

Education Drives Demand for Fiber

In education, as in other fields, innovation increasingly depends on technology – and that technology involves homes as well as schools. “Homework gap” households without good Internet access will lose educational opportunities.

By Rollie Cole / *Sagamore Institute for Policy Research*

Roughly 30 percent of all U.S. households – about 37 million – have one or more children under the age of 18. All those households are or soon will be participating in the educational system. If the trends I identified at South by Southwest Education (SXSWedu) hold true, most of those households will have clear reasons for subscribing to fiber-to-the-home services.

SXSWedu is an annual conference held in Austin by the same organization that puts on the huge South by Southwest conferences on film, music and video games. In 2015, SXSWedu attracted more than 6,000 participants, including (in roughly equal proportions) educators, vendors trying to sell services to educators, and interested observers, such as me. It featured hundreds of sessions, 100-plus exhibitors and, of course, a party at the end of each day. The size and rapid growth of this conference, which first launched as a regional event in 2011, shows how much is going on in the world of educational innovation.

During the 2014 and 2015 events, I identified several trends likely to cause communities to demand higher broadband speeds in the near future – not just in schools but wherever teachers or students of any age are found.

ONLINE TESTING

The move to online testing is the most immediate driver of bandwidth demand in schools. The adoption of Common Core and similar standards and assessments, as every parent knows, has led

to an increase in federal- and state-mandated testing. Because online testing is clearly faster, better and cheaper, many state regulatory agencies are requiring it, sometimes even before adequate broadband is in place.

A number of school districts are struggling because their physical and social infrastructures are not equal to the challenge. In general, testing creates a need for better broadband to and within schools, but students can also benefit from online practice at home.

DIGITAL EDUCATIONAL MATERIALS

In addition to requiring online testing, state agencies are beginning to mandate the use of digital educational materials. For example, North Carolina, which passed laws to limit municipal broadband in 2011, is restricting state textbook funding to digital materials beginning in fall 2016.

A number of huge textbook publishers, such as McGraw-Hill and Pearson, were involved throughout SXSWedu. Their textbook replacements, which are increasingly graphic and interactive, require large files to be stored and displayed from somewhere.

Publishers made their early experiments work by loading the requisite files on individual devices in some cases and on school or district servers in others. However, they are facing severe pushback. Students are using devices, such as smartphones and tablets, that have limited storage, and schools and districts are



The Playground at SXSWedu 2015 offered attendees the opportunity to try out the educational technologies being discussed.

resisting any more demands on their servers. In most cases, school districts want publishers to store and serve e-textbooks from the cloud (perhaps using third-party caches somewhere close to their districts). To use cloud-based e-texts effectively will require much higher-speed broadband than many communities now have, especially if students must access texts from homes, libraries and community centers in addition to school buildings.

All schools use textbooks. Many already use static, digital versions of the old static, analog books, with photos and diagrams but nothing that moves or responds to a student. However, if even a small percentage of schools shift to e-textbooks that have extended graphics, video and interactive features, the impact on bandwidth demand could be huge.

SXSWedu spotlighted other firms in addition to the major textbook

publishers that produce digital text and digital video for classroom use. One digital text vendor – Jason Singer, CEO of Curriculet and a former high school principal – explained how his product helped teachers embed a layer of questions, quizzes and annotations into digital texts. He also described a new licensing scheme that charges per view rather than per copy so that schools are not charged for items that no one reads. Some digital video products help

teachers make lecture videos; others help students learn to make their own videos. For example, a student might create a video as part of a college admissions essay.

Students need access to these digital materials at home just as they need access to textbooks at home. Schools could conceivably put the materials on USB flash drives, but having adequate broadband at home is clearly preferable.

NETWORK SKILLS

Guy Kawasaki, a technology evangelist who became famous for marketing Apple's first Macintosh computer, gave a keynote at SXSWedu on today's top 10 lifelong skills. His No. 6 skill was how to use graphics, No. 7 was how to make a video and No. 8 was how to use social media. He is only one of many who advocate learning digital skills. All these skills drive demand for broadband, including broadband at home.

