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High School Students' Access to and Use of Technology at Home and in School

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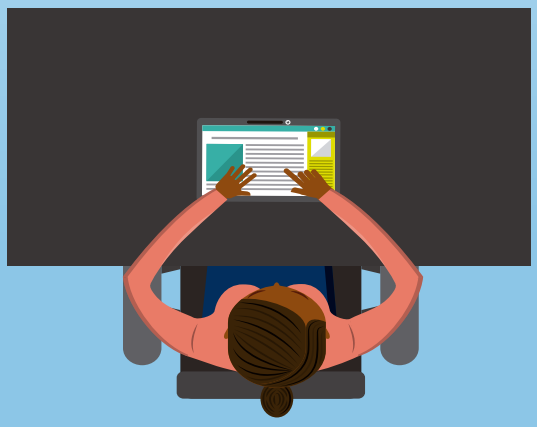

ACT® Center for Equity in Learning

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RELATED WORK

This paper is one of a series of reports on students' access to technology. For more information, see:

Moore, Raeal, *Smartphones and Laptops are the Most Accessible Technological Devices Students Have at Home* (Iowa City, IA: ACT, 2018), https://www.act.org/content/dam/act/unsecured/documents/R1680-tech-devices-at-home-2018-05.pdf.

Moore, Raeal, and Vitale, Dan, *The Digital Divide and Educational Equity: A Look at Students with Very Limited Access to Electronic Devices at Home*. (Iowa City, IA: ACT, 2018), https://www.act.org/content/dam/act/unsecured/documents/R1698-digital-divide-2018-08.pdf .

SUMMARY

Access to technology is essential to educational success as well as workforce and community development. However, geographical, income-based, and racial/ethnic disparities in technology access persist.[2]

This "digital divide"—the gap between people who have sufficient knowledge of and access to technology and those who do not—can perpetuate and even worsen socioeconomic and other disparities for already underserved groups.

The digital divide has also been referred to as the "homework gap," due to the challenges that students in technology-deficient circumstances face when trying to do their homework. This gap continues to widen as teachers incorporate internet-based learning into their daily curricula.[3]

SO WHAT?

ACT surveyed a random sample of students who took the ACT® test as part of a national administration in April 2017.[5] We asked the students numerous questions about their access to and use of technology specifically for educational activities, both at home and in school, including the number and kinds of devices they have access to, the kind and reliability of the internet connection(s) available to them, and how often they used electronic devices for school-related activities.

NOW WHAT?

Access to devices and internet appears to be somewhat uneven among the ACT-tested students we surveyed. Policy recommendations are to expand device access and internet among those who lack them, ensure students can access materials needed for school related activities via mobile technology, and improve the quality of school internet connections.

High School Students' Access to and Use of Technology at Home and in School

Raeal Moore, PhD, & Dan Vitale

Technology—including the internet and electronic devices such as smartphones and computers—is an integral part of everyday life in the United States.[1] Access to technology is essential to educational success as well as workforce and community development. However, geographical, income-based, and racial/ethnic disparities in technology access persist.[2]

This "digital divide"—the gap between people who have sufficient knowledge of and access to technology and those who do not—can perpetuate and even worsen socioeconomic and other disparities for already underserved groups.

The digital divide has also been referred to as the "homework gap," due to the challenges that students in technology-deficient circumstances face when trying to do their homework. This gap continues to widen as teachers incorporate internet-based learning into their daily curricula.[3]

To date, most research about the digital divide has focused on the US population generally, with less attention paid to determining whether the divide exists among students in the US education system.[4]

To contribute toward answering this question, ACT surveyed a random sample of students who took the ACT® test as part of a national administration in April 2017.[5] We asked the students numerous questions about their access to and use of technology specifically for educational activities, both at home and in school, including the number and kinds of devices they have access to, the kind and reliability of the internet connection(s) available to them, and how often they used electronic devices for school-related activities. In general, the survey yielded the following findings (which are described at greater length in the remainder of this brief).

