Too Little, Too Late

A HARD LOOK AT SPRING 2020 REMOTE LEARNING

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OCTOBER 2020

AMERICAN ENTERPRISE INSTITUTE

Executive Summary

Following the unprecedented closure of the nation's school buildings in March 2020 with the onset of the coronavirus pandemic, the AEI education policy team tracked school districts' educational offerings throughout the spring. AEI's COVID-19 Education Response Longitudinal Survey (C-ERLS) conducted six waves of data collection to provide timely, descriptive snapshots of the nations' school districts. Building on that descriptive work from the spring, this report presents new analyses made possible by adding several other data sources to the six waves of C-ERLS data.

These combined data let me compare instructional platforms and supports across a number of district characteristics. These analyses complement and extend the growing body of work from various research groups that focus on the educational offerings from the past spring.[1] In this report, I focus on insights that may add understanding—or bode caution—for a new school year opening under the shadow of the COVID-19 pandemic.

This report presents three main sets of findings. The first section examines total instructional time lost during the spring—losses that were much greater in high-poverty schools. The second section looks at how remote-learning offerings differed across districts' student demographics. It reveals that districts serving more poor and low-performing students offered less robust remote instructional platforms to students, both at the end of the year and throughout the entire year after closures were announced, than more advantaged districts offered. The final section examines the broader contexts influencing school districts' offerings. It shows inferior remote platforms offered in counties with higher poverty and single-parent household rates and in counties with fewer adult bachelor's degree holders and less broadband internet access. In addition, comparisons among districts by their states' voting history show that districts in red states offered lower-quality instructional programs than did districts in purple and blue states.

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In March 2020, the coronavirus pandemic closed every school district across the country, forcing them to radically retool nearly all their operations. The nations' public school students were shuffled out of classrooms as district leaders set up "emergency learning" programs. After the dust settled on what is surely the most disrupted semester in a century, one thing became clear: The pandemic did not affect all students equally.

Schools' responses to statewide closures in the spring varied greatly. While some districts transitioned to remote learning in a matter of days, others canceled instruction for several weeks as they developed new platforms. Time to launch remote instruction was just one of many factors that affected students differently. Both the major features and smaller details of educational offerings—including physical instructional packets versus online learning platforms, grading requirements, expectations for teachers and students, and attendance policies—were all left to the discretion of school leaders.

All these factors varied across school districts, leaving some students further behind than others. As the 2020–21 school year begins, it is crucial to have a clear view of how the spring's educational offerings and students' opportunities to learn differed and where the educational losses mounted.

This report combines data from AEI's COVID-19 Education Response Longitudinal Survey (C-ERLS) with numerous other data sources to analyze differences in how students were affected by school closures throughout the spring. It offers new estimates of how much instruction was lost during the pandemic and how remote instruction differed across demographic lines. Beyond a perspective on what students received, this report also examines community characteristics that may have influenced remote-instruction offerings from the spring, and these may continue to influence reopening plans this fall.

Spring 2020 marks the first of many semesters affected by the pandemic. A clear understanding of what happened and to whom is necessary as schools prepare for the long road ahead.

Data

C-ERLS survey data were collected in six waves between March 27 and May 29. The data were the first nationally representative data on what remote-instructional platforms, supports, and other services school districts offered, as described on their district websites. Over the remainder of the school year, C-ERLS data followed the same sample of 250 school districts. Further details on C-ERLS's structure and design are available in Appendix A.

This report adds several data sources to answer new questions. To get a more comprehensive estimate of the total lost instructional days this spring, I combined three waves of national survey data from

the Education Week Research Center, which provided teacher-reported percentages of students who were "essentially truant" during remote instruction. These are the best national estimates of student nonparticipation during the epidemic, and they are broken out by school-level poverty measures. When combined with C-ERLS data, these survey data allow me to estimate total lost instruction due to canceled instructional days and student nonparticipation and how lost instruction varied with student poverty.

Combining data from several sources allows me to categorize districts on a number of characteristics and then compare the remote-instruction offerings they provided. Data from the Common Core of Data from the National Center for Education Statistics provided information on the proportion of minority students and students eligible for free and reduced-priced meals (FRM). Small Area Income and Poverty Estimates (SAIPE) from the US Census Bureau provided an additional measure of district poverty to complement the measures of student FRM eligibility.

Data from the Stanford Education Data Archive (SEDA) provided comparable information on districts' academic achievement and academic growth, as drawn from multiple prior years of student test scores. SEDA also provided comparable measures of the proportion of adults with bachelor's degrees or higher in the county and the share of single-parent households with children. American Community Survey data provided county-level estimates of broadband access. Finally, states' voting histories in presidential elections from 2000 to 2016 were used to categorize states as red, purple, and blue and compare the offerings of districts in them.

Findings

C-ERLS data capture how school districts' remote-learning offerings matured over the spring. Many districts began with relatively basic platforms in the immediate aftermath of school closures and then developed more sophisticated systems throughout April. While that development denotes progress through the spring, many district leaders and district websites have described the educational platforms offered this spring as "emergency learning," contrasting it with much improved "remote learning platforms" they are promising this fall. In the next three sections, I outline what this emergency learning looked like and how it differed across districts, to point to broad trends that indeed need improvements.

Lost Instructional Days. The pandemic left students with fewer days of instruction than previous school years. I examine total lost instructional time by combining two contributing factors: canceled instructional days and student nonparticipation.

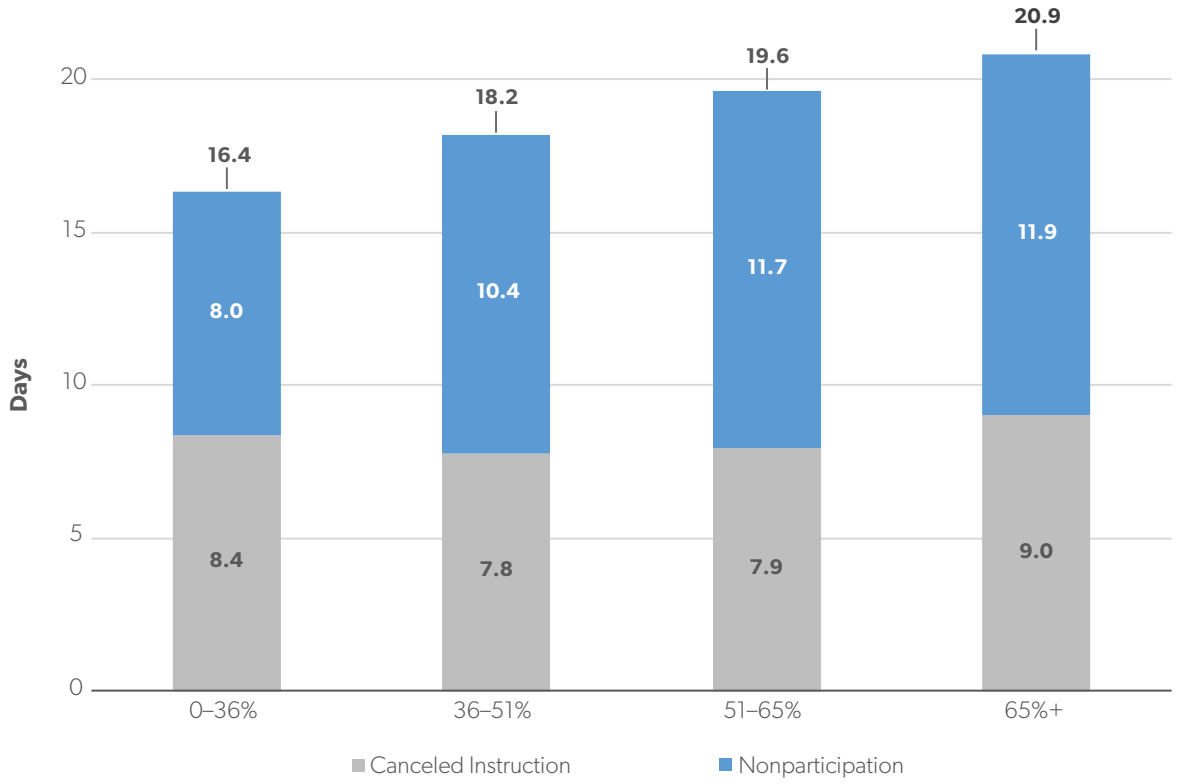
Canceled Instructional Days. Most districts were forced to cancel scheduled days of instruction immediately after pandemic building closures were announced so an initial program of remote instruction could be established.

