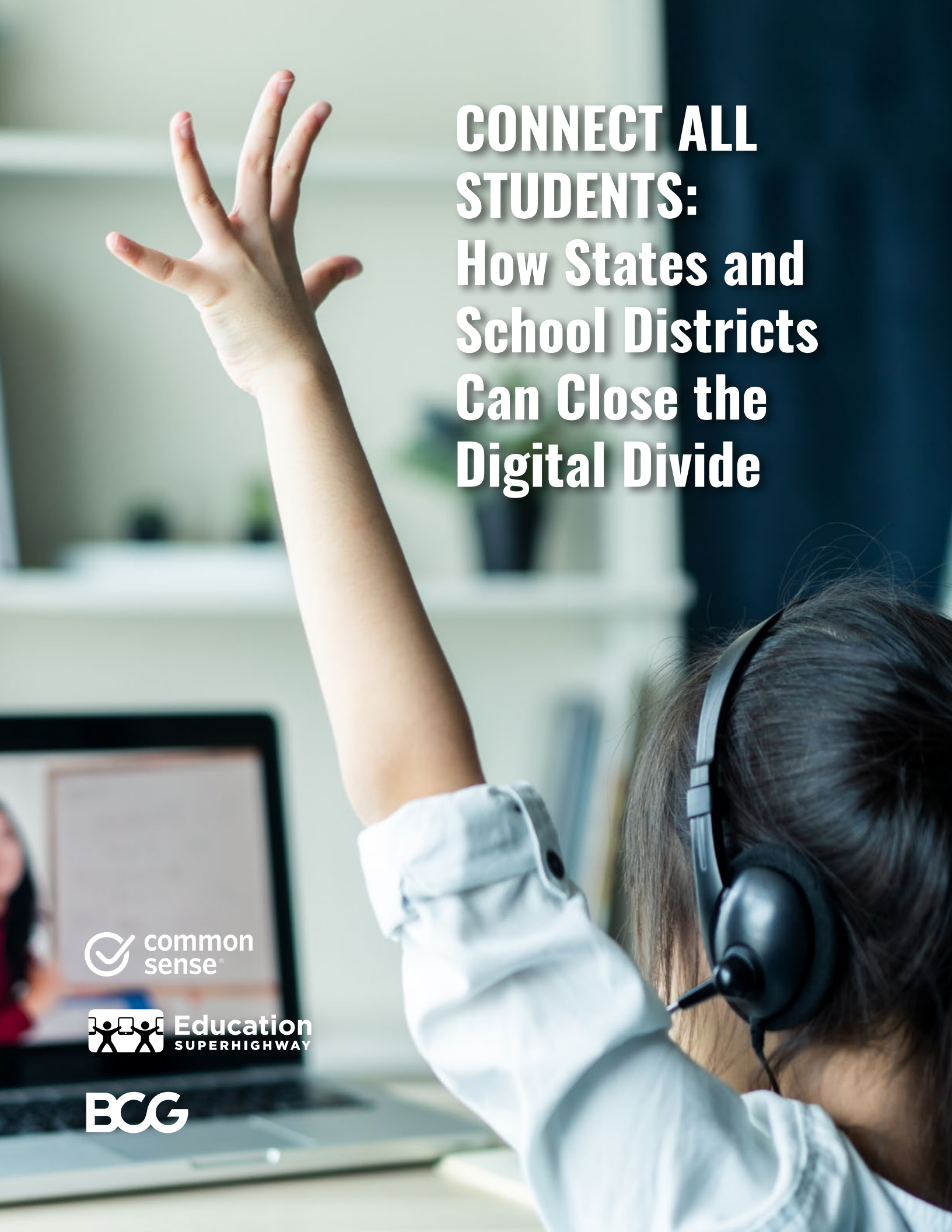

CONNECT ALL STUDENTS: How States and School Districts Can Close the Digital Divide

common sense®

Education SUPERHIGHWAY

BCG

This report was developed by Boston Consulting Group in partnership with Common Sense and EducationSuperHighway.

Common Sense is the nation's leading nonprofit organization dedicated to improving the lives of all kids and families by providing the trustworthy information, education, and independent voice they need to thrive in the 21st century.

EducationSuperHighway is a nonprofit organization founded in 2012 with the mission of upgrading the internet access in every public school classroom in America. The organization believes that digital learning has the potential to provide all students with equal access to educational opportunity and that every school requires high-speed broadband to make that opportunity a reality.

Boston Consulting Group partners with leaders in business and society to tackle their most important challenges and capture their greatest opportunities in order to unlock the potential of those who advance the world.

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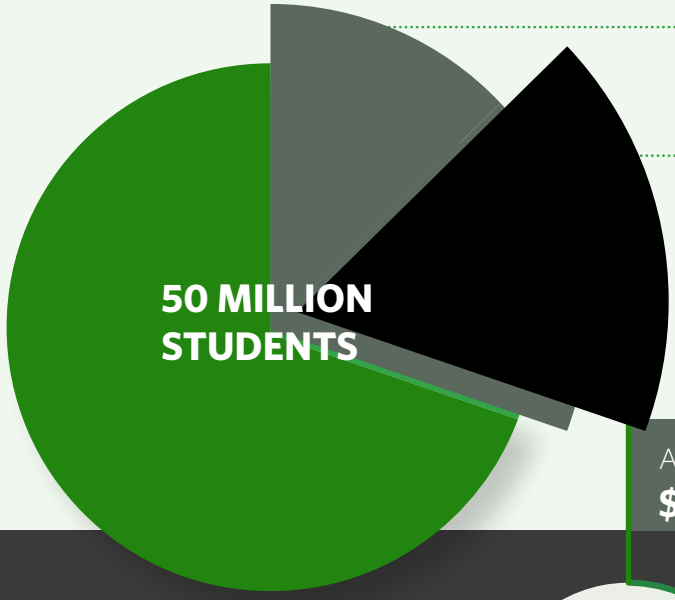
CLOSING THE K–12 DIGITAL DIVIDE IN THE AGE OF DISTANCE LEARNING

Due to pandemic-related school facility closures, 50+ million K–12 public school students had to learn remotely.



15 MILLION TO 16 MILLION (30%)
of these students lack adequate internet or devices to sustain effective remote learning.

9 MILLION
of these students lack both adequate internet and adequate devices.

At least **36 STATES** have allocated over **$1.5B IN CARES FUNDING** for K–12 digital access.

Key Steps to Closing the Digital Divide

ASSESS NEEDS

Identify

Assess who needs connectivity and devices at home and where they live.

PROCURE SOLUTIONS

Research

Determine which devices and connectivity options are desirable and available and how to distribute them.

ACCESS FUNDS

Fundraise

Find the money to pay for it all, usually through a combination of federal, state, local, private, and/or philanthropic dollars.

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EXECUTIVE SUMMARY

Across the United States, even before the onset of the coronavirus pandemic, there was a significant digital divide between K–12 students with access to high-speed internet and computing devices at home, and those without. **With the closure of school buildings for more than 50 million students in March, the "homework gap," as one part of the digital divide is known, threatened wholesale learning loss.** School districts and states scrambled to provide devices and connectivity to their students at home, and Congress responded with limited financial aid through the CARES Act.

More than six months later, there is much to be learned from the largest and most unanticipated experiment in distance learning in U.S. history. Common Sense, EducationSuperHighway, and Boston Consulting Group, each with significant experience working to address digital divide issues, joined forces to understand how stakeholders responded to this emergency and what lessons can be learned from those efforts to close the digital divide going forward.

This report highlights case studies at the state, city, and school district level and concludes that there are three key steps in the still unfinished endeavor of closing the K–12 digital divide during the pandemic.

> **First**: Assess who needs connectivity and devices and where they live.
>
> **Second**: Determine which devices and connectivity options are desirable and available and how to distribute them.
>
> **Third**: Find the money to pay for it all.

We learned that the best solutions relied on high-level communication and collaboration among all stakeholders; that states with a history of broadband investment were able to pivot more quickly to respond to school closures; and that states or districts with high-quality needs assessment were more efficient in procuring and distributing devices and connectivity.

We also learned, however, that even in the best cases, obstacles persist in closing the divide for all students, including insufficient funding, supply constraints, and limited existing infrastructure. In addition, it became clear that many efforts to date, of necessity, are short-term stop-gap measures that are not necessarily sustainable, nor would they be the optimal long-term solution. One caveat to this is that the needs assessment is a helpful step for long-term digital divide efforts.

Finally, while digital literacy is not a focus of this particular report, we found that another critical component to ensuring high-quality distance learning is a holistic digital inclusion[1] approach, including digital literacy, parent and teacher training, and tech support—all of which requires additional planning, staff, and funding.

1. Digital inclusion refers to the activities necessary to ensure that all individuals and communities, including the most marginalized, have access to and use of information and communication technologies (ICTs). These include five elements: 1). affordable, robust broadband internet service, 2). internet-enabled devices that meet the needs of the user, 3). access to digital literacy training, 4). quality technical support, and 5). applications and online content designed to enable and encourage self-sufficiency, participation, and collaboration. Digital inclusion must evolve as technology advances. It requires intentional strategies and investments to reduce and eliminate historical, institutional, and structural barriers to the access and use of technology.

INTRODUCTION

Across the United States, even before the onset of the coronavirus pandemic, there was a significant digital divide between K–12 students with access to high-speed internet and computing devices at home, and those without, historically known as the "homework gap."[2]

Before the pandemic, more than 40% of teachers in Title I schools said they would not assign homework that required digital access because students would have trouble completing it[3], and a 2017 Speak Up study found that the majority of school principals considered digital equity a major challenge.[4]

The coronavirus pandemic, which required most K–12 students to attend school from home from March through at least October, has transformed the homework gap into an even more significant problem, leading to a learning gap and raising additional concerns about learning loss in a distance learning setting.[5] And because **the digital divide disproportionately affects students from lower-income families and students of color, failure to close the digital divide risks further undermining key student groups that already face greater obstacles to educational success.**

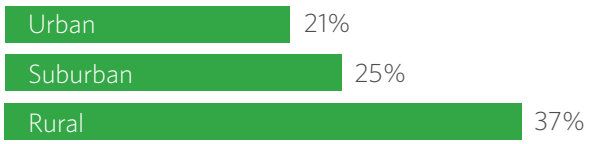
A June 2020 analysis by Common Sense and BCG on the digital divide among America's public school students and teachers found that the divide was larger than previously estimated: **About 15 million to 16 million students, or 30% of all K–12 public school students, live in households without either an internet connection or a device adequate for distance learning, or both.**[6] (The same report also found that up to 400,000 K–12 teachers—roughly 10% of all public school teachers—live in households without adequate internet connectivity, and 100,000 teachers lack adequate home computing devices.)

Closing the K–12 digital divide has multiple benefits: It is essential to ensure all students have equal access to distance learning; it enables remote working and workforce development, offering a two-generation approach to help break cycles of poverty; and it serves as a downpayment toward closing the broader digital divide.[7]

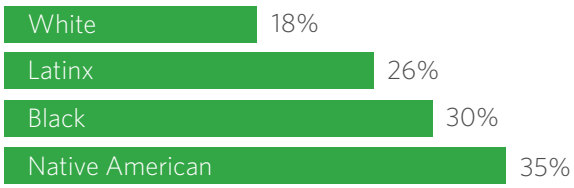
The digital divide disproportionately impacts rural communities and Black, Latinx, and Native American households

% of students without broadband

by geography



by race/ethnicity



Research by the Greenlining Institute has shown that districts subject to financial redlining practices in the 1930s face a higher digital divide today.*

*On the Wrong Side of the Divide. Source: U.S. Congress Joint Economic Committee. (2017, September). America's Digital Divide. Perrin, A. (31 May, 2019). Digital gap between rural and nonrural America persists. Pew Research Center.
Note: Asian race/ethnicity not included in bar chart.

