**UK Call for Evidence: Impact of COVID-19 on Education and Children's services**

## LEARNINGS AND PERSPECTIVES FROM THE US

### About Common Sense Media

Common Sense is an independent nonprofit organisation dedicated to helping children and families thrive in a rapidly changing digital world. Common Sense launched in the United States over 15 years ago, and has recently established a presence in the UK, where it is registered as an independent charity.

Common Sense has helped millions of families and children around the world make smart, responsible choices about the media they create and consume and the online experiences they participate in.

We are the leading organization in the United States that parents, teachers, and policymakers go to for unbiased information, trusted advice, and innovative tools to harness the power of media and technology as a positive force in all children's lives. In the UK, our ratings and reviews reach more than 3 million families through our partnership with Sky, and more than 5000 teachers are registered to use our free Digital Citizenship resources.

We have established the largest and most trusted library of age-appropriate family media ratings and reviews (30,000+ titles) covering all media types that reach 100+ million users.

Common Sense's innovative K-12 digital citizenship curriculum is currently being used in nearly 50% of U.S. schools. In the UK we are also working with the Digital Learning Division at Education Wales to translate our curriculum for Welsh students, as well as several school groups in England. We will be launching a UK version of our Common Sense Education Digital Citizenship resources in January 2021, and will launch these in Wales soon after.

### Impact of COVID-19 on learning

We believe it would be useful to UK policy makers to share some perspective of how COVID-19 has affected students, teachers, and families in the United States, specifically recent polling and a study conducted this summer, which are attached as Appendices. We believe many of these challenges are also faced by students, teachers, and families in the United Kingdom.

In the United States, the COVID-19 pandemic has laid bare the inequity caused by many students being unable to access the Internet at home – known as the "homework gap." With 50 million students at home instead of at school, America is confronting a huge equity challenge: ensuring all students and families have access to technology and broadband internet.

**Two recent polls by Common Sense and Survey monkey have identified the toll distance learning is having on kids and families in the United States:**

- At the beginning of the pandemic, our SurveyMonkey poll (see Appendix A) found that more than half of teens who no longer attend school in-person say they are worried about not being able to keep with their schoolwork. And four in ten haven't attended a distance learning class since in-person school was cancelled. School closures and stay-at-home orders have necessitated a shift to distance learning. But not every school district is equipped to make the switch. And not all families have access to high-speed internet or the childcare support they need. More than six in 10 teens say they are worried about falling behind academically because of the pandemic, and Latinx, Asian and other groups are particularly worried (79% and 67%, respectively).

- In a follow up to our initial research, we completed another study with SurveyMonkey (see Appendix B) that highlights the feelings of teens as they return to school this year, both in person and online. We found that 59% of teens say that they think online learning is worse than in-person learning. Forty-two percentå of teens feel that "learning remotely" is their biggest academic challenge this year, followed by 37% who cited "uncertainty of the pandemic", and 32% said "emotional upheaval." Twenty seven percent of students believe unreliable internet would be their greatest challenge.

**In addition, a recent Common Sense study found that many millions of students in the US are being left behind in distance learning.** Common Sense Media's recent study (see Appendix C) with Boston Consulting Group found that 15 to 16 million U.S. students do not have access to technology they need to learn from home during this coronavirus pandemic. This analysis identifies students lacking basic technology for distance learning, including reliable high-speed internet, sufficient data plans, and a computer, laptop, or tablet device. We also find that while the homework gap is a problem in every single state and region, vulnerable student populations bear the greatest burden:

- 37% of rural students and 21% of urban students lack home Internet access
- 35% of Native American students, 30% of Black students, and 26% of Latinx student have inadequate Internet access at home compared to only of 18% White students
- According to Pew Research data, 35% of students from households with annual incomes below $30,000 do not have access to high-speed Internet at home.
- No state is immune to the impact of the digital divide. In our "best connected" state 1 and 4 students don't have the internet at home. In our "worst connected" states half of all students don't have the internet at home.

The homework gap isn't just about homework anymore; lack of access to the internet and a remote learning device during the coronavirus pandemic school closures puts these students at risk of significant learning loss. The digital divide also affects our teachers. The report highlights that 300,000 to 400,000 U.S. K–12 teachers live in households without adequate internet connectivity—roughly 10% of all public school teachers—and 100,000 teachers lack adequate home computing devices. From being able to access secure school files for students, Zoom for learning, or Khan academy, teachers and students are negatively impacted by poor access and infrastructure.

We hope that the attached polls and reports provide useful data points for your examination of how Covid-19 is affecting education. Please feel free to Jenna Khanna with any questions at jkhanna@commonsense.org.

# Appendix A

# Common Sense Media | SurveyMonkey Poll: How Teens Are Coping and Connecting in the Time of the Coronavirus

## Key Findings

1. **Teens are worried about how the coronavirus will affect their families.** Sixty-one percent are worried they or someone in their family will be exposed to the virus, and 63% are worried about the effect it will have on their family's ability to make a living or earn money. Hispanic/Latino teenagers are especially worried about the financial effects: Nearly nine in 10 Hispanic/Latino teens say they're worried about the impact on their family's ability to make a living.

2. **The coronavirus pandemic is making many teens feel lonely.** About four in 10 teens (42%) feel "more lonely than usual" right now—nearly the same number as those who say they feel "about as lonely as usual" (43%). Just 15% say they feel "less lonely than usual." Girls are more likely than boys to say they feel more lonely than usual (49% vs. 36%).

3. **Texting and social media are providing social outlets for teens.** Sixty-five percent of teens report talking to friends or family via texting or social media more often than they usually do. More than a third (37%) have reached out to a friend or family member they haven't talked to in a while.

4. **But texting and social media with friends may not be enough.** About half of teens (48%) say they feel less connected than usual with their friends right now.

5. **The outbreak is bringing many families together.** Forty percent of teens say they feel more connected than usual with their families.

6. **Teens are connecting to others through a variety of means—even phone calls!** A majority (59%) of teens say they're connecting with family or friends who are outside their home at least once a day. The top ways to stay connected to people they can no longer see in person are texting (83%), phone calls (72%), social media (66%), and video chats (66%).

7. **The spread of the coronavirus has upended school for teens, with 95% of 13- to 17-year-olds in the U.S. reporting the cancellation of in-person classes at their schools.** Slightly more than half of teens who no longer attend school in person say they are worried about not being able to keep up with their schoolwork (56%) and their extracurricular activities (55%) while in-person school activities are canceled. Black and Hispanic/Latino teens are significantly more likely than White teens to be worried about keeping up with schoolwork. Girls are more likely than boys to say they're worried about keeping up with both schoolwork and extracurriculars.

8. **Many teens aren't connecting with their teachers.** Almost one in four teens (24%) say they're connecting with their teachers less than once a week. Forty-one percent haven't attended an online or virtual class since in-person school was cancelled.

9. **Finding space to do schoolwork is a challenge for many teens.** More than a quarter of teens (28%) say they lack a dedicated space where they can do schoolwork at home.

10. **Compared to pre-pandemic times, teens are looking to news organizations for information.** Almost half (47%) of teens say their knowledge of the coronavirus pandemic is primarily informed by news organizations, while 37% say they primarily get information from friends, family, or teachers, and just 11% say they learn the most from personalities or influencers online. By comparison, a June 2019 Common Sense Media/SurveyMonkey poll found that 33% of teens said their knowledge of current events was primarily informed by friends, family, or teachers, 31% by news organizations, and 31% by personalities or influencers online.

## Summary

The spread of the coronavirus has upended life for American teenagers, with 95% of 13- to 17-year-olds in the U.S. reporting the cancellation of in-person classes at their schools. Eight in 10 teens (80%) say they're following news about the coronavirus pandemic closely, and concern is high: Sixty-one percent are worried they or someone in their family will be exposed to the virus, and 63% are worried about the effect it will have on their family's ability to make a living or earn money.

Teenagers of color are more likely to say they're worried that they or someone in their family will be exposed to the virus and about the potential economic effect on their family. Hispanic/Latino teenagers are especially worried about the financial effects: Nearly nine in 10 Hispanic/Latino teens say they're worried about the impact on their family's ability to make a living.

| How worried are you ... | | | | | | |
|---|---|---|---|---|---|---|
| | | Total | White | Black | Hispanic /Latino | Other |
| … that you or someone in your family will be exposed to the coronavirus? | Worried | 61% | 56% | 71% | 66% | 63% |
| | Not worried | 39% | 44% | 29% | 33% | 37% |
| … about the effect the coronavirus may have on your family's ability to make a living or earn money? | Worried | 63% | 53% | 74% | 87% | 50% |
| | Not worried | 36% | 47% | 26% | 13% | 50% |

Just under half (47%) of teens say their knowledge of the coronavirus pandemic is primarily informed by news organizations, while 37% say they primarily get information from friends, family, or teachers, and just 11% say they learn the most from personalities or influencers online. That's quite a contrast from our June 2019 Common Sense Media/SurveyMonkey poll, in which 33% of teens said their knowledge of current events is primarily informed by friends, family, or teachers, 31% by news organizations, and 31% by personalities or influencers online.

***Trying to stay connected while apart***

More than half (54%) of teens say they are "very much" practicing social distancing, 40% say they are doing so "somewhat," and only 6% say "not at all." About four in 10 teens (42%) feel "more lonely than usual" right now—nearly the same number as those who say they feel "about as lonely as usual" (43%). Just 15% say they feel "less lonely than usual."

Girls are more likely than boys to say they feel more lonely than usual (49% vs. 36%).

Large majorities of teens say they've stopped visiting public places such as restaurants, movie theaters, or concert venues (81%) and stopped meeting with close friends in person (68%). While 65% of teens report talking to friends or family via text or social media more often than they usually do, far fewer teens say they've taken more direct steps to increase their connections with others during this time, such as reaching out to a friend or family member they haven't talked to in a while (37%), providing emotional support online to others (21%), or posting information online about the coronavirus's effects (13%).

Black teens are the least likely to have made major changes to their behaviors, though a majority still say they have stopped going to public places and meeting with friends. Black teens also are more likely than others to say they've received emotional support online from others.

| Have you done any of the following in response to the coronavirus? (Select all that apply.) | | | | | |
|---|---|---|---|---|---|
| | **Total** | **White** | **Black** | **Hispanic /Latino** | **Other*** |
| Stopped attending public places such as restaurants, movies, or concerts | 81% | 84% | 67% | 83% | 83% |
| Stopped meeting with close friends in person | 68% | 72% | 55% | 66% | 75% |
| Talked to friends or family through texting or social media more than you usually do | 65% | 67% | 61% | 62% | 70% |
| Reached out to a friend or family member you haven't talked to in a while | 37% | 37% | 40% | 36% | 33% |
| Provided emotional support online to others | 21% | 20% | 17% | 23% | 27% |
| Received emotional support online from others | 16% | 14% | 23% | 18% | 14% |
| Posted information online about the coronavirus's effects on your life or your family's life | 13% | 11% | 12% | 18% | 11% |
| None of the above | 6% | 6% | 11% | 3% | 4% |

*Respondents in the "other" category are included in the total sample but not in findings that are broken out by race (the cell sizes of each individual group in the "other" category are not large enough for us to examine differences between them).

About half (48%) say they feel less connected than usual with their friends right now, while 36% say they feel about as connected as usual, and 16% say they feel more connected than usual.

A majority (59%) of teens say they're connecting with family or friends who are outside their homes at least once a day. Texting (83%), phone calls (72%), social media (66%), and video chats (66%) are some of the ways teens are staying connected with people they can no longer see in person. Messenger apps (48%) and email (37%) are less popular.

On a positive note, 40% of teens say they feel more connected than usual with their families, while 52% feel about as connected as usual, and just 8% feel less connected than usual.

***Schooling from home is a concern***

Most teens whose in-person classes have been canceled say schoolwork is still being assigned while they are at home (86%).

Students in public school and private school are equally likely to say their in-person classes have been canceled, but while nearly all students in private school still have schoolwork being assigned remotely, fewer students in public school say the same (96% vs. 83%).

Slightly more than half of teens who no longer attend school in person say they are worried about not being able to keep up with their schoolwork (56%) and their extracurricular activities (55%) while in-person school activities are canceled. Girls are more likely than boys to say they're worried about keeping up with both schoolwork and extracurriculars. Black and Hispanic/Latino teens are significantly more likely than White teens to be worried about keeping up with schoolwork.

| **How worried are you about not being able to keep up with _____ while in-person school activities are canceled?** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | **Total** | **Male** | **Female** | **White** | **Black** | **Other** | **Hispanic /Latino** |
| Your schoolwork | Worried | 56% | 50% | 61% | 49% | 66% | 40% | 70% |
| | Not worried | 44% | 50% | 39% | 51% | 34% | 59% | 29% |
| Your extracurricular activities | Worried | 55% | 51% | 59% | 54% | 53% | 50% | 62% |
| | Not worried | 45% | 49% | 41% | 46% | 47% | 49% | 38% |

Students in public school are nearly twice as likely as students in private school to worry about keeping up with their schoolwork (61% vs. 34%) while in-person activities are canceled. They're also significantly more likely to worry about not keeping up with extracurriculars (57% vs. 49%).

Many students are not in frequent contact with their teachers or engaged in online schooling. Almost one in four teens (24%) say they're connecting with their teachers less than once a week. Students in private school report more frequent contact with their teachers and more communication related to school in general. Two-thirds (66%) of teens in private school say they're connecting with their teachers once a day or more, including 33% who connect a few times a day and 14% who connect once an hour or more. Among teens in public school, just 31% connect with their teachers once a day or more often, including 15% who connect a few times a day and just 2% who connect once an hour or more.

| Percent of teens who report doing each of the following while in-person school activities are canceled ... | | | |
|---|---|---|---|
| | Total | Public school | Private school |
| Connecting with their teacher ... once a day or more | 36% | 31% | 66% |
| ... a few times a day | 17% | 15% | 33% |
| ... once an hour or more | 4% | 2% | 14% |
| ... less than once a week | 24% | 28% | 4% |
| Having a dedicated space where they can do schoolwork at home | 71% | 71% | 67% |
| Attended an online or virtual class | 58% | 53% | 82% |
| Using email to stay connected to school | 68% | 68% | 78% |
| Using a learning management system to stay connected to school | 51% | 50% | 65% |
| Using video chat or videoconferencing to stay connected to school | 47% | 39% | 88% |
| Using texts to stay connected to school | 33% | 33% | 33% |
| Using social media to stay connected to school | 25% | 26% | 23% |
| Using messenger apps to stay connected to school | 22% | 21% | 24% |
| Using phone calls to stay connected to school | 18% | 19% | 15% |

While more than half of teens (58%) say they've attended an online or virtual class since the end of in-person classes, the rate is significantly higher among students in private school than students in public school (82% vs. 53%). However, 41% of teens haven't attended an online or virtual class since in-person school was canceled. Students in private school are also more likely than students in public school to say they're using video chat or videoconferencing (88% vs. 39%), email (78% vs. 68%), and learning management systems/course websites (65% vs. 50%) to stay connected to school.

Many students at home struggle to find space to do their schoolwork; though 71% of teens say they do have a dedicated space, more that one in four teens (28%) say they don't have a dedicated space to do their schoolwork.

The differences between students in private and public school are more drastic than differences by race/ethnicity or age.

Those students who have attended online or virtual classes are, surprisingly, just as worried about keeping up with their schoolwork and just as lonely as students who haven't attended online or virtual classes. However, they are a bit more likely to report feeling more connected than usual to their friends.

| **How lonely would you say you feel right now?** | | | |
|---|---|---|---|
| | Total | Attended virtual or online classes | Haven't attended virtual or online classes |
| More lonely than usual | 42% | 42% | 41% |
| About as lonely as usual | 43% | 43% | 44% |
| Less lonely than usual | 15% | 14% | 15% |

| **How worried are you about not being able to keep up with your schoolwork while in-person school activities are canceled?** | | | |
|---|---|---|---|
| | Total | Attended virtual or online classes | Haven't attended virtual or online classes |
| Net worried | 56% | 55% | 56% |
| Net not worried | 44% | 44% | 44% |

| **How connected would you say you feel to your friends right now?** | | | |
|---|---|---|---|
| | Total | Attended virtual or online classes | Haven't attended virtual or online classes |
| More connected than usual | 16% | 19% | 13% |
| About as connected as usual | 36% | 34% | 38% |
| Less connected than usual | 48% | 47% | 49% |

Methodology

This SurveyMonkey Audience survey was conducted March 24 - April 1, 2020 among 849 teenagers ages 13-17 in the United States. Respondents for this survey were selected from more than two million people who take surveys on the SurveyMonkey platform each day. The modeled error estimate for the full sample is plus or minus 4.0 percentage points. Data have been weighted for age and sex using the Census Bureau's American Community Survey to reflect the demographic composition of the United States age 13-17.