On average, C-ERLS data show schools canceled just over eight instructional days immediately following building closures in their district. Eight instructional days are equivalent to 16 percent of the time remaining in the year after closures were announced and nearly 5 percent of an 180-day school year (Figure 1 and Table B1).[2] Some districts took longer to reopen than others: A quarter of schools were in districts that canceled three or fewer instructional days, while another quarter lost 13 or more.

The number of lost instructional days differed across districts for several reasons. The most obvious is that the number of days it took for remote instruction to start differed, with 30 percent of schools in districts that shifted to remote instruction within a week of closures, while another 28 percent took three weeks or more.[3] Other factors include whether spring breaks were scheduled before or after closures were announced and whether districts changed the scheduled end of the academic year.[4]

Canceled instructional days warrant the attention they garnered because they can have serious long-term negative impacts on students' educational progress.[5] C-ERLS data do not show substantive differences in the number of canceled days across

Figure 1. Instructional Days Lost to Closures and Nonparticipation, by District Poverty



Source: Author's calculations using C-ERLS and Education Week Research Center survey data.

different kinds of school districts, and thus earlier C-ERLS reports did not display them.

Truancy Rates. Canceled days were not the only source, or even the largest source, of lost instruction. During last school year and since, numerous reports have documented that large percentages of students did not participate in the remote instruction that school districts offered. Los Angeles Unified School District reported that as many as 40 percent of students failed to participate in its remote-learning programs.[6] During the week of April 13, Clark County, Nevada, teachers were unable to contact 35 percent of the district's student body—more than 100,000 students.[7] As late as the week of May 11, Chicago Public Schools reported that 15 percent of students had no contact with their school.[8] A nationally representative survey by RAND Corporation showed this pattern was nationwide, with 18 percent of teachers reporting they were unable to contact half or more of their students or families throughout the spring.[9]

Three national surveys of teachers by the Education Week Research Center revealed similarly troubling data: that between 21 and 25 percent of students were "essentially truant" for remote instruction.[10] (See Table B1.) These startlingly high percentages were undoubtedly caused by the pandemic, either because families' lives were disrupted, because the remote instruction that the pandemic caused was unengaging or easy for students to skip with little consequence, or both. C-ERLS data showed that in the spring, many districts did not expressly expect participation or take attendance,[11] and grading policies were much more lenient in many districts, which may have exacerbated the problem of students "ghosting" their schoolwork.

Student Nonparticipation. These alarming numbers certainly warrant a broader estimate of total instruction lost to nonparticipation, or "truancy." Because neither C-ERLS data nor other national surveys of schools or districts could capture time lost to nonparticipation directly, I estimated it by combining detailed data from the aforementioned Education Week Research Center surveys with C-ERLS data.

The Education Week Research Center provided data on each of their three surveys, administered on April 8, April 23, and May 5, and disaggregated by school poverty. Each contained teacher reports on the percentage of nonparticipating students and FRM-eligible students at their school. On average, teachers in schools with less than 25 percent FRM-eligible students had lower truancy rates, around 12 percent, than did higher-poverty schools. The highest-poverty schools had truancy rates of about 30 percent.[12] (See Table B2.)

For a comprehensive estimate, I combined Education Week Research Center's school-level truancy percentages for each category of poverty with the C-ERLS data on districts' shares of schools that fell in each category and the number of districts' remote instructional days closest to each survey date.[13] Figure 1 shows the district-level estimates by poverty level, with the C-ERLS districts divided into four equal-sized groups—less than 36 percent eligible for FRM, 36–51 percent eligible, 51–65 percent eligible, and more than 65 percent eligible.

Across the entire sample, the average number of days lost to truancy was 10.5, equivalent to almost 20 percent of the time after closures were announced and 6 percent of an 180-day school year. Of course, these numbers varied considerably across districts according to different rates of student poverty. The lowest-poverty districts lost about eight days on average to nonparticipation, while districts in the highest two categories of poverty lost 50 percent more, about 12 days on average.

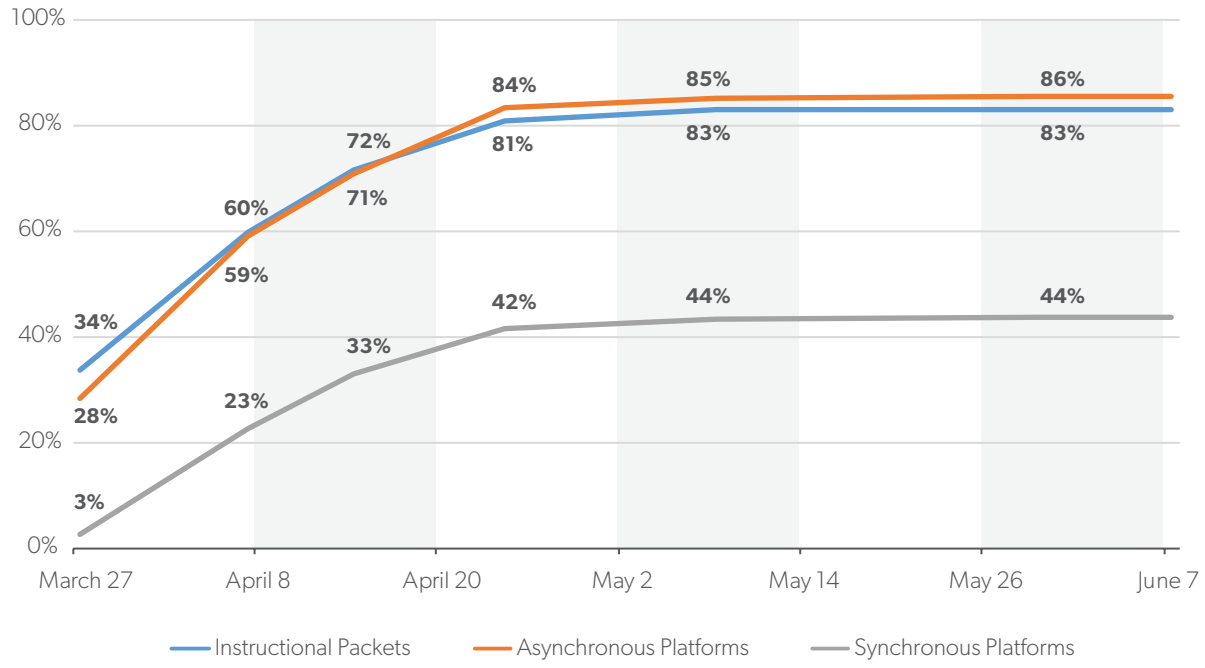
Total Instructional Days Lost. Adding canceled days to days lost due to nonparticipation yields a much larger and more comprehensive estimate of the total time lost during the pandemic last spring. On average, 19 instructional days were lost. The least poor districts lost 16 instructional days, equivalent to 29 percent of the school year that remained after closures were announced in those districts and 9 percent of an 180-day school year. In the poorest districts, the losses were four full weeks of instruction, or 20 days, which is equivalent to 41 percent of the period after closures and 12 percent of a school year. The greater losses in those districts were almost entirely due to nonparticipation.

The potentially larger losses estimated by generalizing from the Education Week Research Center data suggest that days canceled by districts were a minor share of lost instruction and that losses during the COVID-19 pandemic were systematically worse for poor students than we may have previously captured.

