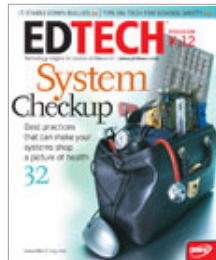


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THE \$150 NOTEBOOK

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Organizations develop inexpensive portables with the aim of giving them to children in developing countries and possibly in the United States.

Larry Stevens



11% or less of students in the bottom quarter of Mexico, Thailand and Turkey's socio-economic groups have access to home computers, compared with at least 70% in those countries' top quarters.

Herbert Hoover's 1928 campaign promise of "a car in every backyard," while less well-known than his famous "a chicken in every pot" slogan, appealed to many because it offered a technology that could allow the breadwinner to travel farther to work, get a better job and permanently improve the family's financial condition. The successful campaign recognized that many people felt there was a great divide between those who had access to transportation, the most important technology at the time, and those who didn't.

Today there is another great divide; this is one related to communications and computer technology. One Laptop Per Child, a project at Massachusetts Institute of Technology, seeks to narrow that divide by developing an affordable notebook computer that can be distributed to children around the world.

OLPC hopes to encourage developing countries, and possibly some U.S. states, to buy tens or even hundreds of thousands of the PCs, called the Children's Machine.

Low Cost, Plus Functionality

Most of the buzz about the OLPC notebook comes from its low cost, which may allow countries with relatively small budgets to buy them. Argentina, Brazil, Libya and Nigeria are considering purchases, and all four agreed to participate in system beta tests that began in January.

Originally called the "\$100 Laptop" because developers hope to achieve that price point by 2008, the machine is expected to be released with a price tag of \$150 sometime this winter or early spring.

But while OLPC's low price grabbed the attention of officials in developing countries, Walter Bender, president of software and content for OLPC, points out that the machine is not just a bare-bones, stripped-down version of a typical commercial notebook.

"We wanted it to be inexpensive, but our primary focus was its epistemological value," Bender says.

The notebook comes with hardware and software features that the OLPC team believes increase its usefulness and educational value to people in developing countries.

For instance, many rural areas don't have clean electrical power, and others don't have any power at all. So the notebook runs on less than 2 watts (compared with the 20 to 40 watts typical for a commercial notebook) and is powered by a sturdy nickel metal-hydride battery.

The hand crank, pictured on early prototypes, and possibly pedal power will be options in future versions. Bender's goal is to achieve 10 minutes of use for each one minute of human power.

The Children's Machine supports all 802.11 protocols. So users can surf the Web at hot spots. But even more important, children in rural areas with limited Web access will be able to communicate with others within a half a kilometer line of sight using the 802.11's mesh-networking standard.

The machine also will have a video camera, photo-editing software and the ability to play and compose music. It will include a Web browser, a Web server and tools such as Adobe Acrobat Reader for viewing static content, but with the added ability to type or write notes in the margins and share those notes with other users. It also will have a word processor and a journaling tool.

WHAT'S IN A \$150 NOTEBOOK?

EdTech asked **Walter Bender**, president of software and content for the **One Laptop Per Child** project.



EdTech: What sacrifices in functionality have you made to allow the computer to sell for \$150?

Bender: When we started this project, we realized there were two ways to get to a low price. The first was to take a traditional computer and scale it down so that it would be just functional enough to work. The other was to decide what the children around the world need and build it from scratch to meet those needs. We decided on the second way. So, we don't believe there have been any compromises. For example, we invented a new display, better than you can get at any price. It works outdoors in full sunlight but runs at less than 2 watts and costs about one-third as much as other displays.

EdTech: Why did you choose Linux for the operating system rather than Windows?

Bender: One reason is its smaller footprint. Also, because Linux is open, we can readily configure it so we can pull in things we need but also remove things we don't. Open-source software gives children and their teachers the freedom to reshape, reinvent and reapply software, hardware and content. So the notebook can be localized to meet the learning needs of different communities.

EdTech: What kinds of customization do you think individual countries might embrace?

Bender: One thing is language. There are 230 local languages in Nigeria. There is no way a central development team can build in that number of languages. But people in the field in each locale can because we use open systems.