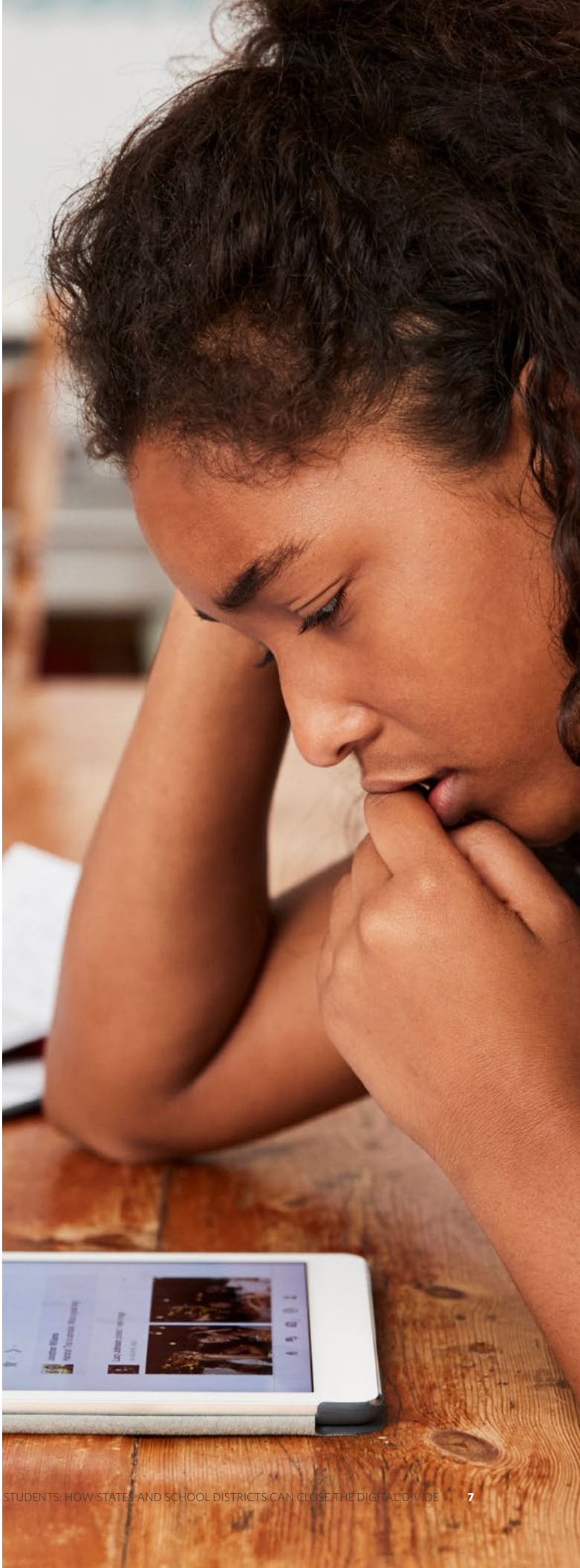
2. FCC Commissioner Jessica Rosenworcel is credited with first using the term "homework gap," which sheds light on this critical problem for K–12 students. In this report, as in our previous report *Connect all students: How states and school districts can close the digital divide* we expand the definition of "homework gap" to refer to students who cannot complete all schoolwork that requires adequate internet and computing devices at home.
3. *Infographic from The Homework Gap: Teacher Perspectives on Closing the Digital Divide*
4. *How America's Schools are Addressing the Homework Gap: Speak Up 2016 findings*
5. *The COVID-19 slide*, *COVID-19 and student learning in the United States*
6. Note: Where discrepancies exist between the digital divide figures reported in the prior Common Sense/BCG report and the figures reported in state/district spotlights, this may be due to 1). limitations in data collection and assessment, 2). varying definitions of what constitutes adequate connectivity, and/or 3). differences in methodology and scope, e.g., rural vs. state-wide, or student vs. household focus.
7. The term "digital divide" refers to the gap between individuals, households, businesses, and geographic areas at different socioeconomic levels with regard both to their opportunities to access information and communication technologies (ICTs) and to their use of the internet for a wide variety of activities (*Glossary of Statistical Terms: Digital Divide*. Organisation for Economic Co-operation and Development. Accessed July 2020).

The report estimated the **cost of closing the digital divide for K–12 students to be between $6 billion and $11 billion in the first year**, and it called on Congress to make a direct investment in student connectivity and devices as part of an emergency coronavirus response package.

In March, Congress passed the Coronavirus Aid, Relief, and Economic Security (CARES) Act, which included $13.2 billion for K–12 education (the Elementary and Secondary School Emergency Relief Fund, or ESSER) to be distributed by the U.S. Department of Education[8] to the states to use for a wide range of unmet educational needs, one of which is distance learning.

The CARES Act also included an additional $3 billion for the Governor's Emergency Education Relief Fund (GEER), designated for governors to use for either higher education or K–12 education, and which also can be used for distance learning and other purposes[9]. The ESSER and GEER funds, while helpful, did not offer a coherent approach to closing the student digital divide and were insufficient to fully close the K–12 digital divide in any single state.

> Greater direct federal investment and support is still needed to address the divide during the pandemic and to sustainably close the digital divide once and for all.



8. CARES Act Emergency Relief
9. Governor's Emergency Education Relief Fund

OBJECTIVE, SCOPE, AND GUIDEBOOK

Objective

This report provides a fact base of best practices to close the K–12 digital divide during the pandemic to enhance decision-making for all stakeholders. Without a robust and codified set of approaches, states and districts are at risk of recreating suboptimal connectivity solutions and may even end up competing against one another given supply chain constraints.

This report is intended to serve as a guide for:

States and districts: This report offers a broader view of which approaches are possible and identifies where certain approaches are best suited depending on stakeholder needs, size, and capabilities.

State and federal policymakers: This report is intended as a guidebook from which policymakers can develop more sustainable and permanent long-term solutions and funding sources.

Businesses, philanthropies, and nonprofits: This report identifies avenues where resources from these entities would be most useful and how they can support system effectiveness.

Based on our review of state, city, and school district models during the pandemic, the report concentrates on **three steps to closing the student digital divide during the pandemic**:

Who: Assess who needs connectivity and devices at home and where they live.

What: Determine which devices and connectivity options are desirable and available and how to distribute them.

How: Find the money to pay for it all, usually through a combination of federal, state, local, private, and/or philanthropic dollars.

Scope

The report is based on 18 interviews with stakeholders supporting state, city, and district efforts to close the digital divide, complemented by news media reports, existing research by education nonprofits, and previous work by Common Sense, EducationSuperHighway, and Boston Consulting Group, among other sources. The bulk of the information for this report was collected in September of 2020.

For a robust distance learning experience, students and teachers need four things:

1. High-speed internet service at home (robust: 200/10 Mbps; adequate: 25/3 Mbps[10])
2. Internet-enabled learning devices (excluding cellphones[11])
3. Distance learning instructional content
4. Support, including digital literacy resources, teacher and parent training, and social/emotional resources

This report focuses primarily on the first two elements: ensuring that all students have home access to the internet and access to devices capable of meeting the demands of distance learning. These elements intersect and must be examined together rather than independently of one another, as a student with connectivity but no device is still on the wrong side of the digital divide, and the same is true of a student with a device but no connectivity.

This report offers best practices to bridge the digital divide in the context of the coronavirus pandemic and potential approaches within the confines of what is available today. It operates under the assumption that federal action is limited, states are the primary drivers of coordinated action, and while the exact dynamic between states and districts may vary, execution is largely done at the local, district level.

10. Pg. 23, *Closing the Digital Divide in the Age of Distance Learning*
11. Given that many education platforms, and content, are not optimized for mobile phones and make it difficult to complete student assignments, individuals with only a mobile phone are not considered to have an adequate device for distance learning.

Finally, this report assumes states and districts can make use of the currently available pandemic funding, including ESSER and GEER funds as well as existing state, district, and city budgets that can be deployed to close the digital divide, although a large portion of this funding has been fully committed or already spent. As stated above, it is clear that additional federal funding is needed to close the student digital divide fully.

In the Appendix, we provide detailed "spotlights" from our interviews with state, city, and district officials to highlight effective existing models in the areas of needs assessment, procurement, and funding, representing potential approaches to reducing the divide and establishing a path to meeting longer-term connectivity goals. Excerpts from the spotlights are used throughout the report.[12]

Guidebook

The guidebook is oriented around three key steps—Who, What, and How—and additional considerations toward closing the K–12 digital divide during the pandemic.

In addition, it is important to remember that there is no one right approach to closing the divide. Efforts vary in both their context and objectives.

Context: Every community will have a slightly different slate of stakeholders. Some states have built their education system with a top-down approach, while others place more power at the local level, in the hands of districts. Engagement by additional stakeholders in a community can boost resources and potentially help share the work of closing the digital divide (e.g., public-private partnerships, community broadband organizations). Furthermore, starting points and existing circumstances will also vary, including:

- Demographics of the target population (e.g., size, urban-rural mix, family income, language(s) spoken)
- State of existing infrastructure (e.g., availability, speed, providers)
- Degree of student connectivity (e.g., robust home connection, dedicated learning device)
- Unique community needs (e.g., accessibility, usability, other barriers to adoption)

Objectives: It's important to recognize that if a state or district seeks to implement their digital divide program quickly, there are inherent trade-offs to be considered. When selecting an approach, it is important to clearly identify what constitutes adequate connectivity and the devices necessary for a distance learning program.[13]

- Maximizing speed of implementation, for example, requires streamlining negotiation processes and purchasing easily accessible connectivity options (e.g., handing out hot spots, choosing devices without supply chain constraints).
- Minimizing costs, for example, requires reducing lengthy request for proposal (RFP) processes, which may prolong the time students are without access.
- Maximizing quality, for example, may require setting up service-level contracts, narrowing selection options to those that meet stringent thresholds (e.g., upload/download speeds), or investing in long-term infrastructure.

12. The Appendix also includes a brief description of state and district examples beyond those covered in the spotlights.
13. See, for example, pg. 16, *Closing the Digital Divide in the Age of Distance Learning*

THE GUIDEBOOK

Step No. 1

Who: Conduct needs assessment to determine which students need connectivity and devices and where they live.

Conducting a needs assessment is a critical component of closing the digital divide. State and local education officials must understand which students need support to ensure home access to connectivity and devices that meet distance learning requirements. If this data is granular (down to the address level with specifics around available speeds and providers), it can ensure that state and district efforts efficiently provide resources in the short term.

However, this data will also be valuable as states and school districts seek to build long-term strategies. Assessments allow officials to gain insight into the broadband adoption needs specific to each family situation (e.g., familiarity with digital literacy, number of people sharing access). It's worth noting that if districts and states invest in a robust and recurring assessment program, the data will be valuable not only for states but also for federal policymakers and other potential private and philanthropic partners seeking to close the digital divide.