Instructional Offerings Throughout Pandemic School Closures. One of the principal measures C-ERLS captured was the kind of remote instructional platforms districts offered and how those offerings varied over time. Across all six waves of data collection, instructional packets and asynchronous instructional programs (such as Google Classroom) were available in similar percentages (Figure 2), while comparatively fewer districts offered some form of synchronous platform, such as Zoom or Google Hangouts. All three of these platform types increased rapidly in April and then plateaued throughout May and June. Our final data showed 86 percent of districts offered asynchronous platforms, 83 percent (not statistically different) offered instructional packets, and 44 percent offered some kind of synchronous instruction.

Before turning to how these and other instructional offerings differed across districts, it is important to illustrate how the percentages reached at the end of the year[14] may give too rosy a view of what was offered. Districts offered students no instruction during canceled days, and while some canceled no instructional days, others canceled four weeks of instruction. Thus, there is a significant gap between two measures of educational offerings—one capturing the proportion of the total closure period that instructional offerings or services were available to

Figure 2. Remote Instructional Platforms Offered by School Districts, Spring 2020



Note: This figure extends to June 7, past the last day of C-ERLS data collection, to reflect the full scope of the school year. June 7 was the average last day of school in the C-ERLS sample of districts.
Source: Author's calculations using C-ERLS data.

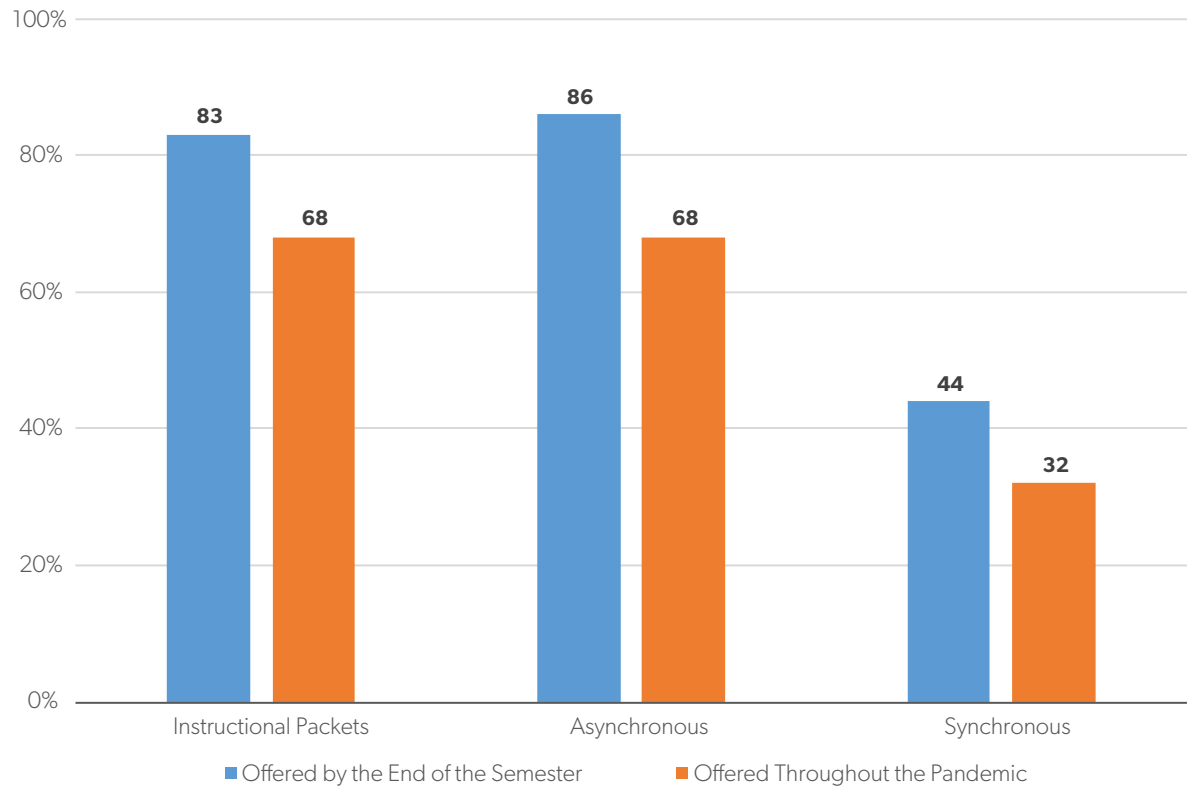
students and another measuring the percentages of schools that were providing those offerings *at the end of the school year*. Since my greatest concern is the instruction students received from districts while school buildings were closed—and not where districts ultimately ended up—it is worth distinguishing between what was offered throughout the closures and at their end.

Districts that offered remote instruction early and with a short closure period fared better on this measure than those that slowly ramped up instruction. I used C-ERLS's six waves to capture the proportion of scheduled instructional days that district offerings were available from the beginning of any remote instruction in a given district to the end of the school year.[15] Also, districts with a longer school year (some districts had six full weeks of instruction left after the earliest school year ended) could have had an instructional platform available for more time after our final data collection (May 29).

By the end of the year, 86 percent of schools were in districts that offered asynchronous platforms such as Google Classroom, but those platforms were available for just 68 percent of the instructional days after closures were announced. (See Figure 3.) Instructional packets were similar, available in 83 percent of schools in late May but for only 68 percent of instructional time after closure. (Packets were available for the same time as asynchronous platforms, 68 percent, because in many schools they were established first.) Synchronous platforms, such as Zoom or Google Hangouts, were available in 44 percent of schools in late May but for 32 percent of the year after closures.

The longitudinal C-ERLS data are uniquely suited to measure the amount of time instructional programs and supports were available to students, and these measures may be a more meaningful, if pessimistic, reflection of the spring's online learning than districts' final offerings. Note that the variation in these numbers is not as straightforward as percentages of

Figure 3. Instructional Platforms Available at the Close of the School Year and Throughout the Pandemic



Source: Author's calculations using C-ERLS data.

schools or districts offering a given program or support because these combine multiple differences—canceled days, percentages of schools offering and not offering instructional programs or supports, and the duration of the school year—all of which differ across districts and categories of districts examined in this section. Still, if one's primary concern is how much instruction students received after the pandemic closed schools, which would better diagnose potential learning losses, these measures better address that concern than the offerings measured at the end of the year.

The remainder of this report uses percentages as of the end of the school year to examine differences in instructional programs and supports between schools in different kinds of districts, first by student composition and then by community characteristics. End-of-year percentages are uniformly higher than the percentage of total expected instructional time after closures, but differences in the end-of-year percentages are more straightforward because they have a single source of variation. Percentages of total expected instructional time after closures are presented in Appendix B and show many comparisons of year-end percentages made in the body of the report.

Instructional Differences Across Districts. Remote instructional programs and supports differed across districts by a number of characteristics. Presented below are these differences for the instructional platforms districts offered and relied on, the assistance and expectations districts had for students, and a comprehensive measure of the strength

of districts' offerings. These measures are compared across districts using compositional aspects such as student poverty and achievement and community characteristics such as broadband access.

C-ERLS's design means that any differences that are statistically significant are sizable. The data's animating purpose was to provide timely and repeated (every 7–14 days) nationally representative data on what schools were offering during the pandemic, and thus a small sample (250 districts) was an intentional part of a manageable design. The small sample does limit statistical power for comparisons, meaning the data are unlikely to identify statistically significant differences unless they are quite large. While some of these differences between districts have been presented in earlier work, I now look at a number of differences across districts by student composition in terms of poverty, academic achievement and growth, and minority status.[16]

Instructional Platforms. Across all districts, similar percentages of schools were in districts that offered instructional packets and asynchronous platforms, with packets a lower-quality option than asynchronous platforms that enable and encourage greater teacher-student interaction. In high-poverty districts, higher percentages of schools offered instructional packets and lower percentages offered asynchronous learning platforms compared to low-poverty districts (Table B3).[17] The poverty gap was even larger for synchronous platforms, which were offered in a third of high-poverty schools and nearly half of low-poverty schools.

