive Users through to the Start of the 2020-2021 School Year



Limitations

This study used Lexile measures for students derived largely from assessments completed in a home, rather than a school, environment. It is assumed that the quality of the testing environments varied more than the variation in testing environments in schools. Therefore, the Lexile measures resulting from assessments at home are likely subject to more measurement error than assessments taken in school. This measurement error could have been caused by factors such as distractions, assistance from others, or use of outside learning aids, etc.

The sample of students taking the pre-test assessment is a subset of students who will ultimately take the LevelSet pre-test this fall. It is possible that this sample is biased in unknown ways.

Conclusions

This analysis of data from a major online learning platform has provided several important insights about the online learning experience in the United States since the start of the COVID-19 pandemic:

1. The initial projections for loss of potential learning gains from the time of school closures through June 1, assuming a worst-case scenario where students experienced no literacy growth after school closures, was 28%. Thankfully, based on data through June 1, we have determined that this worst-case scenario was not realized. However, students still did experience a 12% loss to their potential learning gains.

2. We previously projected that the achievement gap between low- and high-income schools could potentially widen by up to 18%. Fortunately, this was not the case, as data through June 1 shows the actual end-of-year achievement gap was only 3% larger than the achievement gap projected under the assumption of no school closures. It should be noted however that there was greater evidence of a widening achievement gap in the elementary school level than at the middle school or high school levels.

3. We previously projected the gap between struggling readers and advanced readers could increase by as much as 6% during school closures. Thankfully, data through June 1 shows the actual end-of-year gap had only increased by 2%. As with the achievement gap between students from low- and high-income schools however, there was greater evidence of a widening gap between struggling and advanced readers at the elementary school level than at the middle or high school levels.

4. Although many of the worst-case projections did not play out, there was still a significant overall negative impact on student learning. Students who did not demonstrate any engagement with Achieve3000 Literacy after school closures started this school year, on average, with a reading measure 20% lower than what has been observed in prior years. Thus, our preliminary conclusion is that the impact of COVID was a loss of 20%, or 73 days, of potential learning.

About this Research Brief

This research brief is a collaboration between Successful Practices Network, Center for College & Career Readiness, and Achieve3000. The Successful Practices Network (SPN) is a not-for-profit organization dedicated to bringing schools and districts the most up-to-date resources and assistance to achieve success by design. The Center for College and Career Readiness is a not-for-profit training and research organization currently focused on maximizing individual learner engagement through advanced neuroscience research. Achieve3000 is a leading edtech solutions provider delivering a comprehensive suite of proven-effective digital solutions that accelerate literacy and deepen learning across the content areas

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McNulty, Ray, and Kevin Baird. *The Impact of School Closures on Student Learning: An Analysis of Real-Time Data for 1.6 Million Students Using Achieve3000 Literacy*. Red Bank: Achieve3000, 2020.

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