



# COVID-19 AND THE DIGITAL DIVIDE IN VIRTUAL LEARNING

April 23 to July 2, 2020

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# Introduction

This research brief examines the digital divide in virtual learning during the latter part of the 2019–20 academic year when the COVID-19 pandemic forced schools to end face-to-face teaching. The analysis uses data from the U.S. Census Household Pulse Survey (HPS) covering the 12-week period from April 23 to July 2 to assess the pattern and trajectory of availability to computer and Internet, focusing on racial, income, and other systematic disparities. The digital divide predates the current public-health crisis,<sup>2</sup> but the findings show that the pandemic exacerbated the digital divide among minority and low-income households. The major findings include:

1. Limited computer and Internet service availability for children’s educational purposes increased from nearly 19 percent of households to more than 27 percent.
2. All racial groups (White, Black, Asian, and Hispanic)<sup>3</sup> experienced a significant increase in limited availability. These increases were largest for Hispanics and Blacks, which contributed to a widening of the racial digital divide.
3. Low-income households were most impacted by unavailability, increasing from 34 to 44 percent, while households at the other end of the economic ladder experienced a minor growth from 9 to 12 percent.
4. The lack of access to technology was tied to parent’s educational attainment, affecting a third of the households where the respondents did not finish high school.
5. Younger households faced the most technological barriers, and all age groups experienced an increase over time.

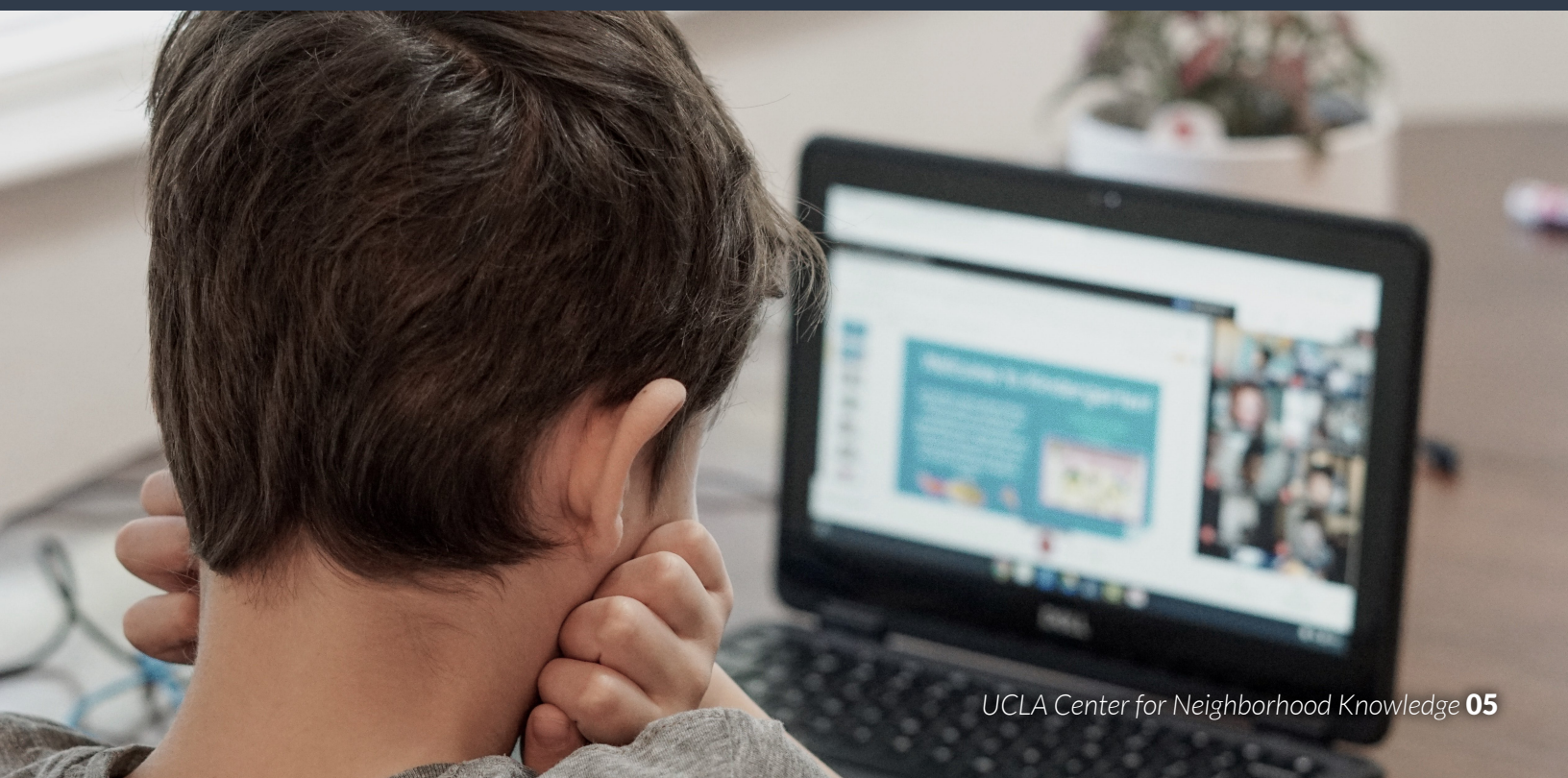
The observed disparities in limited technological resources for virtual learning probably is not just a current and temporary phenomenon. It remains to be seen if schools will be able to address the digital divide in this new 2020–21 academic year. More problematic is the potential long-term negative effect on our society and economy. Unchecked, the digital inequality threatens to widen the racial and income gap in educational achievement, and contributes to a reproduction of intergenerational inequality.