These percentages indicate that on average, the quality of instruction in high-poverty schools was likely lower, constituting another detriment to poor students beyond their disproportionate nonparticipation outlined above. A similar pattern is evident when schools are grouped by academic achievement, with schools with historically higher test scores offering more online instruction and less often using packets.

Each platform is nonexclusive, meaning a district could offer one, two, or all three platform types. The second set of columns in Table 1 indicates which platforms districts primarily relied on: instructional packets, online platforms, or a mixture of the two. Again, lower-poverty and higher-achieving districts rely on online platforms more frequently.

High-minority districts show a distinct set of differences, offering both instructional packets and asynchronous platforms in higher percentages. While research frequently shows consistent results between high-poverty and high-minority schools, that is not the case here. Poorer and lower-scoring districts offered more packets and fewer asynchronous platforms, while high-minority districts offered more of both. The contrast is also seen in the platforms relied on. High-minority schools relied on packets less frequently, and the nonsignificant differences in relying on online programs are also in the opposite direction as seen for poverty and academic achievement.

Applying measures of districts' historical academic growth from the SEDA, which instead of absolute measures of test scores reflect districts' ability to raise students' test scores, shows a pattern of few substantial differences, save for a more frequent reliance on online platforms.[18]

Assistance and Expectations. Beyond instructional platforms, C-ERLS captured measures of technology assistance, expectations, and grading policies that also showed differences consistent with gaps in instructional platforms offered. Table 2 shows that high-poverty districts offered fewer devices to students, had lower expectations for teachers to make one-on-one contact with students, and took attendance at lower rates than did low-poverty districts. Additional large gaps in the expected participation and grading for performance are nonsignificant but match the trend in high-poverty schools. These same gaps are reflected in the percentages for absolute achievement, though not as clearly.

Again, the contrast between high-minority districts and high-poverty districts is clear. High-minority districts far more frequently offered some assistance with internet access and showed a large, nonsignificant gap for offering devices to students that was in the opposite direction as the pattern with poverty and academic achievement.

Table 1. Instructional Platforms Offered and Relied on by Districts' School Composition

District Composition		Platforms Offered			Platforms Primarily Relied on		
		Instructional Packets	Asynchronous	Synchronous	Mostly Packets	Both Packets and Online	Mostly Online Platforms
Poverty	High	92%**	77%*	33%*	29%*	21%	50%*
	Low	79%	89%	49%	17%	17%	66%
Academic Achievement	High	79%*	90%*	51%*	16%	14%†	70%**
	Low	88%	81%	36%	26%	23%	51%
Percentage Minority	High	91%**	91%†	39%	15%†	23%	63%
	Low	80%	83%	46%	23%	16%	60%
Academic Growth	High	83%	89%	48%	19%	14%	67%†
	Low	84%	83%	41%	22%	21%	56%

Note: †p < 0.10, *p < 0.05, **p < 0.01, *** p < 0.001.
Source: Author's calculations using data from C-ERLS Wave 6, May 29, 2020; Common Core of Data, 2017–18; and Educational Opportunity Project at Stanford University, 2009–16, https://edopportunity.org/.

Table 2. Technology Assistance and Expectations for Remote Learning by Districts' Student Characteristics

District Composition		Technology Assistance		Expectations			Grading Work	
		Internet	Devices	One-on-One Contact	Expected Participation	Taking Attendance	Any Grading	For Performance
Poverty	High	68%	57%†	64%*	56%	21%*	63%	25%
	Low	70%	70%	79%	66%	35%	69%	34%
Academic Achievement	High	72%	70%	79%†	66%	36%†	68%	31%
	Low	67%	61%	70%	59%	25%	66%	32%
Percentage Minority	High	87%***	72%	77%	63%	24%	72%	32%
	Low	62%	63%	73%	63%	34%	65%	31%
Academic Growth	High	70%	71%	76%	61%	33%	70%	37%
	Low	70%	62%	73%	65%	29%	65%	29%

Note: †p < 0.10, *p < 0.05, **p < 0.01, *** p < 0.001.
Source: Author's calculations using data from C-ERLS Wave 6, May 29, 2020; Common Core of Data, 2017–18; and Educational Opportunity Project at Stanford University, 2009–16, https://edopportunity.org/.

Comprehensive Measures of Instructional Quality. Remote-learning efforts differ across districts as shown by these discrete indicators, but none of these measures captures the entire package of remote-instruction education. A combination of data points, however, can provide a more holistic assessment of potential instructional quality. I categorized districts into three categories based on how instructional offerings might approximate the classroom instruction students receive when school buildings are open.

1. Rigorous instructional offerings occurred in districts that relied on online platforms to allow individual teachers to direct students' remote learning; provided some synchronous instructional platforms; expected all students to participate, either through

Table 3. Composite Measure of Districts' Remote Platform by Districts' Student Composition

District Composition		Composite		
		Perfunctory	Moderate	Ambitious
Poverty	High	52%*	36%	12%*
	Low	35%	41%	23%
Absolute Achievement	High	31%**	43%	26%**
	Low	50%	36%	14%
Minority	High	40%	43%	17%
	Low	41%	38%	21%
Achievement Growth	High	35%	39%	26%
	Low	41%	38%	21%

Note: †p < 0.10, *p < 0.05, **p < 0.01, *** p < 0.001.
Source: Author's calculations using data from C-ERLS Wave 6, May 29, 2020; Common Core of Data, 2017–18; and Educational Opportunity Project at Stanford University, 2009–16, https://edopportunity.org/.

explicit statements or by formally taking attendance in remote instruction; required that teachers grade students' remote work; and expected teachers to have some form of direct contact with students.

2. Perfunctory instructional offerings occurred in districts that relied on instructional packets or explicitly stated on their websites that students' participation was not required, that attendance would not be taken, or that student work would not be graded. If a district website did not communicate any information on remote-instruction offerings, then it was placed in this category.

3. Moderate instructional offerings occurred in districts that were less ambitious than rigorous counterparts but more ambitious than perfunctory ones.

Overall, 40 percent of schools were in districts with perfunctory programs, and 40 percent were in districts with moderate programs. One in five schools, or 20 percent, were in districts whose websites described rigorous programs of remote instruction.

Table 3 shows stark differences in remote-instruction offerings by poverty and academic achievement. Half of schools in higher-poverty and lower-achieving districts had perfunctory instructional programs, compared to about a third of wealthier and higher-achieving districts. These are large differences, in which the share of schools with rigorous remote-instruction programs in high-poverty and low-achieving districts was about half the share in more advantaged districts. Again, there were no substantive differences evident by districts' minority-student composition or academic growth.

These comparisons by district student composition are important, if blunt, indicators of the kinds of students who might have been disproportionately underserved during pandemic closures. High-poverty and lower-performing districts provided lower-quality educational programs across a number of indicators. The significantly larger amount of instructional time lost to nonparticipation in higher-poverty schools compounds this quality problem with a quantity problem.

Based on differences in the instruction students received, there appears to be multiple trends that together may indeed exacerbate long-standing and stubborn achievement gaps by poverty. Perhaps more encouraging are findings that minority composition is not clearly linked to these poverty gaps, as is often the case.