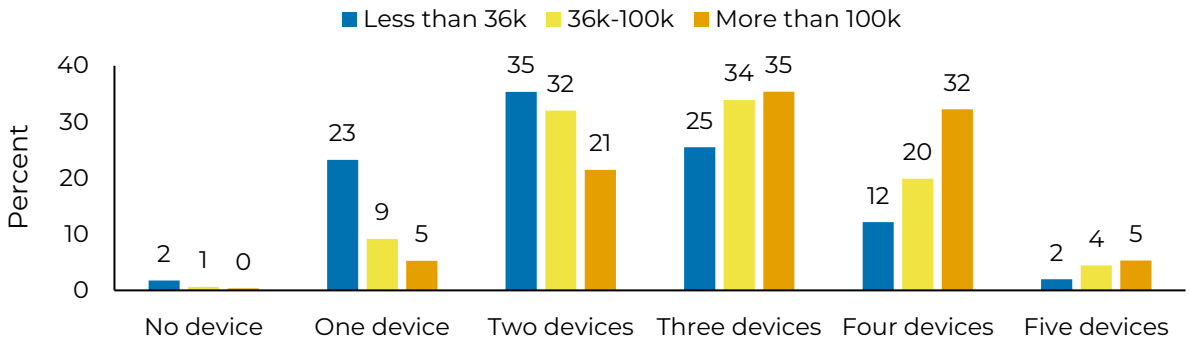
- Nearly all students have home internet and at least one electronic device they can use at home. However, the total number of devices students have access to tends to increase with reported annual family income range and sometimes differs by racial/ethnic group.
- The most commonly reported available device at home is a smartphone, and the most commonly reported home internet connection is a monthly cellular data plan. Students also tend to report that their home internet is of higher quality, and is more reliable, than their school's internet connection.
- The most commonly reported available device in school is a desktop computer.
- Among a selection of school-related activities, students tend to use a device most often to check their grades or communicate with their teacher.

Device Access

Almost all students (99%) who participated in the survey reported having access to at least one electronic device at home. This was true by income and by racial/ethnic group.[6] However, it is worth noting—although perhaps not surprising— that the percentage of students who reported having access to only one device at home was substantially higher among traditionally underserved students such as those in the lowest reported annual family income range (Figure 1; 23% vs. 9% and 5% for higher income ranges).[7]

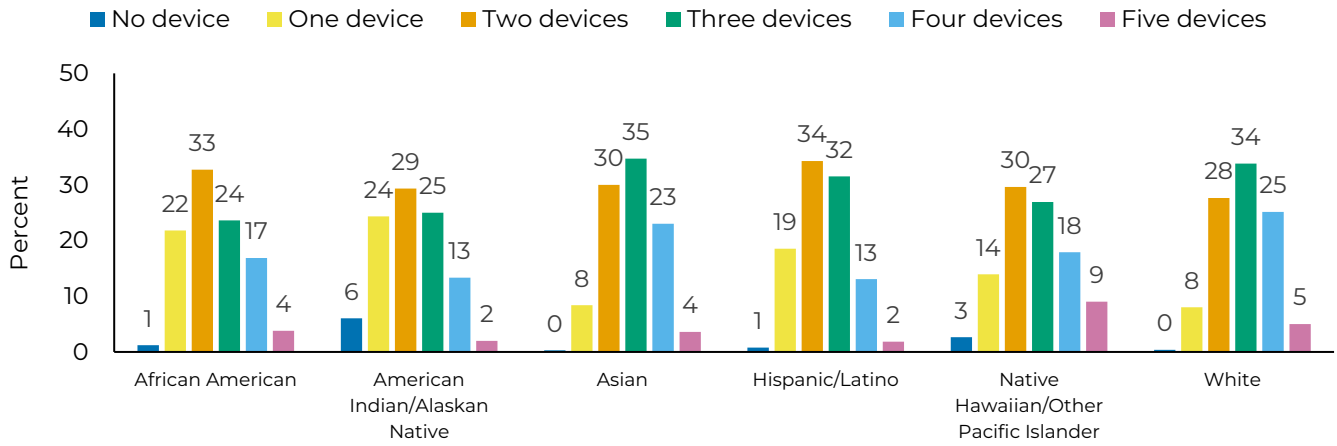
The percentage of students who reported having access to only one device at home was substantially higher among traditionally underserved students such as those in the lowest reported annual family income range.