# Toplines

**How closely are you following news about the coronavirus?**

| | Total N=849 |
|---|---|
| ***NET closely*** | ***80%*** |
| Very closely | 28% |
| Somewhat closely | 52% |
| ***NET not closely*** | ***20%*** |
| Not so closely | 15% |
| Not closely at all | 5% |
| No answer | 0% |

**How worried are you that you or someone in your family will be exposed to the coronavirus?**

| | Total N=849 |
|---|---|
| ***NET worried*** | ***61%*** |
| Very worried | 26% |
| Somewhat worried | 36% |
| ***NET not worried*** | ***39%*** |
| Not so worried | 29% |
| Not worried at all | 9% |
| No answer | 0% |

**How worried are you about the effect the coronavirus may have on your family's ability to make a living or earn money?**

| | Total N=849 |
|---|---|
| ***NET worried*** | ***63%*** |
| Very worried | 31% |
| Somewhat worried | 33% |
| ***NET not worried*** | ***36%*** |
| Not so worried | 24% |
| Not worried at all | 12% |
| No answer | 0% |

**To what degree is your household practicing "social distancing"? Social distancing refers to household members staying home as much as possible to avoid possible spread of the virus.**

| | Total N=849 |
|---|---|
| Not at all | 6% |
| Somewhat | 40% |
| Very much | 54% |
| No answer | 0% |

**Which, if any, are you using to stay connected with family/friends who you no longer see in person due to the coronavirus? (Select all that apply.)**

| | Total N=849 |
|---|---|
| Texts | 83% |
| Phone calls | 72% |
| Social media | 66% |
| Video chat or video conferencing | 66% |
| Messenger apps | 48% |
| Email | 37% |
| None of the above | 2% |
| Other (please specify) | 6% |
| No answer | 1% |

**How often are you connecting with family/friends who are outside your home?**

| | Total N=849 |
|---|---|
| Once an hour or more | 14% |
| A few times a day | 35% |
| Once a day | 11% |
| A few times a week | 20% |
| Once a week | 9% |
| Less than once a week | 12% |
| No answer | 0% |

**Have you done any of the following in response to the coronavirus? (Select all that apply.)**

| | Total N=849 |
|---|---|
| Stopped attending public places such as restaurants, movies, or concerts | 81% |
| Stopped meeting with close friends in person | 68% |
| Talked to friends or family through texting or social media more than you usually do | 65% |
| Reached out to a friend or family member you haven't talked to in a while | 37% |
| Provided emotional support online to others | 21% |
| Received emotional support online from others | 16% |
| Posted information online about the coronavirus' effects on your life or your family's life | 13% |
| None of the above | 2% |
| No answer | 0% |

**How connected would you say you feel to your friends right now?**

| | Total N=849 |
|---|---|
| More connected than usual | 16% |
| About as connected as usual | 36% |
| Less connected than usual | 48% |
| No answer | 0% |

**How connected would you say you feel to your family right now?**

| | Total N=849 |
|---|---|
| More connected than usual | 40% |
| About as connected as usual | 52% |
| Less connected than usual | 8% |
| No answer | 0% |

**How lonely would you say you feel right now?**

| | Total N=849 |
|---|---|
| More lonely than usual | 42% |
| About as lonely as usual | 43% |
| Less lonely than usual | 15% |
| No answer | 0% |

**Which of the following best characterizes the type of school you attend?**

| | Total N=849 |
|---|---|
| Public school | 76% |
| Private school | 12% |
| Charter or magnet school | 6% |
| Homeschool | 4% |
| Other (please specify) | 2% |
| No answer | 0% |

**Have in-person classes at your school been canceled due to the coronavirus outbreak?**

| | Total N=849 |
|---|---|
| Yes | 95% |
| No | 4% |
| No answer | 1% |

**Is schoolwork still being assigned while you are at home?**

| | Total n=805 |
|---|---|
| Yes | 86% |
| No | 14% |
| No answer | 1% |

**How worried are you about not being able to keep up with your schoolwork while in-person school activities are canceled?**

| | Total N=805 |
|---|---|
| ***NET worried*** | ***56%*** |
| Very worried | 21% |
| Somewhat worried | 35% |
| ***NET not worried*** | ***44%*** |
| Not so worried | 24% |
| Not worried at all | 20% |
| No answer | 0% |

**How worried are you about not being able to keep up with your extracurricular activities (e.g. athletics, student groups) while in-person school activities are canceled?**

| | Total N=805 |
|---|---|
| ***NET worried*** | ***55%*** |
| Very worried | 30% |
| Somewhat worried | 25% |
| ***NET not worried*** | ***45%*** |
| Not so worried | 23% |
| Not worried at all | 21% |
| No answer | 0% |

**How often are you connecting with family/friends who are outside your home?**

| | Total N=805 |
|---|---|
| Once an hour or more | 4% |
| A few times a day | 17% |
| Once a day | 15% |
| A few times a week | 28% |
| Once a week | 11% |
| Less than once a week | 24% |
| No answer | 1% |

**How often do you keep a regular schedule now that you are at home?**

| | Total N=805 |
|---|---|
| Every day | 15% |
| Most days | 29% |
| About half the time | 21% |
| Rarely | 21% |
| Never | 13% |
| No answer | 0% |

**Do you have a dedicated space where you can do your schoolwork at home?**

| | Total N=805 |
|---|---|
| Yes | 71% |
| No | 28% |
| No answer | 1% |

**Have you attended an online class or virtual class while in-person school activities have been canceled?**

| | Total N=805 |
|---|---|
| Yes | 58% |
| No | 41% |
| No answer | 0% |

**Are you using any of the following to stay connected to school while in-person activities are canceled? (Select all that apply.)**

| | Total N=805 |
|---|---|
| Email | 68% |
| Learning management system/course website | 51% |
| Video chat or video conferencing | 47% |
| Texts | 33% |
| Social media | 25% |
| Messenger apps | 22% |
| Phone calls | 18% |
| None of the above | 6% |
| Other (please specify) | 6% |
| No answer | 2% |

**My knowledge of the coronavirus is primarily informed by:**

| | Total N=849 |
|---|---|
| People I know in the real world, such as friends, family, or teachers | 37% |
| Personalities/influencers, celebrities I follow on social media or YouTube | 11% |
| News organizations | 47% |
| None of the above | 4% |
| No answer | 0% |

**Are you:**

| | Total N=849 |
|---|---|
| Male | 51% |
| Female | 49% |

**Are you:**

| | Total N=849 |
|---|---|
| White | 54% |
| Black | 14% |
| Hispanic | 23% |
| Asian | 6% |
| Other | 4% |

# Appendix B

# Common Sense Media | SurveyMonkey Poll: Teens Don't Like Online Learning but Still Prefer to Play It Safe

## Key Findings

1. **Teens definitively think online learning is worse than in-person learning.** A majority of teens (59%) say that online learning is worse than in-person schooling, with 19% characterizing it as "much worse." However, Black teens are less likely than teens of other races/ethnicities to think online learning is worse. Only 45% of Black teens consider online learning to be worse than in-person schooling, compared to 60% of White teens, 64% of Hispanic teens, and 62% of Asian teens or teens of other races/ethnicities.

2. **Learning drives the desire for in-person schooling.** Among those who want to return to school in person, almost half (46%) say it's because they learn better in person, with fewer teens (30%) saying it's because they miss the social interaction they have with friends and other students.

3. **But only a small percentage of teens think school should be fully in person.** If the choice were up to them, only 19% of teenagers say they think their school should take place fully in person this fall, while 42% would prefer to be fully remote and 37% would choose a hybrid model. Fully two-thirds (66%) of those who want their instruction to take place fully remotely say it's because they think the coronavirus is too big of a threat.

4. **A majority of teens are worried about falling behind because of the pandemic.** More than six in 10 teens (61%) say they are worried about falling behind academically because of the pandemic, with Hispanic and Asian teens or teens of other races/ethnicities particularly likely to say they are worried about falling behind (79% and 67%, respectively) compared to White teens (55%).

5. **Access to teachers and unreliable internet are big challenges for many students.** Almost a third of teens (32%) cite lack of access to teachers as a major academic challenge. More than a quarter (27%) say unreliable internet will be a major challenge in their schooling.

6. **Most teens have little confidence that their schools will be safe.** About 70% of teens say that they trust their school only "a little" or "not at all" to take enough precautions to keep them safe during the pandemic. Only three in 10 teens (30%) say they trust their school "a

lot." Black and Hispanic teens are more distrustful of their schools' capabilities to keep them safe compared to White teens (74% each vs. 67%).

7. **Teens of color are more concerned about getting sick from in-person schooling.** Teens of color are more likely to be worried that they or someone they know will get sick as a result of going to school in person: 62% of White teens vs. 78% of teens of color, a difference of 16 percentage points. Overall, 69% of teens are worried that they or someone they know would get sick because of in-person schooling.

## Summary

***Teens say online learning is worse than in-person learning.***

Despite the fact that middle school and high school students have "grown up online," their negative impressions of online learning indicate a strong preference for academics to take place face-to-face rather than virtually.

A majority of teens (59%) say that online learning is worse than in-person schooling, with 19% characterizing it as "much worse." The rest of teens are nearly evenly split between those who say online learning is better than in-person schooling (19%) and those who say they are about the same (21%).

Girls and boys have nearly identical views on the effectiveness of online learning, and the findings are mostly consistent by race/ethnicity as well. One exception is Black teenagers, only 45% of whom consider online learning to be worse than in-person schooling, and 30% of whom consider it to be better.

Teens select "learning remotely" as the biggest academic challenge they expect to face this year (42%), followed by the "uncertainty of the pandemic" (37%), "emotional upheaval" (32%), "being able to access their teachers" (32%), "unreliable internet" (27%), "access to books and school supplies" (17%), and "access to devices" (11%).

More than six in 10 teens (61%) say they are worried about falling behind academically because of the pandemic, with Hispanic and Asian teens or teens of other races/ethnicities particularly likely to say they are worried about falling behind (79% and 67%, respectively). Teens of color are more likely to say they are "very worried" (35%) than White teens (18%). More specifically, 26% of Black teens, 42% of Hispanic teens, and 33% of Asian teens or teens of other races/ethnicities report being "very worried."

| How worried are you that you will fall behind academically because of the pandemic? | | | | | |
|---|---|---|---|---|---|
| | **Total (*N* = 890)** | **White (*n* = 368)** | **Black (*n* = 231)** | **Hispanic (*n* = 150)** | **Asian/Other (*n* = 141)** |
| ***NET worried*** | **61%** | **55%** | **51%** | **79%** | **67%** |
| Very worried | 26% | 18% | 26% | 42% | 33% |
| Somewhat worried | 35% | 37% | 25% | 36% | 34% |
| ***NET not worried*** | **38%** | **45%** | **47%** | **17%** | **33%** |
| Not so worried | 24% | 29% | 27% | 10% | 23% |
| Not worried at all | 14% | 16% | 20% | 7% | 10% |

Fewer than one in 10 teenagers say they are attending school in person this fall, and almost one in five still don't know whether their school is planning to reopen fully in person, fully remotely, or by taking a hybrid approach (as of August 27). About as many teens say their school is moving to fully remote instruction (35%) this fall as say their school is adopting a hybrid model, mixing remote and in-person instruction (40%).

If the choice were up to them, only 19% of teenagers say they think their school should take place fully in person this fall, while 42% would prefer to be fully remote and 37% would choose a hybrid model. Three in 10 teens say they trust their school "a lot" to take enough precautions to keep them safe during the pandemic; fifty-two percent trust their school "a little," and 17% trust their school "not at all."

Fully two-thirds (66%) of those who want their instruction to take place fully remotely say it's because they think the coronavirus is too big of a threat. Almost seven in 10 teens (69%) are worried ("very worried" or "somewhat worried") that they or someone they know would get sick because of in-person schooling. This concern is higher for teens of color (78%) than White teens (62%). More specifically, 71% of Black teens, 82% of Hispanic teens, and 79% of Asian teens or teens of other races/ethnicities are worried about this.

Only 15% say they prefer remote instruction because they learn better remotely, only 11% say they prefer it because they don't like the social environment at school, and only 6% say they prefer it because they have more technology resources at home than they do at school.

Among those who want to return to school in person, almost half (46%) say it is because they learn better in person, with fewer teens (30%) saying it is because they miss the social interaction they have with friends and other students. Only 12% of those who prefer to return to school in person

say their main reason for feeling this way is because they don't think the coronavirus is much of a threat. Very few (7%) say they prefer to return to in-person instruction because their school has more technology resources than they do at home, and even fewer (2%) say it's because they participate in a free breakfast or lunch program at school.

***Teens worry about missing opportunities school offers.***

Half or more of teens say they are "very" or "somewhat" worried that they will lose connections with friends (56%), miss out on extracurricular, non-sports activities (53%), and lose opportunities for scholarships (52%). Scholarships are even more of a concern for teens of color (57%) compared to White teens (48%), with 49% of Black teens, 60% of Hispanic teens, and 60% of Asian teens or teens of other races/ethnicities reporting this worry. Additionally, teens are worried that the pandemic will hurt their future job or college aspirations (50%). This is a heightened concern for teens of color, who are more likely to report being "very worried" (26%) compared to White teens (14%). More specifically, 34% of Hispanic, 20% of Black, and 19% of Asian teens or teens of other races/ethnicities report being "very worried." Fewer (38%) are worried about missing out on after-school sports.

| **How worried are you ...** | | | | | | |
|---|---|---|---|---|---|---|
| | | **Total (*N* = 890)** | **White (*n* = 368)** | **Black (*n* = 231)** | **Hispanic (*n* = 150)** | **Asian/ Other (*n* = 141)** |
| Losing connections with friends | Worried | 56% | 57% | 52% | 58% | 52% |
| | Not Worried | 35% | 35% | 35% | 32% | 37% |
| Missing out on extracurricular activities (non-sports activities) | Worried | 53% | 56% | 42% | 51% | 57% |
| | Not Worried | 37% | 36% | 41% | 39% | 34% |
| Losing opportunities for scholarships | Worried | 52% | 48% | 49% | 60% | 60% |
| | Not Worried | 35% | 39% | 35% | 27% | 31% |
| The pandemic will hurt my future job or college aspirations | Worried | 50% | 47% | 48% | 58% | 57% |
| | Not Worried | 41% | 46% | 41% | 32% | 36% |
| Missing out on after-school sports | Worried | 38% | 38% | 36% | 38% | 38% |
| | Not Worried | 42% | 41% | 46% | 41% | 46% |

About half of teens (48%) continue to say they feel less connected to their friends than usual—exactly the same percentage as in March, when social-distancing practices were first mandated.

Similarly, 40% of teens say they feel more lonely than usual, 41% feel about as lonely as usual, and 18% feel less lonely than usual, nearly identical to the responses in March.

One change since March: Slightly fewer teens now say they feel "more connected than usual" to their family, down to 33% from 40% in March.

| **How strong are teens' social connections during the COVID-19 pandemic?** | | | |
|---|---|---|---|
| | | March 2020 (*N* = 849) | August 2020 (*N* = 890) |
| How connected would you say you feel to your friends right now? | More connected than usual | 16% | 16% |
| | About as connected as usual | 36% | 34% |
| | Less connected than usual | 48% | 48% |
| How connected would you say you feel to your family right now? | More connected than usual | 40% | 33% |
| | About as connected as usual | 52% | 51% |
| | Less connected than usual | 8% | 14% |
| How lonely would you say you feel right now? | More lonely than usual | 42% | 40% |
| | About as lonely as usual | 43% | 41% |
| | Less lonely than usual | 15% | 18% |

***Many teens feel less academically prepared, and some are seeking extra help.***

A plurality (43%) of teens say they feel less academically prepared for this school year, while 38% feel about as prepared as last year and 17% feel more prepared than last year.

More than half of teens say they would turn to a teacher (53%) or their friends/classmates (53%) if they have challenges with learning this year. Nearly as many (46%) say they would get support from their family as say they would use websites or apps for support (45%). Just 10% say they would use community services or after-school programs for extra academic help, and very few (7%) say they most likely would not seek extra support for learning challenges.

If they have challenges with emotional or social problems, however, equal numbers of teens say they would seek support from their friends and classmates (47%) as would seek help from their family (47%). Significantly fewer would turn to a teacher (20%), therapist/counselor (20%), or websites or apps (18%). In these circumstances, 16% say they most likely would not seek extra support, and just 6% would turn to community services or after-school programs.

Some 31% of teenagers say they are signing up for extra online classes this year, while 10% are hiring a tutor and 13% are joining a school "pod" with other families. Black teens are more likely to say they will join a "pod" (22%) than teens of other races/ethnicities (10% of White, 12% of Hispanic, and 16% of Asian teens or teens of other races/ethnicities).

The vast majority (88%) say they have the technology they need to be able to do their schoolwork remotely, though Black teens and Hispanic teens are slightly less likely to say they have everything they need (85% and 81%, respectively) compared to White teens (93%).

## Methodology

This SurveyMonkey poll was conducted August 20 to 27, 2020, among 890 teens age 13 to 17 in the United States. Respondents for this survey were selected from more than 2 million people who take surveys on the SurveyMonkey platform each day. The modeled error estimate for the full sample is plus or minus 5.5 percentage points. Data has been weighted for age and sex using the Census Bureau's American Community Survey to reflect the demographic composition of the United States age 13 to 17.