Table 4. Instructional Platforms Offered and Relied on by Districts' Community Characteristics

Community Characteristics		Platforms Offered			Platforms Primarily Relied on		
		Instructional Packets	Asynchronous	Synchronous	Mostly Packets	Both Packets and Online	Mostly Online Platforms
SAIPE Poverty	High	87%	78%*	28%***	28%*	20%	52%*
	Low	81%	90%	53%	17%	17%	66%
Single-Parent Percentage	High	93%**	91%†	34%†	17%	24%	58%
	Low	80%	84%	47%	22%	16%	62%
Adult Baccalaureate Percentage	High	77%†	96%***	57%***	9%***	21%	71%**
	Low	87%	80%	36%	28%	17%	55%
Broadband Access	High	79%	91%*	55%**	12%*	15%	73%*
	Low	87%	81%	35%	28%	21%	51%
State Voting History	Red	85%	79%	32%	27%	19%	54%
	Purple	80%	94%*	51%*	18%	16%	66%
	Blue	84%	86%	53%*	16%*	18%	66%

Note: †p < 0.10, *p < 0.05, **p < 0.01, ***p < 0.001. Symbols in state voting history denote differences from red states.
Source: Author's calculations using C-ERLS Wave 6, May 29, 2020; US Census Bureau, "Small Area Income and Poverty Estimates (SAIPE) Program," https://www.census.gov/programs-surveys/saipe.html; Educational Opportunity Project at Stanford University, 2009–16, https://edopportunity.org/; US Census Bureau, American Community Survey, 2015–18; and states' voting histories in presidential elections from 2000 to 2016.

School District Offerings by Community Characteristics. Looking at community characteristics associated with differentials in district offerings provides some circumstantial (but certainly not causal) evidence of what could drive the differences in offerings. In the following section, I outline offerings by five community characteristics: measures of poverty, percentage of single-parent households, adult baccalaureate percentage, broadband access, and state voting history.

I gauge county poverty using 2018 SAIPE data to provide a useful comparison with imperfect school measures of district FRM eligibility rates. County-level historical percentages of single-parent households and percentages of adults in the county with at least a baccalaureate degree, both gathered from SEDA, are potentially informative, the first as a rough indicator of in-home instructional support[19] and the second as a signal of social capital. Measures of broadband access in each county, drawn from the 2018 American Community Survey, may influence the practicality of widespread online instruction in the spring of 2020. Finally, given the partisan divides on the pandemic, I examined districts by their states' voting history, categorizing states that voted for Republican presidential candidates since 2000 as red states, those that voted for Democratic candidates since 2000 as blue states, and the remainder as purple states.

Poverty. The SAIPE estimates of poverty reflect those seen in FRM eligibility but show even more pronounced differences for the percentages of schools with synchronous and ambitious platforms (Tables 4 and 6).[20] These underscore the salience of poverty, variously measured, in terms of the remote-learning opportunities students received.

Single-Parent Households and Adult Population with Bachelor's Degrees. County density of single-parent households and baccalaureate degree holders shows contrasting patterns. Counties with more single-

Table 5. Technology Assistance and Expectations for Remote Learning by Districts' Community Characteristics

Community Characteristics		Technology Assistance		Expectations			Grading Work	
		Internet	Devices	One-on-One Contact	Expected Participation	Taking Attendance	Any Grading	For Performance
SAIPE Poverty	High	66%	58%†	64%**	56%	21%*	62%	23%*
	Low	71%	70%	80%	66%	36%	69%	36%
Single-Parent Percentage	High	81%*	76%**	74%†	64%	19%*	67%*	24%
	Low	66%	63%	74%	63%	34%	67%	34%
Adult Baccalaureate Percentage	High	81%**	78%**	85%**	72%	38%†	74%*	37%
	Low	63%	59%	68%	57%	27%	62%	29%
Broadband Access	High	81%***	80%***	81%*	70%*	34%	74%*	39%*
	Low	60%	54%	69%	57%	28%	61%	26%
State Voting History	Red	62%	51%	64%	50%	22%	62%	30%
	Purple	79%*	80%*	80%*	69%*	37%*	73%	37%
	Blue	71%	72%*	82%*	54%	37%*	67%	29%

Note: †p < 0.10, *p < 0.05, **p < 0.01, ***p < 0.001. Symbols in state voting history denote differences from red states.
Source: Author's calculations using C-ERLS Wave 6, May 29, 2020; US Census Bureau, "Small Area Income and Poverty Estimates (SAIPE) Program," https://www.census.gov/programs-surveys/saipe.html; Educational Opportunity Project at Stanford University, 2009–16, https://edopportunity.org/; US Census Bureau, American Community Survey, 2015–18; and states' voting histories in presidential elections from 2000 to 2016.

parent households had offered packets and asynchronous offerings in more schools but synchronous platforms in fewer schools. In contrast, higher percentages of schools in counties with a higher-educated population offered packets less often and both asynchronous and asynchronous platforms more often.

The differences in types of platforms used for more educated counties are even clearer, as they centered mostly on packets a third as often as less-educated counties and on online platforms far more frequently. The differences made by a more educated populace, also captured in a survey from the National Center for Research on Education Access and Choice (REACH), are also evident in the technology assistance and expectations reflected in Table 5 and in the lower proportion of schools offering perfunctory platforms, as seen in Table 6. While it is impossible to say whether a more educated population drove these differences, they are consistent with the idea that expectations for remote platforms may have been higher in such locales and thus districts met those expectations.

Broadband Availability. Broadband availability also differed across districts in important ways, largely because the indicators for remote instructional quality privilege online programs, which are far more practical to roll out when broadband is widely available.[21] Unsurprisingly, 10 percent more schools in counties with more broadband access offered asynchronous platforms and 20 percent more offered synchronous platforms than schools in counties with lesser broadband access. Not only does the reliance on online platforms and availability of technology assistance show predictably similar patterns, but additional statistically significant gaps show that technology assistance, expectations for one-on-one

Table 6. Composite Measure of Districts' Remote Platform by Districts' Community Characteristics

Community Characteristics		Composite		
		Perfunctory	Moderate	Ambitious
SAIPE Poverty	High	48%†	43%	9%***
	Low	36%	38%	26%
Single-Parent Percentage	High	43%	47%	10%*
	Low	40%	38%	23%
Adult Baccalaureate Percentage	High	31%*	44%	25%
	Low	46%	37%	17%
Broadband Access	High	35%	39%	26%*
	Low	45%	40%	15%
State Voting History	Red	44%	40%	16%
	Purple	35%	39%	25%
	Blue	41%	39%	20%

Note: †p < 0.10, *p < 0.05, **p < 0.01, ***p < 0.001. Symbols in state voting history denote differences from red states.
Source: Author's calculations using C-ERLS Wave 6, May 29, 2020; US Census Bureau, "Small Area Income and Poverty Estimates (SAIPE) Program," https://www.census.gov/programs-surveys/saipe.html; Educational Opportunity Project at Stanford University, 2009–16, https://edopportunity.org/; US Census Bureau, American Community Survey, 2015–18; and states' voting histories in presidential elections from 2000 to 2016.

contact and participation, and grading for performance were also higher, again plausibly because of the practicality of extending each on the base of substantial broadband access.

State Voting History. Over the summer, the political cleavages in the approach to and assessment of the pandemic threat became increasingly clear, especially in the run-up to the 2020–21 school year. With that context, I compared districts' offerings based on whether they were in red, blue, or purple states. The comparisons reveal a surprising and fairly consistent pattern in which districts' offerings in red states were less comprehensive than their blue and particularly purple state counterparts.

Schools in red states offered asynchronous platforms less frequently than schools in purple states and, by larger margins, offered synchronous platforms less frequently than both blue and purple states. These differences may overstate the gap between districts in red states compared to blue and purple states. The only significant difference in terms of platforms relied on was for packets between red and purple states. Also, there were no significant differences in perfunctory or ambitious platforms offered. However, the pattern of gaps, significant and not, are consistent with difference in platforms offered that suggest red state districts had weaker offerings. In Table 7, the distinctions between red and purple states, and to a less consistent degree between red and blue states, are also evident in technology assistance, expectations for one-on-one contacts between students and teachers, expected participation, and attendance.

A large part of that story is differences in broadband access across red, purple, and blue states. The broadband rates of districts in red states were 42 percent of a standard deviation below the average rate in purple state districts and 89 percent of a standard deviation below the same average in blue states (Table 7). Another way to see this difference is the percentage of districts in the low broadband category used above. Sixty-nine percent of districts in red states were in this category, compared to 54 percent in purple states and 37 percent in blue states.