Considerations when creating a student digital divide needs assessment include:

- Crafting questions that will provide the appropriate level of detail without being overly technical or burdensome in length for the responders.
- Identifying a data repository for storing the information once it is collected, such as a student information system (SIS).
- Building an assessment program that allows robust use of the data, including the impact of digital access on learning outcomes, solutions design, and state and federal policy advocacy.
- Overlaying student digital divide data with other data sets to identify trends and possible solutions (e.g., overlaying with internet service providers, or ISPs, on coverage maps).
- Balancing timeliness of information collection with a thoughtful investment in the assessment program to repeat data collection year over year.
- Protecting student data and ensuring compliance with state and federal education privacy laws.

Protecting student privacy

Most school districts considering sharing student information with ISPs or other third parties will have to consider both federal student privacy law and newer state laws. Generally, the federal Family Educational Rights and Privacy Act (FERPA) requires written consent from parents in order to release information held in education records. In the absence of consent, federal law does permit educational institutions to disclose personal information if the disclosure fits into one of several exceptions, including directory information, a disclosure to a school official, and information for an audit or evaluation. Educational officials are advised to seek legal guidance on any transfer of student information. Sharing address information with internet service providers for the purpose of identifying unconnected households could be considered directory information so long as no additional data from education records is included. In the absence of a federal or state study or program, however, the best practice is likely to be getting written consent from parents.

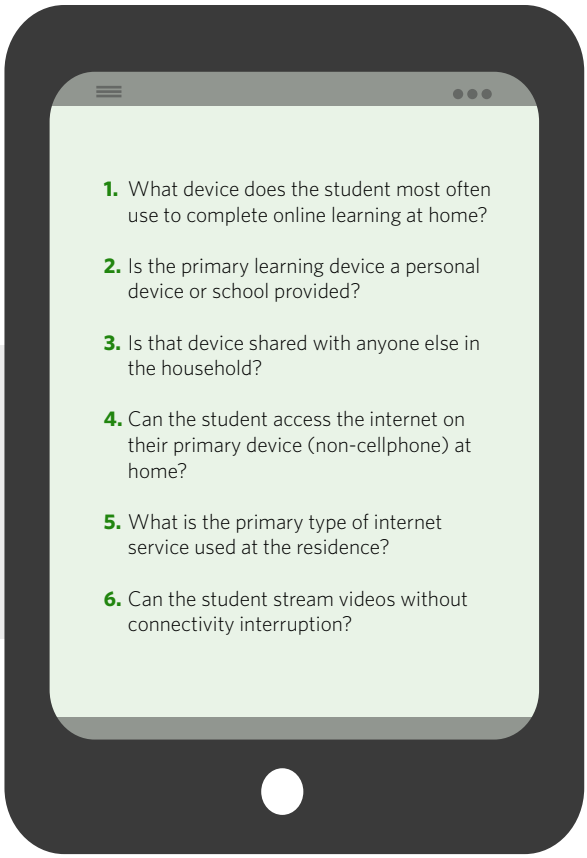
Furthermore, FERPA exceptions require contractual protections. The Council of Chief State School Officers (CCSSO) has a list of best practices that districts and states should follow, including establishing a written agreement that includes restrictions on use, retention and deletion schedules, and basic data security requirements. Commercial use beyond the provisioning of internet service should be prohibited.

Following such best practices may also assist educational agencies in over 30 states who must additionally contend with state-specific laws, though again school districts are advised to consult with legal counsel.

14. FERPA Exceptions Summary
15. CCSSO Home Digital Access Data Collection Blueprint for State Leaders
16. State Student Privacy Laws. As of 9/6/2020, 34 states had passed student privacy laws that applied to either local or state educational agencies.

There are a range of approaches for assessing the size of the student digital divide, each with trade-offs in terms of speed, ease of implementation, and ability to inform long-term solutions. While estimates and surveys quickly provide a means of assessing the size of the need, school leaders should work toward more robust and sustainable assessment methodologies that integrate digital divide questions into standard processes (such as registration and enrollment) and systems (e.g., student information systems).

CCSSO has identified a set of six key questions[17] related to student device and connectivity needs whose answers should be collected in addition to key student demographic information (e.g., name, grade level, number of siblings in household, home address).[18] The student-level data will play a key role in the procurement process for connectivity and devices, as discussed in Step No. 2.



Implementation of survey-based needs assessment process

PLANNING

- Leverage teachers and school administrators in design process to **understand student context** and needs.
- Set up necessary **FERPA and data privacy protocols**, including data sharing agreements, file transfer protocol, and secure authentication.
- **Communicate upcoming assessment** to families (via text, call, email).
- Pilot with select teachers and students to **test process** for technical glitches, completion time, mobile compatibility, and language translation.
- **Set deadlines and incentives** for completion, especially for populations with lower expected response rates.
- Prepare to **guide families through process**, explaining the purpose of the needs assessment and emphasizing confidentiality.

EXECUTION

- Focus on **easing access burden** for families.
- Leverage online links shared via email, text, and auto-dialers that direct families to a **mobile- and web-friendly survey**.
- Implement **non-digital alternatives** to better reach unconnected families.
- **Use in-person avenues** for completion in line with social distancing guidelines.
- **Conduct follow-up calls** to non-respondents midway through the window to provide reminders and offer support.
- Leverage teachers, community-based organizations, and potentially ISPs to help support **data completion and accuracy**.
- **Track completion** regularly and update all stakeholders on key metrics.

FOLLOW-UP

- Analyze responses and **implement robustness checks** (e.g., weighting responses if not comprehensive, calling about non-responses).
- **Sense-check results** to protect against faulty responses (e.g., requesting unneeded laptop) by comparing estimated results to existing data, asking schools to verify if needed.
- Supplement collected data with other administrative data (e.g., performance, graduation/dropout rates) if possible to gain **understanding of the digital landscape**.
- Be transparent and **share results with all stakeholders**, including next steps and plans for immediate action.
- Reflect on the process, capture learnings, and **build infrastructure** to replicate the assessment and aggregate data going forward.

17. See, for example, the CCSSO's *Home Digital Access Data Collection: Blueprint for State Education Leaders*.
18. For School Districts: Registration Question Bank

K–12 Bridge to Broadband Initiative

ISPs launch programs to enable school districts to identify and purchase residential broadband service for lower-income families

In partnership with EducationSuperHighway, regional and national internet service providers (ISPs) are creating offerings tailored to meet the needs of schools looking to close the K–12 home digital divide.

Built on the recent success of partnerships between school districts and ISPs in Chicago, Atlanta, Philadelphia, and Las Vegas, the initiative promotes five core principles for ISPs working with school districts or states to identify students without broadband at home and to advance effective solutions.

Create a **sponsored service** offering for school districts to purchase internet services for students at home.

Provide the **data** school districts need to identify students who lack at-home broadband (i.e., provide addresses of students who are unserved and who could be provided with broadband service within 10 days).

Agree to a baseline set of **eligibility** standards.

Minimize the amount of information required to sign up to facilitate **enrollment** for families in need.

Commit to protecting participating families' **privacy** by not using the supplied information for target marketing.

Participating providers offer broadband service to over 80% of U.S. homes. State and district leaders can visit K–12 Bridge to Broadband to find participating providers.

Step No. 2

What: Establish process for procuring devices and connectivity.

Efforts to ensure that every student has a dedicated learning device and home internet access have required state and local education leaders to address new procurement challenges in light of the pandemic. While some parallels in procurement strategies exist between purchasing devices and connectivity services, there are specific strategies associated with each that will be discussed separately in the following sections of the report.

Devices

The vast majority of school districts had experience purchasing devices prior to the pandemic. **However, the pandemic necessitated some school districts to quickly purchase additional devices if they were not already at a 1-to-1 student-to-device ratio, and supply chain constraints for some learning devices have added complexity to the purchasing process.** Many school districts have also had to navigate the challenges associated with sending devices home with students for the first time.[19]

When it comes to selecting the appropriate devices to purchase, school leaders typically factor in grade-level needs, compatibility with existing software and IT systems, and cost. Supply chain constraints during the pandemic have led to device availability becoming another decision-making factor in the short term.

To alleviate the administrative burden on school districts and help them better navigate supply chain challenges, some states, such as Texas and Maine, have aggregated demand and run statewide procurements for devices. It is important for states considering aggregated procurements to factor in device preferences from school districts. The state of Indiana committed CARES Act funding to learning device purchases but allowed the school districts to handle procuring the devices based on their local preference.

In addition to purchasing the physical devices, states and districts should consider service-level agreements, as seen in the Maine Learning Technology Initiative (MLTI) model.

19. For more information on how schools can manage device lending programs, see the Digital Bridge K–12 Device Toolkit.

Which device types should be selected?

	LAPTOPS	CHROMEBOOKS	TABLETS
Typical grade level	• Typically used for grades 9 through 12	• Typically used for grades 2 through 12	• Typically used for pre-K through 2 and in special education
Benefits	• Better processing power and storage capacity • No current supply chain constraints • Longer-lasting and durable • More leasing options • Useful for STEM applications	• Low cost of purchase and repairs • Cloud filtering and authentication simple for schools • Easy integration with Google Classroom and apps	• Allows for direct annotation • Touchscreen is easy to use • Can be LTE-enabled (does not require hot spot/broadband)
Limitations	• Higher cost • Difficult to administer with filtering software	• Current supply chain is back ordered, reducing distribution speed • Licensing and expiration challenges	• Higher cost • Licensing and expiration challenges • Unable to perform more complex tasks

Examples	• Dell Inspirion 14 3000
	  ▪ Cost: $294
	  ▪ Screen: 14"
	  ▪ RAM: 4GB
	  ▪ Hard drive: 128 GB
		• HP Google Chromebook 11 G5
		  ▪ Cost: $199
		  ▪ Screen: 11.6"
		  ▪ RAM: 4 GB
		  ▪ Hard drive: N/A
			• iPad
			  ▪ Cost: $429
			  ▪ Screen: 10.2"
			  ▪ RAM: 3 GB
			  ▪ Hard drive: 128 GB

These agreements integrate device purchasing with repairs and maintenance, warranty, and replacement, ensuring greater sustainability of results and a provider focus on performance (e.g., a working laptop always being available).

Device distribution

The pandemic presented a new challenge for device distribution, as districts needed to determine how to get devices to students while school buildings were closed. Many districts coordinated with food-service distribution programs to deliver devices to students. Others had manufacturers ship devices directly to students where privacy and asset logistics allowed. Other low-contact approaches to maintaining safe distribution during the pandemic have included:

1. Drive-through distribution
2. Pickup appointments at designated distribution centers
3. Rotating the distribution center to different campuses
4. "Uber"-style drop-off of devices at student homes (e.g., through teachers, administrators, or third parties)

Tech support for students, teachers, and families

In addition to ensuring all students have devices and connectivity at home, quality distance learning requires ongoing tech and digital literacy support for students and their families. School districts need to budget for additional staffing and tech requirements. Where possible, states and school districts should partner with community-based organizations (CBOs) that are well versed in providing both tech and digital literacy support to new technology users. Developing robust tech support was key to improving the success of Los Angeles Unified School District's (LAUSD) efforts to roll out a distance learning program. Even though LAUSD had an established IT support line, demand for the service pushed administrators to significantly expand capacity. Simple calls around log-ins need to be addressed quickly and separated from complex calls on technical issues related to setup, equipment, or software.