# Toplines

**Is your school currently operating or planning to begin the school year operating:**

| | Total: *N* = 890 |
|---|---|
| Fully remote | 35% |
| "Hybrid" (partly remote and partly in person) | 40% |
| Fully in person | 7% |
| I don't know yet. | 18% |
| No answer | 0% |

**Do you think your school should be:**

| | Total: *N* = 890 |
|---|---|
| Fully remote | 42% |
| "Hybrid" (partly remote and partly in person) | 37% |
| Fully in person | 19% |
| No answer | 2% |

**What is the main reason you want your school to be fully remote?**

| | Total: *n* = 379 (Base = Teens who want school to be fully remote) |
|---|---|
| I don't like the social environment at school. | 11% |
| I learn better remotely. | 15% |
| I have more technology resources at home than I do at school. | 6% |
| I think the coronavirus is too big of a threat. | 66% |
| No answer | 3% |

**What is the main reason you want your school to be fully in person?**

| | Total: *n* = 144 (Base = Teens who want school to be fully in person) |
|---|---|
| I miss social interaction with friends and other students. | 30% |
| I learn better in person. | 46% |
| My school has more technology resources than I do at home. | 7% |
| I participate in a free breakfast or lunch program at school. | 2% |
| I don't think the coronavirus is much of a threat. | 12% |
| No answer | 3% |

**How much do you trust your school to take enough precautions to keep you safe during the pandemic?**

| | Total: *N* = 890 |
|---|---|
| A lot | 30% |
| A little | 52% |
| Not at all | 17% |
| No answer | 0% |

**How worried are you that you or someone you know will get sick as a result of going to school in person?**

| | Total: *N* = 890 |
|---|---|
| ***NET worried*** | ***69%*** |
| Very worried | 32% |
| Somewhat worried | 37% |
| ***NET not worried*** | ***30%*** |
| Not so worried | 19% |
| Not worried at all | 11% |
| No answer | 1% |

**Do you have the technology you need (computer, reliable internet access, etc.) to be able to do your schoolwork remotely?**

| | Total: *N* = 890 |
|---|---|
| Yes | 88% |
| No | 11% |
| No answer | 0% |

**Compared to last year, how academically prepared do you feel for this school year?**

| | Total: *N* = 890 |
|---|---|
| More prepared than last year | 17% |
| About as prepared as last year | 38% |
| Less prepared than last year | 43% |
| No answer | 1% |

**How effective do you think online learning is compared to in-person schooling?**

| | Total: *N* = 890 |
|---|---|
| Online learning is much worse | 19% |
| Online learning is worse | 40% |
| They're about the same | 21% |
| Online learning is better | 10% |
| Online learning is much better | 9% |
| No answer | 0% |

**How worried are you that you will fall behind academically because of the pandemic?**

| | Total: *N* = 890 |
|---|---|
| ***NET worried*** | ***61%*** |
| Very worried | 26% |
| Somewhat worried | 35% |
| ***NET not worried*** | ***38%*** |
| Not so worried | 24% |
| Not worried at all | 14% |
| No answer | 1% |

**Are you doing any of the following this year? (Select all that apply.)**

| | Total: *N* = 890 |
|---|---|
| Hiring a tutor | 10% |
| Joining a school "pod" with other families | 13% |
| Signing up for extra online classes | 31% |
| No answer | 49% |

**What will be the biggest challenges for you academically? (Select all that apply.)**

| | Total: *N* = 890 |
|---|---|
| Learning remotely | 42% |
| Uncertainty of pandemic | 37% |
| Emotional upheaval | 32% |
| Being able to access my teacher(s) | 32% |
| Unreliable internet | 27% |
| Access to books and school supplies | 17% |
| I don't feel this year will be any different academically compared to past years. | 12% |
| Access to devices | 11% |
| No answer | 3% |

**If you have challenges with learning this year, where would you look to get support?**

| | Total: *N* = 890 |
|---|---|
| Teacher | 53% |
| Friends/classmates | 53% |
| Family | 46% |
| Websites/apps/YouTube | 45% |
| Community services or after-school programs | 10% |
| Most likely will not seek extra support | 7% |
| No answer | 3% |

**If you have needs for social or emotional support this year, where would you look to get support?**

| | Total: *N* = 890 |
|---|---|
| Teacher | 53% |
| Friends/classmates | 53% |
| Family | 46% |
| Websites/apps/YouTube | 45% |
| Community services or after-school programs | 10% |
| Therapist/counselor | 7% |
| Most likely will not seek extra support | 3% |
| No answer | 2% |

**How would you best describe your feelings about the future?**

| | Total: *N* = 890 |
|---|---|
| Very negative | 5% |
| Negative | 13% |
| Neither negative nor positive | 47% |
| Positive | 24% |
| Very positive | 10% |
| No answer | 1% |

**How worried are you about each of the following:**
**Losing connections with friends**

| | Total: *N* = 890 |
|---|---|
| ***NET worried*** | ***56%*** |
| Very worried | 28% |
| Somewhat worried | 27% |
| ***NET not worried*** | ***35%*** |
| Not so worried | 19% |
| Not worried at all | 15% |
| Not applicable | 8% |
| No answer | 2% |

**How worried are you about each of the following:**
**Losing opportunities for scholarships**

| | Total: *N* = 890 |
|---|---|
| ***NET worried*** | ***52%*** |
| Very worried | 24% |
| Somewhat worried | 28% |
| ***NET not worried*** | ***35%*** |
| Not so worried | 21% |
| Not worried at all | 14% |
| Not applicable | 11% |
| No answer | 2% |

**How worried are you about each of the following:**
**Missing out on after-school sports**

| | Total: *N* = 890 |
|---|---|
| ***NET worried*** | ***38%*** |
| Very worried | 20% |
| Somewhat worried | 17% |
| ***NET not worried*** | ***42%*** |
| Not so worried | 20% |
| Not worried at all | 22% |
| Not applicable | 18% |
| No answer | 2% |

**How worried are you about each of the following:**
**Missing out on extracurricular activities (non-sports activities)**

| | Total: *N* = 890 |
|---|---|
| ***NET worried*** | ***53%*** |
| Very worried | 21% |
| Somewhat worried | 32% |
| ***NET not worried*** | ***37%*** |
| Not so worried | 22% |
| Not worried at all | 16% |
| Not applicable | 8% |
| No answer | 2% |

**How worried are you about each of the following:**
**The pandemic will hurt my future job or college aspirations**

| | Total: *N* = 890 |
|---|---|
| ***NET worried*** | ***50%*** |
| Very worried | 19% |
| Somewhat worried | 31% |
| ***NET not worried*** | ***41%*** |
| Not so worried | 28% |
| Not worried at all | 13% |
| Not applicable | 7% |
| No answer | 2% |

**How connected would you say you feel to your friends right now?**

| | Total: *N* = 890 |
|---|---|
| More connected than usual | 16% |
| About as connected as usual | 34% |
| Less connected than usual | 48% |
| No answer | 1% |

**How connected would you say you feel to your family right now?**

| | Total: *N* = 890 |
|---|---|
| More connected than usual | 33% |
| About as connected as usual | 51% |
| Less connected than usual | 14% |
| No answer | 1% |

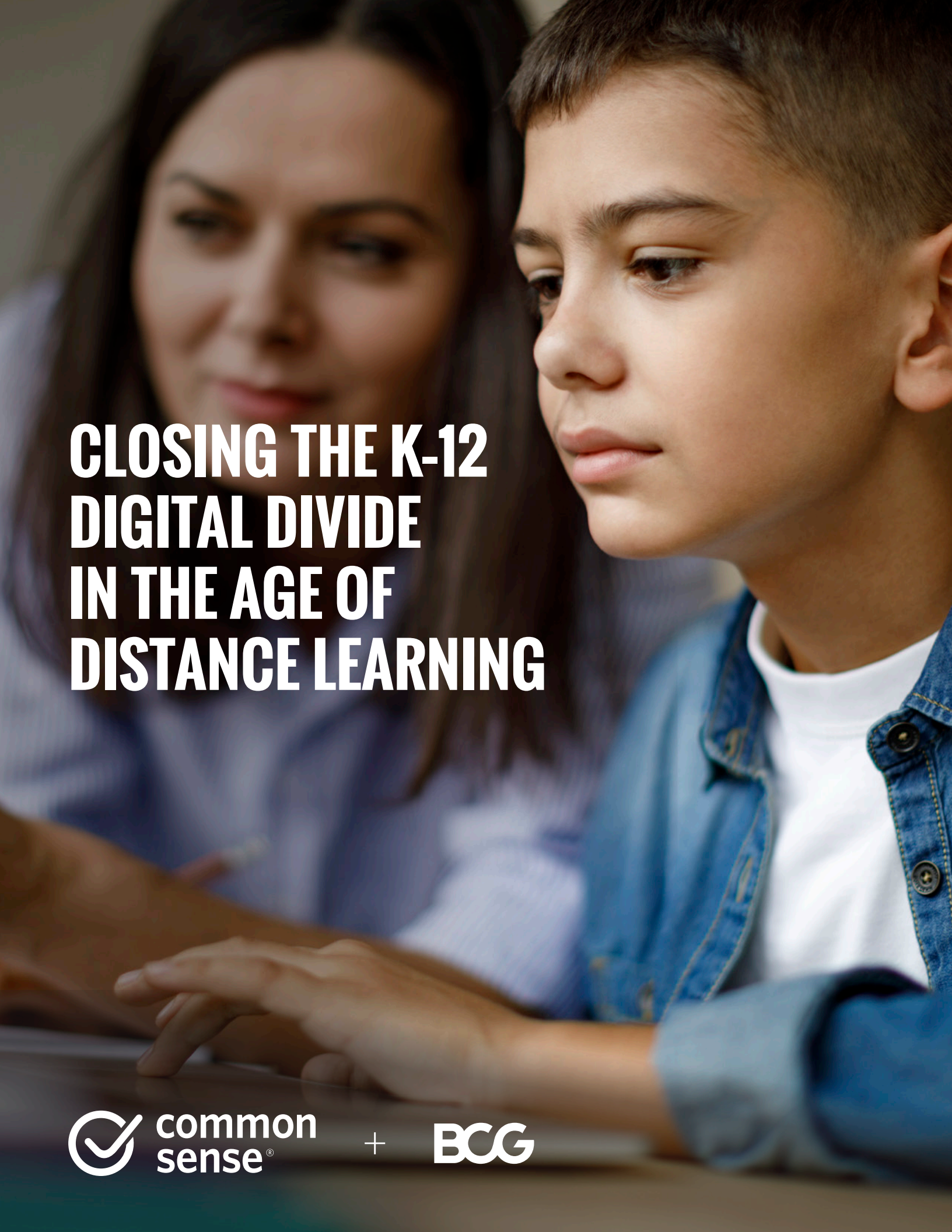
**How lonely would you say you feel right now?**

| | Total: *N* = 890 |
|---|---|
| More lonely than usual | 40% |
| About as lonely as usual | 41% |
| Less lonely than usual | 14% |
| No answer | 1% |

**Which of the following best characterizes the type of school you attend?**

| | Total: *N* = 890 |
|---|---|
| Public school | 71% |
| Private school | 9% |
| Charter or magnet school | 8% |
| Homeschool | 6% |
| Other (please specify) | 4% |
| No answer | 1% |

# Appendix C



# CLOSING THE K-12 DIGITAL DIVIDE IN THE AGE OF DISTANCE LEARNING

common sense® + BCG

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

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.

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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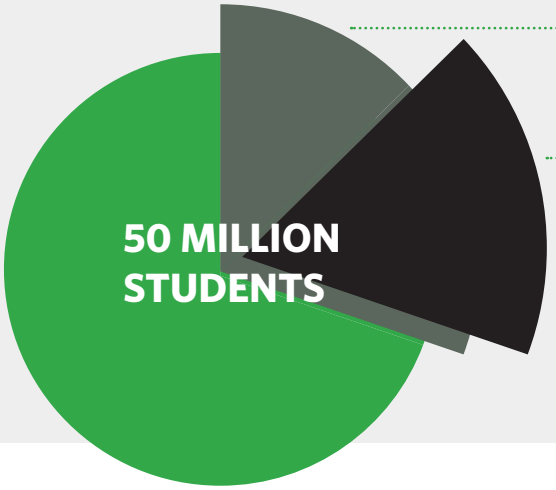
# CLOSING THE K-12 DIGITAL DIVIDE IN THE AGE OF DISTANCE LEARNING

## Due to COVID-19 school facility closures, 50 million K-12 public school students have had to learn remotely from home

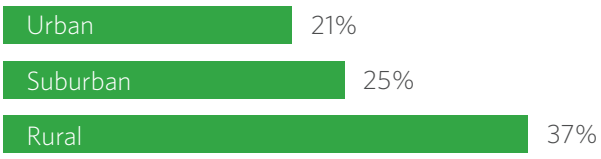



**15 MILLION TO 16 MILLION (~30%)**
of these students lack adequate internet or devices to sustain effective distance learning at home

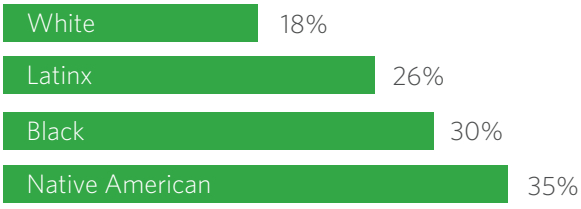
**9 MILLION**
of these students lack both adequate internet and devices

## The digital divide is a major problem across all 50 states

**% OF STUDENTS WITHOUT ADEQUATE CONNECTIVITY**
by geography




by race/ethnicity




Even in states with the smallest divides, **~1 IN 4 STUDENTS** still lack adequate internet

For states with the largest divides, **~HALF OF STUDENTS** lack adequate internet

Furthermore, up to **400,000 TEACHERS** can't teach because of lack of internet

Nearly all students in the US are expected to be learning remotely in the Fall; the digital divide will prevent many students from accessing the education they deserve

**Where do we go from here? How do we close the digital learning divide once and for all?**

**Closing the student digital divide will require action from Congress to invest $6 billion to $11 billion in the first year, and an additional $1B for teachers**

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# KEY FINDINGS

A new analysis by Common Sense and BCG of the digital divide for America's K-12 public school students and teachers finds that the "homework gap" is larger than previously estimated.

- Approximately 15 million to 16 million K-12 public school students, or 30% of all public K-12 students, live in households either without an internet connection or device adequate for distance learning at home, a higher number than previously recorded; and of these students, approximately nine million students live in households with neither an adequate connection nor an adequate device for distance learning.
- The homework gap isn't just about homework anymore; lack of access to the internet and a distance learning device during the COVID-19 pandemic school closures puts these students at risk of significant learning loss.
- This analysis identifies students lacking baseline technology requirements for distance learning, including reliable high-speed internet, sufficient data plans, and a computer, laptop or tablet device.
- The digital divide is a major problem for students in all 50 states and all types of communities but is most pronounced in rural communities and households with Black, Latinx, and Native American students.
- 300,000 to 400,000 K-12 teachers live in households without adequate internet connectivity, roughly 10 percent of all public school teachers, and 100,000 teachers lack adequate home computing devices.
- The cost of closing the digital divide for students is at least $6 billion and as much as $11 billion in the first 12 months, and it would cost an additional $1 billion to close the divide for teachers.
- The novel coronavirus pandemic has changed the nature of the homework gap, exacerbated existing inequities in education, and heightened the urgent need for Congress and the states to provide emergency funding to ensure all students have equal access to distance learning.
- The private sector, districts, and education support organizations also have important roles to play in this challenge to identify the right technology that meets the unique needs of their students and teachers today while fitting their long-term digital aspirations, and that are delivered systematically and equitably to districts across the United States.

# INTRODUCTION

Across the United States, even before the onset of the novel coronavirus pandemic, there was a significant digital divide between K-12 students with and without access to high speed internet and computing devices at home, known as the "homework gap."[1] A new analysis by Common Sense and BCG finds that the nature of the homework gap has changed in this period of distance learning caused by the pandemic, and that the gap is larger than previously understood. The analysis puts a first-year price tag on closing the gap, and for the first time estimates the digital divide for public school teachers. This report provides a detailed assessment of the digital divide's interrelated components of internet connection and devices, and their respective technical requirements, which are needed to ensure adequate distance learning for today's K-12 students and teachers.

This analysis, combining the most recent 2018 data from the U.S. Census Bureau and the National Center for Education Statistics, shows that before the pandemic an estimated **15 million to 16 million K-12 public school students lived in households without either an internet connection or a device adequate for distance learning at home**,[2] representing 30% of all public K-12 students. **Of these students, approximately nine million students live in households with neither an adequate connection nor an adequate device for distance learning**.

Our new interactive map[3] shows this student digital divide is a major problem across all 50 states. The **digital divide affects every state and every type of community, but it is more pronounced in rural communities and for Black, Latinx, and Native American households**; while 18 percent of White households lack broadband, 26 percent of Latinx, 30 percent of Black, and 35 percent of Native American student households lack adequate home internet access.[4] In rural communities, 37 percent of students are without a home broadband connection compared to 25 percent in suburban households and 21 percent in urban areas.[5]

Distance learning that offers real-time interaction with teachers and classmates and allows for effective engagement with curriculum and assignments requires reliable high-speed internet, sufficient data plans, and a computer, laptop, or tablet device; this analysis estimates the number of students in households who lack these distance learning requirements, including students that only have access to internet via a cellular connection on a mobile device. This is an important distinction in the context of today's distance learning environment, to ensure equitable access to technology resources.

Teachers are also affected by lack of home internet and devices; based on this new analysis, our report shows that **approximately 300,000 to 400,000 public school teachers (8 percent) lack access to adequate connectivity and 100,000 (3 percent) lack devices**, limiting the distance learning potential for entire classrooms of students.

In addition to revealing a new and larger estimate of the size of the student digital divide, and an assessment of the digital divide for teachers, our report estimates that **the cost of closing the digital divide for K-12 public school students ranges from $6 billion to $11 billion in the first year, and up to an additional $1 billion for teachers**. This estimate covers the costs of an adequate internet plan, related connectivity expenses, and a computer, laptop, or tablet for all students and teachers that are "digitally divided."

This student digital divide has long been a challenge for many, fueling economic inequality and lost opportunity—with some students and families unable to complete homework assignments or gain experience with the tools essential for professional success later in life. Yet, the COVID-19 pandemic has exacerbated this problem, causing an unprecedented disruption in the U.S. educational system. Nearly all U.S. public schools closed early this year, driving more than 50 million students to transition to full-time distance learning from home. While nationwide, 99% of public schools have high-speed broadband access,[6] distance learning from home presents many challenges, with the potential for significant inequities given internet and device gaps. Digital platforms are often the only option for educators to stay safely and deeply connected to their students' development at this time.

