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THE CHRONICLE OF HIGHER EDUCATION  
*Information Technology*

From the issue dated July 21, 2006

## Can Technology Save the Developing World?

### Cheap laptops are just the first step to jump-starting education in poor regions

By BROCK READ

Thousands of scholars and speakers flocked to the annual National Educational Computing Conference, held this month in San Diego, but there was little question who the star of the event would be. After all, Nicholas Negroponte was there, and he had his laptop with him.

As he showed off the laptop — a prototype of a brightly colored machine that can be manufactured for about \$100 — Mr. Negroponte, founder and head of the One Laptop Per Child project, waxed rhapsodic about its potential to transform the developing world.

"You can get into a realm where you can treat it like an inoculation, where it's part of the life of every child," he told people at the conference.

Already four countries — Argentina, Brazil, Nigeria, and Thailand — appear ready to try to fulfill Mr. Negroponte's vision. Each has agreed to purchase one million of the low-cost laptops next year and to distribute them to impoverished students. (The cost of the laptops has risen from \$100, Mr. Negroponte's original estimate, to a still-affordable \$138.) Several other nations, including China, Egypt, India, and Mexico, have also announced plans to discuss deals with One Laptop Per Child.

As the project's reach has expanded, Mr. Negroponte's prototype has become something of an iconic image — thanks to its unmistakable, brightly colored rubber casing. That savvy bit of design, along with the founder's high profile, has achieved the unlikely goal of making big news out of a wonky subject: access to technology for students and scholars in some of the world's poorest nations.

One Laptop Per Child may be getting the lion's share of the publicity, but a growing number of other charitable projects also attempt to modernize educational technology in the developing world. Students and scholars in

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poor nations don't just need affordable computers, according to leaders of those projects. They also need reliable Internet connections and access to online scholarly material.

That is especially true in Africa, where bandwidth is prohibitively expensive and scholarly journals are in short supply. Efforts to improve Web access and the availability of research material on the continent are fraught with obstacles: Money is tight, charitable foundations don't always treat technology as a high priority, and Africa's colonial history has left national governments suspicious of aid from the developed world.

But project officials argue that African scholars must be given the chance to benefit from an Internet that has seemed, to date, dangerously unresponsive to the needs of developing nations. And they hope that the attention generated by Mr. Negroponte's media-friendly project will end up galvanizing their own efforts.

"In the short term, things like HIV and AIDS care, clean water, and sanitation are a must," says Leslie Chan, a senior lecturer in social sciences at the University of Toronto at Scarborough who has written extensively on technology access for developing countries. "But technology isn't just a ready-made aid. It's a resource we build so that African nations can, at some point, take care of their internal issues."

### **Broadening Bandwidth**

Africa's Internet infrastructure has improved by leaps and bounds in recent years: Fiber-optic cables now cross much of the continent, offering the prospect of broad-bandwidth Internet connectivity. But the miles upon miles of newly laid cable, installed by telecommunications companies, have often been of limited help to local colleges and schools.

Because the cables are expensive to lay — and because individual companies hold monopolies on the networks in most African nations — bandwidth remains prohibitively expensive.

Mr. Chan estimates that the cost of Web access in Africa is at least three or four times the going rate in the United States and Europe. In some areas, other analysts say, bandwidth costs 10 times as much as it would in most developed countries.

Those costs have kept colleges in nations like Kenya, Mozambique, and Nigeria from moving past maddeningly slow dial-up connections.

With those economic facts in mind, six American foundations have formed a consortium that has helped almost 20 African universities significantly increase their bandwidth without upping their computing budgets.

Under the plan, called the Bandwidth Initiative, institutions in Ghana, Kenya, Mozambique, Nigeria, South Africa, Tanzania, and Uganda joined together to buy broadband Internet access, offered by satellite, at discounted rates. By purchasing the bandwidth in bulk from Intelsat, a telecommunications company, the universities acquired 93,000 kilobits per second of bandwidth — almost eight times more than they had among them two years ago — for a total monthly fee of about \$217,000.

That may not sound like a steal. But most African institutions would have to pay an average of \$678,000 a month for the same bandwidth, according to officials with the project.

The six foundations — the Carnegie Corporation of New York, and the Ford, MacArthur, Rockefeller, Andrew W. Mellon, and William and Flora Hewlett Foundations — kicked in more than \$5-million to subsidize the initial purchase. The subsidy, which was intended to prevent participating institutions from paying more than they are used to for Internet access, will be phased out in three years, says Suzanne Grant-Lewis, coordinator of the Bandwidth Initiative, which is based in New York.

