



# EDTECHNEXT

Emerging technology for K–12 education

## Ultraportables

### Evolutionary Devices or a Revolutionary New Breed?

Visit any coffee shop, airport terminal or business meeting and the ubiquitous presence of laptops is a given. Even in schools, laptops are increasingly common, thanks to 1:1 laptop initiatives.

So it might be easy to dismiss the emergence of ultraportable laptops and other devices as simply the next iteration of a familiar technology—and that would be a mistake.

Most laptops are simply portable desktop computers, mimicking the look and functionality of their bulkier counterparts. Developers of ultraportables, however, are rethinking the laptop and related devices for a very different user experience, particularly for the education market. Ultraportables—a class of supercompact, lightweight laptops—are different by design.

Depending on the vendor and the

device, ultraportables may feature child-friendly materials—think rubber and plastic—and whimsical colors. Laptops may convert to tablets, with digital pens or touchpads

How the quest for the “\$100 laptop” is shaping up—and how it could shake up the education market

supplementing keyboards and trackballs as input devices, which support visual, interactive learning. Screens may adjust automatically to bright

sunlight for outdoor use. Software is usually compatible with widely used programs—and also may include new, customizable applications that support active learning, collaboration and social interaction. Smart applications even adapt themselves to their users. Built-in microphones, speakers, cameras and probes may enhance multimedia functionality, interactivity and data collection.

Ultraportables for the education market, then, are a different breed

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# The Educational Potential of Ultraportables

*Lemon Grove School District* near San Diego, CA, is collaborating with Microsoft, Cox Communications, DT Research, Cisco and the San Diego County Office of Education to develop its own “e-pads” for its K–8 students, many of whom lack computers and Internet connectivity at home.

“We needed a solution that would address our key requirements: flexible access from anywhere, using different types of computers; low TCO and easy administration; the ability to deploy a wide variety of resources, including multimedia; and data security,” says *Darryl LaGace*, *Lemon Grove’s chief technology officer*. “The e-pad can be deployed as a thin client with enhanced local capacity based on flash storage or it can be deployed as a slate running a tablet PC OS loaded on the optional hard disk drive. For our students, we issue the flash model with a local browser, media players, Microsoft’s OneNote and the Citrix client. The teacher edition has the optional hard drive installed running Windows Tablet OS and several other local applications.”

[www.lgsd.k12.ca.us/lemonlink](http://www.lgsd.k12.ca.us/lemonlink)

Many of the innovations of ultraportables are inspired by an unlikely source—emerging and third-world markets—where educational technology capacity and infrastructures may be sparse. Developers are bent on providing affordable, full-feature computing and Internet access to close the digital divide—and they are putting the needs of children and the goals of learning front and center.

It turns out that ultraportables could transform teaching and learning in U.S. schools as well by giving students ubiquitous computing and network access. Researchers (Klopfer, Squire, Holland & Jenkins, 2002) suggest these possibilities:

**Anytime, anywhere learning.** Ultraportables work in classrooms, outdoors and at home. They’re meant to move around with people, not tether them to a desk.

**Connectivity.** Many ultraportables are designed to be used as part of a network, not as standalone machines; they enable students and teachers to connect to data-collection and other handheld devices and to a common network that creates a true shared environment.

**Social interactivity.** Ultraportables allow students and teachers to communicate, collaborate and exchange information. Some feature built-in chat programs, while Internet connectivity gives students access to social networking tools such as blogs, wikis, YouTube videos and multimedia applications.

**Context sensitivity.** Ultraportables can gather data unique to their location, environment and time, capturing both real and simulated data.

**Customized instruction.** In classrooms and other educational settings, teachers can monitor every student’s screen, allowing them to personalize and differentiate instruction. They can create flexible groups of students, who can use the ultraportables to work together. Engaging software applications support individualized instruction in core subjects and 21st century skills, such as teamwork and problem solving.

Research shows that 1:1 laptop initiatives contribute to gains in student achievement, engagement and motivation; class preparation and participation; and interaction with teachers and other students. These initiatives also support student-centered learning strategies, such as project-based learning, independent inquiry and collaboration. Yet laptops designed primarily for business use have drawbacks for schools, due to high cost, weight, fragility, and limited battery power. Ultraportables, designed with students and teachers in mind, make the boundaries and hurdles to connecting, creating and learning disappear with ubiquitous computing and networking to learning resources.

