Modeling the Impact of COVID-19 School Closures on Greater Houston Student Proficiency

EmpowerK12 June 29, 2020



Summary

As a result of the COVID-19 pandemic in Texas, most school districts in the Houston Metro Area suspended in person instruction in mid to late March, resulting in a loss of more than two months of in-person instruction time. While it is clear anecdotally that the loss of traditional classroom instruction time had tremendous impacts on students and families, Good Reason Houston believes it is important to quantify or measure those impacts in order to support districts, educators, and decision makers as they think about what students will need in the 2020-21 school year.

To estimate the influence of extended time off outside of the traditional school schedule, Good Reason Houston commissioned EmpowerK12 to review relevant research and analyze Greater Houston data to more specifically project the student achievement impact of the transition to virtual learning and the unexpected time spent out of school. These projections are built and analyzed using local and national data, all of which indicated similar outcomes.

This study finds that every week of lost instruction leads to an average STAAR proficiency rate decline of eight-tenths of a point in math and six-tenths of a point in reading. In 2019-20, Greater Houston area students lost nine weeks of traditional classroom instruction as response to the COVID-19 pandemic demanded that schools close to in-person learning. If students had taken STAAR assessments in spring 2020, the expected proficiency in reading/English language arts (ELA) drops 5.7 points and proficiency in math drops 7.7 points as compared to last year. Based on total regional student enrollment of 512,000 in spring 2018-19, when we apply the model results to students in all grades, we project that today about 29,000 fewer students in ELA and 39,000 fewer in math are on track for grade level proficiency than prior to COVID-19.

About this study's research partners

EmpowerK12

EmpowerK12 is a DC-based nonprofit with the mission to empower education leaders, including principals, support organizations, and policymakers, with the right information, relevant skills, and proper systems needed to continuously improve educational institutions. We are a leader in accountability, education data analytics, and impactful research with similar COVID-19 impact studies conducted for the District of Columbia and Metro Atlanta.

Good Reason Houston

Good Reason Houston was founded in 2017 with the vision that every child, in every neighborhood, excels in a world-class public school and thrives in the Houston of tomorrow. Good Reason Houston partners with superintendents to accelerate progress within school districts and promote courageous decisions that improve the quality of Houston area public schools. Good Reason Houston has set a goal to ensure that by the 2025-26 school year, 60,000 more students are learning in high quality schools, rated A or B based on the Texas Education Agency (TEA) rating system.



Introduction

The last regular day of in-person schooling for most Houston area schools occurred on March 13th. Local school districts began the process to convert to remote and digital learning at that time. Once all Greater Houston area students returned from spring break in late March, all local district were beginning to implement some components of a remote learning strategy, though in many cases it would take districts several more weeks to fully implement a digital learning strategy for most students.

To estimate the influence of extended time outside the traditional classroom, we reviewed relevant research and analyzed Texas data to triangulate possible future student achievement outcomes due to school day cancellations related to COVID-19. First, we reviewed the existing evidence on (a) summer learning loss and (b) learning loss associated with natural disasters such as Hurricane Harvey and Hurricane Katrina. Then, we compared the similarities of those outcomes with Greater Houston data points, including how schoolwide student attendance impacts growth and achievement on the Texas STAAR assessments. Finally, we applied a model based on national research and Texas data to determine how Greater Houston achievement rates in 2020-23 may be impacted.

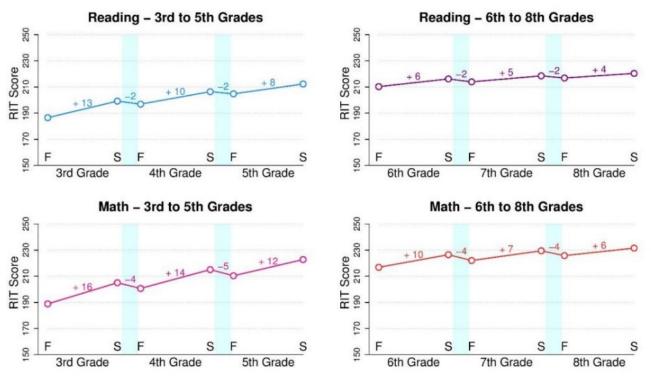
What can we learn from national studies on summer learning loss?