The consortium plans to expand its membership to other African institutions in need of better rates on bandwidth. Ms. Grant-Lewis also hopes the project will spur African governments — and politicians in the developed world — to demand cheaper bandwidth across the continent. "One of our desires is to put pressure on the telecommunications providers to meet their social responsibility," she says.

Although many of the consortium's universities are already making use of their broader bandwidth, the project is only half-done, says Ms. Grant-Lewis. Its officials are now working to train professors and administrators in using online technology in their classrooms.

The Bandwidth Initiative has already left member institutions dreaming about the future. There is considerable excitement about online learning: Officials of Mozambique's Eduardo Mondlane University, for example, are hoping to set up five distance-education facilities for students living outside the nation's capital, Maputo.

Ms. Grant-Lewis says she would like to see the universities use their new bandwidth for more than improving the speed of scholarly searches and establishing a few distance-learning centers. When she discusses the African project, she could just as easily be listing potential points of improvement for American institutions: With added bandwidth, she says, professors can "make course offerings more relevant, more up to date," and "expand class beyond the lecture hall."

But before African universities can achieve those lofty goals, they need an additional injection of training and software, says Toronto's Mr. Chan. To illustrate his point, he describes a recent visit to the University of Dakar, in Senegal. The university's library, he says, was lined with state-of-the-art computers, all with decent Web connections. But three-quarters of the machines had been waylaid by viruses — and the two computers that were in use were being wasted on bandwidth-intensive movie downloads.

Campus officials were given a promising information-technology infrastructure, Mr. Chan says, but they didn't have any virus-protection or bandwidth-management software.

"In the case of western Africa, the bandwidth is there," he says. "Getting connectivity is okay, but once you get it, you have to be able to manage it — and then the issue of content comes into play."

### **Supplying Content**

In other words: What's the point of having high-speed Web access at a university if you can't find much scholarly use for it?

Although groups like the World Health Organization and the United Nations have led projects intended to make scientific journals broadly available in Africa, the rising costs of other scholarly journals have priced them out of the market there. And the cost of printing and digitizing journals has prevented most African researchers from spreading their

research to the developed world.

Efforts to fix those problems are gaining steam. JSTOR, a nonprofit organization that maintains an archive of scholarly journals, announced in July that it had waived participation fees for African institutions.

The move is JSTOR's most ambitious effort to extend its reach to the developing world. In recent years the archive, which is supported by the Mellon Foundation, has cut its subscription fees — which, for American colleges, can run upwards of \$10,000 — substantially to institutions in Africa, Asia, and Eastern Europe. Bruce Heterick, JSTOR's director of library relations, says almost 150 institutions from developing nations now subscribe to the archive.

But the price cuts weren't making much of an impact in Africa, where even low fees were often too much for campus officials. Although JSTOR has signed deals with about 40 African institutions, in 17 countries, more than half of the participating colleges are located in South Africa, he says.

"There are some barriers to success that we can't do much about, like bandwidth or electricity," says Mr. Heterick, referring to rolling blackouts that affect much of the continent. "But our board very much wanted to allow broader participation in Africa, and we decided that we can at least reduce that financial barrier."

Mr. Heterick hopes to double the number of countries with colleges subscribing to JSTOR within a year. Whether the archive can pull that off depends on its ability to publicize its availability without placing a sales force in Africa. Spreading the word about new scholarly archives isn't easy on a continent with few academic consortia, says Ms. Grace-Lewis.

Mr. Heterick is quick to point out that JSTOR is not a one-stop shop for institutions looking to bolster their online collections. The archive chiefly comprises publications that are at least a year old, and not all of the material may seem relevant to African researchers.

But for many African universities, a program like JSTOR's offers a rare opportunity to develop a workable collection of academic research.

"Many institutions that have JSTOR in the U.S. already had much of that content on paper, in their libraries," says Mr. Heterick. "Institutions in developing nations may have journals from years when they got foundation money or the economy happened to be better, but they don't have much of this stuff on paper."

"There are a lot of fantastic scholars and researchers in these countries that don't get noticed," he says, "either because they don't have a forum for bringing their research forward, or because they're working on content that is 10 to 15 years old."

As a way of keeping scholars up to date, data infusions like JSTOR's can be very useful, says Mr. Chan. But if foundations and scholarly archives simply dump knowledge on the developing world, they will be doing local scholars something of a disservice, he argues.

"There's still a patronizing view that you guys are poor, we have knowledge, and we'll give this to you for free," he says. "That's been the approach over the past 35 years in terms of aid and development, and it's only started to change recently."