# Data & Empirical Approach

This research brief uses information reported by the U.S. Census Bureau's weekly HPS to empirically examine whether COVID-19 has exacerbated the digital divide in the United States. The compilation of this dataset is a multiagency collaboration effort to collect information on the social and economic effects of COVID-19 on Americans. As a rapid response demonstration project, HPS is part of the Experimental Data Product series. Although HPS has some limitations, it is nonetheless provides useful insights.<sup>4</sup>

The HPS asked Internet and computer service availability questions to households with children in K–12 grades. The questions are phrased as follows: “How often is a computer or other digital devices available to children for educational purposes?” (COMPAVAIL in the Pulse questionnaire). “How often is the Internet available to children for education purposes?” (INTERNTAVAIL in the Pulse questionnaire). The survey allows five responses each to these questions: This service is (1) always available, (2) usually available, (3) sometimes available, (4) rarely available, or (5) never available. Respondents can only choose one of these answers. Respondents also report their race/ethnicity (White, Black, Asian, or Hispanic), their household income category (ranging from less the \$25,000 to more the \$200,000), and their highest level of educational attainment (ranging from less than a high school degree/general educational degree to a bachelor's degree or higher). Only information from individuals reporting computer and Internet availability are included in the analysis, which reduces the relevant sample from a population of nearly 262,000 respondents from the original total of more than one million observations.



# Temporal Patterns of Availability during the Pandemic

Charts 1 and 2 present weekly levels in the percentage of households with limited computer and Internet services. The first chart presents the percent of households where (1) computer service availability is limited, (2) Internet service availability is limited, and (3) availability of both services is always limited. The statistics show a significant temporal increase. For instance, the rate for both limited computer and Internet availability increased by nearly 9 percentage points, from less than 19 percent to more than 27. This may be due to a number of factors: increasing demands or need by members of the household (e.g., for remote work, online shopping, basic communication, and more distance teaching) and decreasing financial resources (e.g., prolonged spells of unemployment).