Help desks: *Should be implemented as a central digital inclusion resource* (including IT as well as digital literacy support) for parents and caregivers, with proper staffing levels and multilingual resources, and in-person appointments when feasible.

Repairs and maintenance: *Should be made available at the school or district level.* Funding should be allocated in yearly budgets for repairs, including costs of warranties and potential insurance programs.

Inventory: *Should be managed before and after distribution* through asset tagging with procedures to address student mobility, theft, and graduating classes.

Refresh cycles: *Should be updated to ensure device quality* and should occur in smaller loads to spread out costs.

Security and data privacy: *Should be implemented through school networks or prefiltered devices*. It is also important to vet online educational materials and teach cybersecurity to families to ensure compliance with the Children's Internet Protection Act (CIPA). In recent years (and especially since the pandemic), hackers have targeted school districts that handle large amounts of personal data.

School districts can take several actions to bolster their security and data privacy practices[20]:

1. Collaborate with stakeholders on guidelines for governance and use.
2. Ensure contracts meet required compliance laws (e.g., CIPA and state student privacy laws) and limit any commercial use of data.
3. Identify and train a tech security lead.
4. Perform regular audits and system tests.
5. Institute security and privacy trainings.
6. Implement technical measures that limit access to data.
7. Review and evaluate any edtech for student or teacher use.[21]

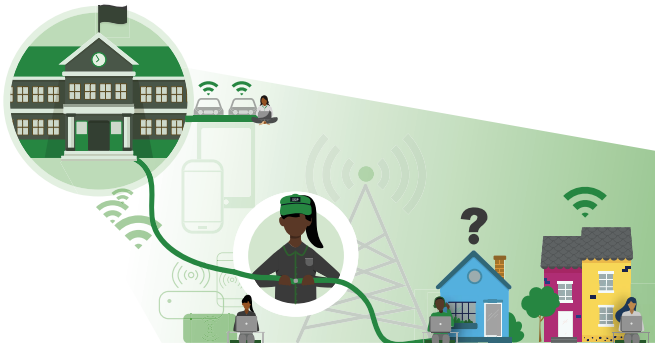
To ensure effective ongoing use of devices, states and school districts should establish robust digital inclusion programs to ensure that caregivers and students have the skills necessary to effectively participate in distance learning. When developing digital inclusion programs, school districts should consider providing materials on digital citizenship and resources to equip students, caregivers, and teachers to protect themselves against online threats and limit unwanted access to and use of personal information (e.g., through use of effective passwords). Private sector vendors and nonprofits (e.g., the National Digital Inclusion Alliance[22] and Wide Open School[23]) are already prepared to offer this support, with many offering free digital literacy resources.

Connectivity

The coronavirus pandemic has caused a dramatic shift in the way education leaders think about the role schools should play in ensuring that all students have access to the internet at home.[24] Prior to the pandemic, most schools considered home internet access to be the responsibility of the family.[25] When schools shifted to distance learning in March as the primary means for delivering instruction, attitudes about the responsibility of schools to ensure home internet access for students also shifted.[26]

The homework gap existed before COVID-19

Schools are bridging the homework gap during COVID-19



20. Framework from Trusted Learning Environment
21. The Common Sense Privacy Program has worked with a number of districts to evaluate popular edtech products.
22. The Digital Inclusion Startup Manual
23. Resources for Teachers from WideOpenSchool and Digital Citizenship resources from Common Sense Education
24. Twin Cities educators seek assurances for safe return to classroom
25. Many Districts Won't Be Ready for Remote Learning If Coronavirus Closes Schools
26. How School Districts Are Outsmarting a Microbe

Unlike with devices, schools had little to no experience procuring home connectivity services for students. The following sections cover strategies and best practices that emerged as state and local leaders worked to bridge the K–12 home connectivity gap.

Planning the procurement process

The first step in procuring connectivity services for students at home is to have a clear assessment of the need (see Step No. 1 of this report). Once the student-level need is understood, local connectivity options can be identified by overlaying ISP and LTE[27] coverage maps. Online service provider look-up tools and coverage maps, such as the ones offered at www.digitalbridgek12.org, can assist in identifying available options.

After an initial set of options has been identified, local ISPs should be engaged to get a better understanding of their service offerings. Many providers expanded their offerings during the pandemic to include programs tailored to education entities looking to purchase residential internet access on behalf of families. At the state level, these conversations can be facilitated through internet service provider associations, similar to the approach North Dakota and Connecticut took (see North Dakota and Connecticut spotlights in the Appendix). Discussions with providers should include the following topics:

- Ability to deliver desired upload/download speeds and minimum data requirements for distance learning
- How to ensure that CIPA-compliant filtering can be implemented
- Total cost of ownership, including installation fees, equipment costs, maintenance, repairs, and customer support

Many states and school districts have worked to negotiate contracts that front-load costs to take advantage of this one-time funding (e.g., higher installation costs vs. ongoing fees, and equipment purchase agreements vs. equipment rental).

The planning process should also determine whether an RFP is needed. State and local procurement law may require that an RFP process be followed, although many of these requirements have been suspended during the pandemic. There are additional pros and cons to using an RFP, namely the trade-off between optimizing the speed of purchasing and optimizing pricing through competition and negotiation. If an RFP is to be used, there are templates available at digitalbridgek12.org/toolkit/procure/internet-access-rfp/.

Evaluating connectivity options

The availability of different connectivity options depends on many factors, namely locale (urban vs. rural), geographical characteristics (i.e., terrain), and historical local investment in broadband infrastructure. Some school districts, particularly those in large urban areas, may have a variety of connectivity options available. Others in less populated locales may have limited choices.

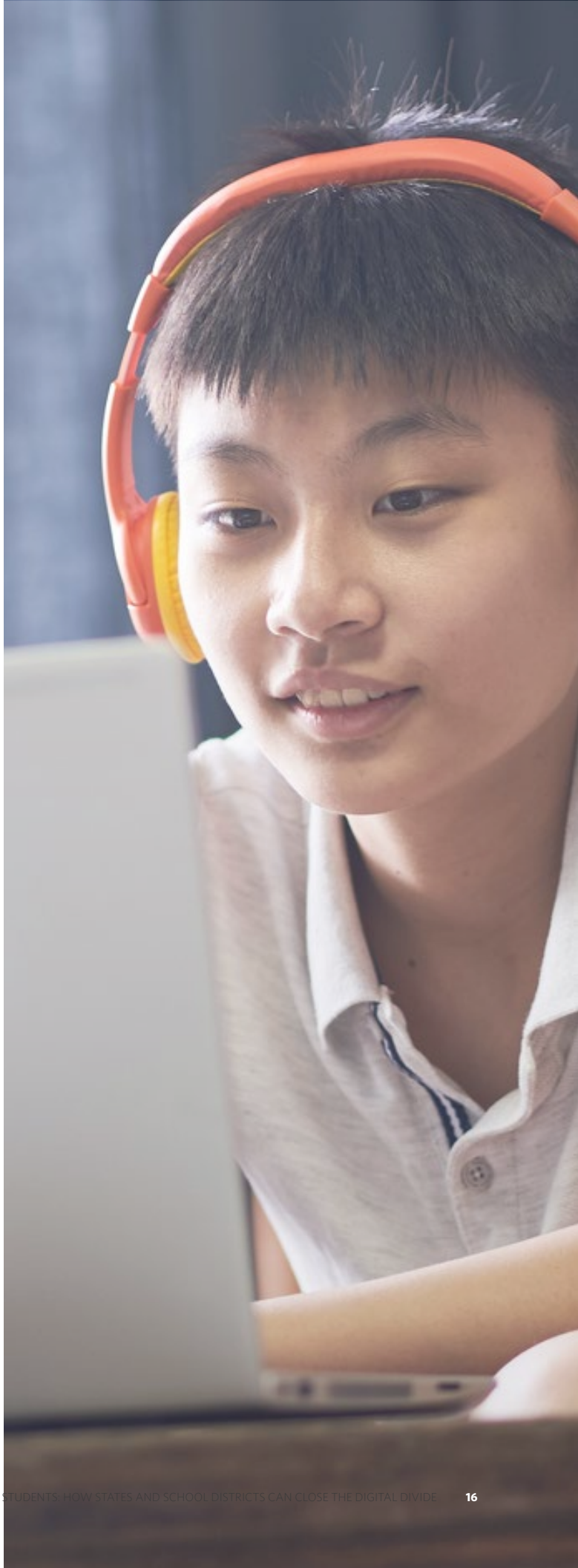
Fixed broadband, such as cable or residential fiber, usually offers the most reliable indoor service and fastest speeds, isn't constrained by data caps, and provides some of the lowest price points for internet access. Fixed broadband has the ability to connect a majority of K–12 students based on existing network infrastructure, but many families with access to broadband networks are not connected due to barriers to adoption (e.g., affordability, sign-up requirements).[28] To overcome these barriers, states and school districts are using an innovative approach: The school district serves as a single subscriber for multiple households through what's known as a sponsored service, or a single-payer contract, with an ISP.[29] This allows school districts to relieve the burden on families around eligibility and sign-up. However, where fixed broadband options do not exist, or where adoption barriers cannot be quickly overcome, cellular hot spots provide an alternative. For example, school districts with students facing housing instability may find hot spots to be a more effective connectivity solution.

In areas where both broadband and LTE access are lacking, more creative solutions need to be employed to provide home internet. This could include satellite internet, deployment of Wi-Fi buses, and installation of mesh networks.

27. LTE stands for "long-term evolution" and is a marketing phrase that signifies progression toward true 4G.
28. The Alliance for Excellent Education found that 80% of students without adequate connectivity are in metropolitan areas vs. in nonmetropolitan, or rural, areas. The majority of metropolitan areas are connected to the fixed broadband grid. For students in these regions, lack of adequate connectivity is largely tied to affordability and other barriers to adoption
29. What Are Single Payer Agreements?

In **SAN RAFAEL, CALIFORNIA**, while higher-income neighborhoods enjoyed robust home access to broadband, the Canal neighborhood, an area populated predominantly by lower-income workers, had a lack of broadband infrastructure that would have created additional barriers to the success of distance learning efforts.[30] **Over the summer of 2020, public and private stakeholders in the community built a mesh network to connect more than 2,000 students and their families for the 2020–2021 school year.**[31]

In **CHATTANOOGA, TENNESSEE**, Hamilton County Schools quickly supported all students in need of home access through an existing partnership with municipally owned telecom provider EPB. EPB's earlier investments in a sophisticated fiber network infrastructure enabled them to quickly extend fiber infrastructure throughout the community, deploying 100 Mbps broadband for high-speed internet to more than 28,000 lower-income families. Thanks to their earlier investments, EPB was able to drive down the cost of service, extending use of the **$8.2 million raised by the district to secure a 10-year program that will offer students 100 Mbps broadband service completely free of charge**[32] (see Chattanooga spotlight before Appendix).



30. Canal Digital Access Equity Fund
31. How San Rafael, California Built a Neighborhood Mesh Network That Turned into Something More
32. Hamilton County and Chattanooga use Smart City Infrastructure to Bridge the Digital Divide for Students

What connectivity types should be selected?