As the new school year starts with emerging reopening differences among red, blue, and purple states, these differences from last spring take on new meaning. The patterns from the spring across many measures provide relatively compelling evidence that

Table 7. Broadband Access in Sampled Districts in Red, Blue, and Purple States

State Voting History	Broadband Access	Red State Differential in Std. Dev. Units	Broadband High	Broadband Low
Red	75.3%	N/A	31%	69%
Purple	78.5%	42%	46%	54%
Blue	82.1%	89%	63%	37%

Source: Author's calculations using US Census Bureau, American Community Survey, 2015–18; and states' voting histories in presidential elections from 2000 to 2016.

schools in red states offered lesser educational opportunities than those in purple and blue states.

These differences are not expressly highlighted in other research, but they are partially corroborated. The REACH analyses, which not only have the benefit of greater statistical power than C-ERLS data but also allow for multivariate analyses that can control for multiple factors, list states in a ranking of educational offerings, and red states as defined in these analyses make up a conspicuously high number of the lowest-ranked states. The C-ERLS data that show these differences expressly across red, blue, and purple states are not large enough to broadly establish that districts in red states offered uniformly weaker remote learning, but the large and consistent differences are worrisome and deserve additional study.

Discussion

The analyses presented in this report add to our understanding of what school districts offered to students, what instruction students received, and how those offerings differed across districts over spring 2020. By providing a longitudinal look at the spring and the total time after closures were announced that different programs and supports were available to students (detailed in the appendix tables), these analyses shine a harsh light on how few opportunities were available compared to a typical school year with students and teachers physically present in the same classroom.

The way those opportunities varied across districts not only shows for whom they varied but also further suggests some reasons behind the differences. Given that extraneous factors like broadband access will remain through the next school year, these analyses provide potential explanations for why schools may reopen differently this fall.

The evidence strongly suggests that any educational deficits poor students had at the start of pandemic closures grew substantially as school buildings remained closed. The comprehensive look at lost time shows that nearly two-fifths of the instruction students would have received was displaced after closures were announced. These problems with the average quantity of instruction poor students received are exacerbated by the shortcomings of educational programs that were also disproportionately worse for poor students. These findings add a number of other axes on which district offerings diverged, and across the board there are indicators that individual measures of district disadvantage marked lesser educational programs.

While student characteristics detailed first give some insight into which students received less sophisticated remote-learning opportunities, the community characteristics provide some evidence supporting what factors could have been behind those differentials. The most glaring of these is broadband access, which has an obvious link to internet-dependent remote instruction. A report by the RAND Corporation similarly showed that disparities in internet access were more prominent throughout the pandemic in high-poverty, rural areas, which added to larger instructional challenges.[22] I assert that remote educational quality is better on average when online platforms are used. While these are not uniformly better, if remote instruction is necessary, online platforms are a superior mode for learning.[23]

Broadband access clearly provides the means to deliver higher-quality instruction, as is evident by the differences across districts with more access, which are among the largest and most consistent of any characteristic used.

Other categories' influences are more of a stretch but are indicative of why districts may have offered what they did in the spring. Baccalaureate degrees may not have a plain direct connection that would explain why less-educated district offerings were relatively lower quality,[24] but more educated parents may hold higher expectations for the sophistication of online programs and may have the social capital to hold district officials to those expectations. In contrast, poorer families may have comparatively lesser expectations and probably less social capital to bring to bear. Although some may take umbrage at such a hypothesis, these observations are not of the world as it should be, but as it is, and when children's long-term prospects rise and fall with (remote) educational opportunities, they are even more important to address candidly.

Finally, the gaps in educational offerings shown in red states compared to those in blue and purple states do not clearly indicate why districts offered particular programs in the spring, only that they were less potent in many ways. It may be that red states' political views aligned with an expectation that closures would be short-lived and thus required less investment. Similar expectations could flow from the relatively shorter remainder of school years in red states, which on average were 47 instructional days, compared to 52 in purple and 60 in blue states. Either speculation is far from conclusive without additional study with larger samples.

The gaps may still be informative, as they may provide some explanation for why red, blue, and purple states differ in their fall reopening plans. Some early analyses have argued politics has a heavy influence on schools' plans to return in the fall in person or with remote learning. One analysis by Jon Valant of the Brookings Institution shows that districts in counties with a higher share of 2016 votes for Donald Trump were more likely to return in person despite having high COVID-19 case rates, while districts with lower Trump vote shares were returning remotely despite having lower case rates.[25] A Center on Reinventing Public Education analysis reflected a similar pattern, in which students in districts planning an "ill-advised" opening (where COVID-19 case rates were judged too high) were 72 times more likely to live in a state with a Republican governor, while those in "cautious" districts (opening remotely despite low COVID-19 rates) were 27 times more likely to have a Democratic governor.[26] The interpretations in both these cases are that politics has an outsized influence on reopening plans.

Politics surely has a role, but the above findings on red states suggest there may be more to the story than rank politics. School district leaders certainly appreciate how well or badly remote learning worked for their students in the fall, and the numbers above suggest more district leaders in red states would look to avoid a return to remote instruction for the sake of their students' educational prospects. The broadband access factor is part of that calculus, as the broadband access that was a disproportionate problem for red states in the spring will still be a problem this fall. The experience from the spring, coupled with the enduring challenges for remote instruction this fall, may provide more compelling reasons than politics for more districts in red states to reopen in person, even in the face of a serious COVID-19 threat.

The emergency remote learning that occurred after school closures were announced last spring was far from the relatively modest ideal of traditional classroom learning. While precise measures of the effects of the unprecedented school closures last spring will not be available for some time, the indicators from C-ERLS data throughout the spring reinforce the gathering evidence that the damage to students' learning will be dramatic. Moreover, the harm will be disproportionate in disadvantaged school districts. As the nation's schools begin a new school year on the heels of these travails, the importance of ensuring a return to effective and equitable educational opportunities may never have been higher.

Acknowledgments

I am tremendously grateful to AEI's education and domestic policy teams, who supported this research at a rapid pace while working remotely. Aleida Baumgartner, Brendan Bell, Cade Grady, Abby Guidera, Will Kessler, RJ Martin, Matt Rice, Peyton Roth, Jess Schurz, Olivia Shaw, Sidney Sonck, Valerie Truong, Hannah Warren, Hunter West, and David Wilde provided outstanding research assistance in gathering and processing data for this report. In addition, this report would not exist without the tireless efforts of Cody Christensen and Lexi West, who provided invaluable analytic support.

I also want to thank the Education Week Research Center for providing data on spring 2020 truancy rates. Of course, the responsibility for the application of those data and all the views expressed in this report are the author's alone, and I take full responsibility for any errors that remain.

About the Author

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Appendix A. Overview of AEI's COVID-19 Education Response Longitudinal Survey

Table A1. C-ERLS Data Collection Dates

Wave	Date of Data Collection
1	March 26–27, 2020
2	April 6–7, 2020
3	April 13–14, 2020
4	April 23–24, 2020
5	May 7–8, 2020
6	May 27–29, 2020

Source: Authors.

C-ERLS was developed quickly amid the pandemic with the intention of being rapid, reliable, representative, and repetitive. The design allows us to gather data that paint a current picture of school and district efforts.

Table A1 lists the dates that rounds of data were collected. Information was gathered exclusively from school district websites (and pages linked to them) on the assumption that these sites are the centralized communication hub for most districts and that they yield current information with an assuredly high response rate.

We selected a nationally representative sample of 250 public school districts so the data would reflect the broader population of districts.[27] In total, this is just under 2 percent of all regular school districts in the country, providing information for 10,289 schools (roughly 11 percent of all public schools).[28]

Although the C-ERLS sample is at the district level, we gathered information about what those districts are offering across all their schools. Thus, we present results as percentages of all schools, which can be interpreted as the proportion of public schools[29] whose districts are offering a given program, platform, or service.