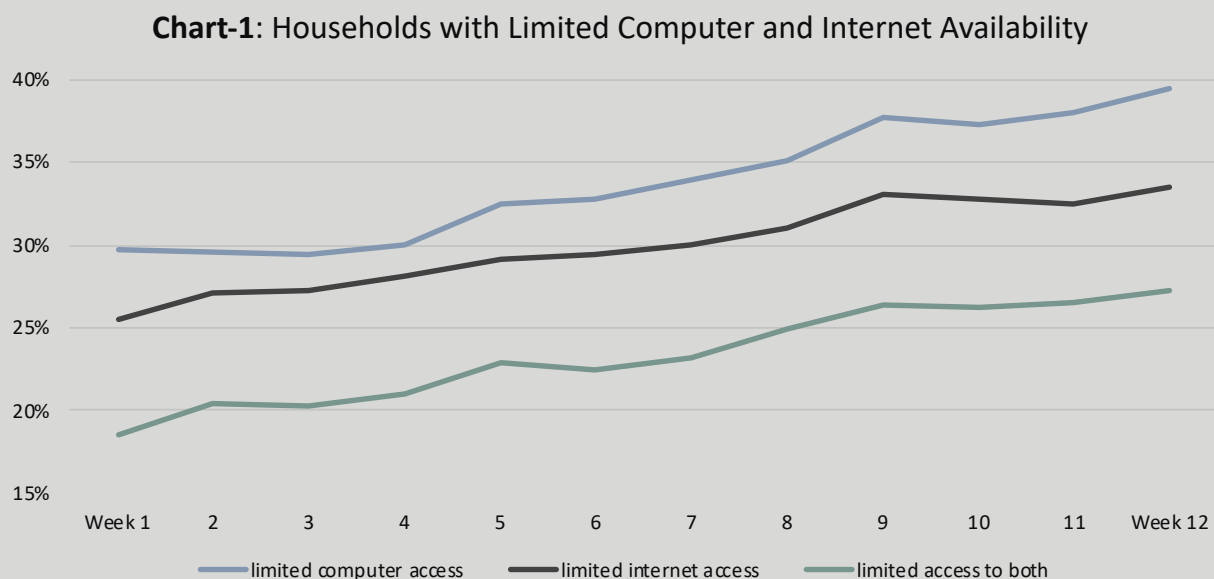
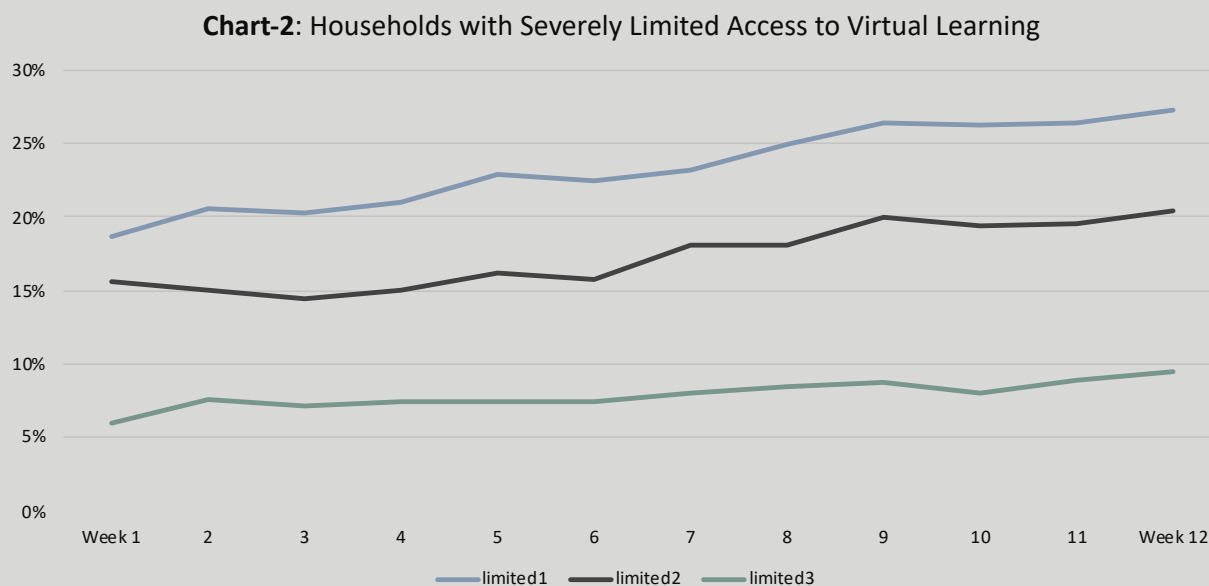


Chart-2 presents percentage of households by increasing severity of unavailability: (1) computer and Internet service is never, rarely, sometimes, or usually available (limited1); (2) computer or Internet service is never, rarely, or sometimes available (limited2); and (3) computer and Internet service is never, rarely, or sometimes available (limited3). The first classification of limited service is the same classification presented in Chart-1. These findings show the severity of limited access to virtual learning increased during the pandemic for all three indicators. The percentages increased from 6 to 9.5 percent for limited3 and from 15.6 to 19.6 percent for limited2. While these increases in severely limited availability do not match the increase of the less severe classification (limited1), the higher percentage of households who never, rarely, or sometimes have access to virtual learning is cause for more concern.