As of May 29th, nearly every US jurisdiction ordered or recommended the cancellation of the remaining academic year, lengthening the traditional, ten-week summer break by an additional two and a half months. While some students receive instruction through camps, summer classes, and family activities during a typical summer break, the rigor and connection to the school curriculum often lack confluence, which leads to academic regression when school is out (Alexander et al, 2001). Many schools across the nation are adopting distance learning initiatives of varying degrees to mitigate COVID-19 closures. Literature on large-scale distance learning is non-existent, leaving summer learning loss as one of the best ways to assess possible achievement impact.

The traditional summer break is essentially a relinquishment of approximately 45 additional instructional days for students during the summer months, June through August, or roughly 25% of the typical 180 instructional days in the school year. Researchers found that students who took the NWEA Measures of Academic Progress (MAP) assessment in the spring and again the following fall at the start of a new school year earned fall scores that were, on average, 25% lower in the fall than the spring for math and 13% lower in reading (Thum & Kuhfeld, 2020). This means that over the summer months students in elementary or middle school grades lost nearly one-fifth of the skillsets they learned the prior school year.

The line charts on the following page show the national average scale score on NWEA MAP in the fall and spring across grade levels.

Summer Learning Loss Subject Spring Summer N-Size Grade Loss Math -21% 132,062 1 2 -11% 133,623 Math 3 -11% 135,458 Math 4 Math -18% 130,077 Math 5 -38% 148,818 Math 6 -35% 165,541 Math 7 -39% 190,705 1 -17% 131.136 Reading Reading 2 -3% 128,742 3 -4% 134,519 Reading Reading 4 -3% 134,361 Reading 5 -13% 148,564 Reading 6 -27% 162,887 7 Reading -25% 194,033



National 2015 Norms on the NWEA MAP by Grade

"F" represents average fall score and "S" the average spring score

Nationally, there is evidence of differential summer learning loss across socioeconomic student groups (Quinn et al, 2016). Atteberry and McEaching (2016) used NWEA MAP scores to look at learning trajectories. In general, students grow during the school year and then regress over the summer with differential summer regression accounting for about 35% of the racial achievement gap. However, there is substantial variation of summer loss – some students gain ground over the summer, while some students lose nearly as much ground as they gained during the school year.

Cooper et al. (1996) reviewed 39 studies pertaining to summer vacation and student achievement and performed a meta-analysis on 13 of the most recent studies. The results of the meta-analysis indicated that typical "summer loss was equivalent to about 1 month on a grade-equivalent scale" or "about one-tenth of a standard deviation relative to spring test scores" (p. 259). Achievement losses were greater in math and greater for economically disadvantaged students.

Kim and Quinn (2013) also conducted a meta-analysis on 41 studies looking at summer reading interventions to mitigate the typical learning loss. They found significant benefits for low-income children versus middle-income children. This study provides evidence for the necessity of quality resources for learning at home during distance learning.

Rambo (2015) looked at differences in reading loss over the summer between higher and lower achieving students and found that "average students grew steeply during the school year and gained nothing over the summer. By contrast, initially high-achieving students grew more slowly than average students during school but maintained that same slower growth rate in the summer" (p. 112).



What can we learn from the impact of hurricanes Katrina and Harvey?

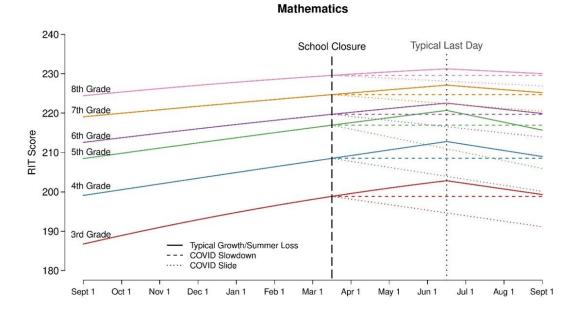
Hurricane Katrina and Hurricane Harvey both generated mass flooding that led to substantial delays in the start of the school year in affected areas. For Katrina, residents in New Orleans and Mississippi were affected by displacement and school delays. A 2008 Ward et al. study examined the outcomes of displaced Mississippi students who missed an additional 8% of the 2005-06 school year and found that displaced students had lower math growth but no statistically different reading growth compared to Mississippi students who were not displaced.