	 FIXED INTERNET CONNECTIONS	 HOT SPOTS	 SUPPLEMENTAL OPTIONS *Satellite, mesh networks, cell on wheels**
Use cases	• In areas with existing infrastructure (e.g. fiber, cable, DSL) • Where a long-term solution is a priority • When synchronous distance learning is preferred	• When rapid implementation is needed • Where no fixed option is available • For students facing housing insecurity	• Where wired or wireless service is not available
Benefits	• Stable, high-quality connection that multiple members can use concurrently	• No enrollment required by families • No installation • Can be managed centrally by districts	• Can offer connectivity where other solutions are not available
Limitations	• Gaps in infrastructure deployment • Difficulty for families with sign-up and installation	• Limitations with coverage based on location • Certain indoor settings can limit signal • Networks can become overwhelmed • Low data caps can throttle or cut service	• Typically higher-cost solution • Can be more difficult to implement • Should not be considered as a long-term solution
Cost	• **Ongoing**: Service ($10–$40/month), modem/router ($0–$10/month) • **One-time**: Installation ($0–$100)	• **Ongoing**: Service ($15–$40/month) • **One-time**: Hot spot device ($60–$80)	• Costs will vary • **Ongoing**: Service ($60–$70/month), equipment ($10–$15/month) • **One-time**: Installation ($0–$100)

*Also includes Wi-Fi buses, microcells, and other creative solutions; dial-up lacks required speed to support digital learning.

Overcoming adoption challenges

Efforts to expand residential broadband access for families of students have often run into adoption challenges, as awareness, understanding, and trust of these offerings is often low, on top of the fact that the families most in need of them often—because of this exact issue—lack access to the channels by which schools most often contact parents.

Schools and CBOs can serve as trusted intermediaries when a family wary of signing up with a provider on their own may prefer to work through the school or other organizations. This could simply mean serving as a trusted point of information for families. Outreach about school-sponsored internet offerings through community-based organizations can maximize awareness and result in greater rates of adoption of broadband service. Chicago Connected in partnership with Kids First Chicago and Chicago Public Schools is funding CBOs to support the sign-up process for free broadband service and provide continuing digital literacy support.[33] Coupling broadband-adoption resources with device pickup at schools is another way to increase the take rate of services. Finally, providers can directly increase trust and rapport with families through a dedicated "distance learning" customer service line.

Digital inclusion[34] resources are also needed to support students, teachers, and families once they have been

33. Chicago Connected
34. Digital inclusion refers to the activities necessary to ensure that all individuals and communities, including the most disadvantaged, have access to and use of information and communication technologies (ICTs). This includes five elements: affordable, robust broadband internet service; internet-enabled devices that meet the needs of the user; access to digital literacy training; quality technical support; and applications and online content designed to enable and encourage self-sufficiency, participation, and collaboration.

equipped with devices and connectivity. Dedicated training needs to be conducted for teachers so they can properly educate students in a vastly different educational environment. Digital literacy and technical support are essential for all parties engaged in the distance learning process. States and school districts should include in their efforts a plan to include professional training for social and emotional supports, resources to assist with mental health screening, and implementation of a curriculum that supports diversity, equity, and inclusion.

A note on educational online content

While the focus of this report is the provisioning of high-speed internet and devices, it is important to highlight the additional resources needed to close the digital divide, such as tech support and training, which we discussed earlier in this report (see "Tech support for students, teachers, and families," above), as well as high-quality online instructional content.

In a digital environment, it is essential to maintain quality and continuity of curriculum despite differences in available educational tools and in-person learning opportunities. A recent Common Sense Media survey[35] found that about 60% of teens feel online learning is worse than in-person learning, and about 30% of teens cite lack of access to teachers as a major academic challenge.

Once students are online, educators will need to adapt their teaching techniques and even create new methods to encourage students to focus and engage. New content is needed, including prerecorded lessons, computer-adaptive teaching, and potentially the use of gamification to increase engagement. Investing in training and effective content will empower teachers and help them thrive in a new teaching environment. Digital citizenship training for both teachers and students will support safe and responsible usage of the digital classroom.[36]

35. New Survey: Majority of Teens Say Online Learning Is Worse Than In-Person, but Only 19% Think School Should Return to Full In-Person Instruction
36. Realizing the Promise: How can education technology improve learning for all?

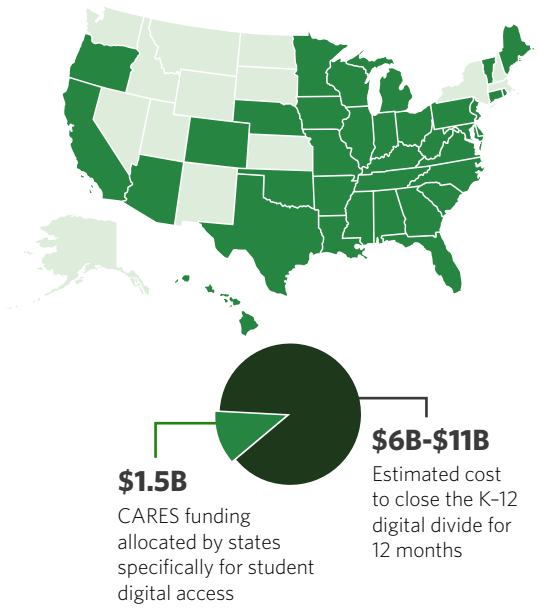
Step No. 3

How: Find the money to pay for devices, connectivity, and support.

Emergency coronavirus funds

In response to the coronavirus pandemic, Congress passed the CARES Act in March, including two funding sources to support emergency K–12 education needs. The $13.2 billion Elementary and Secondary School Emergency Relief Fund (ESSER) made distance learning an allowable expense, and allowed for a long list of other coronavirus-related needs (e.g., cleaning supplies, school-based meals, mental health services). The $3 billion Governor's Emergency Education Relief Fund (GEER) gave governors wide discretion to support K–12 education, higher education, or both, including support for distance learning. It's important to note that because CARES, ESSER, and GEER all allow for expenses other than distance learning, it's possible that while funding may be eligible to support distance learning, states may choose to prioritize other emergency uses for the funding.

CARES spending by states, specific to K–12 access*



* Based on public releases as of October 2020; may understate the number of states and amount of funding that has been allocated for K–12 access through CARES.

Several states have used these CARES funds to partially close the digital divide. At least $1.5 billion of CARES funding has been allocated by 36 states specifically to address K–12 digital access. However, these funds are still insufficient to cover first-year costs to bridge the K–12 digital divide, and additional funding is needed to support ongoing costs to close the divide (e.g., maintenance, replacements, monthly costs, training, tech support, etc.) beyond the first year.[37]

Private and philanthropic funds

In addition to government support, state and school leaders should take stock of potential private-sector and philanthropic partners who could provide funding and in-kind support. There is strong momentum to support initiatives to close the distance learning digital divide, especially now that some schools may need to be able to quickly transition back and forth between in-person and distance learning at least until the end of the 2020–2021 school year. The efforts of Citadel, Crown Family Philanthropies, and other philanthropic groups to fund Chicago's home connectivity push are one such example. Besides funders typically interested in education and connectivity issues, states and school districts should consider engaging organizations with a commitment to local economic development.[38] However, it is important to note that these funding sources are not necessarily reliable for sustained device purchasing and connectivity needs. Private companies have also made commitments to support efforts to close the digital divide: T-Mobile's Project 10Million is offering up to 10 million households free data over the next five years,[39] Comcast Internet Essentials is offering low-cost plans, Kajeet is supporting Wi-Fi buses,[40] and HP has provided $10 million worth of products and grants.[41] In particular, HP is partnering with providers to ship Windows devices and Chromebooks to districts. They have also launched the HP Refresh Program to enable communities to donate and clean unused laptops and redistribute them to schools.

To maximize the use of available private or philanthropic support, state and school districts should build comprehensive plans based on their needs assessments that lay out the special role private or philanthropic partners can play and how students will be affected in the absence of that support. Ultimately, only public funding offers the kind of reliable and comprehensive investments needed to close the digital divide.

37. See, for example, pp. 21–23, *Closing the Digital Divide in the Age of Distance Learning*
38. Learning loss due to coronavirus-related disruptions in education could exacerbate existing disparities in achievement and have a long-term impact on children's economic well-being as well as the U.S. economy.
39. Project 10Million
40. Kajeet SmartBus
41. As the digital divide widens, tech companies help fill the gap

Making the case for additional public funding

Accessing reliable and comprehensive funding from state and federal policymakers requires analysis and data to make a compelling case. For example, states and school districts should provide comprehensive numbers of students in need of support, necessary components of the program (e.g., broadband service, devices, tech support, digital literacy, professional development, etc.), coupled with estimated costs and a specific plan to procure and distribute to ensure that policymakers understand the full scope of the program. This detailed planning backed by granular assessments will help bolster the case that, with public funding, states and districts are well positioned to close the digital divide. **At the federal level, Congress and the administration have been presented with numerous analyses and have shown an increasing willingness to make the student digital divide a priority, but as of this writing they have not yet provided the level of support that is needed.**

States and districts can also use their assessments to help close gaps in infrastructure deployment. Data showing the costs and trade-offs of delivering distance learning to students with poor infrastructure access helps policymakers understand where there are gaps in this critical infrastructure and how an investment in a "future-proof" network (capable of at least 100/100 Mbps) could help ensure universal access to high-quality distance learning.

Since Congress passed the CARES Act in March, it has had under consideration further proposals for emergency coronavirus response legislation, including provisions for direct funding for distance learning during the pandemic. In September, the House of Representatives approved a package that included $12 billion through the E-rate program to provide connectivity and devices for students at home during the pandemic. The Senate has not yet considered the House legislation. In addition to funding through emergency pandemic response legislation, at the federal level there are existing programs that, with support from policymakers, could be deployed now to bridge the digital divide:

- **The FCC's Connect America Fund, the FCC's Rural Digital Opportunity Fund, and the USDA's ReConnect Loan and Grant Program** can be leveraged over time to enable significant infrastructure improvements, as seen in North Dakota, where 99.8% of rural students have home internet access as the result of more than two decades of investment.
- **E-rate**, one of the FCC's Universal Service Funds, has successfully helped to wire the vast majority of America's schools and libraries. If expanded, E-rate funds could be used to connect eligible students at home. E-rate rules requiring price transparency helped drive the cost of school broadband down by 90%.[42]
- **Lifeline**, also part of the FCC's Universal Service Funds, is the only federal program that provides people with lower incomes (at or below 135% of the federal poverty guidelines) with a cost subsidy for telecommunications service. With changes to encourage greater participation from broadband service providers and a higher subsidy level (currently set at $9.25 per month), this program could help support at-home broadband service for students from lower-income families and their caregivers nationwide.
- Other avenues to purchase devices may exist: Districts may use **Title I-A funds** to acquire laptops and tablets if use of the devices is supported by the school's comprehensive needs assessment and implemented through evidence-based instructional strategies. States may also use **IDEA Part B funds** to support the use of assistive technology devices for students with disabilities. Additionally, districts may use **Title IV-A funds** to purchase devices for students who lack them.

42. EducationSuperHighway milestones

POLICY IMPLICATIONS

Stakeholders are dependent on good policy decisions to help them close the student digital divide during the pandemic and to keep it closed for good. Federal and state policymakers should take the following actions:

Assess the K–12 digital divide

School districts need resources and guidance to continue their digital divide assessments and to ensure the data can be utilized at the local, state, and federal levels to close the digital divide.