1. 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, we expand the definition of the "homework gap"to refer to students who cannot complete homework that requires internet and computing devices at home.
2. Did not account for effects of COVID-19 pandemic. Adequate internet connection is defined as fixed, high-speed broadband, and cellular or satellite networks when combined with sufficient data plans for distance learning and the necessary hardware to connect to a distance learning-appropriate device (e.g., hot spot device to connect to laptop, LTE-enabled device); adequate internet connection excludes dial-up as well as cellular networks with connection through mobile phones only. 2018 National Center for Education Statistics (NCES) data.
3. Please follow this link to explore Common Sense Media's interactive map of the digital divide: https://www.commonsensemedia.org/digital-divide-stories#/state
4. U.S. Congress Joint Economic Committee. (2017, September). *America's digital divide*. Retrieved from https://www.jec.senate.gov/public/_cache/files/ff7b3d0b-bc00-4498-9f9d-3e56ef95088f/the-digital-divide-.pdf.
5. Perrin, A. *Digital Gap between Rural and Nonrural America Persists*. Pew Research Center. 31 May 2019. Retrieved from www.pewresearch.org/fact-tank/2019/05/31/digital-gap-between-rural-and-nonrural-america-persists/.
6. EducationSuperHighway. (2019). *2019 State of the States*. Retrieved from https://s3-us-west-1.amazonaws.com/esh-sots-pdfs/2019%20State%20of%20the%20States.pdf.

The "homework gap" is no longer just about homework; it's about access to education. In this new environment, with the prospect of extended distance learning this summer and into the fall, lack of technology access will significantly impact students' ability to learn and engage, accelerating learning loss for students cut off from teachers and peer resources. One study projects that **by the start of the next school year, the average student may have lost up to a third of their expected progress from the prior year in reading and half of their expected progress in math due to recent school closures from COVID-19**.[7]

In this crisis, closing the digital divide is more critical than ever. Given the uncertain prospects of both virus progression and availability of appropriate vaccines and treatment, some states have already announced fully distance learning or blended instructional models for the upcoming academic year.[8] As this crisis extends into the long term, schools will need support preparing for distance delivery in the upcoming academic year. **Addressing COVID-19 learning disruptions with internet and learning devices will serve an urgent need to enable effective distance learning and mitigate learning loss; it will also position communities that have long struggled with the digital divide with equitable technology resources to better succeed in the future.**

Schools and school districts; local, state and federal governments; the private sector; and philanthropies are rapidly working to address the digital divide. Yet, data limitations and a wide range of national-level estimates available have hampered efforts to create a structured, systematic approach to the problem schools face today. Our analysis builds state-level granularity, leverages the most recent Census data available reflecting household technology adoption, and builds a methodology that aligns to technical specifications required for learning from home.[9] **Our study builds a fact base around the size, nature, and scope of the digital divide in the context of the COVID-19 pandemic and how to systematically take action to address it**. **This new analysis also adds urgency to the call for Congress and the states to provide direct emergency funding to close the student digital divide before the gap between those who can learn from home and those who cannot further drives inequality in America.**

In order to support a better understanding of the K-12 digital divide, we assess:

1. **The size of the distance learning digital divide for K-12 public school students and teachers on a state-by-state basis**. We triangulate public Census data with public and private sector benchmarks and perspectives to characterize the problem by geography (rural, suburban, and urban), income, and race/ethnicity, and identify respective technology needs of key student segments.
2. **Requirements for distance learning to ensure equitable technology access for all students**. This includes technological specifications for connectivity and devices, as well as non-technological supports for successful activation, such as instructional content and ancillary services (e.g., maintenance, teacher professional development, digital literacy for families), which are necessary for successful distance learning.
3. **Estimated cost to bridge the digital divide.** Our estimate is based on the cost of key technology requirements (e.g., monthly internet costs, installation, home computing devices) to meet the needs of different student segments, the size of each segment, and scenarios for various distance learning objectives for schools/districts.

Our analysis is based on reviewing the existing literature; merging and leveraging granular federal data sets in new ways; and conducting interviews with private sector stakeholders (broadband and cellular network providers, device manufacturers), school districts, and other public and social sector stakeholders to understand the landscape, validate the methodology, and provide benchmarks for triangulation.

All K-12 students deserve equal access to modern technology at home required for their education; this is more important now than ever with mass closures of school facilities. To reduce learning loss and continue education gains for K-12 public school students in the upcoming school year due to the pandemic, **policymakers, the private sector, districts, and other education organizations must take action**. In particular, Congress has the clear opportunity to **use the upcoming stimulus to invest between $6 billion and $11 billion in direct appropriations to provide connectivity and devices to students at home who are without it today**. In the long term, Congress, in partnerships with the states and the private sector, can take steps to close the digital divide once and for all with infrastructure investments where they are needed.

**High-speed internet connection at home is not a luxury.** It is as essential as electricity and running water to be fully engaged in American society and to ensure equal opportunity at desired educational, economic, health, public safety, and social outcomes.

7. Kuhfeld, M., Soland, J., Tarawasa, B., Johnson, A., Ruzek, E., & Liu, J. (2020, May). *Projecting the potential impacts of COVID-19 school closures on academic achievement*. (EdWorkingPaper: 20-226). Retrieved from Annenberg Institute at Brown University: https://doi.org/10.26300/cdrv-yw05.
8. Bernstein, L. *Back-to-school plans include big changes for K-12 students, educators*. https://wjla.com/news/nation-world/back-to-school-plans-include-big-changes-for-k-12-students-teachers.
9. See appendix for more details on analysis methodology and data limitations as a result of limited national and granular-level data.

# SIZE OF THE DISTANCE LEARNING DIGITAL DIVIDE

The fact that some students can do their schoolwork remotely with reliable, fast internet on their own device while others cannot is one more way in which education inequities and achievement gaps are exacerbated in the United States. Without a detailed understanding of the size and characteristics of the distance learning digital divide, policymakers, districts, education agencies, private sector actors, and others cannot determine actionable approaches to address the issue and what is required for their implementation. To date, a range of estimates exist that examine different components of the problem—the connectivity gap or device gap, for students or teachers—though they lack a structured, systematic characterization of the distance learning digital divide in the context of COVID-19. This analysis examines key segments at the intersection of adequate internet connection and devices for students, and overall technology gaps for teachers.

### How do we define the distance learning digital divide?

**Effective distance learning requires both adequate devices and internet connection so that students may engage with curriculum, teachers, and classmates**. Because of this intersection, these elements must be examined together, not independently of one another. To understand the size of the digital divide for students, this analysis builds a segmentation based on both the number of students with access to a device and those with adequate internet connection.

**Students are considered to have an adequate distance learning device if they have a desktop computer, laptop, or tablet**[10] **in their household**. While this analysis does not account for 1-to-1 access to a device for students given data limitations, it is important to provide students with their own device, as sharing a device with a sibling or parent can cause distance learning disruptions.

While it is possible to engage in distance learning via a mobile device, there are several notable challenges, including: (1) incompatibility with existing homework and learning applications with mobile operating systems, (2) difficulty in using small screens to read and digest information, as well as typing and producing assignments, and (3) higher likelihood of distraction on a mobile versus other device. Given these challenges, **students with only a cellular device (mobile phone) are not considered to have an adequate distance learning device**.

**Adequate internet connection is defined as internet with sufficient speeds for distance learning, of 25/3 Mbps (download/upload speeds), at a minimum.** These connection speeds can be provided through a fixed broadband network, including digital subscriber line (DSL), cable, or fiber. Adequate internet connection excludes dial-up, which has connection speeds that are too slow (40 Kbps – 60 Kbps) for distance learning.

Cellular or satellite networks can provide baseline internet speeds but also require sufficient data plans to maintain distance learning and the necessary hardware to connect to a distance learning-appropriate device (e.g., hotspot device to connect to laptop, LTE-enabled laptop or tablet). A household that reports having access to the internet through cellular on their mobile device is considered inadequate due to the challenges students face with distance learning engagement on a mobile device alone, as described above.[11]

We recognize that **cellular connection is adequate if distance learning devices are tethered to the mobile device or are using a hotspot, coupled with sufficient data caps and speed**.[12] Given data limitations from the survey results, households with hotspot or LTE-enabled devices are not explicitly accounted for, and thus the households with inadequate internet connectivity may be somewhat overstated in this analysis.

**With internet speeds of 25/3 Mbps, it would take ~3 minutes to load a half-hour video at 720p resolution, compared to ~9 minutes with 10/3Mbps internet.**

> "Technology access has been a huge challenge for the high schools. We have students in town and many in the country. Despite having local ISPs giving free temporary access to students, it doesn't reach everywhere and is quite slow. One of my students said it might take 30 minutes to watch a 2-minute Khan Academy lesson because the streaming freezes often while loading more content.
>
> **- Brooke, high school teacher, Galt, California**[13]

10. Tablets include, but are not limited to, Apple iPads.
11. For more detail on internet speed, please refer to "Internet speed requirements" on page 16.
12. This analysis is based on responses from the American Community Survey (ACS). Survey questions related to internet connectivity presume that if the respondent selects access via cellular connection, that they are accessing the internet solely through a mobile phone. Given that many education platforms and content are not optimized for a mobile phone, and make it difficult to complete student assignments, for the purposes of this analysis we do not consider respondents with cellular internet only to have adequate connectivity for distance learning. However, cellular hotspots and LTE devices, which are solutions many districts are currently seeking for their students, do provide adequate connectivity, though this segment of internet users is not accounted for in this analysis given survey limitations.
13. Common Sense Media, Connect All Students teacher survey, spring 2020

## Figure 1: Three types of connectivity can support distance learning

| | Wired broadband | Wireless (Cellular) | Satellite | Dial-up |
|---|---|---|---|---|
| Download / Upload speed[1] | 5-35 Mbps/1-10 Mbps (DSL)<br>10-500 Mbps/5-50 Mbps (cable)<br>250-1,000 Mbps (fiber)[2] | 50 Kbps-2 Mbps (3G)<br>5 Mpbs-50 Mbps (4G) | 500 Kbps-25 Mbps | 40 Kbps-60 Kbps |
| Definition | Connects **fixed locations** with wired tech[3] DSL/ADSL, cable, fiber | Provides **mobile connectivity** that does not require a fixed receiver[3] | Connects **fixed locations**[3] with communications satellite | Connects **fixed locations** using public access telephone network |
| Connection characteristics | **Stable** connection, high infrastructure req'mts; occasional speed variation throughout day | **Mobile** but less stable connection; more limited speeds | **Easily disrupted** with high latency | **Slow**, with limited quality of connection |
| Use case | Areas with **access** to corresponding infrastructure | **Unwired**, but access to cellular network | **Rural / distance** geographies with no wired or wireless service | Areas with phone infrastructure only |
| Cost | **Ongoing:**<br>Service: $10-$40 / mo<br>Model/router5 : $0-$10 / mo<br>**One-time:**<br>$0-$100 (installation) | **Ongoing:**<br>Service: $15-$40 / mo<br>**One-time:**<br>$60-$80 (hotspot device) | **Ongoing:**<br>Service: $60-$70 / mo<br>Equipment: $10-$15 / mo<br>**One-time:**<br>$0-$100 (installation) | **Ongoing:**<br>$0-$20 / mo (free trials available) |
| | *Sources of adequate internet connections when coupled with appropriate hardware and data usage* | | | |

1. Varies by provider but typical speeds included here. 2. Symmetrical, so range refers to upload and download speed. 3. Fixed is defined here as serving a localized area, such as a residence or business location

### Why is there a digital divide?

There are three key reasons explaining this divide: infrastructure affordability, access challenges, and other barriers to adoption.

Affordability is a significant driver of households without internet or devices. According to the 2017 Current Population Survey, **34% of households with children aged 3-18 and no internet cite affordability as the major reason for no connection**.

**At least 18 million individuals across the United States, including urban, rural, and tribal communities, have limited or no access to high-speed broadband infrastructure**, according to the Federal Communications Commission (FCC).[14] Additionally, many geographies have limited cellular signal (for hot-spot or device tethering) in their homes, particularly in rural areas.[15] In these instances, satellite is an option, though it is much more expensive on average and with a frequently spotty signal resulting in intermittent connectivity. Access is also an issue in urban areas. For example, internet access is a significant challenge for unhoused and highly mobile families; urban districts such as New York have as many as 114,000 unhoused and highly mobile students, representing ~10% of the students[16] who are unable to access consistent broadband internet due to a lack of permanent address.

14. Based on 2020 FCC Broadband Report and FCC Form 477 data – see Methodology section for further detail; note that some estimates show that the number of households without broadband infrastructure access to be up to 42M.
15. According to the Federal Broadband Report, https://docs.fcc.gov/public/attachments/FCC-20-50A1.pdf (table 2a), nearly 99.9% of the population (and 99.4% of rural areas) are covered by 5/1 LTE Mbps.
16. Shapiro, E., & Brittainy Newman. (2019, Nov. 19). 114,000 Students in N.Y.C. Are Homeless. These Two Let U.S. into Their Lives. *The New York Times*. Retrieved from www.nytimes.com/interactive/2019/11/19/nyregion/student-homelessness-nyc.html.

**Public housing and homeless shelters often lack internet infrastructure; an investment to update internal networks would allow for more efficient connectivity support to students and their families.**

Several broader barriers to adoption also play a role in this challenge. Ability to navigate the fixed broadband application process is cited as a challenge for those unfamiliar with the process, who are overwhelmed with options, or who are hesitant to share their personal information. According to some districts interviewed, families calling providers to access broadband receive inconsistent and conflicting information on eligibility about discounted/free offerings available to lower-income families. Stipulations related to unpaid balances, credit checks, or offerings made available to only new customers have acted as barriers for some families who are otherwise eligible for the program in terms of income level and qualification for free and reduced lunch. Further, most discounted broadband connectivity offerings are not offered via schools, but direct to households, making it difficult for schools to supply fixed broadband in a streamlined way (e.g., buying in "bulk") for their students, families, and teachers. School districts must also consider families' ability to cover fees, including one-time hardware fees and installation for establishing fixed broadband connections. Fixed broadband installation often requires entry of a technician into individual homes, which some families are uncomfortable allowing, though some fixed broadband providers are beginning to offer self-installation. These access hurdles are well within the purview of the network provider industry to address, and we look to public policy and the private sector to play a role to alleviate these challenges.

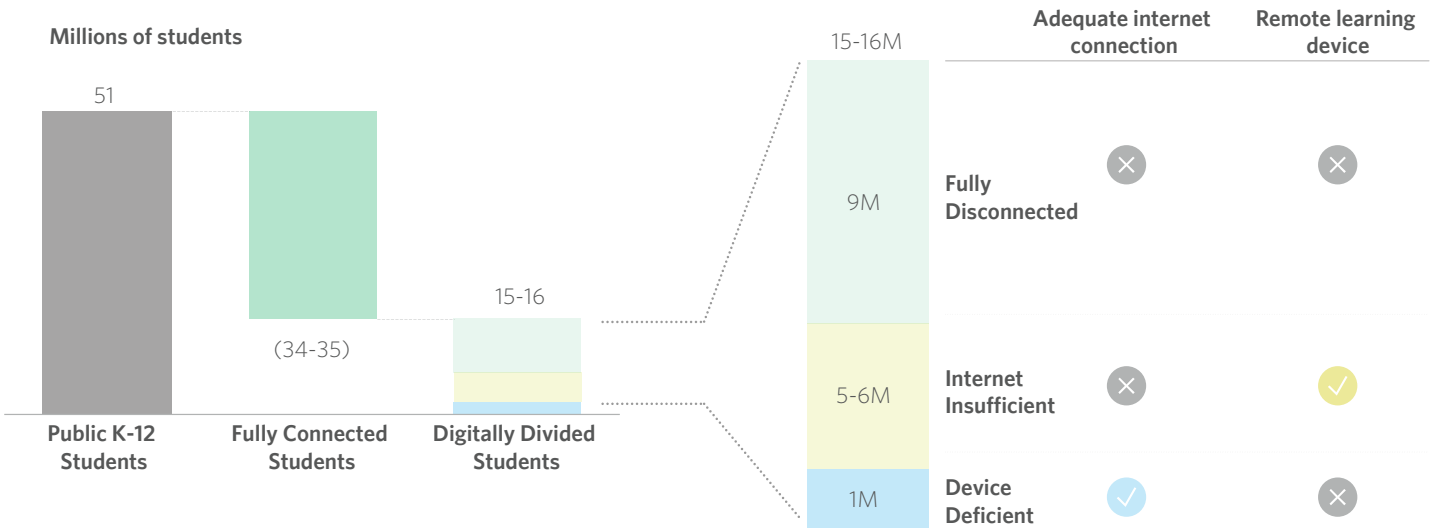
### Digitally divided student segments

To understand how internet connection and device access intersect, this analysis groups students into four segments with differing technology needs. Each segment requires a different set of solutions to fulfill their distance learning technological needs, which will vary depending on the distance learning objectives of their respective schools/districts.

Figure 2 illustrates the size of each segment in millions of students. Approximately 15 million to 16 million students lack adequate internet connection, a distance learning device, or both. These 15 million to 16 million digitally divided students fall into three segments[17] with different sets of characteristics:

*(Continued on next page)*

## Figure 2: 15-16M digitally divided students make up ~30% of K-12 public school students




Note: Distance learning devices are considered to be laptops and tablets (excludes a cellular device alone). Adequate connectivity is defined as DSL/ADSL, cable, fiber, or satellite. Cellular connection alone is not considered adequate, but can be with the right supplements.
Source: ACS 1-year survey compiled by US Census Bureau – aggregated at household level, NCES, BCG analysis

17. Our estimates are calculated using the number of students in a given area using NCES data and the % of individuals with or without at least one device in their household using the ACS. Therefore, the number of students without access to their own device is likely higher and our cost estimates likely represent the low end if our goal is a single device per student. Any attempt to estimate the number of students without 1-to-1 devices will be imprecise and heavily assumption-based, given no such data exist. Note that our cost estimates for connectivity likely represent the high end as multiple students may be in the same household and can share a single fixed broadband connection.