### **A Two-Way Street**

Programs like Hinari — the World Health Organization's attempt to offer major scientific journals to developing nations either free or at reduced cost — sound great on paper, says Mr. Chan. But they make the mistake of assuming that research conducted in America or Europe is necessarily relevant to doctors and students in Africa. "What good is an article on a new surgical technique to a doctor who has no way to implement it?" he asks.

Supporting scholarship in Africa, he says, is a two-way street. Instead of just using the Web to give information to researchers in developing nations, foundations must provide those researchers with a way to share knowledge with each other — and with the developed world.

A growing number of projects intend to do just that — including Aluka, another nonprofit group sponsored by the Mellon Foundation. Aluka, based in Princeton, N.J., bills itself as "a digital library of scholarly resources from the developing world."

The organization was created to help African nations put their own material online, says Rahim S. Rajan, Aluka's technical director. "What we're trying to do is to build some capacity on the ground, so that African institutions can develop their own expertise and start their own digitization projects," he says.

Aluka is working to create three collections of material relevant to African researchers. One archive, comprising photographs, field notes, and botanical data on plant life native to the continent, is being culled chiefly from herbariums and museums in the developed world.

But the other two collections draw on content that is locally available — and which has never before made it online.

One pulls together oral histories, photographs, and periodicals to chronicle pro-independence and anti-apartheid struggles in Botswana, Mozambique, Namibia, South Africa, and Zimbabwe. The other uses newly created computer models and global-imaging data to create a gazetteer of Africa's lost historical sites.

Establishing those collections is important work, says Mr. Rajan, but the project's real legacy should be to help African institutions get the tools and the training to start their own digitization projects.

"We're spending lots of time teaching people at these institutions how to digitize things and how to capture metadata," he says. "The longest-lasting thing we can give, in some ways, is expertise."

Like Mr. Chan, Mr. Rajan worries that some African scholars will see Aluka as an unwanted intervention.

"There's a long history of imperial projects coming in, making some promises, and never delivering," he says. "A lot of institutions in Africa are jaded. They've worked in the past with numerous donors, and they haven't necessarily benefited from the associations."

Mr. Rajan argues that projects like Aluka must make a point of providing African institutions with at least some clear, short-term benefits — not just to build trust, but also to persuade government officials to invest in educational technology.

"It's too easy to say that these institutions are mismanaged," he says.

"You're talking about places where, for instance, governments have to make decisions about whether to make sure the water is clean or whether a university should have Internet access. The Web is seen as a luxury — and, in a way, it is one."

The sense that technology is a luxury item for developing nations is still prevalent among many charitable foundations as well, says Mr. Chan. Spurred by a pledge made in 2005 by the G-8, a group of industrialized democracies, that member nations would give a minute percentage of their gross domestic products to international-development projects, Mr. Chan has tried to persuade Western college presidents to adopt a similar policy. So far, he says, he has not found any takers.





Progress in improving access to technology remains hamstrung, he argues, by the fact that well-meaning charitable efforts are largely uncoordinated. "Because these projects are all receiving money from different donors, they don't really talk to each other," he says, noting that many foundations hold virtually identical conferences on online learning in Africa every year. "There's a lot of self-interest, to be blunt."

But among officials of JSTOR and Aluka, there is also a sense that the Web must be thoroughly democratized before African nations fall further behind.

"The power of the Web is that it lets countries leapfrog ahead," says Mr. Rajan. "It gives them access to information that will contribute to development. But the Web should not be an exclusively European or North American universe."

#### INFUSING DIGITAL TECHNOLOGY

Several charitable endeavors seek to improve access to computers and online research material for students and scholars in Africa.

	One Laptop Per Child <sup>1</sup>	Bandwidth Initiative <sup>2</sup>	JSTOR <sup>3</sup>	Aluka <sup>4</sup>
				
Algeria			✓	
Botswana			✓	✓
Cameroon				✓
Egypt			✓	
Ethiopia			✓	✓
Ghana		✓	✓	✓
Ivory Coast			✓	
Kenya		✓	✓	✓
Madagascar				✓
Malawi			✓	
Mali				✓
Morocco			✓	
Mozambique		✓		✓
Namibia			✓	✓

Nigeria	✓	✓	✓	✓
South Africa		✓	✓	✓
Tanzania		✓	✓	✓
Tunisia			✓	
Uganda		✓	✓	✓
Zambia			✓	
Zimbabwe			✓	✓

[1](#) **Goal:** To distribute cheap, Internet-ready laptop computers in developing nations  
[2](#) **Goal:** To help African colleges buy high-speed Internet connections at affordable prices  
[3](#) **Goal:** To offer online scholarly journals to African colleges at no cost or at a steep discount  
[4](#) **Goal:** To build online databases of African research and to jump-start African digitization projects

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