Broadband for Education

When Google Fiber announced it was coming to Kansas City to build its first citywide gigabit network, the reaction was frequently: Who could possibly need that much bandwidth? Today, parents and educators would probably agree with Joe Fives, director of technology for the Kansas City, Kan., public schools: "It almost seems like you can't have enough."

Connected schools offer students the opportunity to take interactive field trips to museums and historical sites, study specialized subjects with teachers at other schools, and watch activities ranging from neurosurgery to Himalayan expeditions in real time.

School districts with superior broadband capabilities use "flipped classrooms," in which teachers record lessons as videos on YouTube or similar sites and students study the lessons at home. In school, students solve problems based on the previous night's lesson and get individual help from teachers.

Can communities afford *not* to assure high-capacity broadband for their students? U.S. communities spend $634 billion a year educating the 55 million K–12 students. Yet these students rank 35th in math, 23rd in reading, 27th in science and 16th in technological readiness compared with students in other developed nations. High-speed broadband is one key to closing the gap – and getting a better return on taxpayers' investment.

> Students need good broadband at home as well as in the classroom so they can use Internet-based resources for homework.

Today's fiber-connected schools demonstrate how broadband enhances students' educational opportunities. Though most schools now have Internet access, adequate school broadband is still a work in progress. But over the next few years, fiber-connected schools should become more common, thanks to the federal government's ConnectED initiative. One big issue that is taking longer to solve: ensuring that all students have access to broadband after they leave the school building for home. Fortunately, marketing surveys show that families with K–12 children at home are more likely than any other demographic to buy broadband services. Still, not all homes have broadband available, and not all parents can afford broadband connections.

Here are a few of the many districts that have solved the problem.

NORTH GEORGIA NETWORK

North Georgia Network Cooperative (NGN), a regional fiber provider, supplies dedicated gigabit Internet connectivity to area schools. High schoolers connect to labs, teachers and courses that are available in other districts but not in theirs. Preschoolers at the Little School in Clarkesville, Ga., recently watched a puppet show staged 80 miles away – too far for a "field trip" – as it was streamed into their classroom. When it was over, they participated in a live Q&A with the puppeteer.

"This is just one example of how our technology is giving children amazing learning opportunities," said Michael Foor, VP of marketing at NGN. "We are constantly on the lookout for new and exciting ways for students to benefit, and we're very excited for the future of this technology."

OWSLEY COUNTY SCHOOL DISTRICT

For the Owsley County School District in eastern Kentucky, the mission is "to create an innovative learning environment that breaks down all barriers to student learning and prepares *all* students for college, career and the 21st-century world."

Photo courtesy of Belen Jesuit Preparatory School

Students at Belen Jesuit Preparatory School in Miami began using iPads in the classroom during the 2011-12 school year. In this picture, sixth-grade students use iPads during a Spanish class taught by Alicia Fariñas.

It's a big goal for one of the poorest counties in the nation: Median family income is less than $20,000 in the small rural school district, 41 percent of adults lack high school diplomas and nearly 90 percent of the 740 students qualify for free or reduced-price meals.

But Owsley *is* rich in broadband. Almost all students have gigabit-certified fiber Internet access, both at school and at home, thanks to People's Rural Telephone Cooperative (PRTC), the district's local telephone company. Superintendent Dr. Tim Bobrowski said that PRTC has donated service in some cases and that the district tries to help students with surplus equipment if they don't have their own home computers.

Academically, the results have been startling. Three years ago, 8 percent of Owsley County graduates were recognized as being college- or career-ready. For the class of 2015, it was 83.3 percent.

Students take courses online that are not available locally, and sophomores, juniors and seniors are offered dual-credit courses at several local colleges. In May 2014, Owsley High graduated its first student receiving both a high school diploma and an associate of arts degree.

One of Owsley's most innovative ideas is virtual snow days. Each winter, students missed nearly a month of school when snow and ice made traveling to school too dangerous. Now kids log in to Blackboard Learn, the district's learning management system, and tackle the day's work from home. Blackboard allows teachers to upload lessons and supplemental materials for students to access anywhere, electronically.

"Instead of just learning from the book, it gives you a lot of additional material," said one Owsley High student, who says she accesses the site frequently to supplement her Spanish classwork.

Thanks to programs such as MasteryConnect, which monitors student performance and spots remediation needs, teachers can deliver individualized lessons. Both teachers and administrators monitor the coursework to ensure that the virtual day parallels the learning that would have taken place on a regular instruction day.

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>
> – Bailey Mitchell, CTO and CIO, Forsyth County (Ga.) Schools

Owsley's teachers don't get snow days off, either. "I send them Facebook messages, email them, text and call," reports one math teacher. Notices and requirements for each snow day also go out on Twitter and Infinite Campus Messenger. With students messaging back, it's a two-way street. The district keeps finding new ways to take advantage of the community's robust fiber infrastructure. Two of its school buses are now equipped with Wi-Fi.

The latest new program? Telemedicine. Equipment provided by a county health department grant connects the school nurse with a local health care provider, who can virtually examine a patient and then call in a prescription or refer the child to a specialist. Staff members have access to the service as well.

FORSYTH COUNTY

Since 2012, the Forsyth County school district just outside Atlanta has used a business Ethernet connection from Comcast to support streaming video, interactive whiteboards, mobile devices and digital content for its 40,000 K–12 students in 35 schools. The system provides learning plans based on individual students' needs, preferences and performance. It takes into account learning interests and learning style to increase student engagement and boost academic performance. Students can learn at home on their own or at school, using high-speed Internet connections, and be rewarded by their teachers in collaborative settings.

Forsyth lets students use their individual Internet-capable tablets, laptops, netbooks and cellphones to work in classrooms. Other schools around the country have substituted standard equipment – iPads, Chromebooks and so forth – vastly cutting their maintenance costs while creating new learning environments. In Forsyth schools, for instance, students participating in the NOBLE Virtual World project interact in a digitally created world where they can create anything they imagine. Students develop creativity, data analysis and problem-solving skills by working in teams and creating plans and solutions.

Forsyth County Schools reduced its textbook costs by about 85 percent using interactive online content, including streaming video, simulations and other digital resources that, unlike physical textbooks, are kept always up to date. Administrative offices also benefit from fast, efficient data transmission as well as from file sharing and document storage via the district's central server.

"Bandwidth is the key. The only way to have access to all that digital content is to connect the technology and infrastructure in support of it," said Bailey Mitchell, chief technology and information officer for Forsyth County Schools. "My view is that every time you increase the speed of the network, you are enabling incredible educational opportunities." ❖