1. **Fully disconnected (9M students).** *Students with neither distance learning devices nor adequate connectivity*. The segment of least connected students is also the largest segment to address, which includes students who that have no high-speed internet and no device in their household. 10%-20% of this group is made up of students who do not have access to broadband infrastructure.[18] The average income for this group is ~1.9x the poverty line, compared to the national average of 3.1x the poverty line, and 20%-30% of this group qualifies for food stamps, indicating affordability as a significant reason for lack of connection or device. 30%-40% of this segment is Black, Hispanic, or Native American – the three groups with the highest proportion of individuals without connection.

2. **Internet insufficient (5M-6M students).** *Students with distance learning devices and without adequate connectivity*. In this segment, 10%-15% of students do not have access to broadband infrastructure, restricting accessibility and representing one driver of disconnection despite having a device; 10%-15% of households in this segment qualify for food stamps through SNAP which is a proportion similar to the broader U.S. population, indicating a balance of access and affordability challenges, along with presumed connectivity adoption barriers due to a variety of factors. Of this segment, 70% of students have access to internet through a cellular connection on a mobile phone; however, this is not adequate for online learning; the other 30% of students do not have a high-speed connection.

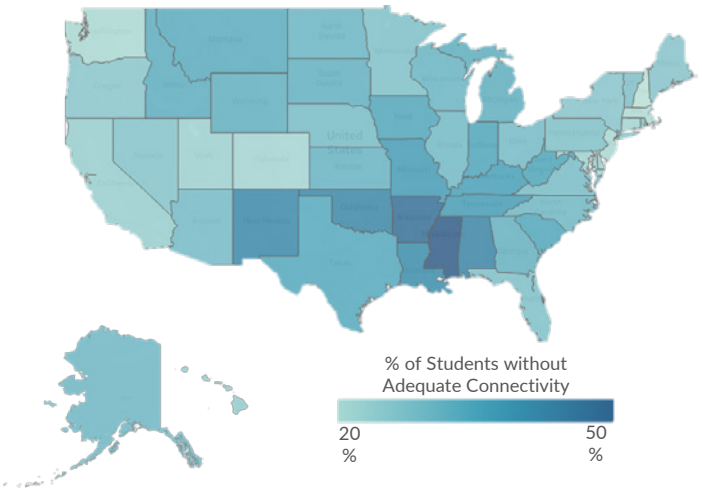
3. **Device deficient (1M students).** *Students without distance learning devices but with adequate connectivity*. Students in this segment likely have a cell phone or other device (e.g., smart TV) to access the internet but do not have devices adequate for distance learning (i.e., laptop, computer, or tablet). 20%-30% of this segment were recipients in 2018 of SNAP food stamps.

18. Figures triangulated using 2017 Community Population Survey - Computer and Internet Use supplement and 2020 FCC Broadband Report.

## State-level analysis

The digital divide is a major problem across all 50 states, with an average of 30% of public K-12 students without access to either adequate (high-speed) internet or devices. States along the East Coast and West Coast tend to have higher penetrations of adequate connectivity, in terms of the percentage of public K-12 students with internet. Students across the South, including Mississippi, Arkansas, Oklahoma, and New Mexico, have among the lowest internet penetration rates. While generally making up a smaller absolute number of students, the prevalence is much higher in these states, which are made up of largely rural and tribal communities and have more limited infrastructure. The states with the highest rates of penetration, such as New Hampshire, are still experiencing up to 20% of students without adequate internet connection for distance learning. The top 10 states with the largest absolute number of disconnected students comprise approximately 50% of the overall need, with Texas, California, and Florida having the largest population of students without internet connectivity. (See table for all 50 states included in the appendix.)

### Figure 3: States with highest proportion of students lacking adequate internet connection are primarily in the South

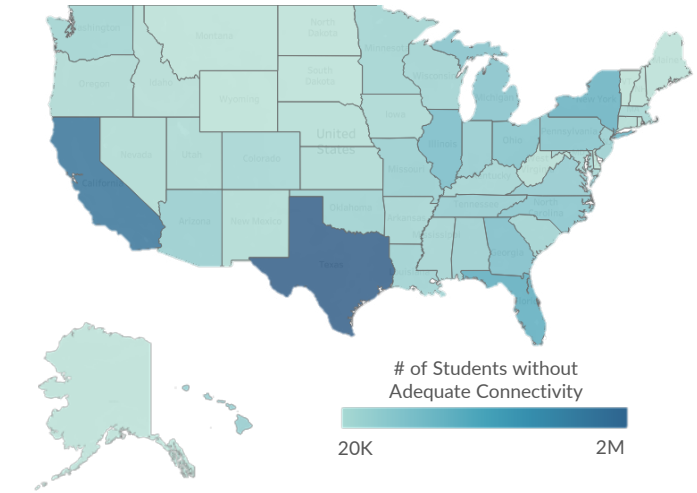



By proportion: 10 states with the highest proportion of K-12 students without adequate internet connection

| State | Without adequate connection | % Without adequate connection | Without adequate device | % Without adequate device |
|---|---|---|---|---|
| Mississippi | 234,207 | 50% | 167,875 | 36% |
| Arkansas | 225,926 | 46% | 157,252 | 32% |
| Alabama | 304,964 | 41% | 231,999 | 31% |
| Oklahoma | 285,444 | 41% | 198,833 | 28% |
| Louisiana | 281,391 | 40% | 227,315 | 32% |
| New Mexico | 133,623 | 40% | 94,858 | 28% |
| Tennessee | 363,553 | 36% | 277,261 | 28% |
| Kentucky | 240,673 | 36% | 186,148 | 27% |
| Missouri | 333,212 | 36% | 224,772 | 25% |
| West Virginia | 92,323 | 34% | 83,450 | 31% |

Source: American Community Survey compiled at household level – 1 year aggregation, NCES, BCG analysis

### Figure 4: Texas, California, and Florida have the largest population of students without adequate connection




By population: 10 states with the largest population of K-12 students without adequate internet connection

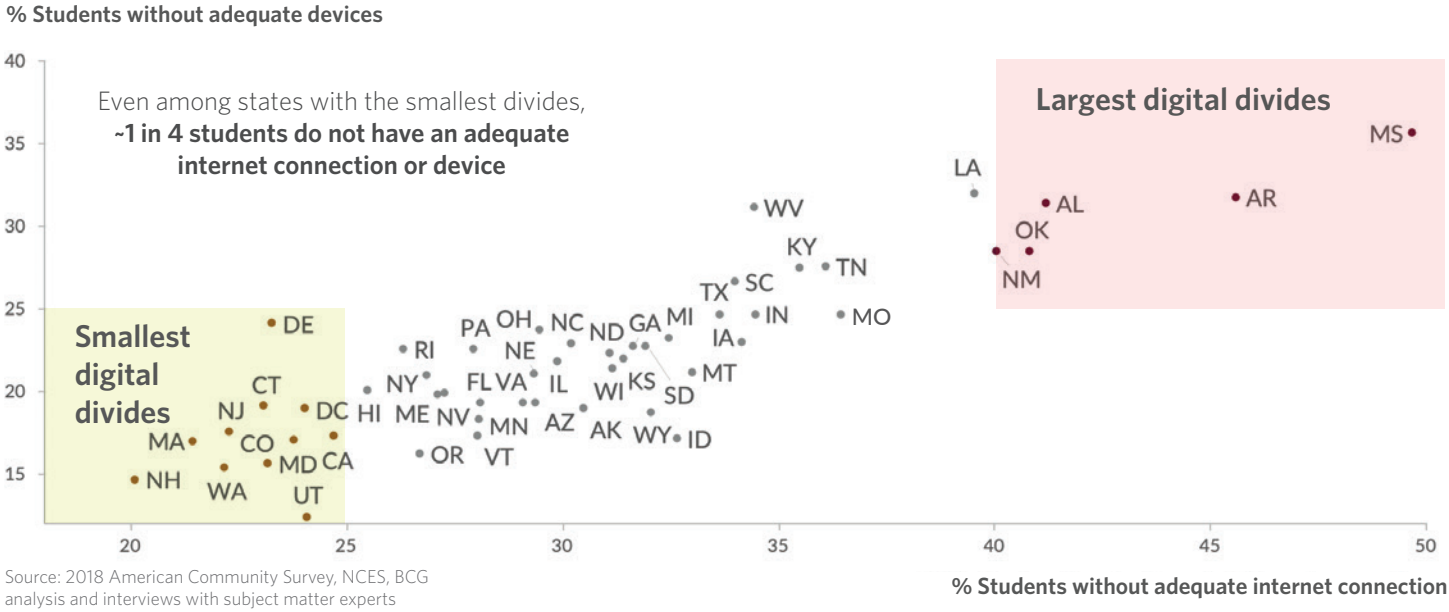
| State | Without adequate connection | % Without adequate connection | Without adequate device | % Without adequate device |
|---|---|---|---|---|
| Texas | 1,829,000 | 34% | 1,339,000 | 25% |
| California | 1,529,000 | 25% | 1,063,000 | 17% |
| Florida | 801,000 | 28% | 549,000 | 19% |
| New York | 726,000 | 27% | 567,000 | 21% |
| Illinois | 589,000 | 30% | 430,000 | 22% |
| Georgia | 560,000 | 32% | 401,000 | 23% |
| Ohio | 500,000 | 29% | 402,000 | 24% |
| Michigan | 488,000 | 32% | 350,000 | 23% |
| Pennsylvania | 484,000 | 28% | 390,000 | 23% |
| N. Carolina | 469,000 | 30% | 355,000 | 23% |

*Top 10 states represent ~53% of total students without adequate connection*

Source: American Community Survey compiled at household level – 1 year aggregation, NCES, BCG analysis

## Figure 5: A major digital divide persists in all 50 states

**Percent of students in households without devices and adequate internet connectivity, by state**




Source: 2018 American Community Survey, NCES, BCG analysis and interviews with subject matter experts

### Select state challenges and efforts in closing the digital divide

**Mississippi:** Ranked among highest states with lowest fixed broadband access in 2015 FCC/ Mississippi State University study – many districts opting for paper packet learning versus online options due to poor access

**New Mexico:** Ranked 49th in broadband access, with only 11% of population with access to fiber-optic; high proportion of Native American communities with poor access

**New Hampshire:** NH School Connectivity Initiative established to gain sponsors and enhance access to high-speed broadband connectivity for K-12 students

**Utah:** 2015 Senate bill 222 established digital teaching and learning program, allocating funding to e-learning; ranked #2 in 'Best internet access' due to high access and fast speed, according to *US News* ranking

> I use Google Classroom to deliver assignments[...] For those students that do not have internet accessibility or computers[...] I provide the hard copies [...]. It is harder to track what they are doing or don't understand because they can only give me the work packets back on the distribution days and it takes longer to give feedback.
>
> **- Karen, middle school teacher, Gulfport, Mississippi**

> During this time of school closing many students live in remote places (reservation lands) where cell towers do not exist. Cell phone connection is a challenge as well as internet access. Those lack of resources pose more concerns for safety as well as equitable education opportunities in these remote areas.
>
> **- Susan, high school teacher, Cuba, New Mexico**

**Washington:** State legislature established broadband office in 2019 - ~$22M in state budget to improve rural connectivity – currently has 95% broadband coverage

**New York:** 60%+ fiber coverage + top-5 states in education funding deployed per student. 2013 Beyond High School initiative aimed to tackle digital divide – little state-wide coordination since that time

**Texas:** Recent state-wide coordinated effort Operation Connectivity to provide K-12 connectivity across the state. Highest number of fiber providers (166), although small fiber blueprint (32% served)

### Public school teacher technology gap

With school closures in place, the burden of internet cost is now pushed to teachers to enable distance learning, rather than a cost borne by schools. Yet, teachers are not without connectivity and device challenges themselves. Estimates show that between **300,000 and 400,000 teachers lack an adequate connection required for distance teaching**, representing 8% of all teachers as opposed to nearly 30% of public school students. Of this group without adequate internet connection, two-thirds subscribe to cellular internet on an enabled device only and one-third have no internet connection in their homes.

Teachers are generally equipped with proper devices, though estimates show that **2%-4%, or 100,000 public school K-12 teachers, lack at least one laptop or tablet device in their home** to administer distance teaching. Qualitatively, many teachers are sharing devices with their own families, making fully synchronous teaching difficult.

Overall, while technology gaps impact teachers at a lesser rate than the overall population (i.e., 8% of teachers lacking high-speed internet compared with 30% of public school students), that impact is magnified, by ~16x on average, based on the number of students in their classroom.[19]

### Trends impacting the distance learning digital divide in 2020

The figures used in this report to characterize the distance learning digital divide draw from data captured prior to the COVID-19 pandemic. It is necessary to acknowledge in this report the underlying trends and shifts across America's households since March 2020, for which there is limited comprehensive data. Based on qualitative interviews of network providers, school districts, and others, as well as literature reviews, we find that three key trends will impact these size estimates at the beginning of the 2020-2021 school year. First, there have been significant, swift efforts by districts, governments, private sector, and philanthropy across the United States to provide devices and connectivity to students since March 2020. Yet, the data on these efforts is intermittent and inconsistently measured (though several organizations are working to track this data across the country). These efforts have certainly reduced the existing gaps in pockets, particularly for large urban districts. Smaller school districts face more hurdles to access technology, with smaller scale and smaller budgets while competing for supply with other large and small districts. In addition, Congress included distance learning as an allowable expense for K-12 schools in its March stimulus bill.

While some school districts will use funds for this purpose, the limited appropriations for pubic schools must compete among multiple priorities at a time of reduced budgets and have only recently reached states for distribution.

#### Urgent supply challenges facing many smaller school districts

> "It feels like there's not a Chromebook to be found … the upheaval has happened in the supply chain overnight.
> **-Todd, school district Chief Technology Officer, Indiana**

> "If the demand is great and if a large urban area eats up a bunch of the stock, then how far behind do you think the rural areas are going to be?
> **- David, elementary school principal, Montana**

Second, unprecedented unemployment rates are forcing many families that were previously in the middle class (i.e., not qualified for free and reduced lunch) to require services and support to meet basic needs, including food security.[20] Based on connectivity provider interviews, it is expected that when the Keep Americans Connected Pledge[21] expires on June 30, many families will need to make difficult financial trade-offs, including becoming delinquent on or opting out of household internet service as a result of these economic challenges.

Third, social distancing measures under COVID-19 make internet connectivity an essential to safely stay in touch with friends and family, work from home, apply for jobs, and keep up with critical developments. Families who had previously relied on public libraries and public Wi-Fi in cafés and restaurants that are now closed or limiting patrons are finding that having access to the internet at home has become increasingly critical.

These supply and demand trends will undoubtedly have different and opposing impacts on the size of the K-12 digital divide in 2020, and it is too early to understand how they will change the size and nature of the divide. Thus, they are not quantitatively accounted for in this report due to the lack of available data. However, they are critical to observe and analyze moving forward to gain a deeper understanding of the drivers and size of this gap for the next school year.

19. In 2020, the national average student to teacher ratio in public schools is 16 to 1, according to Educationdata.org; this does not account for high school teachers who have 100+ students across multiple classes.
20. *'People are looking at me': For many who lost jobs in the coronavirus epidemic, hunger comes with shame*. June 4, 2020. Washington Post.
21. Keep Americans Connected is an FCC initiative to ensure that Americans do not lose their broadband or telephone connectivity as a result of COVID-19's exceptional circumstances; 800 companies and associates have signed the pledge.

For example, at the time of this report's publishing, private sector vendors are still providing short-term discounts/free connectivity and devices, or are just ending their discount periods. These offers may be distorting the effects of the pandemic, as they incentivize new enrollments and help to maintain previously existing customers who may not be able to afford the full price of connectivity and devices after the current discount period ends.

# TECHNOLOGY REQUIREMENTS FOR DISTANCE LEARNING

For a robust distance learning experience, students and teachers need four things: **(1) high-speed internet service; (2) internet-enabled devices that allow for assignment completion (excluding cell phones); (3) distance learning instructional content; and (4) support, including digital literacy, teacher readiness, and technical support**.[22] In the section that follows, we describe key technical and nontechnical requirements to ensure a student has what he or she needs to succeed in a distance learning environment.

## Broadband internet service specifications

### Internet speed requirements

Though the majority of Americans have access to some form of internet service, not all services are robust enough to support distance learning. Internet service must meet certain download and upload speeds—corresponding to how quickly a connection can retrieve or send data, respectively—to be effective in a distance learning environment. Passive streaming and web browsing have historically formed the majority of internet usage, with internet service providers (ISPs) typically providing asymmetrical service favoring higher download speeds. However, **with videoconferencing increasingly used for distance learning, coupled with other household video needs like working-from-home and telemedicine, both household download and upload speed requirements are increasing.**

**For a single user, 25 Mbps[23] / 3 Mbps , corresponding to download and upload speeds, respectively, is a reasonable minimum standard**. Most video conferencing and virtual classroom platforms recommend 4 Mbps-8 Mbps of download speed and 1-3 Mbps of upload speed for conferencing experiences with multiple users, with requirements increasing with the number of users supported by the platform.[24] Most fixed broadband vendors have temporarily increased internet speeds to the 25 / 3 Mbps benchmark, in recognition of the unique circumstances and demands of COVID-19, though most speed increases are not expected to be maintained through or after the summer.[25]

**Districts, policymakers, the private sector, and philanthropy have the opportunity to help realize many district aspirations for digital learning, and must avoid several pitfalls:**

**Achieve 1-to-1 student-to-device parity;** account for the number of devices in the household and ensure students are not sharing laptops with each other or parents.