In 2017, flooding from Hurricane Harvey lead to as many as three- to five-week delays in the start of the school year across many Texas Gulf Coast districts. Students in the most significantly affected districts attended 8.3% fewer school days that year. When compared to non-affected districts with similar demographics and prior achievement levels, students at affected school districts demonstrated 2018 scale score gains that were 7.8% lower in reading and 21.6% lower in math, according to an EmpowerK12 analysis.

What are other early COVID-19 studies saying about possible achievement loss this academic year and the future?

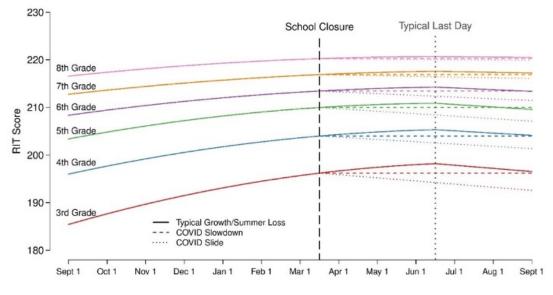
Two reports were released in late April, one national and one focused on an urban city, utilizing large datasets and modeling techniques to provide an early warning to policymakers about the extent of possible student learning loss due to the pandemic.

Kuhfield & Tarasawa (2020) utilized a robust dataset from NWEA MAP to extend previous summer loss research and adjust for additional slide due to COVID-19 school closures. According to the study, "preliminary COVID slide estimates suggest students will return in fall 2020 with roughly 70% of the learning gains in reading relative to a typical school year. However, in mathematics, students are likely to show much smaller learning gains, returning with less than 50% of the learning gains and in some grades, nearly a full year behind what we would observe in normal conditions" (p. 2).





Reading



Source: NWEA Report on COVID Slide, April 2020

EmpowerK12 (2020) analyzed student-level data in Washington, DC to project likely proficiency losses by 2021 and beyond due to COVID-19. The organization estimated that the District of Columbia, one of just two states to make substantial gains on NAEP (the Nation's Report Card) in 2019, will see proficiency on their state assessment drop 16.5 percentage points in reading and 10.4 percentage points in math.

The chart below shows the projected proficiency based on the date students return to school fulltime. A recent update to local guidance means DC students will not be able to return to school for regular in-person instruction full-time until there is a vaccine or cure. However, the projections show the extent of likely proficiency loss that has already occurred due to COVID closures with more loss compared to a normal year possible this fall.

RETURN DATE	Math PARCC 4+	ELA PARCC 4+
APRIL 27, 2020	29.6%	34.9%
MAY 26, 2020	26.6%	31.1%
AUGUST 30, 2020	23.6%	27.5%
PREDICTION NO COVID	34.0%	44.0%

District of Columbia "All Students" Proficiency

Source: EmpowerK12 on DC state assessment proficiency loss due to COVID-19, April 2020

How does lower attendance impact student performance on Texas STAAR?

To address this question, we analyzed the last two years of Texas school report card data from the Governor's Office of Student Achievement. Since the Texas Department of Education only publishes attendance data at the school level by demographic and not by grade, our school sample only includes schools that only have students in tested grades, primarily upper elementary and middle schools.

	<u>All TX</u>	<u>Sample</u>
Number of Tested Schools	8,402	1,814
Number of Tested Students	5,256,533	1,212,656
Percent At Risk	53%	50%
Percent Students with Disabilities	10%	10%
Average Growth	69.7	67.4
English Language Arts Proficiency	40.9	40.4
Mathematics Proficiency	45.1	42.2
Attendance Rate	95.2%	95.6%

Characteristics of 2018-19 Sample Texas Schools Compared to the State

Learning Loss Due to Student Absence in Sample Texas Schools

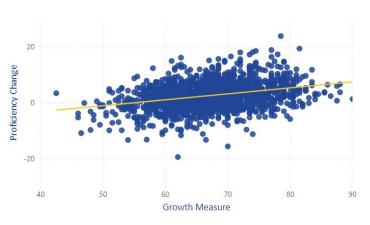
To build a predictive model that estimates the impact of COVID closure on STAAR proficiency, we began by analyzing the link between proficiency changes, student growth measures, and absenteeism within the sample set of Texas schools. We find a statistically significant correlation (p < .01) between student attendance rates at the school level and STAAR growth. Further, there is a significant correlation (p < .01) between school growth and a school's change in proficiency rate from one year to the next, allowing us to create a model that estimates proficiency changes based on changes to regular school attendance.