# Virtual Learning Connectivity by Race/ Ethnicity, Income, and Education

Charts 3–6 present levels in virtual learning connectivity by four-week periods by race/ethnicity, income, education, and age for households where computer and Internet service is never, rarely, sometimes, and usually available. Chart-3 present virtual learning connectivity by race/ethnicity. These findings show for the initial four weeks that 25 and 22 percent of Black and Hispanic households experience limited virtual learning connectivity compared to 15 and 18 percent for Asian and White families. All four racial/ethnic groups experienced decreased availability of computer and Internet service during the pandemic. By the end of the study period, a third of Black and Hispanic households fell into this category.

**Chart-3:** Households with Limited Computer and Internet Availability by Race

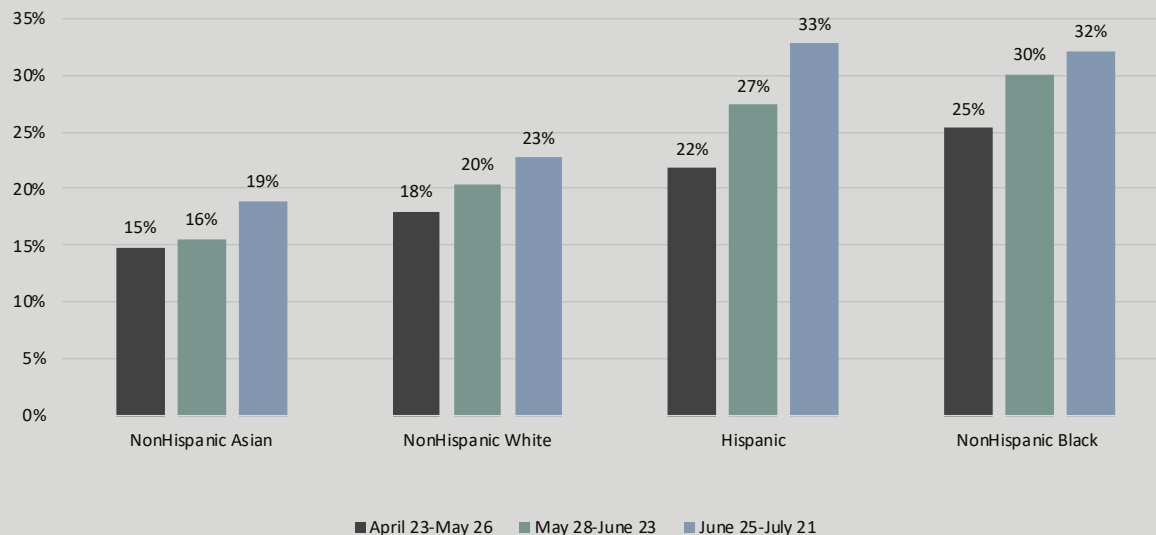




Chart-4 presents differences by income level. These levels are grouped by households with \$25,000 in income in 2019, between \$25,000 to \$49,999, between \$50,000 and \$99,999, or more than the \$100,000. The findings shows a systematic inverse relationship, that is, higher income is correlated with better access to technology. Low-income households fared the worst, increasing from 34 percent to 44 percent. However, households in the most affluent had rates that were only a quarter as high. The percentage point gap between the two income categories more than doubled, leading to a widening of the digital divide.