**Account for the desired extent of synchronous learning and type of instructional content to determine technical requirements;** these decisions have a direct correlation with speed and data usage requirements, and are important to assess together when building data plans and/or connectivity strategies.

**Make investments in the short-term that pay-off now and in the long-term; with the urgency to provide technology support in the short-term,** it is important to take time to assess appropriate requirements that meet distance learning needs, and support long-term district digital strategies and aspirations.

**Evaluate not just broadband or cellular access, but also internet speeds;** internet speeds vary significantly throughout the day, often well below quoted speeds making synchronous learning difficult; work with network providers to maintain high speeds, and continue building out infrastructure that improves overall speed.

**Consider how families can leverage the internet beyond education;** in this period of social distancing the internet helps families stay safe in their homes by enabling them to learn remotely, and stay connected while also providing essential social and professional services (e.g., telemedicine, access to job applications). All online activities should have privacy-protection for personal data.

22. Adapted from community-vetted definitions of digital inclusion, as provided by the National Digital Inclusion Alliance (NDIA), a nonprofit organization bringing together over 300 nonprofit organizations, policymakers, and academics. Retrieved from https://www.digitalinclusion.org/definitions/.
23. Download and upload speeds cited are applicable for both fixed broadband and wireless/cellular connections.
24. Assessed from review of bandwidth requirements stipulated for major virtual classroom or video conferencing platforms, including Google Classroom, Zoom, Blackboard, Schoology, Edmodo, and LearnCube.
25. The survey data informing this analysis is dated to 2019, before speed increases were taken into effect.

**This minimum speed benchmark corresponds only to each concurrent user's requirement. Households with multiple users—including parents and family members—will require speeds directly proportional to the number of concurrent users**. For example, if two students live in a household and rely on distance learning videoconferencing at the same time, the bandwidth required for a quality experience would be double the minimum requirement: 50 Mbps / 6 Mbps. For real-time elements of distance learning, 25 Mbps / 3 Mbps per concurrent user requirement must correspond to actual and stable speeds. Past analyses have found that some subscribers, particularly for DSL and satellite service, encounter significantly lower-than-advertised speeds, with more than 30 percent of subscribers experiencing a median download speed less than 80 percent of the advertised speed.[26]

### Cellular data requirements

In some geographies, households only have access to cellular networks and lack broadband infrastructure. Though typically offering a less stable internet connection than fixed broadband, cellular networks or external mobile hotspots can connect to devices for suitable for distance learning. Mobile LTE coverage at 5/1 Mbps is available for 99.9% of the US population[27] such speeds are sufficient for 1-to-1 and group video platforms such as Zoom.[28]

> Over 30% of our families currently do not have Internet at home, 35% of students are accessing online content via parents' smartphones. That creates a whole other set of challenges: parents needing the phone for their own communication needs, parents being at work and students unable to access online work, limited data plans creating worries about paying bills or losing connectivity.
> **- Jessica, elementary school teacher, Oakland, California**

For cellular internet access, it is necessary to purchase a monthly data plan. Based on interviews with school districts, many are setting a wide range of data caps, with some selecting unlimited plans. Given the experimental nature and unclear outcomes of recent distance learning transitions, districts and network providers are still assessing actual usage data to meet distance learning needs.

Based on interviews with ISPs and districts, early estimates on usage from cellular data plans distributed as a result of COVID-19 school closures (and representing the primary source of internet for distance learning) find that students have been using between 5 GB and 30 GB of data/month for distance learning since mid-March.

Yet, this data usage depends on several factors. We find that data usage is directly dependent on both the extent to which the district or school limits internet usage beyond education resources or classroom time, and the extent to which they provide synchronous distance learning engagement. Thus the impact of data caps must be considered as each district refines its distance learning strategies. However, early results measure a period of significant uncertainty and challenges to scale distance learning quickly, and therefore may be underestimating the need once distance learning has been in place for an extended period. Further, many districts are still developing and refining distance learning strategies for their schools, as well as the remote delivery of wrap-around support services (counseling, clubs, SEL programming, etc.).

**Synchronous learning, or real-time classroom engagement, typically requires more data usage when administered through video.**

**For example, Zoom video calls range from 540MB for 1-to-1 calls to 840MB for group two-way video calls per hour.**[29]

**Data caps of 10-30GB/month are typically sufficient for classrooms using ~1 hour of Zoom calls per day. However, classrooms using Zoom for 5 hours/day, may require upwards of 70-100 GB/month. These estimates do not account for other internet applications used during the school day.**

Higher data caps allow for less constrained classroom and school applications, such as synchronous learning, as well as clubs, counseling, and other supports. Data-constrained schools will have to make trade-offs on extracurriculars for students, not to mention the amount of synchronous learning time in the classroom.

26. FCC. (2018). *Eighth Measuring Broadband America Fixed Broadband Report.* https://www.fcc.gov/reports-research/reports/measuring-broadband-america/measuring-fixed-broadband-eighth-report.
27. FCC (2020). *Broadband Deployment Report*. https://docs.fcc.gov/public/attachments/FCC-20-50A1.pdf.
28. *Zoom support and system requirements*. https://support.zoom.us/hc/en-us/articles/201362023-System-requirements-for-Windows-macOS-and-Linux.
29. Zoom help center, https://support.zoom.us/hc/en-us/articles/201362023-System-Requirements-for-PC-Mac-and-Linux.

Usage limitations imposed by the school or the district impact cellular data usage. Schools with asynchronous / low synchronous learning environments and with more constrained allowable usage (e.g., limited to sanctioned educational content) will require much less data, with estimates of 5 GB and 10 GB being sufficient in these instances. Thus, schools with fewer usage limits that place higher emphasis on synchronous learning are likely to require higher caps or unlimited cellular data plans. There are learning trade-offs for students when limiting usage; higher income families with their own internet and devices are not subject to the same constraints, meaning they have more opportunities for enrichment outside of class-time compared to their lower-income peers. Solutions must take into account the impact of these types of usage constraints on educational equity, especially when considering the additional impact of social distancing requirements on a student's overall educational environment.

### Considerations influencing broadband vs. cellular decisions

There are pros and cons to each type of connectivity, and it is important for districts to understand these dynamics as they seek to support students and teachers in getting connected. Fixed broadband internet connectivity is part of many districts' long-term plans for digital sustainability, often at a lower monthly cost for sufficient speeds and unlimited access, and the ability to connect multiple devices. Yet, fixed broadband options are not without their own challenges. Many school districts indicated that when providing connectivity to students, it was challenging to simply connect families with resources, even for free or heavily discounted connectivity, because of the complexity of or discomfort some families had with navigating these resources and their enrollment processes. Internet speeds can vary throughout the day, requiring infrastructure improvements in certain geographic areas around the United States to ensure universal access to broadband internet service. As discussed previously *(see page 9)*, there are several barriers to adoption that households face in their connectivity decisions for broadband.

Cellular internet has allowed for quick district response to internet connectivity, as it does not require fixed infrastructure or an application process. However, users do cite challenges with internet speed, signal, and managing data usage effectively with cellular. While it can be considered a costly option due to data usage plans, several network providers are providing discounted monthly rates for K-12 education during the COVID-19 pandemic, making it a more sustainable option. Further, for unhoused or highly mobile students and families, cellular connectivity provides internet that will remain with the student through a change of address.

### Internet-enabled devices

In order to apply internet access to distance learning, students and teachers need suitable devices, including laptops and tablets. Mobile phones, while helpful learning supplements, are not appropriate sole vehicles for completing and submitting assignments, with many education platforms not optimized for mobile.

The appropriate device will depend on the connectivity solution available. For students and teachers who can be provided sufficient and reliable connectivity through **fixed broadband, suitable devices will include traditional laptops and tablets with built-in Wi-Fi**, which have no additional hardware requirements. **Where a cellular network (4G or above) is the option, students and teachers will need LTE-enabled laptops or tablets, or a traditional laptop or tablet plus a mobile hotspot device**.

Typical device features to enable quality distance learning include embedded video, touchscreen, and keyboards, particularly for middle school and high school students to complete assignments. Many districts are providing tablets for early learning in elementary, particularly grades K-2. Protective coverings/cases are also important in protecting devices from damage. Districts recognize that providing internet-enabled devices will result in some infrastructure loss due to theft, accidental damage, or other reason. It is important to administer these devices to students to avoid the risk of theft (e.g., deliver directly to home), as well as to provide insurance for parents and families in case of loss.

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

### Instructional content

Instructional content for distance learning is often a blend of synchronous and asynchronous learning, supported through audio/video-enabled meeting spaces, software to support digital learning content development, and a learning management system to help teachers plan and manage this content. Instructional content must be tailored to students' unique needs, including age-specific developmental requirements and students' home learning environments. Depending on internet connectivity speeds, teachers must consider alternative instructional content and tools with lower internet speed requirements.

Real-time engagement for teachers is an important tool for teachers to provide engagement with classmates, as well as 1-to-1 attention and support. Teachers cite that one of the biggest challenges in distance learning is not having the real-time feedback on whether or not students are understanding and engaging with concepts, usually provided in-classroom by visual cues and observation of students' classwork. Many are relying on applications like Zoom to engage directly with students as a substitute for the in-classroom experience. Parents are also a critical part of a successful distance learning experience; they also need sufficient resources to effectively support their children with distance learning. Many private sector vendors and nonprofit initiatives have assembled free and discount software suites enabling at-home learning, including content providers, communications software, testing platforms, and online tutoring solutions.

The type of instructional content selected, and extent to which district objectives align with synchronous learning, should have a direct impact on the required connectivity speed and data usage plans that the district seeks to offer.

## Support

### Teacher readiness

School districts and private sector vendors alike highlight teacher readiness as one of the primary barriers to successful distance learning, with some teachers not trained to effectively incorporate digital tools into their instruction. While a survey by Gallup and the NewSchools Venture Fund found that the majority of teachers (53 percent) say they would like to use technology more often, an even larger majority (56 percent) cited lack of training as a "significant" or "extremely significant" problem.[30] One vendor indicated walking away from procurement opportunities where school districts were not sufficiently attentive to the teacher-readiness element of device and connectivity enablement. School districts that more swiftly transitioned to distance learning held professional development trainings for teachers, with instruction on basic use of conferencing and other digital tools, as well as how best to integrate technology, pedagogy, and content.

### Digital literacy training

Across all users, digital literacy skills are a necessary pathway to bridging the homework gap. Individuals need support in developing the skills to take advantage of the opportunities enabled by internet connection and devices. One component of this is information literacy, to enable individuals to find electronic information and evaluate online resources for teaching quality and privacy. Digital literacy also equips students and teachers to identify and protect themselves against online threats and limit unwanted access to and use of personal information. Importantly, digital literacy increases consumers' understanding of the potential benefits of digital technologies, and it builds motivation for mastering skills required to harness the internet for their educational and personal development. Private sector vendors are already prepared to offer this support, with many ISPs including free digital literacy training—and even requiring its use—in offerings to schools or lower-income populations.

### Technical support

Quality technical support is required as users activate, build a knowledge base for, and troubleshoot issues with their connectivity, devices, and tools. Vendors indicated that the demand on customer and technical support call centers has dramatically increased during COVID-19, particularly for education-specific program offerings. School districts likewise indicated that the level of technical support offered was often a key reason districts selected certain vendors and learning platforms over others. Without technical support, users may be unable to activate or take full advantage of the resources provided to them.

### Technology supply

As schools make decisions on required technology for devices and connectivity, product availability may constrain their choices. For example, many schools prioritized procurement of Chromebooks due to simplicity, cost-effectiveness and compatibility with Google Classroom and Google Docs. However, Chromebooks and low-end Windows PCs have quickly become supply constrained during the pandemic, driven by a mixture of home office demand and device manufacturers with limited excess capacity. This reality has forced schools to scramble for procurement through multiple vendors in search of inventory, purchasing products based on availability instead of preference. To continue along this example, the total Chromebook U.S. market was only ~14 million units in 2019, with nearly ~10 million units already selling into the education channel.[31] **Given the size of the digital divide, the current supply constraint will likely persist past the start of the new school year.**

30. Klein, A. (2019, Nov. 18). Digital Learning Tools Are Everywhere, But Gauging Effectiveness Remains Elusive, Survey Shows. *Education Week*. Retreived from www.edweek.org/ew/articles/2019/09/18/digital-learning-tools-are-everywhere-but-gauging.html.
31. IDC Quarterly Personal Computing Device Tracker.

> "My school is over 70% low socio economic and over 50% of our students do not have Wi-Fi. Even though companies are offering free internet, most of the time they don't have enough boxes to service a neighborhood, or they don't cover that area. Please help!"
>
> **- Reina, high school teacher, Aubrey, Texas**

There are three ways to bridge this shortfall in the immediate timeframe. First, device manufacturers can reallocate inventory planned for consumer channels into education channels. Second, schools can extend the life of used devices, either by stalling refreshment for existing devices or purchasing refurbished devices. Third, schools can operate a portfolio of different devices (potentially across multiple operating systems) and prioritize device type depending on age groups and pedagogical objectives. In the absence of industry and government efforts to prioritize supply of low-end devices, schools and government funding will be used to pay more for high end devices.

### Technology combinations by segment

As noted above, the digital divide is comprised of three key segments: **(1) fully disconnected** (no connectivity and no device); **(2) internet insufficient** (has laptop or tablet, but inadequate connectivity); and **(3) device deficient** (adequate connectivity, but no laptop or tablet). Each of these segments has a unique set of needs that must be met with a variety of options for device, connectivity, and other installation / connectivity considerations.

It is important that districts and others consider the core needs of each segment to evaluate and select the potential technology combinations most appropriate for their students, teachers, and households. Taking this approach will provide appropriate support and meet students where they are in terms of digital connection, and also will aim to optimize for cost considerations. For example, given today's environment of restricted supply, many districts are purchasing devices opportunistically, and opting for cellular connectivity due to ease of set-up, despite the fact that these options may not be best suited for student needs or meet sufficient levels of connectivity for the district's objectives.

Figure 6 outlines these potential combinations for each segment.[32]

## Figure 6: Connectivity and device options are mutually dependent, resulting in bundled offerings

| | Internet insufficient | | | Device deficient | Fully disconnected | | | |
|---|---|---|---|---|---|---|---|---|
| Bundle | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Access considerations | No access to fixed or cellular | Access to cellular only | Access to fixed | Already has fixed or satellite | No access to fixed or cellular | Access to cellular only | Access to cellular only | Access to fixed |
| Device options | *None* | *None* | *None* | Traditional laptops/ tablets | Traditional laptops/ tablets | LTE-enabled laptops/ tablets | Traditional laptops/ tablets | Traditional laptops/ tablets |
| Connectivity options | Satellite broadband | Cellular data | Fixed broadband | *None* | Satellite broadband | Cellular data | Cellular data | Fixed broadband |
| Other hardware | Satellite dish, installation | Mobile hotspot device | Modem, router, installation | *None* | Satellite dish, installation | *None* | Mobile hotspot device | Modem, router, installation |

Source: Stakeholder interviews; BCG analysis

32. Combinations do not account for build-out of additional infrastructure. Technology combinations included herein focus on existing solutions with current sets of infrastructure for broadband, cellular, and satellite.

# COST AND OPPORTUNITIES TO CLOSE THE DISTANCE LEARNING DIGITAL DIVIDE

To inform public, private, and education stakeholder action, it is critical to outline the estimated cost to close the gap for students and teachers. The cost estimate in this report is based on the approximate price of different combinations of technologies that meet each segment's requirements. These combinations are assembled based on anticipated applications within and across segments, and the overall cost is estimated using previously discussed analysis of the number of students in each segment.

**We estimate that the cost to provide distance devices and connectivity for students who need it is $6 billion-$11 billion in the first 12 months.** This consists of $3 billion-$5.5 billion of one-time costs for installation and set-up, devices, and device warranties; and ~$2.7 billion to $5.6 billion for 12 months of recurring charges for connectivity, connectivity equipment, and mobile device management. The range of the estimate is based on several factors, including:

- Local access to fixed broadband and cellular networks
- Degree of synchronous distance learning targeted
- Degree of content filtering applied to restrict non-educational applications
- District and household preferences, often based on ease of adoption
- Short-term availability of hardware in the market
- Availability of provider discounts for education and/or households
- Eligibility of the school district, geography, and/or household for any available discounts

The precise cost will require stakeholders to evaluate the above factors as well as the divergent qualities of distance learning supported at different points along the range. Notably, connectivity options at the lower bound of the range meet the minimum requirements for distance learning but typically cannot support highly synchronous learning models, such as multiple hours of live video engagement; multiple concurrent users in a household, including non-student users; or, for cellular options, unfiltered content, constraining students' options for educational resources. Device options at the lower bound rely on availability of hardware in the market and may not be fully compatible with a school's chosen learning applications.[33] Low-cost devices are typically refurbished, with availability depending on inventory; are outdated and require earlier replacement to align with student learning needs; or involve separate household eligibility requirements. Higher-cost options are typically more flexible.