Figure 1. Percentage of students who reported the number of devices students have access to at home, by annual family income range



Greater disparities in device access emerged by racial/ethnic group with underserved student groups experiencing large equity gaps. For example, the percentage of American Indian/Alaskan Native students (24%) who reported having access to only one device at home was triple that of White students (8%), and the percentage of African American students (22%) who reported this was nearly as high (Figure 2).

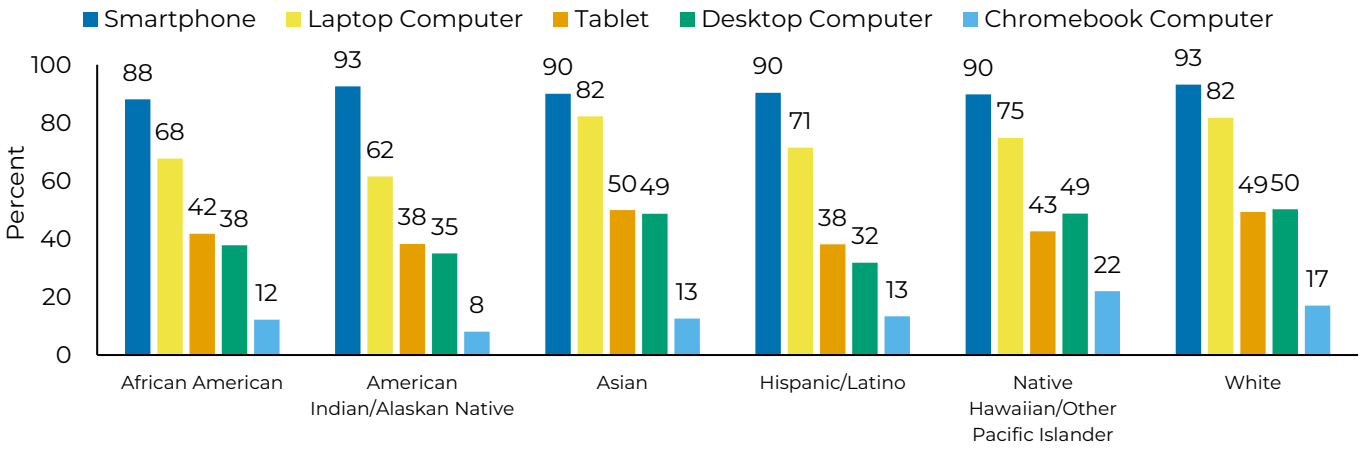
Figure 2. Percentage of students who reported the number of devices students have access to at home, by racial/ethnic group



Of those students who reported having access to technology at home, nearly all (91%) reported that at least one of those devices was a smartphone. A high percentage of students reported having access to a laptop (76%), while fewer than half reported having access to a tablet (45%) or desktop computer (42%).