**Chart-4:** Households with Limited Computer and Internet Availability by Income Level

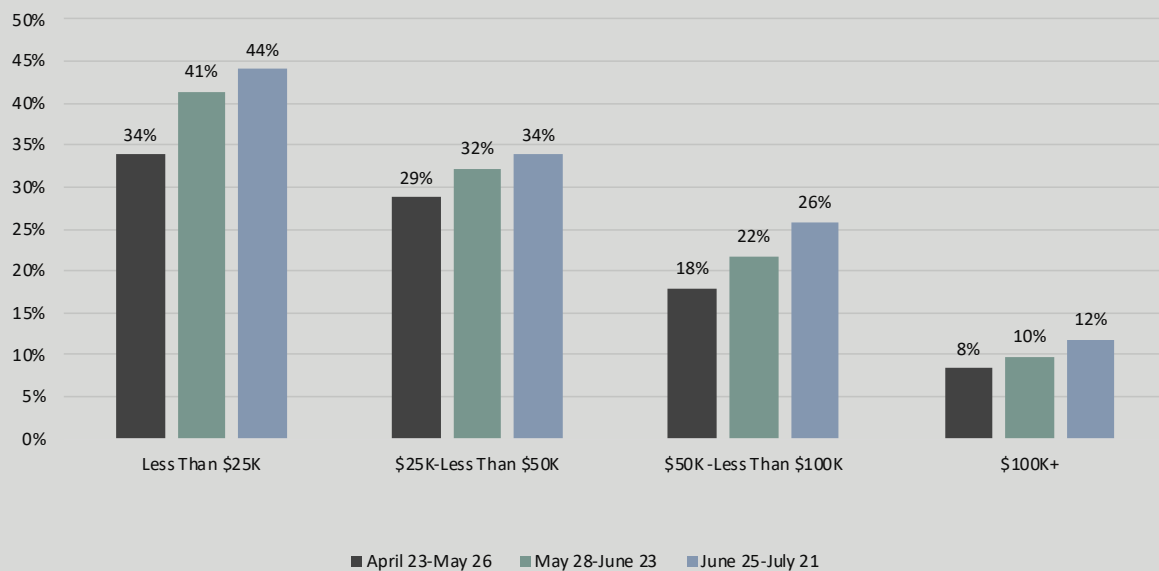


Chart-5 traces virtual-learning connectivity by educational attainment of the adult respondent to the survey, using four categories: without a formal high-school degree (not graduating or only a GED), attaining a high school diploma, attaining some college education without a bachelor's degree, and attaining a bachelor's degree or higher. Students in households with the lowest educational attainment were much more likely to have limited access to virtual learning. The findings also reveal limited availability of computer and Internet service increased measurably for the three other educational attainment groups, while availability did not change appreciably for respondents without a high school diploma. The rates for households with a high school diploma grew to the extent that their levels more closely resembling those for respondents without a high school diploma.

