

## **Future Watch: Devices and Developments that Could Change Ed Tech as We Know It**

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A variety of products and ideas are constantly in development that could influence our lives as computer educators. Some products are currently in development that could change the entire field of educational technology as we know it. While prophets and prognosticators are often proved wrong, allow me to submit three items for your consideration that I suspect may have a profound impact on educators in the near future.

### **The \$100 Laptop**

Everybody likes the idea of ubiquitous computing, with every student carrying a laptop. The primary hindrance to accomplishing this ideal is expense. Palms and Pocket PCs are one solution, but they are designed to supplement full size computers, not replace them. Used laptops are another solution, however obtaining large numbers of used laptops that are consistent in both features, components, and quality is problematic. Entering the arena of ideas as a solution to this dilemma is the \$100 laptop.

The \$100 laptop is an initiative springing from Massachusetts Institute of Technology's Media Lab. Three professors at MIT, Nicholas Negroponte, Seymour Papert, and Joseph Jacobson, are behind the project. The idea is to develop millions of durable, inexpensive laptops, and make them available to developing countries. Governments will be able to purchase the laptops in bulk, distribute them to students and other citizens, and help collectively lift the technological capabilities and literacy of entire nations.

The plan to achieve affordability revolves around using open source software as much as possible, employing a Linux-based operating system. The idea is to build a rugged unit, with multiple USB ports, and a decent processor that can handle daily computing duties. Wi-Fi and cellular capabilities are envisioned. The most expensive part of a typical laptop is the monitor, as anyone who has ever had to replace one knows. For that portion of the equation, the MIT team has tossed around ideas of a portable projection system that eliminates the need for a traditional monitor, or a digital ink system using technology that remains under development. Most recently, the team has apparently settled on using a small LCD screen such as those found in portable DVD players.

Press releases on the \$100 laptop sound incredible in scope. Initial plans call for the production of 100 million units. That's not a typo. If you deal with technology in the classroom, you might be interested in securing some models for your own use. Don't bother looking for them at your neighborhood retail outlet anytime soon, though. The MIT team expects to sell the laptops in bulk directly to the governments of developing countries. The minimum order, at least initially, will be one million laptops.

Despite the huge quantities thrown about in discussion, the team has assembled an impressive array of corporate sponsors joining forces in making this vision a reality. When you see the list of companies working with MIT in the project, the possibilities seem a little more reasonable.

The list includes such high powered technology companies as AMD, Google, Red Hat, and News Corp.

The ultimate goal of providing affordable technology to the masses is a worthy one. If, as several ed tech bloggers point out, the \$100 laptops appear in the US, the possibility of truly ubiquitous computing, approaching that of cell phone use, may come closer to reality. That day will herald new challenges, and opportunities, for educational technology.

For more details on the \$100 laptop and MIT's One Child, One Laptop project, visit <http://laptop.media.mit.edu/>

## **Ubiquitous Broadband**

A quiet revolution is taking place in municipalities across the land, as wide area wireless access is installed in city after city. For a small monthly fee, any resident can tap into the municipal Wi-Fi service, and access the Web from home, at parks, at work, or anywhere else in the city limits. The idea blossomed in Hawaii a few years ago, as community leaders sought to place Wi-Fi access across entire islands in the state. Now, cities like Addison and Southlake in Texas, as well as San Francisco and New Haven, Connecticut have launched these services. Other cities are following suit, as the goal of providing inexpensive municipal broadband without laying down miles of wire becomes as common as "no smoking" ordinances.

One of the goals of municipal broadband efforts is to narrow the digital divide between disparate economic classes. Teachers are adapting to the notion of every family having access to the Internet. Imagine all students being hooked into online resources before, during and after school.

Other ideas for ubiquitous access to the Internet have run into cost snags. Satellite broadband doesn't need wires, but requires several hundred dollars worth of hardware to get it into a building. Traditional Wi-Fi is limited in reach. Cable and DSL have provided the most success in residential broadband services, but per month pricing has traditionally been an issue. With municipalities footing the bill for the infrastructure, and providing a relatively cheap monthly fee, the possibility that every family can afford broadband is becoming viable.