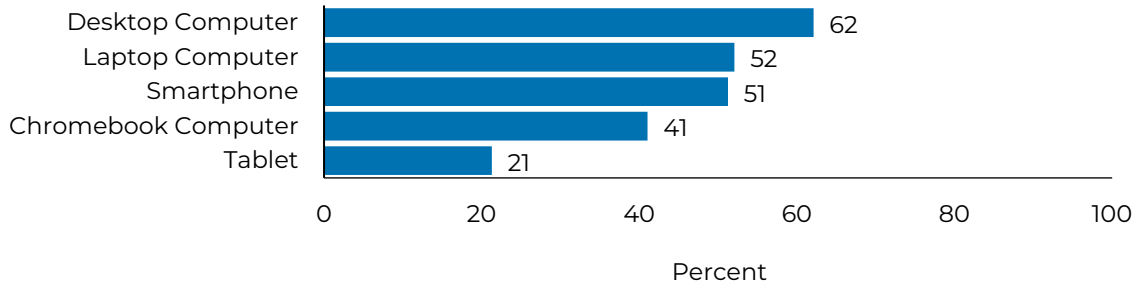
These results generally held true across racial/ethnic groups. As shown in Figure 3, the sharpest racial/ethnic disparities were observed with respect to laptop access, with 20 percentage points separating the group with the lowest reported access (American Indian/Alaskan Native) from the groups with the highest (White and Asian).[8]

Figure 3. Percentage of students who reported the types of devices students have access to at home, by racial/ethnic group



In school, the most commonly reported device students have access to was a desktop computer and the least commonly reported was a tablet (Figure 4). Results by racial/ethnic group or family income differed only minimally from these results.

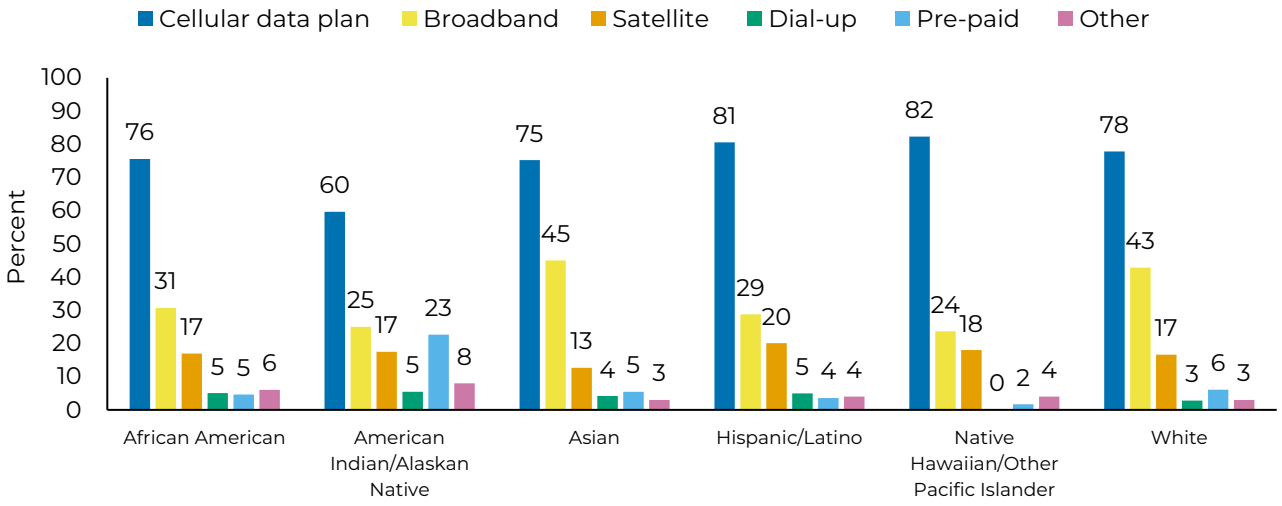
Figure 4. Percentage of students who reported the types of devices they have access to in school



