School-to-Home

Understanding Why 24/7 Access to Broadband is Essential to Student Learning

CoSN
LEADING EDUCATION INNOVATION

CONTENTS

1. The Challenge

According to PEW research:

- About 5 million households with school-age children do not have access to high speed internet services at home.

- Lower income families comprise 40% of households with school-age children, yet almost one third of them do not have home access to broadband services.

- Among lower income groups, Black and Hispanic families are about 25% less likely to have home internet than white families.

The CoSN 2016 E-rate and Infrastructure Survey, notes that fewer than 10% of school systems reported that 100% of students have access to non-shared devices at home or in the community. However, 41% of school systems reported that a large percentage (75%-99%) of students have access to the internet through shared devices. Further, only 68% of school districts reported that they fully meet the 2014-15 minimum internet bandwidth recommendations set by the Federal Communications Commission (FCC) in every one of their schools, indicating a digital equity issue even before students go home.

Why is broadband access important?

The goal is to prepare students for life, college, and career and the life-long learning skills that will be needed as career requirements evolve more rapidly than ever. Adeptness with computers, mobile devices, and the Internet; experience working with digital resources, real-time and asynchronous collaboration in diverse geographies; and creation of digital artifacts such as documents, videos, e-mail and more are required to be prepared for college, successful in personal and civic life and competitive in the job market. Such facility is created as a side effect of using computers and the Internet for the work of students: learning.

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Why are non-shared devices important?

There are two issues with sharing devices. The first is how much time each student has with a device, the second is *when* that device is available. Students need the ability to look up information or jot down ideas at the time it occurs . They need the opportunity to collaborate and respond to their peers without delaying the progress of a shared project. They need access on demand. Students also need access to devices for personal as well as academic purposes, again on demand. Using the device for personal reasons will develop skills such as searching, evaluating online content, creating a digital reputation, and more that combine with academic skills to create authentic Internet fluency.

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Why is on-demand Internet access at home important?

A frequently cited need for home broadband access is the "homewvork gap." In 2009, the Federal Communication Commission's Broadband Task Force reported that approximately 70% of teachers assign homework requiring access to broadband. In homes where broadband is not available, this means that parents need to take their children to a library or, if they have devices but no Internet access, to a local business that offers WiFi. The "homework gap" impacts the most disadvantaged who carry the additional burdens of absence of devices, lack of transportation and no internet connection.

The teacher will have to offer paper alternatives to students who lack internet. The result will be that students without broadband have lower quality homework experience, or that the homework is targeted toward the lower common denominator depriving all students of the opportunity to receive higher quality assignments.

Why is on-demand Internet access beyond school and home important?

The work of students is not limited to the classroom and the home. Students need to be able to work on the school bus, in after-school care, during breaks at after-school jobs, while watching older siblings do sports, at the homes of friends and relatives, and anywhere else where the spend time. Learning, likewise, is not limited to school topics. Students who are developing into lifelong learners utilize on demand Internet access to research a wide variety of topics that catch their interest.

Clearly, there is a great deal of work that needs to be done to narrow the access gap. This issue constitutes a new civil right: The right to digital equity; the right to connect to needed resources—anywhere, anytime. This is a civil right that cannot be achieved by school leaders alone. A holistic approach will ensure that school-aged children aren't reduced to little, or no access. It calls for community leadership that is connected and collaborative. CoSN is actively working on a Digital Equity Action Agenda and has developed a free, Digital Equity Toolkit which can assist school districts in building collaborative partnerships to address digital equity barriers. Together, communities are finding much more success when they attempt to tackle access issues in isolation.

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2. Barriers to Extending Broadband to All Homes

There are two key barriers to addressing the "homework gap." The first is accurately assessing the need. The second is addressing the need which can be expensive in areas where broadband is unavailable and virtually impossible in areas without wired or cellular broadband services. This is common in rural areas but also other areas where there are not enough homes per mile for carriers to justify a buildout. School boards should consider encouraging providers to make every effort to serve every household where a student resides.

Assessing the Need

The first step is to understand the size of the problem. Is it one that can be solved with a handful of cellular hot spots, or is it a far more pervasive problem in the district? For districts that are employing a Bring Your Own Device (BYOD) approach or that call for student use of family owned technology at home, it is important to determine whether students have adequate access to devices that are sufficiently robust to support student assignments.

Determine the requirements for devices and broadband.

- Is there a minimum screen size?

- Is there a requirement for a keyboard?

- Is there a required operating system and version?

- Are there minimum uplink and downlink speeds for Internet access?

Survey families

The survey is an obvious way to obtain information about access but there are challenges. Some families are reluctant to admit that they lack computers or broadband in the home and may answer the questions based on considering cell phones or dial-up connections to be adequate Internet. Others find completing a survey too difficult if the content is overly technical or is not provided in their primary language. In part these issues can be mitigated by thoughtful survey design, but not fully. A sample survey can be found in the Digital Equity Toolkit and may serve as a good place to start.

Other sources of information

Often the most effective way to assess the need is by using the relationship between the teacher or principal and the families to collect information in a trusted environment.There are other sources of information that might help provide a clearer picture such as counsellors, nutritions services, and social service agencies might also provide information without compromising private data.

Addressing the Need

For most districts, only stop-gap measures are available to address the need for adequate Internet access in the home and in the community. Some of the most advanced solutions involve providing devices or hotspots with high-speed Internet for every student that doesn't otherwise have access. For many districts this is unachievable because of cost or lack of availability of fiber or cellular high speed internet in the region.