**Chart-5: Household with Limited Computer and Internet Availability by Educational Attainment**

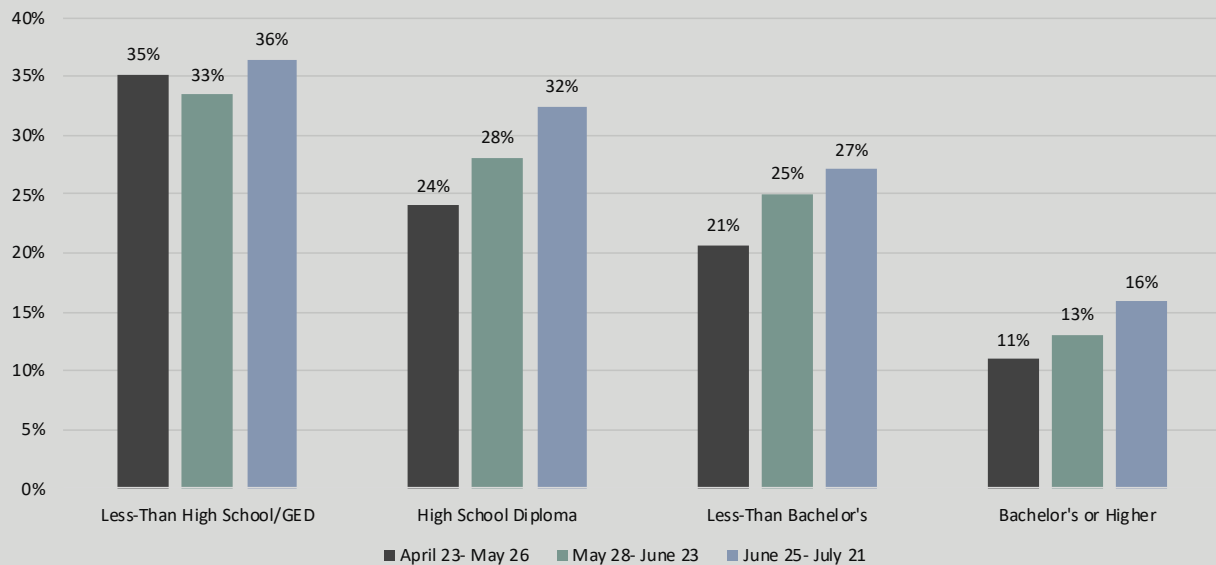
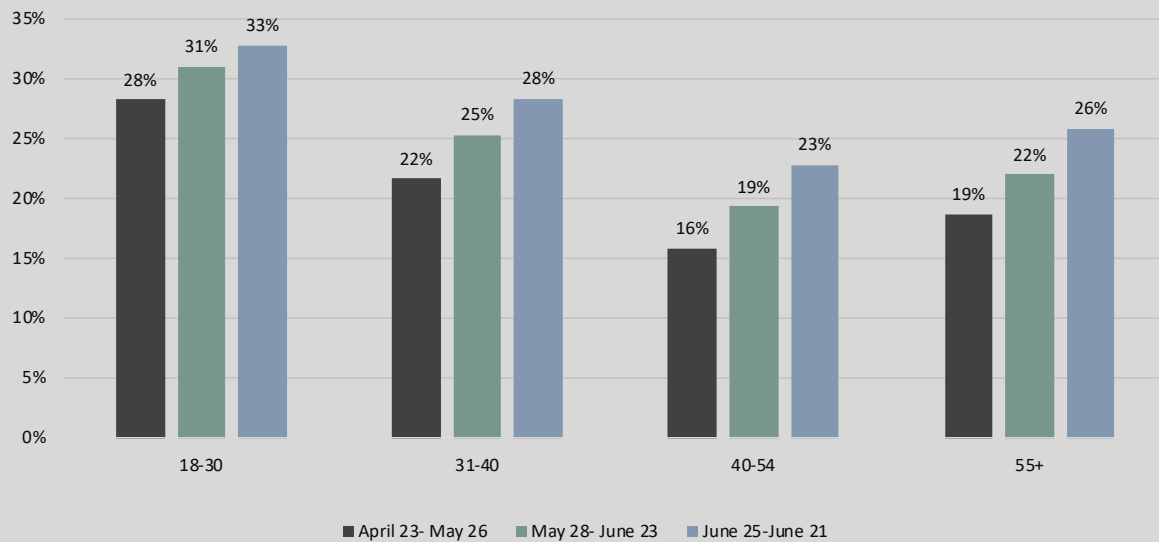


Chart-6 presents changes in virtual learning connectivity by age. Households with younger adults were much more likely to have limited access to virtual learning. These findings are consistent with the observation that younger adults likely face greater challenges paying for virtual learning connectivity for their children given findings in the job displacement edition in this research series showing they are the age group most likely to face job displacement due to the pandemic. Over time, however, the digital divide gap between young adults and older adults shrank due to a faster increase in the probability of older adults experiencing limited virtual learning connectivity for children in their household. Despite this convergence by age, young families are still more likely to face limited computer and Internet availability for their children to use for virtual learning.

**Chart-6: Households with Limited Computer and Internet Availability by Respondent's Age**



## *Concluding Remarks and Recommendations*

The empirical analyses presented in this research brief reveal a reproduction and probably a widening of the digital divide gap along racial and income lines. These social and economic disparities persist even after accounting for levels of education, age, gender, and other factors.<sup>5</sup> While all racial/ethnic groups and all income-earning groups experienced limited availability of Internet and computer services, the barriers were most severe for Hispanics, Blacks, and low-income households. Moreover, limited availability increased significantly more for members of low-income students and students of color.