Internet Access

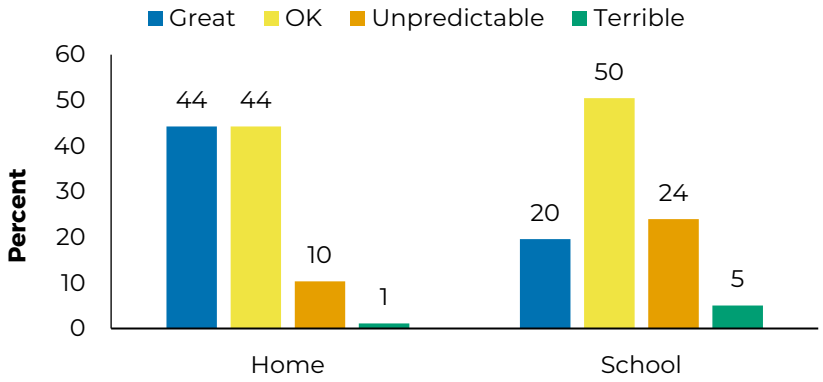
Almost all students (99%) have access to the internet at home. Three of every four students reported that they access the internet via a monthly cellular data plan; broadband, at 36%, was a distant second.[9] Some differences emerged by racial/ethnic group, with these data plans used most often by Native Hawaiian/Other Pacific Islander and Hispanic/Latino students and least often by American Indian/Alaskan Native students (Figure 5).

Figure 5. Percentage of students who reported the types of internet access at home, by racial/ethnic group



Overall, students tended to report that their home internet was of better quality than the internet in school, with, relatively, a far lower percentage rating internet quality in school as “great” and a substantially higher percentage rating it as “unpredictable” (Figure 6).[1]

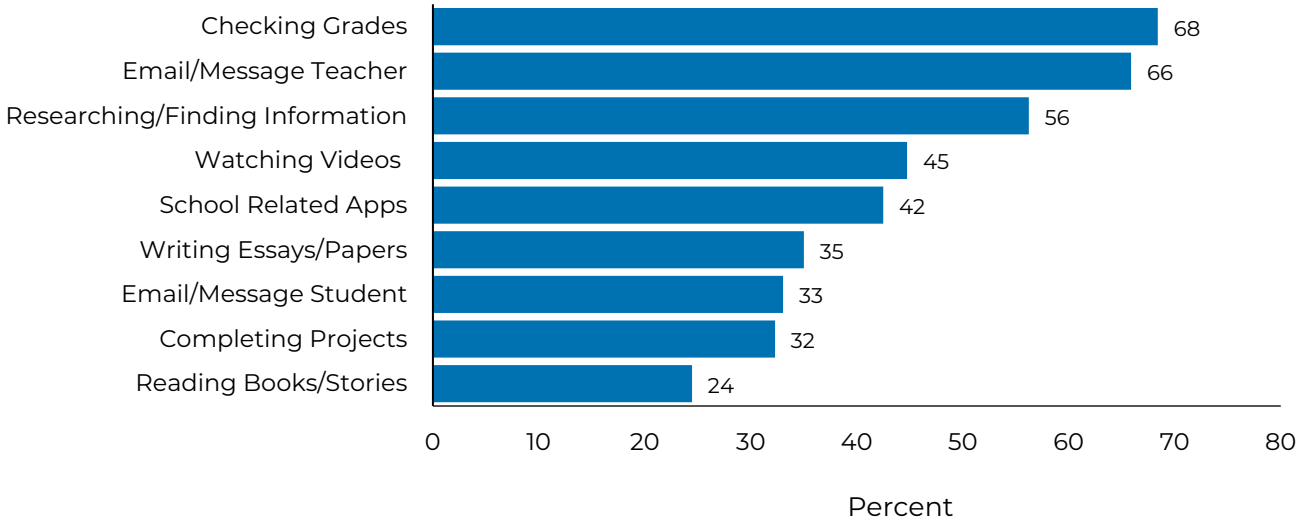
Figure 6. Percentage of students, by reported quality of home and school internet



Amount and Frequency of Device Use for School-Related Activities

Students were asked whether they used devices to complete various school-related activities. If students indicated such use, they were also asked how often they used the device for the activity. Figure 7 presents the findings for students who reported using a device daily to perform an activity. The highest percentages of students—two-thirds or more—reported using a device daily to check their grades (68%) or to email or message their teacher (66%).