The chart at the left shows the average 2019 school growth for the sample schools based on their average student attendance in 2018-19, and the graph at the right shows the correlation between the school growth measure and annual proficiency changes.

<u>Attendance</u> <u>Rate</u>	<u>Avg Days</u> <u>Absent</u>	<u>Math</u> <u>Growth</u>	<u>Reading</u> <u>Growth</u>
97% +	4.5	73.7	71.0
95%-97%	7	69.3	67.1
< 95%	12	62.9	63.6

Attendance Impact on Student Growth

Student Growth Impact on Proficiency





Based on national research and Texas instructional loss data, how might COVID-19 affect future STAAR achievement rates in the Greater Houston region?

Based on the local and national data which show similar outcomes, we can expect that for every week of distance learning there was an average STAAR proficiency rate decline of about eight-tenths of a point in math and six-tenths of a point in reading. In 2019-20, Greater Houston students lost nine weeks of regular instruction due to the COVID-mandated quick transition to distance learning in mid to late March.

If students in grades 3-8 had taken STAAR end-of-grade assessments in spring 2020, we could expect proficiency in reading/English language arts to drop 5.7 points and proficiency in math to drop 7.7 points as compared to last year. Additional charts below examine the impact on three key student groups that are a focus of Good Reason Houston's mission and whose proficiency results trail their peers. Charts for economically disadvantaged students and by race can be found in Appendix I.

All Students 3rd-8th Grade STAAR

Subjects	Mathema	atics	Reading/	ELA
District	2018-19	2019-20	2018-19	2019-20
Aldine	40.3%	32.1%	33.3%	27.1%
Alief	43.1%	35.3%	38.4%	32.5%
Channelview	50.3%	42.1%	38.5%	32.3%
Galena Park	49.0%	41.4%	40.5%	34.9%
Houston	47.2%	39.7%	43.3%	37.7%
KIPP Houston	51.3%	44.4%	49.8%	44.8%
Pasadena	42.6%	34.7%	42.0%	36.1%
Sheldon	34.1%	25.6%	34.5%	28.1%
Spring	35.0%	27.2%	34.6%	28.9%
Spring Branch	52.1%	44.6%	48.6%	43.1%
YES Prep	54.5%	47.2%	39.5%	34.1%
Greater Houston	45.1%	37.4%	40.9%	35.2%

At Risk Student 3rd-8th Grade STAAR

Subjects	Mathematics		Reading/ELA	
District	2018-19	2019-20	2018-19	2019-20
Aldine	27.7%	24.0%	18.5%	17.3%
Alief	38.3%	34.9%	32.4%	31.4%
Channelview	42.6%	39.0%	28.0%	26.8%
Galena Park	38.9%	35.9%	27.9%	27.1%
Houston	31.3%	28.1%	23.2%	22.2%
KIPP Houston	40.8%	38.0%	36.1%	35.4%
Pasadena	32.1%	28.6%	27.9%	26.7%
Sheldon	26.0%	22.2%	23.0%	21.7%
Spring	24.1%	20.7%	22.5%	21.4%
Spring Branch	31.7%	28.6%	25.5%	24.6%
YES Prep	40.1%	37.0%	22.3%	21.3%
Greater Houston	32.1%	28.8%	24.8%	23.8%

Projected 2019-20 Proficiency Rates for Greater Houston School Districts

Students with Disabilities 3rd-8th Grade STAAR

Subjects	Mathematics		Reading/ELA	
District	2018-19	2019-20	2018-19	2019-20
Aldine	21.6%	17.7%	18.5%	17.2%
Alief	29.2%	25.4%	25.7%	24.4%
Channelview	25.8%	21.7%	20.8%	19.4%
Galena Park	19.5%	15.8%	17.1%	15.8%
Houston	27.6%	23.7%	24.4%	23.1%
KIPP Houston	24.3%	20.8%	18.9%	17.7%
Pasadena	28.7%	24.8%	24.6%	23.2%
Sheldon	18.6%	14.7%	14.6%	13.2%
Spring	23.9%	20.1%	23.7%	22.3%
Spring Branch	27.7%	23.9%	24.2%	22.9%
YES Prep	20.0%	16.3%	14.5%	13.2%
Greater Houston	26.0%	22.2%	22.8%	21.5%