It is essential for elected officials and business leaders to act now to address the potential long-term social and economic effects of this health crisis. Examples such as the REACT initiative that facilitates educational partnerships with business presents a model for addressing the current widening of the digital divide.<sup>6</sup> Local governments have also addressed the growing digital divide caused by the pandemic. For example, past research identifies several cities including Philadelphia, New Orleans, San Jose, and Los Angeles, have partnered with school districts to rapidly disseminate thousands of hotspots and connected devices to students in the early weeks of the pandemic.<sup>7</sup> While current efforts to supply minority and low-income families greater access to virtual learning have helped, findings from this research reveal much more work is needed. Indeed, California Governor Newsom acknowledged that, despite significant progress, efforts made to close the widening digital divide caused by the pandemic so far are “still inadequate.”<sup>8</sup> At a minimum, continued expansion of business-educational collaborations and innovative leveraging of technology is recommended. This is true especially given the added challenge the pandemic places on minority, low income, less educated, and young families trying to educate their children to succeed in the new information age. A more comprehensive approach, however, should also include providing free Wi-Fi services to areas with disadvantaged households. The potential gains to future economic growth and societal welfare underscore the merits of this policy prescription.<sup>9</sup>

One major unanswered question is whether or not the digital divide will persist as schools struggle to reopen for new 2020–21 academic year. The findings here provide a baseline for future analyses based on the next wave of Pulse surveys. Monitoring the developments in a timely fashion is critical to identifying lingering systemic disparities and to formulating effective policies and programs to ensure a fair and equitable school system.



# Endnotes

## Picture Credits:

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<sup>2</sup> <https://www.igi-global.com/dictionary/resource-sharing/7562>; Fairlie, Robert (2014). "Race and the Digital Divide," UC Santa Cruz working paper series; <https://www.pewresearch.org/internet/2015/12/21/home-broadband-2015/>; The White House, Office of the Press Secretary (June 2015). "Fact Sheet: President Obama Announces ConnectAll initiative," <https://obamawhitehouse.archives.gov/the-press-office/2015/06/25/fact-sheet-connected-two-years-delivering-opportunity-k-12-schools>; and Goldberg, Rafi, Robinson, Amy, and Carlson, Edward (October 2019). "Digital Divide Is Shrinking for America's Hispanic Population, NTIA Data Show," <https://www.ntia.doc.gov/blog/2019/digital-divide-shrinking-america-s-hispanic-population-ntia-data-show>

<sup>3</sup> While racial/ethnic coding for this study categorizes individuals as non-Hispanic White, non-Hispanic Black, non-Hispanic Asian, Hispanic, and other non-Hispanic minorities. For ease of exposition these groups are listed as White, Black, Asian, Hispanic, and other minorities in this report brief.

<sup>4</sup> For discussion on the HPS limitations and usefulness, see Ong, Paul M., Mar, Don, Larson, Tom, and Peoples, James H., Jr. (September 9, 2020). "Inequality and COVID-19 Job Displacement." UCLA Center for Neighborhood Knowledge and Ong & Associates, <https://drive.google.com/file/d/1JE0kWRggo8zvYOdP5r1bsviDimyLPxg7/view?usp=sharing>

<sup>5</sup> Based on logit model, which also controls for fixed affects by week and geographic locations.

<sup>6</sup> <https://theirworld.org/news/free-computers-american-children-low-income-homes-coronavirus-schools-shutdown>

<sup>7</sup> Brown, Madeline, Ezike, Richard, and Stern, Alena, "How Cities Are Leveraging Technology to Meet Residents' Need during the Pandemic," (June 9, 2020) <https://edsource.org/2020/thousands-of-california-students-to-get-free-wifi-and-chromebooks-for-distance-learning/627823>

<sup>8</sup> Johnson, Sydney, and Burke, Michael (May, 1, 2020). "More California Students Are Online, but Digital Divide Runs Deep with Distance Learning," <https://edsource.org/2020/more-california-students-are-online-but-digital-divide-runs-deep-with-distance-learning/630456>

<sup>9</sup> Brown et al., <https://edsource.org/2020/thousands-of-california-students-to-get-free-wifi-and-chromebooks-for-distance-learning/627823>



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