Figure 7. Percentage of students who reported their daily use of devices for various school-related activities



Policy Recommendations

1. Expand device access and internet among those who lack them.

While not enormously disproportionate, access to devices and internet appears to be somewhat uneven among the ACT-tested students we surveyed. It also appears to affect some underserved students more than other groups, thus contributing to opportunity and achievement gaps. For example, Figure 3 above shows that the percentages of home laptop access among some groups of underserved students are as much as 20 percentage points lower than the corresponding percentages for Asian and White students, a discrepancy that almost certainly puts these underserved students at a disadvantage when attempting to complete assignments at home. Programs that help to rectify device and internet access imbalances—such as one-to-one laptop initiatives,[12] Wireless Reach,[13] or the private-sector Kajeet[14]—are helping to improve educational opportunity for those in greatest need as they prepare for the 21st-century economy.

2. Ensure students can access materials needed for school-related activities via mobile technology.

According to a study published in 2016, one-third of families whose sole access to the internet is via mobile technology quickly hit data limits on their phone plans and about one-fourth have their phone service cut off for lack of payment.[15] Given that in our survey the most commonly reported device at home was a smartphone and the most commonly reported home internet connection was a monthly cellular data plan, teachers should do their best to ensure that students can easily find, view, and use required electronic materials via their phones and that such use does not place an unmanageable burden on their or their families' data plans.

3. Improve the quality of school internet connections.

Based on the overwhelming student response that the quality of internet access at school is "OK" as compared to "great" (see Figure 6) and the high percentages of students using technology to complete school-related activities, districts and states should prioritize and fast-track making such access available in the most technology-challenged schools. For example, rather than removing its support, as has been proposed or enacted,[16] the federal government should maintain or increase support for programs such as Lifeline and E-rate, which enable schools to access affordable broadband internet.

Notes

1. In the second half of 2011, 274 million Americans had internet access, a 200% increase since 2000; Nielsen, *State of the Media: US Digital Consumer Report Q3-Q4 2011* (NM Incite and Nielsen, 2012), http://dreamflymarketing.com/wp-content/uploads/2012/02/Nielsen-Generation-C-Digital-Consumer-Report-Q4-2012.pdf. In addition, 77% of American adults in 2016 owned a smartphone; *"Mobile Fact Sheet,"* Pew Research Center, January 12, 2017, http://www.pewinternet.org/fact-sheet/mobile/.
2. *Federal Reserve Bank of Dallas, Closing the Digital Divide: A Framework for Meeting CRA Obligations* (Dallas, TX: Federal Reserve Bank of Dallas, 2016), https://www.dallasfed.org/cd/pubs/digitaldivide.aspx.
3. McLaughlin, C. *"The Homework Gap: The 'Cruelest Part of the Digital Divide,'" NEA Today*, April 20, 2016, http://neatoday.org/2016/04/20/the-homework-gap/.
4. Exceptions include research by the State Educational Technology Directors Association on access to technology as a bridge to equity (SETDA, "Equity of Access," State Educational Technology Directors Association, http://www.setda.org/priorities/equity-of-access/) and research by the Partnership for Assessment of Readiness for College and Careers on technology and internet accessibility for the purposes of online testing (US Department of Education, Office of the Deputy Secretary, Implementation and Support Unit, *Race to the Top Assessment: Partnership for Assessment of Readiness for College and Careers Year Two Report,* Washington, DC, 2013, https://www2.ed.gov/programs/racetothetop-assessment/reports/parcc-year-2.pdf). Both initiatives are narrower in focus (e.g., emphasis on technology in school and not in the home and for specific purposes such as testing) than research conducted by ACT.
5. 61,639 students who registered to take the ACT (17% of all registrants for the April 2017 test date) were invited to participate in the online survey, and 7,233 students participated (response rate of 12%). Some questions were adapted from the American Community Survey (ACS) and the Pew Research Center, while others were developed internally by ACT researchers. A random sample of students who did not finish the web survey or never started it were mailed a paper survey to ensure that responses from the online administration were not a function of mode of survey delivery. A comparison of web and paper survey respondents showed that the percentages of students with internet access and electronic-device access were virtually identical across the two delivery modes.