On other fronts, residential broadband is getting a major speed boost thanks to companies like Verizon. The company's new service, called FiOS, offers a three-tiered pricing plan ranging from \$40 to \$200/month, depending on speed. The middle tier (about \$50/month, with a discount when combined with their phone service) offers download speeds at up to 15 mbps (megabits per second), and upload speeds of two mbps. Typical cable modem service around the same price range offers 6 mbps downloading and about 300 kbps uploading speeds. Verizon achieves their superior speeds by bringing a fiber-optic line to subscribers' residences.

So, what can Internet users do with that kind of speed? They can download movies (hopefully in a legal manner), engage in video conferences with minimal lag, upload photos and other digital content much faster, and receive faster networking and wireless access in the home. Some of the applications for truly fast broadband have yet to be developed. The day is coming when advanced high speed home networks will be the norm, rather than the exception.

FiOS was introduced last year in Keller, Texas, and has since spread to a handful of other cities in the Dallas metroplex. Verizon is indicating they plan on continuing to spread their rollout of the service. Competitors are not standing idly by, as a host of higher speed options is in the works from phone and cable companies throughout the country.

Ubiquitous access and widely available ultra-high speed access might change our ideas of education, homework, and distance learning possibilities. A higher degree of interactivity becomes possible with faster network connections, and the spread of this technology into every student's home offers additional technological challenges and opportunities.

A good site devoted to news and discussion of municipal networking is [www.muniwireless.com](http://www.muniwireless.com). Verizon's official site for the FiOS service is <http://www22.verizon.com/FiOSforhome/channels/FiOS/HighSpeedInternetForHome.asp>

### **Game-based Instruction**

NASA's Learning Technologies Project called video games the next "killer app" of educational software. Several books have promoted the idea, including Marc Prensky's *Digital-Game Based Learning* and James Paul Gee's *What Video Games Have to Teach Us About Learning and Literacy*. Several academic journals have devoted entire issues in 2005 to educational video games, including *Phi Kappa Phi Forum*, *TechTrends*, and *Innovate*.

Educational researchers, armed with multi-million dollar grants from the National Science Foundation and other governmental entities, have invested countless programming and instructional hours into delivering learning objectives through video games, and have reported their results at the National Educational Computing Conference (NECC), and elsewhere.

Still, as teachers we might be saying to ourselves ... "Video games?" Well, the term is perhaps misleading. When renowned Harvard professor Chris Dede spoke at an ed tech conference at the University of North Texas this summer, he confided that the software he works with, *River City*, is billed as a simulation to parents and teachers. It is instructional software that simply borrows elements found in popular video games. In *River City*, students login to the program and work in teams as they explore a virtual city set in 19<sup>th</sup> century America. The city has a polluted river running through it, and the students must determine the cause of the pollution. In the process, they learn a great deal about environmental science, history, teamwork, and cooperation.

Elsewhere, the University of Southern California has helped the U.S. Army with a language learning game. The DARPA Tactical Language Project simulates an Arabic-speaking environment, in which soldiers brush up on their language skills. They also learn to follow social cues so as not to offend local hosts when serving in the Middle East. Imagine taking students wishing to learn other languages, and offering them a completely immersive environment without leaving the school building.

Many teachers are familiar with *Math Blaster* and other edutainment titles. Depending on the age and development level of the student, such games offer a high level of engagement, at least

initially. Skill absorption may be another issue. But researchers are busy investigating this question, too. One University of Michigan team designed an addition skills program using Game Boy cartridges. The experimental group worked through almost three times as many problems as the control group using traditional paper worksheets.

Designing good games that correlate with appropriate educational standards takes time and effort. But, more and more titles are appearing that are designed with classroom instruction in mind. As the movement gains steam, look for textbook publishers to release game-based instructional material along with other electronic products complimenting their traditional books. Game designers will be producing some spiffy titles as well, and more teachers will take games produced with entertainment value and adapt them for classroom use.

The August/September issue of *Innovate Online*, devoted entirely to instructional video games, is available at <http://innovateonline.info>. Also, in Volume 1, Issue 1, Joel Foreman's paper, "Video Game Studies and the Emerging Instructional Revolution" is very enlightening.

## **Conclusion**

Cheap laptops ... broadband for all ... learning through computer games. These three ideas are changing perspectives among educators. They might not have quite reached what Malcolm Gladwell would call the "tipping point," but they are fast approaching widespread availability and acceptance. As they gain prominence, more perspectives will change. Look for them soon in a classroom, or a student's home, near you.

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