> "My [...] concern is what will happen if this continues. We do not have the school budget to provide 1-to-1 devices to our students. Even if we were able to do that, large areas within our school district do not have high speed internet available. I am extremely concerned with my ability to connect with my students next year. [...] I feel that they are not afforded the same level of instruction they desperately deserve.
>
> **- Leslie, preschool, pre-K, and elementary school teacher, Ellenburg Depot, New York**

33. These estimates do not account for residual value of devices for resale.

## Figure 7: Initial estimate suggests $6-$11B first-year cost to close the student digital divide

| | **Internet insufficient** (Device, no connectivity) 5-6M | | | **Device deficient** (Connectivity, no device) 1M | **Fully disconnected** (No connectivity, no device) 14-15M | | | |
|---|---|---|---|---|---|---|---|---|
| Bundle | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Access considerations | No access to fixed or cellular | Access to cellular only | Access to fixed | Already has fixed or satellite | No access to fixed or cellular | Access to cellular only | Access to cellular only | Access to fixed |
| Device options | *None* | *None* | *None* | Traditional laptops/ tablets | Traditional laptops/ tablets | LTE-enabled laptops/ tablets | Traditional laptops/ tablets | Traditional laptops/ tablets |
| Connectivity options | Satellite broadband | Cellular data | Fixed broadband | *None* | Satellite broad-band | Cellular data | Cellular data | Fixed broadband |
| Other hardware | Satellite dish, installation | Mobile hotspot device | Modem, router, installation | *None* | Satellite dish, installation | *None* | Mobile hotspot device | Modem, router, installation |
| **Cost/ student** | $850-$1,075 | $250-$300 | $125-$375 | $225-$475 | $1,075-$1,525 | $550-$925 | $475-$750 | $350-$825 |
| **% of segment** | 5% | 45% | 50% | 100% | 5% | 23% | 23% | 50% |
| **Segment total** | | **$1.1B-$2.2B** | | **$0.4B-$0.7B** | | **$4.6B-$8.2B** | | |

Note: Low bound assumes a single-student household, eligibility for internet service provider discount programs, and waivers of installation and fixed broadband equipment fees. High bound assumes higher quality offerings and that these offerings support the average number of school-age children in households with children under 18 (1.93). Notably, while fixed broadband, satellite, and a hotspot with sufficient data can be fully shared by a household, service to an LTE-enabled device is often tied to the device itself and cannot be shared.
Source: ACS 1-year and 5-year surveys compiled by US Census Bureau, NCES, stakeholder interviews, BCG analysis

Figure 7 illustrates typical packages for each segment and their cost ranges. The low end of the range accounts for meeting minimum distance learning requirements, whereas the high-end of the range represents costs for more robust distance learning technology. On the following page, we include two illustrative examples demonstrating the difference in distance learning experiences for low-end versus high-end investments.

### Low-end investment user experience: meeting minimum distance learning needs

Your child's class involves a blend of instruction types. The teacher asks all students in the class to turn their videos off to conserve bandwidth. The day includes several groupwork exercises with video on, but typically no more than 1-2 hours. In the afternoon, you connect to your internet, which provides speeds of 25/3 Mbps. Your child's session is undisrupted when you are browsing but you notice pixelation, and sometimes dropped connection, when you try to simultaneously stream videos.

### High-end investment user experience: meeting robust distance learning needs

While your child's class yesterday was in lecture style, today's math class is highly interactive, including small virtual group exercises with all students collaborating via video. To facilitate engagement, the teacher has asked students to enter an application that allows them to show their work online. Your child's laptop is a relatively recent model that has high memory, allowing it to quickly load applications and to process your child's real-time inputs into learning tools. Meanwhile, your younger child is connected to the same 200 / 10 Mbps Wi-Fi network on a tablet, participating in similar classroom exercises.

While we take a similar approach to estimating the cost to provide teachers with connectivity and devices, teachers have higher-cost requirements for distance learning. Unlike their students, teachers must maintain their video for larger portions of the day in order to keep their classrooms engaged. Lower cost devices such as Chromebooks, a popular choice for their affordability, are typically not as effective to support teachers interfacing with different applications and learning platforms. We consequently estimate the cost to equip teachers with higher-cost distance learning devices and connectivity.

**We estimate that $0.6 billion-$1 billion is required to provide distance devices and 12 months of connectivity for teachers who need it**. This consists of $0.03 billion-$0.04 billion for devices and $0.5 billion-$0.9 billion for one year of connectivity, including one-time installation.

As stakeholders decide how to meet student and teacher requirements and what it will take, it will be important to understand local student and teacher needs alongside school district priorities. While students and teachers urgently need support for distance learning, financial and technological sustainability of the solutions will be critical to reducing long-term costs. In particular, stakeholders must consider how they will support the recurring costs of home connectivity, as well as device replacement and upgrade costs that occur several years after initial purchase. Though we prioritize immediate distance learning support to students and teachers, a variety of additional options, including infrastructure build-out, particularly in areas underserved by internet service providers and device manufacturers, will be a critical element of keeping the digital divide closed. These will require additional investments, which are not evaluated here.



# MOVING FORWARD TO CLOSE THE DIGITAL DIVIDE

The digital divide in public K-12 education is significant, with as many as 15 million to 16 million students in households without adequate internet service or devices on which to do school work. As a result of the COVID-19 crisis, this is no longer a matter of a homework gap but of whether or not a child can participate in school. Addressing this challenge will require a deep understanding of local circumstances and needs, significant financial investment, and the ability for districts to decide what is best for their community and educational aspirations. Closing the digital divide in the short term will cost at least $6 billion, and could cost as much as $11 billion, over the next 12 months.

During the COVID-19 pandemic, schools have been in crisis mode as a result of massive school closures – scrambling and taking swift action to switch to distance, at-home learning in lieu of classroom teaching. Some schools never started distance learning because of unequal access, while others started and stopped because of access or external interference issues. Many decisions have been focused on how to provide short-term stop-gap solutions and get students connected as soon as possible, with inconsistent data to inform decisions, patch-work technology solutions, and many still waiting on supplies or unsure how to support their students, families, and teachers. Despite challenges, many districts and educators see an opportunity not just to provide a stop-gap measure during this unprecedented period, but also to realize their long-term aspirations for integrated, equitable digital learning environments.

> "Equipment and access should be available to families with school children. Society must realize the digital divide is real. Access and education should not only be for some and not others, especially those from low socioeconomic backgrounds. Raising expectations for all students young and old, is especially important for a growing society if building young people to have skills and way to create a better life for them and their family.
>
> **-Brenda, middle school teacher, Seattle, Washington**

Based on our research and understanding of the digital divide, we see a significant opportunity to use this difficult moment in history to reshape the future of learning through digital education. There are important roles that various stakeholders can play to help catalyze longer-term change while closing the digital divide in the short term.

**Policymakers | Take swift policy action in the short term, and invest for the long term.** Closing the K-12 digital divide requires action by Congress on a short-term basis in the next COVID-19 federal stimulus bill by providing direct funding to ensure internet service and devices at home for students who lack them today. Congress must also take long-term action and invest funding to upgrade and close gaps in our nation's broadband infrastructure. These actions in combination will ensure robust universal broadband access for students and families across the nation.

**Districts | Define digital education long-term aspirations and objectives.** The "homework gap" has long been an issue, only exacerbated by COVID-19; many districts entered this period with existing plans to address that gap, such as providing students with 1-to-1 student-to-device accessibility. This is a critical time for districts to build out, evaluate, and scale those existing plans, while also assessing how they may need to shift in the current context, and look beyond short-term crisis response. For example, having school-based high-speed internet may no longer be enough to encompass educational connectivity needs and having connectivity in each student's household will be critical should the pandemic require longer school closures. Taking this time to clarify the longer-term vision and aspiration for distance learning, and to lay out digital objectives will drive smarter decision-making in the short-term. Decisions should also be made with a three-to-five year view in mind, so that districts can acquire technology that can be sustained over a longer time horizon. Districts should avoid making quick decisions that will need to be corrected with further investment in the future due to limited information and understanding of the requirements at the outset. For example, while many districts are selecting hotspots to provide quick, scalable internet for their students, the costs could add up quickly in the long-term compared to lower-cost broadband options. .

**Districts | Identify the necessary technology, infrastructure, and capabilities to enable that vision.** As described in this report, there are a significant number of technology considerations to account for to enable distance learning. It is important for districts to ensure that the technology solutions truly meet the needs of students and teachers, requiring a clear understanding of which households are in need, what their specifications need to look like, and how it aligns to the extent of distance learning the district is supporting. A district's approach to synchronous learning, for example, is a significant driver of the hardware, software, services, and connectivity needs for each student and teacher. Moving forward, we anticipate more integration of IT and pedagogy, requiring more professional development for teachers, as well as IT support

and capacity. Further, with teacher readiness support and professional development on distance learning techniques, this is an opportunity for schools to fully leverage the digital tools available to them, and prepare their teachers for new, innovative learning models blending classroom and online platforms and tools. Teachers and schools should also be equipped to utilize appropriate privacy and security tools to protect students. Underscoring all of this is the continued need to build out internet infrastructure where it does not currently exist, as well as bolster existing infrastructure to increase internet speeds beyond the minimum 25/3 Mbps requirements laid out in this report. Part of this build out is not only in rural areas, but also in urban neighborhoods experiencing pockets of slower speeds. There is also a need to connect public housing and homeless shelters to support unhoused and highly mobile populations.

**Private sector | Help deliver, prioritize, and support education technology needs.** The private sector is critical to making effective distance learning a reality. Network providers and device manufacturers must provide transparent, discounted, and consistent prices across all districts, as many districts are navigating significant differences in price, and smaller districts lacking purchasing power face higher prices. Additionally, there are other opportunities to deliver technology needs. We see opportunities for the private sector to make a commitment to prioritize K-12 education support in their supply chains and customer service, and to evaluate and adjust offerings that meet K-12 and household needs, including reducing barriers to adoption. As noted in this report, even with affordable options, and infrastructure access, families face several other burdens to adoption such as financial hurdles (e.g., credit checks), lack of digital literacy, and being overwhelmed with options or lacking support to navigate the process. Connectivity providers can evaluate their processes to ensure they best support families to adopt their technology, while districts can also offer explicit support, guidance, and resources to help families make the best decisions for their homes. Further, they can provide products and services that are accessible through districts rather than through individual applications, and transparent, and consistent pricing to ensure equitable access for districts regardless of their purchasing power.

**Education organizations/nonprofits | Build data, coordination, and support to systematically address gaps.** With so many districts facing a similar issue, it is important to apply a collaborative rather than a competitive mindset. States like Texas, California, and Connecticut, for example, are developing models for cross-district collaboration to ensure all districts are getting what they need, and with greater leverage and scale for negotiation. Public, education, and nonprofit sectors have a significant potential role to support coordination. With inconsistent data collection practices on the localized need and distribution efforts, it is important to align, aggregate, and update the data regularly to systematically understand where the gaps are and proactively address them. This includes making connections across districts (e.g., aggregate localized/regional needs), and connecting with private sector providers that align to localized needs. Further, as noted throughout this report, the potential of our analysis was hindered due to data limitations in several data sets. It is important for public organizations to align on data needs, and improve data collection processes around 1-to-1 device access in homes, types of internet connectivity in households, and broadband/cellular coverage and speed maps. Furthermore, education agencies and nonprofits should work with districts to share pricing, service, and supply terms to strengthen purchasing power.

**All organizations | Apply an equity lens across the board.** This moment is an opportunity to provide equitable access to connectivity and technology not just for students, but also for their families. Underscoring this work is a need to understand how these challenges and issues impact students differently, and work to meet their unique needs. As districts build out a vision for digital education, this means that they will ensure those strategies reach all students. Their approach to technology and infrastructure will account not only for inequities like income, but also for digital literacy of families and other barriers to provide support for equitable access and use of those resources. Districts can also provide critical support and stability for families, including use of the internet to work from home, apply for jobs, access telehealth resources, and stay connected during the pandemic. This is an opportunity to rethink how to support students and families to weather the crisis, and level the playing field between those with full access and those without.

Closing the digital divide will require public and private sectors to come together with a sense of urgency for immediate action to ensure equitable learning opportunities during the pandemic, and a sustained commitment to secure our nation's educational future by ensuring that digital technology will benefit all students and their families..

# APPENDIX

## Definitions

**ACS:** American Community Survey – annual survey conducted by the US Census Bureau sampling approximately 3.5 million households per year.

**Adequate internet connection:** Refers to forms of internet connection that are suitable for online learning. Includes DSL, cable, fiber, and satellite; cellular LTE; or cellular hotspot internet where mobile tethering is feasible. Does not include dial-up or cellular-enabled mobile devices.

**Adequate device:** Devices suitable for online learning. Includes laptops, computers, and tablets. Does not include mobile/cellular phones.

**Adequate internet speeds:** Download and upload speeds suitable for online learning – consensus standard is 25/3 Mbps (download/upload) speeds though this can vary based on the number of devices connected. 5/1 LTE speeds generally sufficient for certain use cases such as virtual video conferencing.

**Cable internet:** Form of internet access that uses a cable model on-premise and connected to ISP's last mile infrastructure. Classified as wired broadband by the Census and considered adequate for distance learning.

**Chromebook:** A laptop running Chrome OS (developed by Google). Machines generally have information stored on the cloud versus in local memory and are often cheaper than traditional laptops. Can have multiple manufacturers such as Acer, HP, etc.

**Dial-up internet:** Form of internet access that uses public telephone networks to connect to ISP. Interferes with phone line. Considered inadequate for distance learning.

**Digital divide:** Students (K-12) who do not have sufficient technology (connection or device) to study, learn, and complete assignments remotely. Three segments of digitally divided audience include:

- Fully disconnected: Students with no adequate connection or adequate device for online, distance learning
- Internet insufficient: Students with an adequate device (laptop, tablet) but without adequate connectivity
- Device deficient: Students with an adequate connection (cable, DSL, fiber, satellite) but without adequate device

**DSL internet:** Form of internet access that uses telephone networks to connect to ISP, but utilizes a different frequency and is independent of phone line. Considered adequate for distance learning.

**FCC:** Federal Communications Commission – government agency that regulates communication. Publishes statistics on broadband deployment and coverage in yearly report using Form 477 data.

**Fiber internet:** Form of internet access characterized by fast speeds. Internet travels through fiber lines and therefore requires infrastructure build-out in coverage areas. Classified as wired broadband by the Census. Considered adequate for distance learning.

**Fixed broadband:** Category of internet access that includes forms of internet delivered to a fixed location. Includes all types of wired broadband and select wireless broadband options such as satellite.

**GB:** Gigabyte – unit of measuring data/information stores and processed in a device

**Homework gap:** term used to shed light on the challenge for K-12 students in completing online homework assignments because they lack adequate internet or devices at home.

**ISP:** Internet Service Provider – Organization that provides internet access services. Examples include Comcast, Charter. Cellular ISPs include Verizon, T-Mobile, etc. In rare cases, certain cities and nonprofits can function as ISPs.

**LTE-enabled device:** A device (usually cell phone or tablet) that can connect directly to a cellular LTE network without the need of a hotspot or wireless router

**LTE / 4G LTE:** Although different technical specifications, the terms 4G and LTE are often used interchangeably to refer to telecommunication standard signifying multiple speed, quality, and functional improvements over its 3G predecessor. 4G LTE connection is deemed adequate for at-home learning.

**Mbps:** Megabit per second – unit of speed measuring how fast data is transferred. Can measure either download or upload speed. 25/3 Mbps refers to 25 megabits downstream speed and 3 megabit per second upstream speed

**Mobile / Cellular tethering:** The practice of using a hotspot (either via a cell phone or wireless hotspot device) to allow nearby devices to connect to the cellular (often LTE) connection

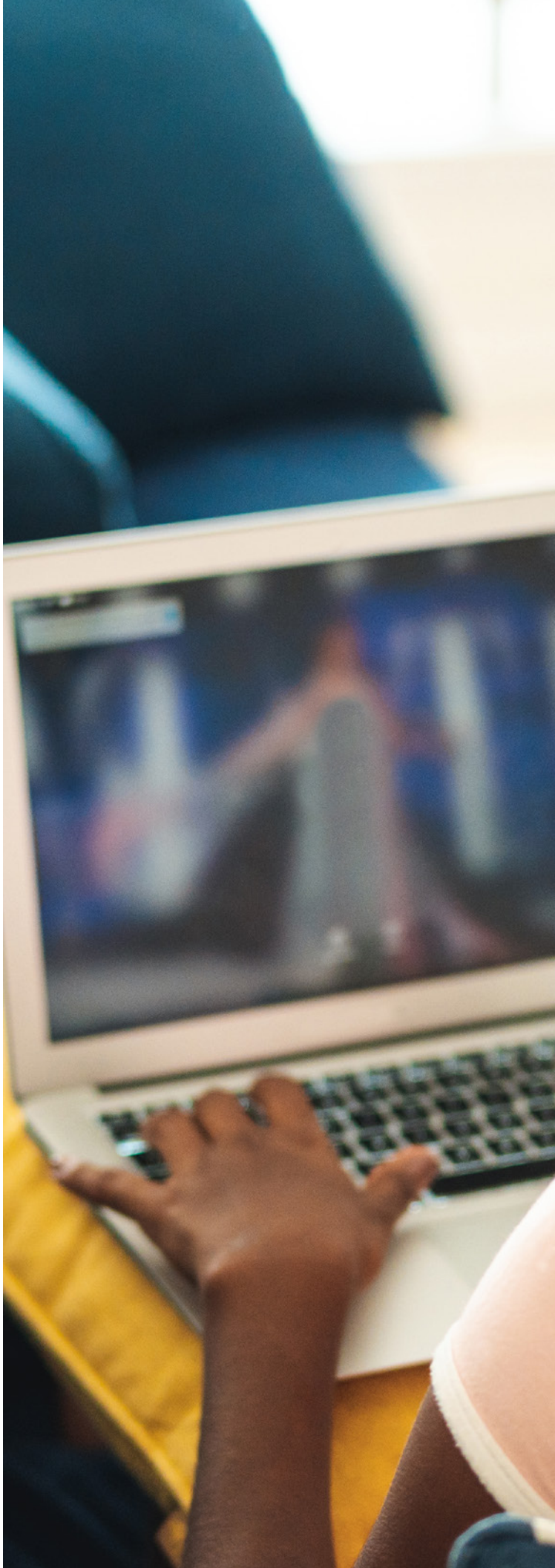
**NCES:** National Center for Education Statistics – division of the US Department of Education that collects and publishes select public school district information.