6. Survey respondents reported their race/ethnicity as follows: 40% White; 25% Hispanic/Latino; 15% African American; 7% Asian; 4% American Indian/Alaskan Native; 4% two or more races; and 1% Native Hawaiian/Other Pacific Islander. The distribution is due to the oversampling conducted on all but the White and "prefer not to respond" categories (which were correspondingly under-sampled). All American Indian/Alaskan Native and Native Hawaiian/Other Pacific Islander students who registered for the April 2017 test date were asked to participate in the survey. In total, 437 American Indian/Alaskan Native and 95 Native Hawaiian/Other Pacific Islander students participated; while the latter is a relatively small number, it constitutes 15% of the total registered students who self-reported this category. Weights were applied in the analyses to account for the over- and under-sampling. Students who selected "two or more races" or "prefer not to respond" (8% in total) were omitted from the race/ethnicity–based analyses (but not from the other analyses).
7. Approximately 28% of students did not report household income level; these students were omitted from the income-based analyses (but not from the other analyses). Of those who provided household income data, 24% reported that their annual family income was greater than $100,000; 37% reported that it was between $36,000 and $100,000, and 39% reported that it was less than $36,000.
8. Students were asked to answer the question: "At home, which of the following types of devices do you have access to? Please choose all that apply." The response options were: Desktop computer, Laptop computer, Chromebook computer, Tablet, Smartphone, and I don't have access to any technological devices at home.
9. In contrast, research by Pew found that 70% of US households have broadband at home (Pew, "Home Broadband 2015," Pew Research Center, December 21, 2015, http://www.pewinternet.org/2015/12/21/home-broadband-2015/). This may be due to differences in the populations under investigation and/or to students' lack of precise knowledge about the type of internet they have access to at home.
10. One percent of students reported having no internet access in school. In the survey, quality-of-internet indicators included descriptions: Great = I never have problems connecting to the internet when I need to; OK = Most days I have a good internet connection but occasionally the internet doesn't work; Unpredictable = Sometimes the internet connection is good, sometimes it's not; and Terrible = Allegedly we have access, but it doesn't work.

11. The most commonly reported activity requiring device use on a weekly or monthly basis was completing projects (37% and 26%, respectively).
12. See, for example, Herold, B. *"One-to-One Laptop Initiatives Boost Student Scores, Researchers Find,"* Education Week, May 11, 2016, http://blogs.edweek.org/edweek/DigitalEducation/2016/05/one-to-one_laptop_test_scores.html.
13. *"Wireless Reach,"* Qualcomm, https://www.qualcomm.com/company/wireless-reach.
14. *"Kajeet, More than just Internet,"* Kajeet, http://www.kajeet.net/.
15. Rideout, V., and Katz, V. S., *Opportunity for All? Technology and Learning in Lower-Income Families* (New York, NY: The Joan Ganz Cooney Center at Sesame Workshop, 2016), http://digitalequityforlearning.org/wp-content/uploads/2015/12/jgcc_opportunityforall.pdf.
16. Stratford, M. *"Final Vote on DeVos Today," Politico*, February 7, 2017, http://www.politico.com/tipsheets/morning-education/2017/02/final-vote-on-devos-today-218612.

ACT Center for Equity in Learning

ACT's Center for Equity in Learning supports research that focuses on closing gaps in equity and achievement. The Center works to produce actionable evidence to guide thought leadership and inform changes in policy and practice that will lead to improved learning and achievement.

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