## Technical Considerations

Ultraportables come with a range of configurations, features and options. Here are brief profiles of a few kinds of low-cost options that may appeal to the education market. Specifications are based on vendor information.

	One Laptop Per Child XO	Intel Classmate PC	Asus Eee PC 4G	Nova 5000 (Base model)
<b>Cost</b>	\$180	\$260–\$500	\$400	\$500
<b>Size</b> <i>(rounded to the nearest inch)</i>	10 x 9 x 1 inches	10 x 8 x 2 inches	9 x 7 x 1 inches	7 x 9 x 2 inches
<b>Weight</b>	3.3 pounds	3.1 pounds	2 pounds	2.7 pounds
<b>Durability</b>	Rugged	Rugged	Rugged	Rugged
<b>Screen size and resolution</b>	7.5-inch LCD 1200 x 900	7-inch LCD 800 x 480	7-inch 800 x 480	7-inch 800 x 480
<b>Memory</b>	NAND flash (512 MB)  128MB of RAM	NAND flash or hard drive on higher-end models  1GB for Linux, 2GB for Windows XP Pro  256 MB RAM	4G flash memory  512 MB of RAM	NAND flash memory (128 MB)  64 MB RAM (128 MB optional)
<b>Ports</b>	Headphone Stereo audio jack Microphone input USB (3)	Headphone Stereo audio jack Microphone input USB (2)	1 VGA monitor out Headphone jack Microphone input	Headphone Stereo Audio jack Microphone input USB (2 master, 1 slave) Keyboard
<b>Battery life</b>	4+ hours	4 hours	3.5 hours	3+ hours
<b>Connectivity</b>	Wi-Fi	Wi-Fi	Wi-Fi	Wi-Fi
<b>Operating system</b>	Linux	Windows XP Pro or Linux	Linux Windows XP compatible	Windows CE.NET 5.0 operating system
<b>Processor</b>	433 Mhz AMD processor	900MHz Intel Celeron M	Intel Celeron M ULV 900MHz	Xscale PXA255 (400Mhz) processor
<b>Media options</b>	Built-in video camera Built-in microphone Built-in speakers	Built-in microphone Built-in speakers	Built-in video camera Built-in microphone Built-in speakers	Built-in speakers

## Fast Facts

Approximately 24 percent of all school districts with student populations of more than 2,500 are planning 1:1 laptop initiatives.

— *America's Digital Schools 2006: A Five-Year Forecast*, a report by the Greaves Group and the Hayes Connection

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## Evolutionary Devices?

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of technology that is worth a closer look for schools. Consider these common features:

**Low-cost.** Ultraportables start at about \$200—substantially less than most laptops—although not all ultraportables are inexpensive.

**Small and lightweight.** Tipping the scales at as little as a couple of pounds, ultraportables weigh considerably less than a backpack full of books, making it feasible for even very young students to tote them around easily.

**Rugged.** Ultraportables are built to withstand the normal punishments that children and the environment can inflict: dirt, water, sunlight, rough handling.

**“Green.”** Many ultraportables are designed to be energy efficient, running at a fraction of the power of ordinary laptops. Ultraportables reduce battery power by using long-life batteries, for example, or chips that allow displays to remain active while the processor idles, or batteries that can be recharged with a generator or from a solar panel.

**Connectivity.** Ultraportables are designed—often in innovative ways—for the way people like to work, play and communicate today. Internet connectivity, multimedia communications and collaboration are givens. Thin client configurations, for example, access the network for application processing, while mesh networks lower the cost of transport within school communities.

What's most intriguing about ultraportables is that they are *not* mini versions of traditional laptops. They may not have the same interface or functionality as laptops. Instead, they're uniquely suitable for learning.

## Learn More

Klopher, Squire, Holland, & Jenkins, H. (2002). *Environmental detectives—the development of an augmented reality platform for environmental simulations*. Educational Technology Research and Development.

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