Despite these challenges districts are looking for ways to improve student access to the Internet in regions where fiber or cellular service is available such as:

- Advertising public Wi-Fi centers
    - » Library buildings
    - » Municipal recreation and community centers
    - » Churches
    - » Cultural centers
    - » Restaurants and coffee shops

- Making school Internet available 24/7 in parking lots and athletic fields

- Providing portable Wi-Fi hotspots or cellular-enabled devices for students to check out for time periods as short as a day to as long as their time at a given school

- Extending existing school networks to home and community via private LTE network technology. In late 2016, Pasadena Independent School District became the first school district In Texas to provide its own private, self-managed, high speed, wireless LTE broadband network for students at home. The 4G-LTE internet access brings relevant curriculum resources that are only available in the classroom, to families in their homes to enable continuous learning opportunities. Students now have the opportunity to explore and expand their knowledge of assignments in their own environment, while staying connected to the same safe and secure network managed by the district.

- Educating families regarding the availability of entry level Internet service. In Chattanooga, TN, the school district brings parents into the school and helps them fill out the forms for discounted services in an effort to make this connection easier. The organization everyoneon provides a database that allows anyone to enter their zip code to find access to discounted internet rates and affordable computers

To date none of these solutions truly address the concerns of equity. Students who don't have WiFi at home have a significant additional burden over those who do such as having to obtain transportation to places where WiFi is available while their counterparts work on schoolwork in the comfort of their homes while their parents prepare dinner. Other solutions often become cost prohibitive either to the school or the family.

Approach	Pros	Cons
Public WiFi	Cost (Often Free to school and house-hold) Compatibility (Works with any Wi-Fi enabled device)	Requires transportation or physical location (sitting in parking lots at night, for example) Does not provide connectivity at home (where most kids do homework with parental support) Not filtered or managed by the school for educational use "Free Wi-Fi" is a frequent vector for malware and bad actors Speed / Performance is unpredictable Policies are outside school control (may block resources students need or have limited hours, bandwidth, etc.) Public Wi-Fi maps can become outdated (businesses close/move, change free access, etc.) No reporting or analytics available
School Provided Hotspot	Filtered / CIPA compliant School owned / managed / controlled Full reporting and analytics available Customizable policies (24/7 or blocked for bedtime or during school hours, etc.) Works virtually anywhere the student is (within cellular coverage) Compatibility (works with any Wi-Fi enabled device) Can be integrated into existing library checkout processes	Cost ($10 - $20 / device / month) Own/Lease and manage hotspot hardware (distribute/collect)

Approach	Pros	Cons
Low-Income Programs	Cost to school Wired connections (cable/dsl) offer decent speed / performance, in most cases (some low-income programs are speed capped) Compatility (if a wi-fi router is included, works with any wi-fi-enabled device)	Cost to family Eligibility requirements (varies by provider, but not all families are eligible, often Title I) Credit checks (varies by provider) Requires a permanent location for wired connection (Cable/DSL doesn't work for transient households) If parents/guardians do not "opt in" or drop it later, school has no recourse for the student's loss of access Typically no filtering, no CIPA compliance No reporting or analytics available
Private LTE Network	Filtered / CIPA compliant School owned / managed / controlled Full reporting and analytics available Customizable policies (24/7 or blocked for bedtime or during school hours, etc.) Works virtually anywhere the student is (within cellular coverage) Compatibility (works with any Wi-Fi en-abled device)	Cost

Some rural districts don't have any Internet providers available. The only available Internet in that case is satellite, which too slow and expensive to serve the needs of education. However, there are communities such as Sandy, Oregon that have built out fiber to (virtually) every door by charging for service at rates that are lower than that of most providers.

Additional spectrum can be used by districts to provide students local Internet access including:

• TV White Space (TVWS or "White-Fi") where schools can share district Internet with student households after hours using un-utilized UHF TV channels

• Educational Broadband Services (EBS) which has recently been revamped by the FCC making it possible for EBS users to provide students with high-speed internet access. The National EBS Association shares more insight on how to take advantage of these services.

    » Bend-La Pine schools in Bend, Oregon are taking advantage of these services

    » Spectrum for private LTE networks is readily available in many areas. The advantages would be a fixed capital expense, one yearly maintainec

3. Network and Device Considerations

Expect bandwidth usage to grow as a result of increased use of technology in the classroom when every student has a device and teachers can rely on students having internet access at home. It is not uncommon for districts to see 60% bandwidth growth each year while they are on the steep part of the growth curve (due to everything from more devices in the district to increased utilization due to new pedagogical approaches.) For more resources on planning for network growth, see CoSN's Smart Education Networks by Design. (www.cosn.org/send)

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Where students are using their own devices, choosing digital applications, resources, and tools that are device agnostic is essential to enable student access with the devices they have available in the home.

Where the district specifies or purchases devices, the end-user device purchased may impact usability, connectivity, support and reliability. Ensure that the devices students are using at school and at home are adequate for instructional use. Consider screen size, computing power, and availability of a keyboard.

4. Funding

Look for funding opportunities to close the gap on home access for students. Consider:

- Capital Expenditures
- Operational Expenditures
- Federal Funds (including Title funds, LAP, IDEA, etc.)
- State Funds (check your state options)
- Bonds
- Levies
- Grants
- In-Kind and School-to-Business partnerships

These opportunities can be leveraged to implement the right solution for growth and support. Be sure to develop a sustainable funding plan that will support school-to-home at stable or increasing levels over multiple years.

Consider ERate and structure funding purchases in conjunction with ERate guidelines/timelines. ERate does not authorize School to Home connectivity at this point; however, if devices are going home these funding options can be used to build and support the network.

This paper is part of [CoSN's Digital Equity](#) and [Smart Education Networks by Design (SEND) Initiatives](#)

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