Short-term funding: States and school districts can implement their own surveys and needs assessments quickly to locate the students caught in the digital divide. Our report provides several good examples of these needs assessments.

Long-term funding: The federal government should initiate and support a nationwide study to determine which students live in the digital divide. A federal-level assessment focused on students will complement other federal mapping efforts, and can support school district efforts to share student information consistent with privacy obligations.

Guarantee adequate funding and supply

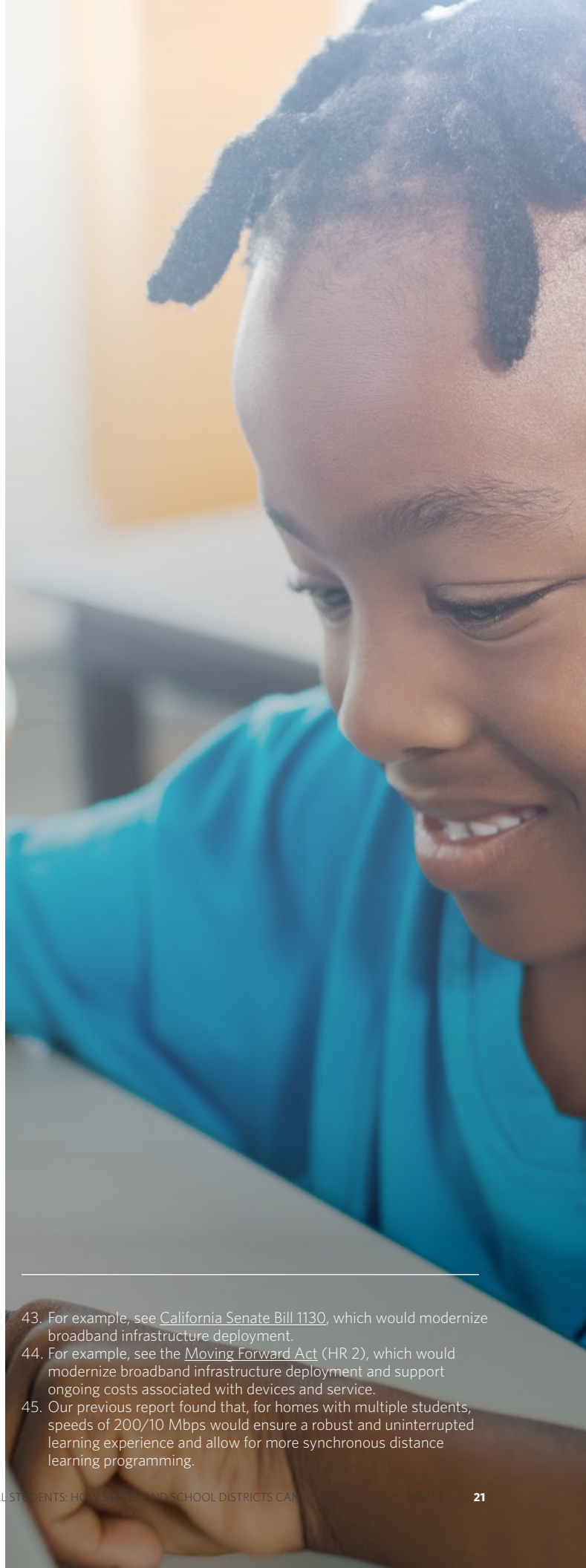
As is now clearly established, too many parts of the country, in urban and rural areas, lack adequate or any broadband connectivity. Meanwhile, funding to date is insufficient to close the K–12 digital divide.

Short-term funding: Congress should appropriate emergency "homework gap" funding sufficient to ensure all K–12 students have connectivity and devices adequate for distance learning during the pandemic.

Long-term funding: States[43] and the federal[44] government should make significant investments in broadband infrastructure and commit to continuing cost supports for both services and devices.

- Deploy new networks that are capable of high-quality distance learning.[45]
- Upgrade existing networks to ensure they are capable of high-quality distance learning.
- Support K–12 students with a subsidy support program for service and devices.

Secure the supply chain: Prioritize the supply of critical connectivity and learning devices for the educational market, and support transparent pricing.



43. For example, see California Senate Bill 1130, which would modernize broadband infrastructure deployment.
44. For example, see the Moving Forward Act (HR 2), which would modernize broadband infrastructure deployment and support ongoing costs associated with devices and service.
45. Our previous report found that, for homes with multiple students, speeds of 200/10 Mbps would ensure a robust and uninterrupted learning experience and allow for more synchronous distance learning programming.

CONCLUSION

Our review reveals **seven key takeaways** from state and local efforts to close the digital divide during the pandemic.

1. **While progress has been made, the K–12 digital divide persists.** States, cities, and school districts have made strong efforts to close the digital divide, yet the divide persists across all 50 states, and greater public investment is needed to close the divide and keep it closed.

2. **Closing the divide is a difficult, but solvable, challenge; schools cannot solve it on their own.** Permanently closing the divide requires better data, new infrastructure, greater funding, new skill sets, and enhanced digital literacy; schools are uniquely positioned, given their connection to families, but solutions must break down silos and bring together all stakeholders: states, districts, the private sector, nonprofits, teachers, and families.

3. **An effective needs assessment is the foundation for rapid action to fully close the divide.** Lack of digital divide data (or even an organization committed to compiling granular digital divide data) on students has stymied efforts to close the digital divide. States and school districts began to conduct assessments when school buildings closed to support their efforts to provide equitable access to distance learning. Quality needs assessments are essential to help states and districts obtain recurring data sets providing visibility into the quality of broadband service, broadband adoption resources in the household, and potential providers in serving an address.

4. **Closing the digital divide is an iterative process; states and districts make different decisions based on differing objectives.** Short-term solutions may result in trade-offs among speed, cost, and quality of implementation; while the lead-up to fall 2020 focused on rapid solutions, now states and school districts are seeking sustainable efforts that will more effectively meet curriculum and student needs to close the digital divide with a long-term solution.

5. **Both centralized and decentralized models can effectively close the divide.** Both state-led and district-led models can be effective: State-led models offer efficiency of scale and reduce the administrative burdens on districts, while district-led models offer flexibility, choice, and greater input from the district, schools, and families.

6. **While states and school districts are having an impact today, their solutions are not sustainable at current funding levels.** Federal CARES Act funding helped to jump-start efforts, but completely and permanently closing the divide will not be possible without greater emergency and long-term funding to invest in infrastructure, devices, and training.

7. **Further research and analysis are needed to effectively close the digital divide for K–12 students and ensure high-quality distance learning for all students.** For example, additional research will help to quantify how better connectivity at home and device distribution to homes minimize learning loss; accurately understand how much of the gap has been closed and what is required to bridge the remainder; further understand barriers to adoption and the best approaches to connect communities lacking broadband infrastructure, including creative solutions such as mesh internet, cell on wheels, or even new infrastructure builds; and better understand which educational content, supports, and digital literacy are needed to ensure high-quality distance learning for all students.

SPOTLIGHTS

Alabama

State-issued vouchers coupled with **ISP collaboration** enabled broad and rapid deployment of services.

The Alabama Department of Economic and Community Affairs (ADECA) acted quickly to set up a broadband expansion program.

- When it became apparent in July that students would not be returning to school in the fall, ADECA quickly partnered with CTC Technology & Energy, a telecommunications contractor, to devise a statewide mechanism to roll out broadband internet quickly and efficiently.
- The program was aimed at lower-income students (about 450,000 across Alabama), focusing on students for whom affordability was a barrier to adoption.
- It allocated $103 million in CARES funds to serve an expected 250,000 households.
- It focused on offering fixed broadband solutions where possible to remove adoption barriers due to one-time costs (e.g., installation fees and equipment costs).

With strong ISP participation, a voucher program was rapidly designed and distributed to lower-income families across the state.

- Contracts were negotiated and signed with 38 ISPs in just three weeks, with statewide pricing for service fees, installation, and equipment costs.
- Qualifying families were sent vouchers with a customized list of provider suggestions based on which ISPs could serve their address, but families could apply the voucher to any address; the program maximized families' ability to choose their service provider.
- Families with no ISP coverage were mailed hot spots; families who already had coverage were able to obtain service credit from providers.
- Billing contracts were set up directly with the state, eliminating the need for families to undergo credit checks or provide billing information.
- Unless families opt out, ISPs can offer them plan options to consider when CARES funding expires.

ADECA continues to push adoption as school begins, with a variety of techniques employed to engage students.

- More than 250,000 vouchers have already been sent, with about 10% adoption in the first 10 days.
- ADECA promoted the program through local nonprofits, school superintendents, robocalls, social media campaigns, ISP marketing materials (within contract confines), and an ADECA ambassador center to support families through the voucher process.

Chattanooga, Tennessee

Active community leaders and **existing fiber networks** provide high-quality, sustainably funded internet.

Cross-sector stakeholders, including the mayor and superintendent as well as leaders from the Enterprise Center and EPB, collaborated to bridge the digital divide in Hamilton County.

- Experts were brought together across the municipality, private sector, and school district to tackle the issue strategically, including collaborating with the University of Tennessee at Chattanooga on GIS data for a clearer overall picture of connectivity.
- The Enterprise Center, an economic development partner with a focus on digital equity, was well suited to support connectivity efforts.
- The telecom provider EPB leveraged its existing fiber network infrastructure to increase adoption of Wi-Fi for students, and the Enterprise Center invested in emergency public Wi-Fi access to ensure there was a connectivity option for all students.

The effort maximized impact through robust identification of student need and through outreach to increase adoption.

- All students under the free or reduced-lunch program (FRLP) were eligible (approximately two-thirds of all Chattanooga students), and schools helped identify additional underserved populations who required connectivity (e.g., unhoused, undocumented, refugee).
- Families received high-speed fiber service, which was far stronger than standard connection and better suited for the virtual learning environment.
- The adoption strategy focused on building trust, including collaborating with community partners who focus on specific demographics or geographies and using multilingual calls, texts, social media, email, and web resources to spread the word.

Through multi-stakeholder engagement, Chattanooga identified a sustainable path to funding.

- A mix of state CARES funding, city and county budgets, and philanthropic donations covered over $7 million in upfront hardware and installation costs; the district and EPB also committed more than $7.1 million to fund costs over the next 10 years.
- By centralizing connectivity through EPB, the program was able to optimize costs to just the cost of service.
- Households must requalify each year so the program can be managed.

Chicago, Illinois

A **unique partnership across stakeholders** funds internet connectivity for the next four years.

Early stakeholder engagement created urgency toward bridging the digital divide.

- The project began with authentic parent voices: Kids First Chicago partnered with the Metropolitan Planning Council on a report that elevated the voices of families directly affected by the digital divide and equipped stakeholders with concrete data, demonstrating the extent of the city's widespread connectivity gaps.
- Chicago benefits from a history of investing in public school education, an issue that continues to be a high priority for the city.
- Investments from Citadel and Crown Family Philanthropies spurred the launch of Chicago Connected, a $50 million program bringing together public, private, and philanthropic partners to serve approximately 100,000 Chicago public school students.

The Chicago Connected partnership maximized the expertise and connections of each stakeholder.