**Operating system (OS):** Software installed on devices that allow device to run, interact with user, and interact with applications. Education applications need to be configured to run on specific operating systems (e.g., iOS, Android, Windows, Chrome) – certain applications are incompatible for certain mobile operating systems.

**Satellite internet:** Form of internet access provided through communication satellites. Speeds are generally fast, but coverage can be spotty due to environmental conditions. Can provide access to regions that are not covered by ISPs. Considered adequate for distance learning but other forms (DSL, cable, fiber) are preferred.

**Synchronous / asynchronous learning:** Synchronous learning occurs in real-time and requires a live internet connection. Asynchronous learning involves online materials and requires an internet connection to initially obtain or submit materials but no continuous connection is required.

**Wired broadband:** Category of internet access (includes DSL, cable, fiber) where a physical connection on-premise exists. Does not include cellular or satellite forms of internet. Considered adequate for distance learning.



## Methodology

Our sizing methodology consisted of two steps: (1) calculation of the number of students and teachers without access to an adequate internet connection and/or device and (2) a cost estimate of the investment necessary to provide all students and teachers with internet connection and devices adequate for distance learning.

### Calculation of the number of students and teachers without access to an adequate internet connection and/or device

Calculation of the number of students and teachers without access to an adequate internet connection and/or device began with a study of what analyses have already been published on the topic and their respective shortcomings. Four common shortcomings emerged: (1) outdated underlying data, such as the 2017 Join Economic Committee report referencing 2015 1-year ACS data; (2) reliance on a survey that either has a low number of respondents (N of ~1,000 or less) or poor representation of respondents relative to U.S. population; (3) unclear definitions of what is deemed as an adequate internet connection or learning device; or (4) biased sample size due to how information was collected (e.g., information on lack of internet was collected via an online survey). Our analysis improves on these studies by using the latest government published data, documenting what is included in our statistics, and validating our findings through subject matter experts.

The U.S. Census Bureau's 2018 1-year American Community Survey (ACS), household internet and device usage rates were calculated. [34,35] The 2018 ACS had a 92% household response rate and was sent out to 3.5 million households, resulting in a significant sample size. For the purposes of this analysis, adequate internet connection is defined as high-speed broadband connection, including satellite and cable/DSL/fiber optic internet—cellular internet, as defined by the ACS,[36] is not included as an adequate internet connection as it does not specify data usage and the question presumes use on a mobile phone only, which is an inadequate device for quality distance learning. Adequate devices for home education include computers, laptops, and tablets—mobile and cellular phones are not included. Both the one-year and five-year aggregated view of the ACS survey is used, although one-year figures are the primary figures published to capture the recent trends in increased cellular internet adoption and decreased satellite internet penetration. Five-year figures likely have a lower margin of error given data collected over five years is used. with state-level student data provided by the National Center for Education Statistics (NCES) for the 2018-2019 school year to provide a view of the number of student households without internet or device access by state.[37] Using ACS public-use micro data (PUMS),[38] the number of households that fall into our four key segments (adequate device and connection, adequate device and no connection, no adequate device with connection, and no adequate device and no connection) were calculated. To estimate the number of teachers without adequate connectivity or devices, a similar methodology was used with one exception—the ACS data was filtered by Standard Occupational Classification codes to include only relevant K-12 teaching professions. Certain zip code and demographic information such as race/ethnicity, age, and gender segmentations were further calculated using NCES data and state/district-level ACS adoption rates. Finally, we estimate that 2 million to 3 million students do not have access to internet due to a lack of access or availability of a wired connection in their residential area—this figure is triangulated based off the 2020 FCC Broadband Report,[39] conversations with FCC subject matter experts, as well as the 2017 Current Population Survey (CPS)—Computer and Internet Use supplemental report.

### Cost estimate of the investment necessary to provide all students and teachers with internet connection and devices adequate for distance learning

In order to estimate the cost to provide internet and devices at home to all students who need it, we consider the connectivity and device needs of the previously defined segments. Within each segment, there are multiple offerings that can meet the segment's requirement, each including complementary equipment, licenses, and support. The appropriate offering in each segment is based on connectivity network access, as well as stakeholder priorities:

34. Question 8: At this house, apartment, or mobile home – do you or any member of this household own or use any of the following types of computer?; Question 9: At this house, apartment, or mobile home – do you or any member of this household have access to the Internet?; Question 10: Do you or any member of this household have access to the Internet using a – full survey can be found at: https://www2.census.gov/programs-surveys/acs/methodology/questionnaires/2018/quest18.pdf.
35. ACS figures can be retrieved at: https://data.census.gov/cedsci/.
36. Cellular data in ACS defined as: "cellular data plan for a smartphone or other mobile device".
37. NCES figures can be found at: https://nces.ed.gov/ccd/elsi/tableGenerator.aspx.
38. PUMS dataset can be found at: https://data.census.gov/mdat/#/.
39. 2020 FCC report can be found at: https://docs.fcc.gov/public/attachments/FCC-20-50A1.pdf.

1. **Fully disconnected** (have neither connectivity nor devices). There are four potential offerings: (1) satellite, most suitable for those without fixed broadband or cellular network access; (2) cellular data plan, with an LTE-enabled device; (3) cellular data plan, with a hotspot and traditional Wi-Fi device; or (4) fixed broadband, with a traditional Wi-Fi device.

2. **Internet insufficient** (have device but no connectivity). Offerings include fixed broadband, cellular, or satellite connectivity, equipment, and installation, depending on what individuals are able to access. Satellite is primarily only suitable for those without access to either connectivity type (e.g., those in rural/remote areas).

3. **Device deficient** (have connectivity but no device). We assume only one potential offering: a traditional Wi-Fi device. This is because we define sufficient connectivity as fixed and satellite broadband only, which does not require an LTE-enabled device.

We first determined the minimum technical requirements for distance learning and then identified the price of components meeting those requirements. We conducted a series of interviews with internet service provider and device vendors to gather data and benchmarks on internet speeds offered in education or other targeted programs; student cellular data usage (number of GBs); education device models offered; educational content and other support provided; and prices and potential education and bulk pricing discounts available for each. We also gathered data from company websites and reviewed press releases on schools' digital purchases during COVID-19. Ultimately, we develop a cost range for each component by triangulating across these sources. Notably, we established component point-in-time pricing based on what can be delivered at scale, even though there may be lower prices on the market. For example, while low-cost traditional Wi-Fi devices can be offered at a $150 price point through special internet service provider programs, these devices are based on available inventory and cannot be purchased at scale.

From the component costs, we estimated a per person cost for each set of distance learning offerings. We accounted for different per person costs for offerings provided to different household sizes. Given that each segment can be served by different offerings, we also assigned percentages to each segment's solution based on what we are hearing from school districts about their priorities (total percentages for each segment sums to 100). With our per person average cost for each segment, we then used our previously sized student segments to get to the total cost to provide connectivity and devices.

While we take a similar approach to teachers, their requirements will be slightly higher than for students, given the higher demands on teachers to maintain video and support multiple learning applications to best engage their classrooms. Devices included in bundles include higher-end laptops (e.g., Dell Latitude for Education or LTE-enabled iPad with a keyboard versus Chromebook) and we assumed higher connectivity speeds are needed to allow for highly synchronous distance learning.

## Data limitations and disclaimers

The majority of analyses presented in this study relies on sources of data that represent the broader US public K-12 population and that are published by reputable, largely government, organizations. We have synthesized conclusions with minimal assumptions, however there are certain elements that we have not captured as the precise data does not exist or is not representative of the overall population.

One such instance involves accounting for **multiple individuals/ devices in a home**. Our data builds on the number of students who have at least one device at home. As such, our figures may underestimate the need for student devices where a student resides in a household with multiple family members and only a single device. In a scenario where each student receives his or her own learning device, we expect our device cost estimates to increase significantly. Our connectivity estimates are less likely to change in this regard as a dedicated connection line per student is less needed (except in the case of an LTE enabled device). Our connectivity figures do not adjust for the fact that some students may share a single residence (e.g. siblings) and can benefit from a single connection.

A second limitation involves **internet coverage**. Specifically, our estimation of students who do not have access to a wired connection due to a lack of infrastructure or coverage in their area may be understated. This data is published by the FCC, however this data is self-reported by ISPs and likely understated due to imprecise data collection methodologies (a single residence with wired connection access in a given area classifies the entire area connected, even if all other residences do not have the adequate infrastructure). We assume 99.9% of the population is covered by 5/1 Mbps mobile LTE as per the FCC, however these speeds may occasionally be insufficient for certain learning use cases. Tribal and rural areas make up significant portion of the 0.01%.

**Other limitations** include reliance on one-year ACS data which have a high margin of error for certain variables and the exclusion of group quarters, the unhoused student population, and other populations underrepresented in the ACS.

In addition to the analyses presented in this document, multiple studies exist citing the data sources listed above but face similar gaps in information. Further analyses, in the form of surveys and interviews with students, educators, and other stakeholders, can help equip student and teachers who live in multi-student homes, single device homes, areas with insufficient internet coverage, group quarters, tribal/rural areas, and face other issues not captured by the data sources listed above.

## State-by-State Detail: Student digital divide

| State | Students without adequate high-speed connection | % Students without adequate high-speed connection | Students without devices | % Students without devices |
|---|---|---|---|---|
| MISSISSIPPI | 234,207 | 50% | 167,875 | 36% |
| ARKANSAS | 225,926 | 46% | 157,252 | 32% |
| ALABAMA | 304,964 | 41% | 231,999 | 31% |
| OKLAHOMA | 285,444 | 41% | 198,833 | 28% |
| LOUISIANA | 281,391 | 40% | 227,315 | 32% |
| NEW MEXICO | 133,623 | 40% | 94,858 | 28% |
| TENNESSEE | 363,553 | 36% | 277,261 | 28% |
| KENTUCKY | 240,673 | 36% | 186,148 | 27% |
| MISSOURI | 333,212 | 36% | 224,772 | 25% |
| WEST VIRGINIA | 92,323 | 34% | 83,450 | 31% |
| SOUTH CAROLINA | 265,652 | 34% | 207,834 | 27% |
| INDIANA | 363,995 | 34% | 260,374 | 25% |
| TEXAS | 1,828,917 | 34% | 1,339,459 | 25% |
| IOWA | 176,004 | 34% | 118,309 | 23% |
| MONTANA | 48,758 | 33% | 31,259 | 21% |
| IDAHO | 101,325 | 33% | 53,153 | 17% |
| MICHIGAN | 488,394 | 32% | 349,627 | 23% |
| SOUTH DAKOTA | 44,300 | 32% | 31,563 | 23% |
| GEORGIA | 559,644 | 32% | 401,025 | 23% |
| WYOMING | 30,244 | 32% | 17,683 | 19% |
| NORTH DAKOTA | 34,789 | 31% | 24,910 | 22% |
| KANSAS | 156,518 | 31% | 109,578 | 22% |
| WISCONSIN | 268,021 | 31% | 183,892 | 21% |
| ALASKA | 39,951 | 31% | 24,894 | 19% |
| NORTH CAROLINA | 468,967 | 30% | 355,304 | 23% |
| ILLINOIS | 588,917 | 30% | 430,271 | 22% |
| OHIO | 500,187 | 29% | 402,404 | 24% |
| NEBRASKA | 95,834 | 29% | 68,888 | 21% |
| ARIZONA | 335,558 | 29% | 220,544 | 19% |
| VIRGINIA | 375,097 | 29% | 248,742 | 19% |
| PENNSYLVANIA | 483,790 | 28% | 390,265 | 23% |
| FLORIDA | 800,519 | 28% | 548,698 | 19% |
| MINNESOTA | 249,845 | 28% | 162,607 | 18% |
| VERMONT | 24,415 | 28% | 15,098 | 17% |
| NEW YORK | 725,856 | 27% | 567,116 | 21% |
| NEVADA | 134,365 | 27% | 97,843 | 20% |
| MAINE | 48,936 | 27% | 35,788 | 20% |
| OREGON | 155,793 | 27% | 94,515 | 16% |

| | | | | |
|---|---|---|---|---|
| RHODE ISLAND | 37,787 | 26% | 32,361 | 23% |
| HAWAII | 46,255 | 26% | 36,369 | 20% |
| CALIFORNIA | 1,528,536 | 25% | 1,063,415 | 17% |
| DISTRICT OF COLUMBIA | 21,301 | 24% | 16,696 | 19% |
| MARYLAND | 213,600 | 24% | 152,389 | 17% |
| UTAH | 163,108 | 24% | 83,999 | 12% |
| DELAWARE | 32,270 | 23% | 33,325 | 24% |
| CONNECTICUT | 121,776 | 23% | 100,462 | 19% |
| COLORADO | 211,425 | 23% | 141,590 | 16% |
| NEW JERSEY | 312,444 | 22% | 245,213 | 18% |
| WASHINGTON | 249,702 | 22% | 172,897 | 15% |
| MASSACHUSETTS | 204,325 | 21% | 161,754 | 17% |
| NEW HAMPSHIRE | 35,855 | 20% | 26,139 | 15% |

## State-by-State Detail: Teacher digital divide

| State | Teachers without adequate high-speed connection | % Teachers without adequate high-speed connection | Teachers without devices | % Teachers without devices |
|---|---|---|---|---|
| MISSISSIPPI | 7,262 | 23% | 1,634 | 5% |
| OKLAHOMA | 7,284 | 17% | 1,873 | 4% |
| ARKANSAS | 6,123 | 16% | 1,505 | 4% |
| ALABAMA | 5,741 | 14% | 1,471 | 3% |
| NEW MEXICO | 3,013 | 14% | 1,131 | 5% |
| TENNESSEE | 8,794 | 14% | 1,965 | 3% |
| WYOMING | 1,055 | 14% | 175 | 2% |
| VERMONT | 1,055 | 14% | 183 | 3% |
| LOUISIANA | 5,028 | 13% | 1,468 | 4% |
| TEXAS | 48,049 | 13% | 11,577 | 3% |
| IOWA | 4,609 | 13% | 738 | 2% |
| NORTH DAKOTA | 1,140 | 13% | 290 | 3% |
| MISSOURI | 8,147 | 12% | 1,970 | 3% |
| MICHIGAN | 10,174 | 12% | 1,749 | 2% |
| SOUTH DAKOTA | 1,190 | 12% | 375 | 4% |
| ALASKA | 925 | 12% | 112 | 1% |
| OREGON | 3,473 | 12% | 395 | 1% |
| INDIANA | 6,444 | 11% | 1,521 | 2% |
| MINNESOTA | 6,379 | 11% | 1,046 | 2% |
| IDAHO | 1,769 | 11% | 452 | 3% |
| KENTUCKY | 4,336 | 10% | 997 | 2% |
| NORTH CAROLINA | 9,818 | 10% | 3,051 | 3% |
| GEORGIA | 11,695 | 10% | 3,205 | 3% |
| KANSAS | 3,582 | 10% | 826 | 2% |

| | | | | |
|---|---|---|---|---|
| WISCONSIN | 5,759 | 10% | 1,038 | 2% |
| ARIZONA | 4,757 | 10% | 1,497 | 3% |
| WEST VIRGINIA | 1,757 | 9% | 370 | 2% |
| SOUTH CAROLINA | 4,987 | 9% | 1,266 | 2% |
| OHIO | 8,236 | 9% | 1,958 | 2% |
| ILLINOIS | 12,416 | 9% | 3,204 | 2% |
| MONTANA | 949 | 9% | 480 | 5% |
| NEBRASKA | 2,202 | 9% | 496 | 2% |
| NEW YORK | 18,035 | 9% | 5,477 | 3% |
| MAINE | 1,390 | 9% | 406 | 3% |
| FLORIDA | 14,999 | 9% | 5,282 | 3% |
| MARYLAND | 5,591 | 9% | 1,016 | 2% |
| NEW HAMPSHIRE | 1,328 | 9% | 108 | 1% |
| UTAH | 2,816 | 9% | 352 | 1% |
| DELAWARE | 735 | 8% | 434 | 5% |
| NEVADA | 1,813 | 8% | 614 | 3% |
| VIRGINIA | 6,616 | 8% | 1,829 | 2% |
| CALIFORNIA | 20,758 | 8% | 5,485 | 2% |
| PENNSYLVANIA | 8,611 | 7% | 2,321 | 2% |
| CONNECTICUT | 2,888 | 7% | 821 | 2% |
| NEW JERSEY | 8,171 | 7% | 2,290 | 2% |
| COLORADO | 3,767 | 7% | 693 | 1% |
| WASHINGTON | 4,212 | 7% | 939 | 2% |
| RHODE ISLAND | 674 | 6% | 106 | 1% |
| HAWAII | 702 | 6% | 250 | 2% |
| MASSACHUSETTS | 4,111 | 6% | 1,311 | 2% |
| DISTRICT OF COLUMBIA | 400 | 5% | 50 | 1% |

## List of stakeholders interviewed

Apple
CDE Foundation
Charter Communications
Comcast
Cox
CT State Dept. of Education (CSDE)
Dallas ISD
EdNavigator
EducationSuperHighway
Emerson Collective
FCC
Kajeet
Khan Academy
Kipp DC
Kipp Delta
LAUSD
Texas Education Agency
T-Mobile
UC San Diego
Verizon
Walmart
Wide Open School
Zoom

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