Some districts we sampled contain charter schools, many of which will not extend the programs and platforms presented on district websites. Our survey method does not account for these charter schools, which may bias the school-level estimates by small amounts.

Note the variance for this survey, with a margin of error of 6.1 percent, is relatively large, and even modest differences in estimates may not be statistically significant. Each wave of C-ERLS data will be publicly available on the AEI website in a modified spreadsheet that masks the identity of small districts (those with six schools or fewer). Additional details about the survey instrument, sampling design, and variable definitions are available on the AEI website.[30]

Appendix B. Truant Students, Lost Instruction, and Remote-Instruction Offerings

Table B1. Teacher-Reported Percentage of Students "Essentially Truant" During Remote Instruction, Overall and by School Poverty, Spring 2020

	School Poverty Percentage				
Survey Date	Total	0–25%	25–50%	50–75%	75–100%
April 8	21%	12%	21%	25%	32%
April 23*	25%	13%	25%	29%	32%
May 5	23%	11%	22%	29%	28%

Note: * Education Week Research Center data from the April 23 survey was only disaggregated by schools with less or more than 50 percent of students eligible for free or reduced-priced meals (20 and 30 percent truant, respectively). I estimate the percentages for four categories of school poverty for the April 23 data based on patterns from the April 8 and May 5 surveys.
Source: Author's calculations using Education Week Research Center survey data.

Table B2. Estimated Average Days of Lost Instruction Between Building Closures and the End of the 2019–20 School Year, by Student Poverty

Percentage Eligible for Free or Reduced-Priced Meals	No Instruction Offered			Students "Essentially Truant"			Total Lost Instruction		
	Days	Percentage of Closure Period	Percentage of School Year	Days	Percentage of Closure Period	Percentage of School Year	Days	Percentage of Closure Period	Percentage of School Year
All Districts	8.3	16%	5%	10.5	20%	6%	18.8	36%	10%
0–36%	8.4	15%	5%	8.0	14%	4%	16.4	29%	9%
36–51%	7.8	15%	4%	10.4	20%	6%	18.2	35%	10%
51–65%	7.9	15%	4%	11.7	22%	6%	19.6	37%	11%
65%+	9.0	18%	5%	11.9	23%	7%	20.9	41%	12%

Source: Author's estimates combining C-ERLS data with Education Week Research Center survey data on teachers' perceptions of the percentage of students who were "truant" during coronavirus closures, provided to AEI by request.

Table B3. Percentage of Total Period of Remote Instruction Offering Instructional Platforms by District Characteristics

District Composition		Platforms Offered		
		Instructional Packets	Asynchronous	Synchronous
Poverty	High	73%	60%*	22%**
	Low	66%	71%	36%
Academic Achievement	High	66%	72%*	39%**
	Low	71%	64%	24%
Percentage Minority	High	72%	72%*	27%
	Low	66%	66%	34%
Academic Growth	High	68%	72% †	35%
	Low	68%	65%	29%

Note: †p < 0.10, *p < 0.05, **p < 0.01, *** p < 0.001.
Source: Author's calculations using data from C-ERLS Wave 6, May 29, 2020; Common Core of Data, 2017–18; and Educational Opportunity Project at Stanford University, 2009–16, https://edopportunity.org/.

Table B4. Percentage of Total Period of Remote Instruction Offering Instructional Platforms by Community Characteristics

Community Characteristics		Platforms Offered		
		Instructional Packets	Asynchronous	Synchronous
SAIPE Poverty	High	73%	60%*	24%***
	Low	66%	71%	43%
Single-Parent Percentage	High	75%†	73%	24%†
	Low	66%	66%	34%
Adult Baccalaureate Percentage	High	64%	76%***	41%**
	Low	71%	62%	25%
Broadband Access	High	65%	74%**	41%***
	Low	70%	63%	23%
State Voting History	Red	64%	61%	22%
	Purple	68%	73%*	36%*
	Blue	73%	72%*	39%**

Note: †p < 0.10, *p < 0.05, **p < 0.01, *** p < 0.001. Symbols in state voting history denote differences from red states.
Source: Author's calculations using data from C-ERLS Wave 6, May 29, 2020; Common Core of Data, 2017–18; and Educational Opportunity Project at Stanford University, 2009–16, https://edopportunity.org/.

Table B5. Percentage of Total Period of Remote Instruction Offering Technology Assistance by District Characteristics

District Composition		Technology Assistance	
		Internet	Devices
Poverty	High	54%	44%*
	Low	57%	57%
Academic Achievement	High	59%	59%*
	Low	53%	49%
Percentage Minority	High	69%***	56%
	Low	50%	52%
Academic Growth	High	57%	58%†
	Low	55%	50%

Note: †p < 0.10, *p < 0.05, **p < 0.01, *** p < 0.001.
Source: Author's calculations using data from C-ERLS Wave 6, May 29, 2020; Common Core of Data, 2017–18; and Educational Opportunity Project at Stanford University, 2009–16, https://edopportunity.org/.

Table B6. Percentage of Total Period of Remote Instruction Offering Technology Assistance by Community Characteristics

Community Characteristics		Technology Assistance	
		Internet	Devices
SAIPE Poverty	High	56%	46%
	Low	56%	52%
Single-Parent Percentage	High	65%†	59%
	Low	54%	52%
Adult Baccalaureate Percentage	High	65%**	64%***
	Low	50%	45%
Broadband Access	High	65%**	66%***
	Low	48%	42%
State Voting History	Red	47%	40%
	Purple	62%**	62%***
	Blue	63%**	62%***

Note: †p < 0.10, *p < 0.05, **p < 0.01, ***p < 0.001. Symbols in state voting history denote differences from red states.
Source: Author's calculations using C-ERLS Wave 6, May 29, 2020; US Census Bureau, "Small Area Income and Poverty Estimates (SAIPE) Program," https://www.census.gov/programs-surveys/saipe.html; Educational Opportunity Project at Stanford University, 2009–16, https://edopportunity.org/; US Census Bureau, American Community Survey, 2015–18; and states' voting histories in presidential elections from 2000 to 2016.

Notes

1. For an excellent early survey of this work, see the literature review and additional findings in Douglas N. Harris et al., *How America's Schools Responded to the COVID Crisis*, National Center for Research on Education Access and Choice, July 13, 2020, https://www.reachcentered.org/uploads/technicalreport/20200713-Technical-Report-Harris-et-al-How-Americas-Schools-Responded-to-the-COVID-Crisis.pdf.

2. See Table B1 for percentages of the closure period and school year lost in each category. These percentages vary because the time in each district differed due to different closure dates and different time left in their school calendars. Percentages are derived from variable denominators. This C-ERLS estimate matches the estimate from a National Center for Research on Education Access and Choice (REACH) study's estimate, which uses a much larger sample of schools. Harris et al., *How America's Schools Responded to the COVID Crisis*.

3. Nat Malkus and Cody Christensen, "School District Responses to the COVID-19 Pandemic: Round 3, Plans for a Remote Finish," American Enterprise Institute, April 27, 2020, https://www.aei.org/research-products/report/school-district-responses-to-the-covid-19-pandemic-round-3-plans-for-a-remote-finish/.

4. To determine the number of instructional days lost in each district due to the pandemic, we measured the delay between initial closures and the first day of remote instruction and subtracted spring breaks scheduled to begin after buildings were closed. Extensions of spring break were counted as lost instruction since instruction would have otherwise been offered if not for the pandemic. A few districts shortened their school year, and one added days for extended learning, which were added to and subtracted from lost days. In addition to district-led changes, we also included in our counts any state mandates that resulted in lost instructional days. While not exhaustive, these counts are reasonable estimates of lost instructional time. We did not count days as lost if districts canceled instruction for teacher trainings because our ability to capture those closures was inconsistent, which may underestimate lost days, though we could not account for scheduled holidays outside of spring breaks and Memorial Day, which could bias the count upward.