English Learners Student 3rd-8th Grade STAAR

Subjects	Mathematics		Reading/ELA	
District	2018-19	2019-20	2018-19	2019-20
Aldine	35.9%	32.9%	21.9%	21.6%
Alief	38.7%	36.0%	30.2%	30.1%
Channelview	46.7%	43.7%	30.8%	30.6%
Galena Park	47.2%	44.7%	35.0%	35.0%
Houston	42.1%	39.5%	30.6%	30.5%
KIPP Houston	50.4%	48.1%	43.8%	43.9%
Pasadena	40.2%	37.4%	34.3%	34.2%
Sheldon	33.7%	31.0%	27.8%	27.6%
Spring	35.5%	32.8%	32.2%	32.0%
Spring Branch	34.3%	31.7%	26.3%	26.3%
YES Prep	44.9%	42.5%	25.4%	25.4%
Greater Houston	40.3%	37.6%	30.0%	29.9%

Based on total regional student enrollment of 512,000 in spring 2018-19 and applying the model results to students in all grades, today about 29,000 fewer students in reading/ELA and 39,000 fewer in math are on track for grade level proficiency than prior to COVID-19. The fall is likely to bring



additional distance learning as schools intermittently transition back to in-person instruction while respecting key public health measures. School officials are contemplating various forms of staggered in-person school schedules as the region recovers from the pandemic.

We do not yet know what kind of instruction will be possible in the 2020-2021 school year. While Texas is currently anticipating a return to traditional instruction, the initial pandemic response has taught us that we must prepare now for many different learning scenarios. It is entirely possible that students will have to receive virtual instruction for at least a portion of the next school year, and that learning is likely to be more effective if districts are able to plan well in advance of the need to reimplement distance learning. EmpowerK12 created a tool to help project STAAR proficiency rates for local school districts as the situation changes. The chart below demonstrates regional proficiency outcomes for the 2020-21 school year based on several different scenarios, as well as predicted proficiency if there had been no pandemic.

2020-21 School Year Scenario	Math Proficiency	ELA/Reading Prof
0% Remote Learning	38.6%	37.5%
25% Remote Learning, 75% Effective	36.4%	35.5%
50% Remote Learning, 50% Effective	28.7%	28.6%
75% Remote Learning, 10% Effective	12.3%	10.7%
Prediction No COVID Pandemic	48.3%	43.1%

Greater Houston 2021 STAAR Proficiency based on Different Distance Learning Scenarios

The following are assumptions and caveats related to the model estimates above:

- Achievement projections only include the STAAR assessments in grades 3-8. We cannot reliably attribute high school attendance rate data to the student population who completed an end-of-course assessment as only a subset of high schoolers takes STAAR each year.
- 2) The model assumes that distance learning initiatives in 2019-20 had limited effect on average. Even under the best circumstances with ample time to prepare, virtual schooling has shown little evidence of success, especially for students from low-income households and students with disabilities (Woodworth et al., 2015). Equitable access to devices and strong broadband internet is still a challenge in the region's less affluent neighborhoods. Also, the fidelity of implementation as compared to the typical six-hour instructional day is likely to be highly uneven.
- 3) The model assumes schools retain the typical 180-day academic year. Additional instructional time represents an opportunity to recover some of the losses, as noted in the next section.
- 4) The model assumes no other major changes in the quality of education in Greater Houston, and that prior incremental achievement gains or losses in each district continue when students return full-time.

