SCIENCE EDUCATION

Researchers Help Chicago Schools Onto the Internet

CHICAGO—Eighth-grader Semaj Bunch pulls up the home page of a German gamma ray observatory on the World Wide Web, while his classmate, George-Marie Garber, surfs for information on the sugar content of orange juice. It's time to work on projects for the upcoming science fair, and for 40 minutes just before lunch period, scarcely an eye wanders from 32 screens in the computer lab at the William H. Ray Elementary School on Chicago's South Side. That scholarly ramble from glucose to gamma rays owes its existence to a pathbreaking collaboration between the University of Chicago and the city's public schools that has already brought fast Internet access—and the tools and training to use it—to 12 neighborhood schools.

Called CUIP for Chicago Public Schools/University of Chicago Internet Project, the collaboration has attracted attention far beyond the 24 neighborhood schools organizers eventually hope to connect. The project is serving as a pilot for a bold plan to hook all 557 public schools in Chicago to the Internet, and it is being viewed as a model for similar collaborations in other cities. "I see [CUIP] as pioneering or paving the way," says Bonnie Eisenhamer, an education program evaluator in the office of public outreach at the Space Telescope Science Institute (STScI) in Baltimore. "It's going to enlighten other people." It's also a rare example of topflight researchers getting out of their labs to help solve a problem that many have been wringing their hands over for years: U.S. school children's lack of interest in or appreciation for science.

CUIP has attracted national attention among educators because of its extensive follow-up efforts once the Internet hardware and software have been installed in the schools. As the nation follows President Bill Clinton's exhortation to connect "every classroom in America ... to the information superhighway," many educators are finding that getting access to the technology is one thing, but actually using it is a far more difficult proposition. "There are grants for technology all over the place," says Sandra Berger, an information specialist at the federally funded Educational Resources Information Center in Reston, Virginia, "but there's no follow-up, no evaluation. They put the computer in the classroom and say: 'Go for it.' " CUIP is trying to bridge that gap with a variety of efforts, including Internet training, teacher partnerships with university researchers, take-home "loaner" computers for teachers who have never used one before, direct technical help, and a planned, trillion-byte digital library of resources for schoolchildren. "The training's been crucial," agrees Cydney Fields, principal of the Ray school.

Humble beginnings. That's a remarkable set of activities for a program whose seeds were planted 4 years ago with a mere $6000 grant from NASA to a collaboration between a postdoc at the university and a high school teacher in one of the South Side's most poverty-stricken neighborhoods. The collaboration began a year earlier when astrophysics postdoc Mordecai-Mark Mac Low and Bennett Brown—a recent physics graduate from the Massachusetts Institute of Technology then teaching at Jean Baptiste Pointe DuSable High School—took groups of students stargazing.

MATTHEW GILSON

Online help. Computer coordinator Yvonne Whittier helps Widelyne Rosier search the Web.

Mac Low approached Brown, whom he knew socially, after learning that NASA had begun awarding supplements to research grants to support small educational projects. Brown had just been recruited by Charles Mingo, the innovative principal at DuSable—which sits next to the Robert Taylor Homes, a federally funded housing project ravaged by high rates of poverty and crime—and he was looking for ways to turn the children on to science. The two applied for and received funding from what is now called NASA's Initiative to Develop Education through Astronomy and Space Science (IDEAS). They used the money to buy binoculars and a small telescope, and took some of Brown's students on camping trips to view the stars from central Illinois. "About half of these kids hadn't been outside the city before," says Mac Low, now at the Max Planck Institute for Astronomy in Heidelberg, Germany.

The two then cast around for a second project. It was at that point that Brown uttered the magic words: "I want e-mail." "As an astronomer, I understood that perfectly," says Mac Low. He and Brown began to cook up a project that would enable isolated and overworked teachers to interact more easily with colleagues both inside and outside the school, and to put them in touch with new educational resources. They approached University of Chicago astrophysicist Donald York, who was also working with local teachers and who has "a fanatical interest in supporting the public schools and in what he calls 'leveling the playing field,' " says Duel Richardson, the director of neighborhood relations in the university's office of community affairs.

Building on advice from York, the growing team used a fresh IDEAS grant to leverage money from the state to hook a T1 Internet line into DuSable and wire the school internally. As the benefits of that connection became apparent, York was already thinking ahead. He led a successful request for funding—this time for $150,000 from the Department of Learning Technologies of the Chicago Public Schools—to begin hooking up 24 other neighborhood schools as they acquired the necessary in-house resources, such as computers and designated "technical coordinators" to keep the system running. Thus was CUIP born. It is now led by Richardson, York, and Richard Dynis of the Chicago Public Schools, and includes a dedicated band of school officials, university administrators, and graduate students serving in a mix of paid and volunteer posts.

The first of the new Internet connections was made late last year, and that experience is now guiding the massive project to network all the city's public schools and link them to the Internet. "It was really the frontrunner for everything we've done since then," says Jim Dunne, the wide-area network manager at Learning Technologies who led the hardware effort. "It was the first time we'd set up electronic mail. [CUIP] gave us a lot of design ideas, a lot of screening criteria. We [learned] the ingredients that make a good Internet connection." The first phase of the citywide project will cost about $8 million, says Dunne, and the final tally will range far higher. Much of that money will come from $2.25 billion in federal funds to be available annually, starting next year, to schools and libraries across the nation as a result of the 1996 Telecommunications Act, which prescribes that they must all have access to modern telecommunications services.