- The City of Chicago led the strategic vision and secured both public and private funding.
- Chicago Public Schools (CPS) determined eligible households and led the daily operations of the initiative.
- Comcast and RCN served as the selected broadband providers, and T-Mobile served as the major cellular hot spot provider.
- United Way of Metro Chicago and Children First Fund served as fiscal agents to ensure security and data privacy.
- Kids First Chicago and 35 CBOs led community engagement efforts by serving as critical conduits to eligible families, providing newly connected households with digital literacy training and support, and ensuring parent and community voices were infused in program design and implementation.

Chicago Connected rapidly designed and executed a sustainable, sponsored service program to provide internet to eligible families.

- They quickly determined that connectivity was the fundamental driver of the digital divide for Chicago students.
- They built a tiered eligibility model focused on the students with the most need using multiple family economic and student level factors, such as diverse learner status, and using the University of Illinois at Chicago hardship index.
- They identified the appropriate provider (for broadband or hot spot) and sent provider-specific vouchers to each eligible family.
- They organized four years of funding, with local philanthropies funding the first two years of the effort (with $5 million from CARES) and CPS funding the remaining two years.

Chicago Connected continues to promote the program through outreach to increase enrollment.

- One-third of eligible students signed up by the first day of school, with sign-ups increasing exponentially since launch.
- Program adoption has been the primary focus thus far through general marketing, informative webinars, and direct texts/calls; personal outreach from schools and CBOs has been particularly effective.

Connecticut

Collaborative state efforts with **district/ISP engagement** enables effective provisioning in smaller states.

Strong leadership and broad stakeholder engagement in Connecticut drove efforts to close the digital divide.

- Governor Ned Lamont set the vision and elevated digital divide as a statewide priority, leveraging a cross-agency leadership team from the department of education, the Commission for Educational Technology, the Connecticut Education Network (CEN), the Office of Consumer Counsel (OCC), the Department of Economic and Community Development (DECD), and Internet2.
- The department of education helped ensure alignment with statewide reopening plans and procurement.
- The Commission for Educational Technology provided digital equity resources, national benchmarks, and program design.
- CEN brought the provider perspective as the fiber backbone of the state.
- OCC helped to consider long-term access issues.
- DECD pushed the digital divide beyond educational considerations.
- The state was already about 50% 1-to-1 with strong broadband infrastructure and fewer rural areas, allowing for greater ease of implementation.

The state worked closely with districts and ISPs to deliver devices and connectivity to students.

- The state-led model fast-tracked procurement of devices and hot spots through bulk ordering organized by the state's IT department.
- Governor Lamont issued an executive order to accelerate purchasing under simplified terms of service with broadband providers to bypass the months-long RFP process.
- Districts identified the best options for their families through a series of webinars with state leaders and broadband carriers.

- The state invested $43.5 million to purchase more than 80,000 devices, 12,000 mobile hot spots, and about 40,000 broadband connections as well as 200 public hot spots.
- Chromebooks and Windows laptops were deployed with preexisting endpoint protection from CEN.
- Devices and connections were prioritized for districts and families with the greatest need.

In parallel, Connecticut drove wraparound support and enablement, including:

- A public outreach campaign and supporting website with free wraparound services (e.g., emotional/social support, mental health support).
- A five-year state strategic plan to ensure that students graduate with digital literacy and that teachers have the skills to effectively teach digitally.
- Continued advocacy for federal (E-rate) and state-level policy to enable long-term investment and connectivity.

Indiana

State-issued grants and **district-led execution** allow for a decentralized model in bridging the digital divide.

The state of Indiana deployed GEER funds to help close the digital divide through a needs-based competitive grant program.

- The program allowed districts to express their relative needs through grant applications as opposed to relying on a formula-based funding approach.
- The grant program forced districts to think strategically about how funds would be invested and gave them choice in how to bridge their divide.
- Grant money could be spent by the district to improve device availability, connectivity, and educator capacity.

Grant requests were reviewed by the state for quality and overall need, to inform the amount to be funded.

- District grant requests were rubric-evaluated across demonstration of need, quality of execution plan (including sustainability), evidence of efficient budget usage, and definition of performance benchmarks, with district equity and existing technological infrastructure also considered.
- Quality assurance was employed to ensure that districts were allocating reasonable costs per line item and requesting an appropriate number of devices based on past student survey results.
- Due to the high volume of requests, only $1 in funds was available for each $3 to $4 dollars requested.
- Stranded investment opportunities (initiatives that could not be funded) were pointed to other state departments and philanthropic funds.

Districts led the provisioning of devices and connectivity, with Indianapolis finding success through effective collaboration.

- Districts that received funding had full jurisdiction over the services they purchased and distributed to students in need.
- The City of Indianapolis, in partnership with the corporate and philanthropic communities, created a coalition of 11 districts, including Indianapolis Public Schools, and 50 charter schools (together totaling about 10% of all Indiana students) to increase purchasing power during procurement.
- A group of Indianapolis-area philanthropies raised $2.6 million to help Indianapolis schools narrow the divide with devices and hot spots.
- The group ran an RFP for connectivity, ultimately partnering with T-Mobile for two years, with districts driving procurement and distribution; requests for hot spots from schools dropped from 38,000 to just 21,000 in fall 2020.
- Through participation in the statewide grant program, the group received about 20% of available funds to continue narrowing the divide.

Los Angeles, California

Efficient procurement and the unlocking of **emergency bond funds** quickly narrowed the short-term divide.

The LAUSD superintendent took swift action to close the digital divide ahead of state-led guidance or relief funds.

- The school board gave the superintendent authority to address the crisis, centralizing leadership and accelerating the process.
- LAUSD ran a rapid procurement process and reached out quickly to vendors like Apple, recognizing that there might be supply chain constraints similar to the earlier supply chain constraints for personal protective equipment.
- LAUSD accessed their previously available voter-approved, property-tax-funded $78 million bond authorization, the outcome of a 10-year authorization effort to procure devices.

LAUSD distributed devices and hot spots to families through schools, enabling 90% of students to engage in online classes, and:

- Estimated that about 150,000 students (about 25% to 35% of the district's 470,000 K–12 students) were affected by the digital divide in 2019.
- Purchased 247,000 devices (of which 120,000 were LTE-enabled iPads) and an additional 105,000 hot spots,

largely through a Verizon partnership, supplementing existing 1-to-1 efforts.
- Streamlined the distribution process with socially distant pickups at schools and no required documentation for eligibility.
- Provided a dedicated IT help desk to assist parents and students logging on, significantly expanding support as school went online.

LAUSD recognized the need for continuing support to ensure the ongoing sustainability of device and connectivity efforts, including:

- Developing rigorous use standards to ensure that connectivity is sufficient to enable distance learning for the entire family.
- Identifying and advocating for additional external sources of funding, beyond school budgets, to cover universal access and support costs (e.g., monthly connectivity costs, administrative costs, tech support desks).
- Continuing and expanding requisite purchasing, including planning for ongoing repairs/replacements and offering devices to a broader base of students (e.g., including purchasing 31,000 devices for pre-K students).
- Addressing teachers' issues with connectivity, devices, teaching tools, and educational software, and supporting their ongoing training and pedagogy necessary to effectively teach remotely.

Maine

A **one-to-one initiative** based on **service-level contracts** accelerates Maine's digital agenda.

Governor leadership led to the 1999 founding of the Maine Learning Technology Initiative (MLTI), focused on digital access in Maine.

- In 1999, Governor Angus King took a $90 million governor surplus, which eventually was taken out of the General Purpose Aid budget, and put it toward MLTI, a 1-to-1 program equipping every seventh and eighth grade student with a device.
- The seventh and eighth grades were selected because they tended to exist in the same building, were a population with lower test scores, and were an age group that was starting to benefit from collaborative environments.
- These funds were also put toward an endowment to fund the program year over year.

MLTI was sustainably set up as a service model as opposed to a commodity purchase.

- Stakeholders agreed that no child was to go without a device for more than a day.
- Repair, warranty, and replacements were included in the contract to expedite service delivery; teacher, school leader, and technology leader training and in-school Wi-Fi were also included as part of the service.

Additional benefits were realized by having a statewide contract.

- The contract resulted in improved pricing, which districts reimbursed at the cost of usage for age groups not covered by MLTI (e.g., K–6 or 9–12 students).
- The scale of the program attracted Apple talent to the state: Eight to 15 Apple FTE positions were created in Maine to service the contract from a product management and professional development perspective, with employees meeting weekly to problem-solve and troubleshoot.
- The program aligned districts on the same digital agenda to build a sustainable digital system.
- The program allowed for a cost-effective buffer pool of devices that can be redistributed across districts.

North Dakota

Historical infrastructure and **effective coordination** lead to efficient needs assessment and rapid action.

North Dakota has a history of investing in broadband coverage, even in its most rural areas.

- In 1996, 14 rural telcos formed Dakota Carrier Network (DCN) to provide broadband at scale and invest in fiber-optic infrastructure, efficiently leveraging federal funds, including the FCC's Connect America Fund.
- In 1999, the state legislature partnered with local ISPs to develop a statewide broadband network for government and education, expanding affordable access to broadband statewide.
- In 2009, a new state policy encouraged fiber-optic investment by exempting property for telecom services from sales and use taxes to spur business development across the state.

When the pandemic hit, North Dakota was able to rapidly cross-reference student addresses and ISP coverage.

- The state had already captured student addresses through the web-based student information system PowerSchool.
- DCN served as a single point of contact to immediately build a robust statewide ISP coverage map, enabling North Dakota to set up and execute a needs assessment quickly with only a few phone calls.
- The database approach ensured that this efficient process could be easily replicated in the future.

A high-quality, rapid needs assessment enabled North Dakota to take quick action to bridge gaps as part of a sustainable solution.

- The state quickly identified 2,000 rural students without connectivity, broken down by root cause (adoption vs. access), and provided broadband access to more than 1,700.
- Mapping efforts enabled the state to identify which ISPs could provide broadband service to rural students and to delegate sign-up and installation of broadband service to the relevant ISPs.

A database approach helped to align and unlock relevant funding sources through the 2020–2021 school year.

- DCN partnered with the Broadband Association of North Dakota (BAND), covering spring 2020 fees in line with the FCC's Keep Americans Connected Pledge.
- State-directed CARES funding is being used to cover 2020–2021 school year connectivity costs.
- Efforts are underway to enact state legislation to sustainably cover the cost of service going forward or to identify available federal funding.

Texas

Strong leadership and **coordination at the state level** maximized funding and led to swift action.[46]

When the coronavirus pandemic hit, the Texas Education Agency (TEA) provided strong leadership to address the digital divide as a state.

- In May, the TEA established the Operation Connectivity Task Force in partnership with the governor's office and the Dallas Independent School District, to create a fact base on the nature and size of the gap in Texas as well as potential policy, technology, and funding solutions.
- The TEA used task force findings to help secure $200 million of CARES Act funding to close the digital divide as quickly as possible.
- The TEA also provided several tools for districts, such as a playbook on how to close the gap and sample surveys for schools to use in gathering relevant data.

To close as much of the digital divide as possible for the 2020–2021 school year, the TEA launched a bulk order on behalf of school systems.

