# Education Initiatives Drive Fiber Demand

Speakers and exhibitors at the 2017 SXSWedu conference – junior sibling of Austin's giant SXSW – showed why students' demand for bandwidth will continue to rise.

By Rollie Cole / *Sagamore Institute for Policy Research*

In March 2017, I made my third annual visit to the SXSWedu conference to research trends in educational technology. I witnessed two important new trends, saw an expansion in the reach and depth of existing trends and even saw some meta-trends that validated the overall growth of the market. More than ever, education relies on fast, reliable broadband. It's easy to see why students and their parents continue to be among the most avid proponents of fiber broadband.

### HOLOGRAMS

The use of virtual reality (VR) and augmented reality (AR) to make educational presentations immersive is growing rapidly. One important subset of AR is the use of holographic images – think of Pokémon characters running through the park but with an educational purpose. Learners can view these 3D images from any angle and perhaps manipulate them to add color, parts (arms to a broken statue or a roof to a ruined building) or annotations. Although state-of-the-art hardware is expensive (the

Microsoft Hololens costs roughly $3,000), everyone expects the hardware to get faster, better and cheaper quickly.

Pearson and Microsoft have launched a project to use holographic bodies in medical school training; the British Museum is creating static, manipulatable 3D images of many of its holdings. Holographic files are large, and though amateurs can readily create static versions, the professional expertise to create authenticated manipulations is rare and expensive. So even though 3D images and virtual worlds can be created in one place and shipped elsewhere like old-fashioned paper textbooks, many people will want to access and store them online.

With AR, a holographic image or annotation appears to be placed in the real world that a student sees. Again, much of the material could be stored on local servers that send AR material and receive "real-world" material from close by, but delivering AR material and computation from central servers is far more economical.

### DIGITAL PERSONALIZATION

A one tutor, one learner system can be a very effective way to teach and learn, but it is expensive. Software, including various forms of artificial intelligence, can more economically create a specialized learning environment for each learner. Such programs may vary the material presented, the method of presentation and the order of presentation based on each student's learning style. They may also vary

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how student and teacher assess progress and identify areas to emphasize going forward. Again, the hardware and software could all be local, but tremendous economies of scale are within reach if the bulk of the content and computation takes place in central servers. Khan Academy, now the official test prep program for the College Board tests that roughly one-third of U.S. high school seniors take, is moving into this area. Though Khan Academy offers ways to run its material on local servers, almost no one accepts that offer because of the technical requirements and storage size of the material.

McGraw-Hill, Pearson, Summit Learning and many other vendors also offer digital personalization – all running on the vendor's servers.

## ONLINE TESTING, DIGITAL TEXTS AND GAMIFICATION

Trends I reported on in 2016 that have expanded in the last year include online testing, digital textbooks and gamification. Standardized tests, such as the College Board SAT and others for lower grades, were first offered online several years ago. The trials revealed the need for robust broadband with good technical support. Since then, as more schools have obtained better broadband, the use of online testing systems has grown, although it is not yet universal. Alongside standardized testing has grown the use of online assessments that employ such test-like procedures as multiple-choice questions. These assessments include smaller standardized versions and personalized assessments called dynamic quizzing. In dynamic quizzing, the material covered in later quizzes varies based on the strengths and weaknesses students showed in earlier ones. Use of such systems has grown dramatically year-to-year.

When digital textbooks were first published, they were static electronic copies of paper textbooks. They quickly became popular because electronic copies were cheaper to update, produce and distribute than paper. Much has changed in the past three years. The major publishers of paper textbooks now talk of digital platforms that include online assessment and digital



Pearson's HoloPatient can be downloaded and placed in any medical teaching environment.

personalization, and they hint that they soon will include AR and VR for immersive learning. The publishers distribute their texts from centralized servers because the educational institutions were unwilling and unable to expand their equipment and human resources to distribute the materials.

The inclusion of game elements into learning environments has also expanded in reach and depth. For example, Kahoot, which offers educational games online, has more than 40 million learner users. One of the book-signing authors featured at SXSWedu was Yu-kai Chou, author of "Actionable Gamification." Again, offline gamification is possible, but teachers and learners tend to take advantage of the games already developed and distributed online.

## THREE META-TRENDS

I observed three initiatives (perhaps better called meta-trends) that confirm the expansion and general acceptance of markets for internet-based educational technologies. The easiest to describe is a new product called CatchOn from a Dallas-based firm of the same name. CatchOn gives school districts the ability to track the use of new digital materials and presumably to analyze use versus costs, learning outcomes and other metrics.

The second meta-trend is an attempt to develop standardized criteria for choosing new products and

standardized ways of measuring those criteria and reporting the resulting measurements. This initiative, called the Courseware in Context Framework, was developed by Tyton Partners in collaboration with the Online Learning Consortium, with support from the Bill and Melinda Gates Foundation. As of March 2017, the framework focuses on digital courseware for higher education.

The third is concerned with the interoperability among the digital offerings, especially those that purport to track learners and learner outcomes. The Michael and Susan Dell Family Foundation developed a set of standards for such data, called EdFi (for educational file format). Working with the Bill and Melinda Gates Foundation and several educational institutions, the Dell Foundation launched InnovateEDU as a nonprofit to advocate the benefits of interoperability and the adoption of EdFi or its equivalent by buyers and sellers of products that receive or publish educational data.

Any of these individual efforts might fail, but they signal the growing maturity of the market for digital educational materials – and therefore the growing maturity of the demand for robust broadband everywhere teaching and learning take place. ❖

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