Societal Benefits

Supporters of the OLPC project believe the Children's Machine is a cost-effective way to improve the educational levels of children in poorer nations. "I think [the Children's Machine] can start a kind of digital vaccination against ignorance and prejudice in the developing countries," says Antonio M. Battro, an Argentinean OLPC board member. Battro is not one of his country's

decision-makers on purchasing the notebooks, but he is close to the Argentinean Ministry of Education.

Battro sees three primary benefits of the OLPC project. First, it will interconnect children and teachers from different groups and nations.

Second, Battro believes the notebook will become an important tool in the teaching and learning of the arts and sciences. Finally, the Children's Machine will become an enabling technology for disabled children. "The computer can work as a prosthesis for the brain and help to overcome many sensory, motor and mental handicaps," Battro says.

Although few would argue against the goal of equipping all children with a computer, not everyone supports the OLPC project. Some opponents say the \$100 million or more that many countries would have to pay to supply all children with notebooks represents a major expenditure that would be better used on roads, electrification and more traditional educational projects.

Other observers take issue with the notebook's unorthodox design, which they say renders it more of a gadget or toy with limited capabilities compared with existing notebooks or desktop systems.

Financial Considerations

Vince Vasquez, public policy fellow in technology studies at the Pacific Research Institute in San Francisco, is one naysayer. "I'm not sure the OLPC project is the best use of national resources to meet the needs of its citizens," he says, adding that developing countries might do better spending limited funds on teachers, schools and books. He believes that computers are important, but a few off-the-shelf PCs in a classroom might make more sense than custom notebooks in the hands of every child.

Some officials of nations that have dismissed the project agree. According to an article in The Hindu, Indian Education Secretary Sudeep Banerjee calls the Children's Machine "pedagogically suspect" and adds that it would be more appropriate to spend money to make secondary education universal in India. "We need classrooms and teachers more urgently than fancy tools," Banerjee says.

Competing Projects

The primary challenge to the Children's Machine design comes from a competing project, Intel's Classmate PC. Both have a rugged case, a small screen, flash memory instead of hard drives, and possible alternative energy sources. (Intel is looking into car batteries and solar power.) Neither device has been sold yet, though Intel said in November it won its first contract with a Mexican manufacturer to build the notebooks.

Perhaps the biggest difference between the two systems is price: The Classmate PC will be released at just under \$400, more than three times that of the Children's Machine.

But, Willy Agatstein, Intel's vice president and general manager of emerging market platforms, believes the cost of ownership should be close because local vendors will provide service and support. "It will be sold through our network of 170,000 dealers," he says.

In contrast, the Children's Machine will be sold to governments that will have to create their own support networks.

Another major difference is that the Intel machine runs most Microsoft Windows applications as long as they can fit on a 2-gigabyte flash card. This allows countries and original equipment manufacturers to take advantage of thousands of off-the-shelf applications. The OLPC notebook runs Linux because of its smaller footprint and the ability to shape software to cultural needs.

WHAT ABOUT IN THE STATES?

The role the One Laptop Per Child notebook or Intel's Classmate PC will play in U.S. education is unclear. Although both will be available for sale to states and schools, chances are the U.S. versions will differ from those available to developing countries. "U.S. students have different expectations

when it comes to PCs than do people in developing countries," says Willy Agatstein, vice president and general manager of Intel's Emerging Market Platforms Group. For example, Intel is now trying to determine if a U.S. version of the Classmate PC should have a hard drive and a larger screen, which would increase the selling price.

Whatever the end result, developers of these rugged, low-cost notebooks agree that increasing access to computer technology will be a boon to educational systems. "Our goal is to put an epistemologically sound laptop in the hands of every child," says Walter Bender, OLPC president of software and content. "If someone comes up with a better design, or if some countries opt to buy a different laptop that serves the purpose, that's fine with us."

MEASURING THE DIGITAL DIVIDE

95% of students in developed countries worldwide have used a computer by the time they are 15 years old. But the numbers for developing nations are much lower.

Computer literacy may be even lower than reported in some countries. The survey only measured computer use among school children. In Brazil, Indonesia and Uruguay, fewer than 60 percent of 15-year-olds attend school.

SOURCE: Organization for Economic Cooperation and Development, www.oecd.org