5. Chad Aldeman, "Analysis: Research Shows Students Lose Learning Even During Brief School Closures for Snow Days. Those Case Studies Show the Harm from COVID Will Be Multiplied Many Times Over," 74, August 26, 2020, https://www.the74million.org/article/analysis-research-shows-students-lose-learning-even-during-brief-school-closures-for-snow-days-those-case-studies-show-the-harm-from-covid-will-be-multiplied-many-times-over/.

6. Megan Besecker and Andrew Thomas, *Student Engagement Online During School Facilities Closures: An Analysis of L.A. Unified Secondary Students' Schoology Activity from March 16 to May 22, 2020*, Independent Analysis Unit, Los Angeles Unified School District, July 2020, http://laschoolboard.org/sites/default/files/IAU%20Report%202020%200707%20-%20Student%20Engagement%20Online%20During%20Closures.pdf.

7. Aleksandra Appleton, "CCSD Shows Improvement in Distance Learning Attendance Numbers," *Las Vegas Review-Journal*, May 7, 2020, https://www.reviewjournal.com/local/education/ccsd-shows-improvement-in-distance-learning-attendance-numbers-2023637/.

8. Chicago Public Schools, "School Engagement Data," May 2020, https://www.scribd.com/document/463252195/Student-Engagement-Data.

9. Laura S. Hamilton et al., "COVID-19 and the State of K–12 Schools: Results from Technical Documentation from the Spring 2020 American Educator Panels COVID-19 Surveys," RAND Corporation, 2020, https://www.rand.org/pubs/research_reports/RRA168-1.html.

10. Holly Kurtz, "National Survey Tracks Impact of Coronavirus Schools: 10 Key Findings," *Education Week*, April 10, 2020, https://www.edweek.org/ew/articles/2020/04/10/national-survey-tracks-impact-of-coronavirus-on.html; Holly Kurtz and Benjamin Herold, "Opinion of DeVos Plunging, Truancy Rising: 10 Key Findings from Latest EdWeek Survey," *Education Week*, April 27, 2020, https://www.edweek.org/ew/articles/2020/04/27/opinion-of-devos-plunging-truancy-rising-10.html; and Sarah Schwartz, "What

Teachers Want: 'Looping,' Grouping by Ability, and Digital Devices, Survey Says," *Education Week*, May 28, 2020, https://blogs.edweek.org/teachers/teaching_now/2020/05/survey_shows_teachers_vision_for_next_school_year_try_looping_make_tech_access_top_priority.html.

11. Twelve percent of districts stated that participation was not required.

12. The Education Week Research Survey data were broken out by teacher reports of student eligibility for free and reduced-price meals in their schools for all three waves. But the middle wave, from April 23, was only broken out by districts serving more or less than 50 percent of such students, while the other waves were reported in categories of 25 percentage points. I interpolated the data for categories of 0–25 percent, 25–50 percent, 50–75 percent, and more than 75 percent eligibility based on the average deviation of these categories from the 0–50 percent and 50–100 percent categories available in all three waves of survey data.

13. I applied the survey truancy measures from each survey date to the time periods that C-ERLS-sampled districts offered instruction. I identified the proportion of schools in each district that had matching free and reduced-price meal eligibility rates to the survey data (less than 25 percent, 25–50 percent, 50–75 percent, and more than 75 percent). Multiplying these three measures—the proportion of district schools, the matching proportions' reported truancy rate for each survey, and the instructional days offered in those districts closest to each survey administration date—provides the best approximation available of the differences across districts in instructional time lost due to nonparticipation.

14. June 7 is included to reflect the full scope of the year because it was on average the last day of school in our sample.

15. Total proportions of time were estimated by counting the instructional days in each district that were closest to a given C-ERLS data collection date and then averaging offerings across all the remote instructional days (of any kind) that the district was open. These calculations assume that offerings at any data collection date began, on average, halfway through the term since the previous data collection.

16. Nat Malkus, "School Districts' Remote-Learning Plans May Widen Student Achievement Gap," *Education Next*, June 16, 2020, https://www.educationnext.org/school-districts-remote-learning-plans-may-widen-student-achievement-gap-only-20-percent-meet-standards/.

17. I split the C-ERLS sample into two groups from each category to provide a reasonable balance between the percentage of districts in the sample, which provide data, and the percentage of schools represented in those districts, which is the unit in which I report results. High-poverty districts are those with greater than 60 percent of students eligible for free and reduced-priced meals. High-achieving district are those identified by the SEDA data as above average for districts nationally. High-minority districts are those with more than 60 percent minority students. High-growth districts were those whose slope for achievement growth in the SEDA data was greater than 0.012. High SAIPE poverty districts were in counties whose SAIPE-estimated child poverty rates were greater than 20 percent. Districts in counties with more than 22.5 percent of families headed by single parents are defined as high-single-parent districts. Districts in counties where 27 percent or more of adults had bachelor's degrees or higher were classified as high-adult-baccalaureate districts. Districts in counties where broadband access was greater than 80 percent, as measured by the American Community Survey data, were classified as high-broadband-access districts.

18. With such a small sample, the lack of significant differences should not be confused with clear evidence that there were not differences by academic growth. However, the contrast with substantial differences by absolute academic achievement raises questions about whether district responses were more aligned with expectations for what districts offered than their historical productivity.

19. This measure is employed based on the crude assumption that two-parent households may on average have more spare capacity to aid their students' instruction. This is a dim reflection of available support, but it is the only vantage on this important aspect of virtual instruction available at the county level nationwide.

20. The correlation between these poverty categories is 0.67.

21. A study by the RAND Corporation examined the digital divide and COVID-19, finding that access to technology fell along poverty lines. Eighty-three percent of teachers in low-poverty schools reported that "all or nearly all" of their students had internet access at home, in contrast with 30 percent of teachers in high-poverty schools. Laura Stelitano et al., "The Digital Divide and COVID-19: Teachers' Perceptions of Inequities in Students' Internet Access and Participation in Remote Learning," RAND Corporation, September 2020, https://www.rand.org/pubs/research_reports/RRA134-3.html.

22. Stelitano et al., "The Digital Divide and COVID-19."

23. While not all internet-dependent instruction would prove better than that done through instructional packets, the limitations of packets are similar to those with correspondence courses, which are obvious. With asynchronous platforms such as Google Classroom, teachers can be more involved with student learning because two-way communication is simplified and teachers can make instructional adjustments daily. Synchronous platforms clearly provide the best opportunity for teacher and students to have learning experiences as close to the classroom as possible.

24. County adult baccalaureate percentages and broadband access have a moderate positive correlation of 0.54 in the C-ERLS sample.

25. Jon Valant, "School Reopening Plans Linked to Politics Rather Than Public Health," Brown Center Chalkboard, July 29, 2020, https://www.brookings.edu/blog/brown-center-chalkboard/2020/07/29/school-reopening-plans-linked-to-politics-rather-than-public-health/.

26. Robin Lake, "Politics, Not Science, Driving Many School Opening Plans," Center on Reinventing Public Education, August 27, 2020, https://www.crpe.org/thelens/politics-not-science-driving-many-school-opening-plans.

27. We selected 250 school districts randomly and proportional to size, with size defined as the number of operational schools in the district. The sampling frame consisted of regular school districts in all 50 states and DC with at least one operational school, as listed in the universe district file from the National Center for Education Statistics' Common Core of Data from the 2017–18 school year.

28. Percentages for school districts can be calculated with the weights available on the complete dataset but not from the single-wave spreadsheets. Raw percentages computed from the single-wave spreadsheet do yield estimates on the percentage for schools. Variance estimates require additional analysis using the complete dataset, which is available upon request.

29. Even more specifically, public schools in the sample reflect all schools in regular school districts in all 50 states and DC that had operational schools as reported in the 2017–18 district universe data file from the Common Core of Data, collected by the National Center for Education Statistics.

30. American Enterprise Institute, "COVID-19 Education Response Longitudinal Survey (C-ERLS)," https://www.aei.org/covid-19-education-response-longitudinal-survey-c-erls/.