Turning education into a game helps students of any age develop their skills. Because today's learning games are graphics intensive and time dependent, they require great broadband.

VIRTUAL LEARNING

Beyond school-sanctioned e-textbooks, a host of supplementary online products for students will drive demand for better broadband at home. Macmillan, for instance, offers a product called "Late Nite Labs" (<http://latenitelabs.com/>). The company claims it will work even at dial-up speeds, but that does not seem plausible.

The Khan Academy is only the best known of hundreds of companies that produce online material targeted directly to students. In addition, teachers use Skype and similar services to bring remote resources to local audiences by means of guest speakers, virtual field trips and even the use of university and corporate lab equipment to run experiments.

Neither school districts nor individual schools want to host the software for virtual learning products. They want publishers to do that, just as they want them to host e-textbooks. So accessing these resources requires Internet connections.

GAMIFICATION

An exciting recent development in teaching involves the use of games and game-like activity to develop physical and mental skills. These include skills that schools have traditionally taught (reading, writing, calculating) along with 21st-century skills such as collaboration. A growing number of these games are computer-based. Some computer games are played on local devices, but many are played online. In some, the main screen is displayed via a computer, and students send their input via devices such as tablets or smartphones.

The move to game-like activity

appears extremely popular, especially when activities can be extended outside school buildings to reach students in homes, libraries and community centers. Such outreach is especially interesting to those involved in lifelong learning (before kindergarten and after graduation).

To engage students, many programs use diagrams and animations as well as photographs and video. To create intensity, many are highly time-sensitive, so delays in uploading, downloading and display can affect game play. Many teachers and students will quickly max out all available broadband and plead for more.

HEALTH

Monitoring or actually improving the health of students is increasingly recognized as a way to enhance quality of life and academic performance. One technique demonstrated at SXSWedu was neurofeedback, or learning to exert partial control over one's brain waves. A small but growing body of studies suggests that learning such control can help students who suffer from such afflictions as ADHD and sleep disorders as well as those who seek to improve peak performance in music, athletics and other endeavors. According to the panel leader, the Seattle Seahawks football team uses neurofeedback techniques with its athletes.

In neurofeedback, electrodes placed on a subject's head send signals to a computer, which displays the results on a screen. Broadband allows almost unlimited distance between the input device and the output device. Although today the neurofeedback patient and the therapist are usually in the same room, if these techniques scale, they will undoubtedly involve patients in

one place and experts following the screens elsewhere – perhaps in another city or even on another continent.

TEACHER DEVELOPMENT

Several speakers pointed out that, except for a brief period of student teaching, a teacher (at any level) can spend an entire career without seeing others teach or being observed by others. Several firms hope to change that by working to develop video recordings of teachers teaching that can be shared with other teachers. These large video files need to be uploaded and downloaded.

A MISSED OPPORTUNITY

I found only one company, whose product was for preschoolers, that appeared to think hard about the role of parents in education. My daughter got her 4 in AP Biology thanks to parent-friendly software. Parents are the buyers for almost all student-oriented items and must at least acquiesce in the purchase of school-related items.

The world is missing a big target for edtech marketing. Only a few firms seem to have discovered this target and include parent logins or other features designed to appeal directly to parents, as opposed to teachers or students.

SUMMARY

The term "homework gap," coined by FCC Commissioner Jessica Rosenworcel, refers to the need for students (and teachers) to have substantial broadband access from home, in addition to access from school, to realize all the value that educational technologies can provide. As most technology experts agree, the fastest, most reliable, most future-proof way to provide substantial broadband access from home is FTTH. So I see the homework gap as one factor most likely to dramatically increase the political and economic demand for broadband in general and FTTH in particular in the next few years. ❖

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