Appendix I. Additional Student Group STAAR 3rd-8th Grade Projections

Economically Disadvantaged

Subjects	Mathematics		Reading/ELA	
District	2018-19	2019-20	2018-19	2019-20
Aldine	39.2%	34.3%	32.0%	29.9%
Alief	41.4%	36.8%	36.3%	34.5%
Channelview	48.5%	43.5%	36.1%	34.0%
Galena Park	47.4%	43.2%	38.4%	36.8%
Houston	41.8%	37.4%	36.3%	34.5%
KIPP Houston	50.5%	46.5%	48.6%	47.1%
Pasadena	40.6%	35.9%	39.7%	37.8%
Sheldon	33.2%	28.2%	33.2%	31.1%
Spring	33.9%	29.2%	33.2%	31.3%
Spring Branch	35.5%	31.0%	31.6%	29.9%
YES Prep	53.9%	49.6%	38.8%	37.2%
Greater Houston	41.3%	36.7%	36.2%	34.3%

Black/African American

Subjects	Mathematics		Reading/ELA	
District	2018-19	2019-20	2018-19	2019-20
Aldine	28.4%	27.2%	28.6%	28.4%
Alief	41.1%	40.2%	40.5%	40.4%
Channelview	37.8%	36.6%	35.7%	35.4%
Galena Park	41.7%	40.9%	37.1%	37.1%
Houston	34.0%	33.0%	35.0%	34.9%
KIPP Houston	49.0%	48.4%	51.9%	52.0%
Pasadena	34.2%	33.1%	35.6%	35.4%
Sheldon	22.1%	21.1%	26.8%	26.6%
Spring	26.7%	25.7%	28.1%	28.0%
Spring Branch	27.1%	26.2%	28.3%	28.2%
YES Prep	40.8%	39.9%	27.6%	27.5%
Greater Houston	33.7%	32.7%	34.2%	34.1%

Projected 2019-20 Proficiency Rates for Greater Houston School Districts

Asian

Hispanic

Subjects	Mathematics		Reading/ELA	
District	2018-19	2019-20	2018-19	2019-20
Aldine	43.3%	38.2%	34.1%	31.3%
Alief	39.1%	34.3%	33.4%	30.7%
Channelview	51.6%	46.5%	38.6%	35.7%
Galena Park	49.8%	45.5%	40.1%	37.8%
Houston	45.9%	41.4%	39.6%	37.1%
KIPP Houston	52.9%	48.8%	49.8%	47.6%
Pasadena	41.4%	36.6%	40.8%	38.1%
Sheldon	37.2%	32.0%	36.4%	33.4%
Spring	37.7%	33.0%	36.7%	34.0%
Spring Branch	37.1%	32.6%	34.1%	31.6%
YES Prep	55.8%	51.4%	40.5%	38.1%
Greater Houston	44.1%	39.5%	38.2%	35.7%

Subjects	Mathematics		Reading/ELA	
District	2018-19	2019-20	2018-19	2019-20
Aldine	83.3%	82.3%	69.5%	69.5%
Alief	72.1%	71.2%	58.3%	58.3%
Channelview	100.0%	99.2%	72.7%	72.8%
Galena Park	95.0%	94.1%	85.0%	85.0%
Houston	87.1%	86.2%	83.1%	83.1%
KIPP Houston	91.3%	90.5%	75.0%	75.1%
Pasadena	83.0%	82.1%	73.1%	73.2%
Spring	68.1%	67.1%	60.5%	60.4%
Spring Branch	90.5%	89.6%	80.5%	80.5%
YES Prep	73.1%	72.0%	46.2%	46.1%
Greater Houston	82.0%	81.1%	73.5%	73.6%

Projected 2019-20 Proficiency Rates for Greater Houston School Districts

White

Subjects	Mathematics		Reading/ELA	
District	2018-19	2019-20	2018-19	2019-20
Aldine	46.7%	45.2%	46.8%	46.3%
Alief	44.0%	42.8%	42.2%	41.8%
Channelview	50.9%	49.3%	42.6%	42.0%
Galena Park	49.2%	48.1%	47.0%	46.7%
Houston	73.0%	71.7%	76.2%	75.8%
Pasadena	52.8%	51.4%	55.4%	54.8%
Sheldon	38.2%	36.8%	39.5%	39.0%
Spring	46.5%	45.0%	46.1%	45.5%
Spring Branch	79.4%	78.2%	75.3%	74.9%
YES Prep	61.5%	60.5%	42.3%	42.0%
Greater Houston	68.4%	67.1%	69.0%	68.5%



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