- They recognized the benefits of a bulk order to increase the urgency for districts to act immediately, to leverage scale for improved pricing and supply chain prioritization, and to ensure that smaller districts were not ignored by suppliers.
- They negotiated pricing and prioritization by leveraging an existing Houston region procurement process with the Region 4 Educational Service Center, coordinating efforts to support negotiations and execution of the statewide bulk order.
- They unlocked greater purchasing power by matching both the funding that districts contributed to the order and the CARES Act funding that local cities and counties contributed.

Bulk order execution required close collaboration and change enablement with about 900 school systems participating.

- The TEA rapidly coordinated with participating districts to understand their needs and execute the bulk order.
- They placed the initial order while working in parallel with districts to fine-tune their needs based on provider pricing, specifications, and product availability.
- They invested in district enablement through webinars, customer service personnel, a customer relationship management (CRM) system, and 1-to-1 phone calls to help districts better understand the program, complete necessary forms, and answer questions.
- They partnered with suppliers to coordinate directly with districts on asset tagging, CIPA compliance, and shipment.

More than 1 million devices and hot spots have so far been acquired as part of Texas's Operation Connectivity.

Wisconsin

Effective surveys and **collaborative state action** identified pockets without coverage.

When the pandemic hit, Wisconsin rapidly launched an action-oriented needs assessment.

- The department of public instruction leveraged their history of assessing student technology needs.
- They partnered with EducationSuperHighway (ESH), CCSSO, and local providers to build out a data governance strategy in less than a month.
- They established a survey with six key questions to determine device and connectivity needs, ensuring data could be replicated and easily aggregated.
- They benefited from having three primary student information system (SIS) vendors (Skyward, Infinite Campus, and PowerSchool) that cover 98% of schools to coordinate data collection.
- They implemented a voluntary survey through these SIS vendors and the existing Ed-Fi API data-collection

46. The full set of materials that TEA made publicly available as part of Operation Connectivity is available here.

protocol known as WISEdata. DPI also increased opt-in through ongoing communications.

DPI coordinated with ISPs to streamline and automate the serviceability assessment process.

- They married FCC maps for ISP coverage with student data from surveys.
- They established data-sharing agreements between the state and districts and between the state and ISPs to effectively match coverage.
- They are now creating maps that show the overlay of ISP coverage and address-level student-needs data, which can be accessed via a secure authentication portal.

DPI is continuing to work closely with ISPs to build a suite of low-cost offerings and to unlock sustainable pricing.

- In a state largely composed of small districts (the average grade size is 60 kids), Wisconsin school districts lacked the resources to do it on their own—only the state had the scale and vantage point to coordinate and negotiate with ISPs.
- Wisconsin's regional education network partners negotiated from a state-level scale to drive down costs (e.g., lower to no installation fees).
- The state created a "digital bridge" website for districts containing product offering specifications and statewide pricing.

APPENDIX

Publicly available resources

Alliance for Excellent Education (All4Ed) and Future Ready Schools (FRS): A national policy and advocacy organization and associated project that offers district and school leaders tools and resources to advance evidence-based practices and create rigorous and engaging student-centered learning environments, including the technology necessary to enable these new systems to perform efficiently with equity for every child.

Common Sense Media: Including an interactive map of coverage with state details and teacher and parent stories on the digital divide.

CoSN (the Consortium for School Networking) is a professional association for school system technology leaders. CoSN provides thought leadership resources, community, best practices and advocacy tools to help leaders succeed in the digital transformation of K-12 education.

Council of Chief State School Officers (CCSSO): A nonpartisan, nationwide, nonprofit organization of public officials who head departments of elementary and secondary education in the states and offer education-related resources, including Restart & Recovery, a coronavirus-related framework and tools.

Digital Bridge K–12: A playbook by EducationSuperHighway to support every public school in America to increase connectivity outside the classroom and connect students to high-speed internet.

Education Week: An independent news organization that covers K–12 education, providing both news and analysis along with explanatory and investigative journalism across a range of digital, print, and broadcast platforms as well as through live and virtual events.

Funds for Learning: A professional organization offering high-quality consulting and support services for the needs of E-rate program participants, including preparing and submitting paperwork, and helping clients to understand and maintain compliance with E-rate rules and regulations.

human-IT: A nonprofit organization that repairs and repurposes old electronics, offers high-speed internet capability for recipient homes and agencies for free or at a heavily discounted cost, and provides digital literacy training (including free online learning courses and other relevant local programs) to recipients.

ISTE (International Society for Technology in Education): A nonprofit organization that serves educators interested in the use of technology in education by providing practical guidance, evidence-based professional learning, virtual networks, and thought-provoking events.

NDIA (National Digital Inclusion Alliance): A nonprofit organization bringing together more than 300 nonprofit organizations, policymakers, and academics to advocate for national access to broadband and end the digital divide.

SETDA (State Educational Technology Directors Association): A not-for-profit membership association launched by state education agency leaders to serve, support, and represent their emerging interests and needs with respect to the use of technology for teaching, learning, and school operations.

Tech Goes Home: A nonprofit organization that brings computers, internet, and training to those who need them, so students can do homework, adults can find jobs and manage finances, and seniors can connect with loved ones and lead healthy lives.

Wide Open School: A curated suite of instructional content created by Common Sense and a coalition of education and media partners for students, families, and teachers. The content includes academic, social and emotional learning, and enrichment curricula; digital literacy and digital citizenship training and resources; teacher-readiness/professional development; and learning resources for students with learning and thinking differences. These resources are available through links to education resource websites, locally housed PDFs/worksheets, connections to kid-friendly entertainment options, and live events.

List of interviews conducted

a. City of Chicago
b. City of Indianapolis
c. Los Angeles Unified School District
d. New York City Department of Education (former)
e. Connecticut Commission for Educational Technology
f. Indiana Department of Education
g. North Dakota Information Technology Department (ITD)
h. Texas Education Agency
i. Wisconsin Department of Public Instruction
j. Professor Brian Whiteacre, Oklahoma State University

Continued on next page...

k. CTC Technology & Energy
l. Edmoxie and the former Maine Learning Technology Initiative (MLTI)
m. Kids First Chicago
n. State Educational Technology Directors Association (SETDA)
o. Enterprise Center
p. HP Education Solutions
q. T-Mobile
r. National Digital Inclusion Alliance

State and district examples

Below are brief descriptions of some of the many state and local efforts to close the K–12 digital divide during the pandemic as of September 2020.

State or district example	Effort to close the digital divide during the pandemic
Alabama	The Alabama Department of Economic and Community Affairs provided families that qualified for free or reduced-price lunch with vouchers to cover broadband installation and service fees through the calendar year. (See spotlight.)
Arizona	The state provided substantial funding for districts to put toward improving distance learning and expanding rural broadband.
Arkansas	The department of education partnered with AT&T and T-Mobile to provide students with devices and two years of high-speed internet with unlimited data.
Atlanta	Atlanta Public Schools leveraged a robust communications plan with Comcast to identify the needs of students who missed class and partner to provide a year of free service.
Boulder, Colo.	The district conducted phone outreach to identify students who lacked internet access and then partnered with LiveWireNet to sustainably provide those households with broadband.
Chattanooga, Tenn.	Chattanooga leveraged existing fiber network infrastructure; brought together experts from the municipality, school district, and private sector; and raised the requisite funds to help bridge the connectivity divide over the next 10 years. (See spotlight.)
Chicago	Chicago Connected, a unique public, private, and philanthropic partnership, was formed to provide families with internet access through sustainable funding sources. (See spotlight.)
Connecticut	Governor Lamont's office brought many stakeholders together to provide devices and connectivity for its districts. (See spotlight.)

Delaware	The state accelerated progress to connect families by deploying a statewide speed survey, building out broadband infrastructure across the state, and acquiring equipment for families in financial need.
Georgia	The state allocated funds to support connectivity initiatives like broadband signal extenders (extending from school buildings) and mobile Wi-Fi for students who live in multifamily housing.
Greenville, Tenn.	Greenville City Schools leveraged their previously implemented registration questionnaire that included a question on home internet to quickly identify and provide internet access to students.
Hawaii	The state department of education allocated funding for devices and connectivity as well as summer learning, special education, training, and support initiatives.
Illinois	The governor administered federal GEER funding to districts to purchase devices such as laptops, tablets, and hot spots, alongside broader statewide initiatives, such as Connect Illinois, that focus on expanding and repairing broadband coverage in communities and schools across the state.
Indiana	The state set up a competitive grant program to distribute CARES funding to districts that then led procurement and in some cases accessed additional philanthropic funding. (See spotlight.)
Iowa	The Iowa Department of Education worked with the state's Office of the Chief Information Officer to conduct a statewide assessment of students' remote learning needs before distributing GEER funding to districts to supply students with devices and hot spots.
Lockhart, Texas	Lockhart teachers and staff led calling campaigns to identify students in need and are providing devices and building a private wide area network (a series of telecommunications towers) throughout the community to support families.
Los Angeles	The Los Angeles United School District procured devices and partnered with Verizon to provide hot spots to students by using emergency district funding. (See spotlight.)
Louisiana	The state of Louisiana conducted a statewide survey of student technology and then distributed federal funding to districts with guidance for using funds to purchase digital devices for disconnected students.
Maine	The state of Maine provided devices and internet to its students, relying on a long-standing statewide 1-to-1 initiative that leveraged a robust service contract. (See spotlight.)

Maryland	Districts in Maryland applied for grant funding to expand access to broadband service, with funding delivered in coordination with the Maryland Department of Housing and Community Development and the Governor's Office of Rural Broadband; additional funding is being used to conduct feasibility studies for a statewide fixed wireless network to further expand access for rural students.
Mississippi	The department of education administered CARES funding to districts to purchase and be reimbursed for devices and hardware, and also ran a grant application for additional funding to expand broadband availability in underserved areas, with schools responsible for negotiating with service providers.
Missouri	The Missouri Department of Elementary and Secondary Education requested that districts submit applications to be reimbursed (using ESSER and GEER funding) for purchasing learning and connectivity devices for students.
New Jersey	The state of New Jersey used CARES funding alongside other emergency, philanthropic, and corporate funding to administer grants to districts that applied for support in purchasing device and connectivity solutions.
New York, New York	The department of education distributed internet-enabled iPads, loaned additional school devices, and announced plans to build out broadband for lower-income residents.
North Dakota	The Dakota Carrier Network had invested in broadband infrastructure across the rural areas of the state for the previous two decades and were able to rapidly identify and provide broadband to rural students. (See spotlight.)
Ohio	The state of Ohio launched a noncompetitive grant program for school districts to apply for CARES funding to be used for Wi-Fi hot spots and internet-enabled devices, with a focus on connecting rural districts and students.
Texas	The Texas Education Agency ran a statewide RFP for devices and hot spots while providing matching CARES funds to enable districts to purchase devices and connectivity. (See spotlight.)
Virginia	The state used a survey to identify students and provide them with Chromebooks and connectivity, using creative solutions like meal distribution sites and Wireless on Wheels.
West Virginia	The state, in collaboration with the West Virginia Department of Education and Higher Education Policy Commission, installed wireless access points at more than 1,000 sites in all counties, including nearly 700 K–12 schools; the state also distributed CARES funding and administered a grant program for counties for additional assistance in closing the digital divide.
Wisconsin	The department of public instruction set up a replicable and sustainable survey through the districts' student information systems, and partnered with ISPs to provide districts with maps that showed the connectivity options of their students. (See spotlight.)

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