Critical follow-up. At CUIP, the hardware installation is just the beginning. Paid and volunteer technical help from the university and the school system is now preparing teachers to make the most of the technology. Among the most remarkable of the volunteer programs is Science Partners, founded 2 years ago by a duo of astrophysics graduate students, Lucia Muñoz-Franco and Luisa Rebull. Since then, with varying degrees of success, the program has paired off dozens of teachers with researchers at the university for 8- to 10-week stints of communicating via e-mail, discussing the use of Web resources for the curriculum, and even arranging classroom demonstrations by the researchers, many of whom want to learn how to become better teachers themselves. "Getting the hardware into the schools is difficult, but it might be the easiest part," says Rebull. "If people aren't trained, the equipment is not going to be used."

Laurie Mann, who teaches sixth-grade science at the Louis Wirth Experimental School, agrees. "I had never used the Internet before it was brought into the school," she says. Her partnership with Zoa Conner, a postdoc at the university, "made me aware of [the Internet] as a tool in teaching and a tool of communication among educated people," says Mann. "That's something I just wasn't privy to before." The partners are using Web resources to help teach the students about scales of measurement, from centimeters and inches to astronomical units like light-years. But, says Mann, although her course has become more current, there are still some barriers to overcome: She says she is disappointed that the students have shown little interest in surfing for information themselves.

At the Ray school, computer coordinator Yvonne Whittier tries to encourage just that kind of exploration during the students' once-weekly visit to the computer lab. "You should be able to go to Yahoo [a search engine] and find something," she tells Widelyne Rosier, whose project for the science fair involves acids and bases. Some already have the hang of it. "I'm doing this project because of my little brother," says George-Marie Garber. "Every time he drinks orange juice he gets hyper." The reason, she theorizes while scrolling through sites with information on orange juice, might be that he is drinking a brand with a lot of sugar.

Even the computer-savvy Whittier calls the university's follow-up programs "invaluable" when technical glitches come up and when teachers have questions about specific academic topics. When Ray teacher Mary Cobb's sixth-grade class was studying Mesopotamia, for instance, they downloaded images and text about rare artifacts at the university's Oriental Institute, before arranging a physical tour. "They were excited that they knew about and then saw the actual artifacts," says Cobb.

Virtual contact with the university will increase still further if a new project comes to fruition: an easily searchable, trillion-byte library that should overcome some of the chaos of the Web by including only materials targeted to kindergarten through 12th-grade students. Meant, in part, to bypass the severe shortcomings of inner-city libraries, the Digital Library has attracted widespread interest in the university's libraries and computer science department, says Jay Mulberry, a Chicago Public Schools principal attached to the project. CUIP has also caught the attention of virtual educators elsewhere. The CUIP schools will, for example, serve as a long-term testing ground for STScI's "Amazing Space" package for teaching science over the Web using images from the Space Telescope.

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Hands-on. Students at William H. Ray Elementary School use the Web for science fair projects.

Whether all of this activity will lead to higher educational performance, no one is quite sure yet, because those assessments haven't yet been done. But Bennett Brown has at least anecdotal evidence that his efforts created some sparks among his students. He sometimes runs into former students of his who are attending the University of Iowa, where he is now a graduate student. "When I'm meeting their friends," he says, "they'll usually introduce me as someone whose class they really enjoyed."

–James Glanz

PUBLIC HEALTH

Yale Virus Collection Needs a Home

It is the end of an era or a going-out-of-business sale—perhaps both. Since 1964, Yale University's School of Public Health has been home to one of the great reference collections of insect-borne viruses—nearly 600 distinct viruses and thousands of freeze-dried strains, not to mention antigens, sera, and reagents. The Yale Arbovirus Unit (YARU) collection was split in 1994, when two senior staffers left for the University of Texas Medical Branch at Galveston and took a duplicate set of samples with them. Now U.S. Army funding for the original collection has ended, all the university's arbovirus experts have left, and Yale is looking for any takers for the collection.

"Many in the field are very concerned," says James Meegan, a virologist at the National Institute of Allergy and Infectious Diseases. "It's an especially valuable collection, as we're facing the emergence of new viral diseases. It should be in the hands of someone who is going to take care of it actively, use it, and train people on it." Meegan and others think that the benefits of having complementary centers of arbovirus research justify the $150,000 cost of maintaining the collection.

The Yale collection dates back to the late 1920s, when the Rockefeller Foundation in New York began its international studies of yellow fever. In 1964, the Rockefeller arbovirologists moved to Yale with their samples and became YARU, with an endowment from Rockefeller and funding from the National Institutes of Health and the Army. Over the next 30 years, the collection continued to grow. "YARU had a truly remarkable history of diagnosing outbreaks," says Meegan, as well as providing expertise when epidemics struck throughout the world.

By the early 1990s, however, the climate for arbovirus research had chilled as researchers paid more attention to problems such as unraveling the AIDS epidemic. Government funding grew scarce and fewer young researchers were entering the field, says former Yale virologist Mark Wilson, who is now at the University of Michigan, Ann Arbor. After virologists Bob Shope and Bob Tesch left for Galveston 3 years ago, the remaining YARU arbovirologists emigrated to other institutions, citing factors including a lack of internal support for the program. "Everything disappeared from Yale very quickly," says Meegan. "They really lost quite a research group." Michael Merson, dean of Yale's School of Public Health, acknowledges that Yale is now giving priority to hiring experts on non–insect-borne viral diseases such as influenza or AIDS.

For the collection itself, the end came in October. Funding for the single technician responsible for the collection ran out after she concluded an 18-month effort to catalog the samples.

Virologists hope that Yale's collection will become the core of a new arbovirus research program elsewhere. "It would be tremendous to have two universities, each with equivalent collections," says Bruce Ennis of the Walter Reed Army Institute of Research. "It doubles the odds that one of the two programs is going to sustain itself." So far, however, Yale has found no takers.

–Gary Taubes