

EDUCATION WEEK

Published: May 18, 1983

Seymour Papert's 'Microworld': An Educational Utopia

By Charlie Euchner

New York--At a meeting of the New York Academy of Sciences here this spring, Seymour Papert managed to take issue with just about every teaching method that schools use in education--particularly the way most of them are now using computers.

Mr. Papert, professor of education and mathematics at the Massachusetts Institute of Technology (mit), is considered one of the most revolutionary thinkers in educational technology.

He first became widely known when he and colleagues at mit developed logo--a computer language specifically designed for elementary schools. Mr. Papert and his followers say that logo eventually could be the centerpiece of a movement to restructure education.

More recently, Mr. Papert has attracted attention because of his association with the Paris-based World Center for Microprocessors and Human Resources, an organization with the goal of using the computer to enable developing countries to "leapfrog" whole stages of development.

In his remarks at the New York meeting, Mr. Papert offered his scientific colleagues the kind of visionary perspective on computers and education for which he is noted. He began with a general critique of schools, saying the traditional K-12 system is arbitrary and should give way to a program of studies directed almost entirely by students--with few of the formal lecture situations that now typify schools.

Mr. Papert disputed the contention of many educators that extensive use of computers in schools is expensive and threatens to widen the gap between students in wealthy and poor districts.

By making a modest financial commitment over several years, he said, districts could provide every student with a terminal. But Mr. Papert does not want his remarks about computers and student-directed education to be considered an endorsement of computer-assisted instruction. Structured computer lessons, he said, are "a bad thing."

Educational Development

In his address and in an interview, Mr. Papert outlined a philosophy not only of how education

[← Back to Story](#)

Expanding Learning Opportunities:
The first in a series of K-12 leadership papers

[Download Now](#)

eduviews:
A K-12 Leadership Series

Sponsored by: Blackboard

in industrialized countries should work, but also of the role it can play in the development of third-world nations in Africa, Asia, and Latin America and with people who have not succeeded in traditional schools.

At the World Center, founded by the French journalist and futurist Jeane Seaman-Schreiber to test Mr. Papert's ideas, researchers hope that the microcomputer will give developing countries the means to move into the modern era without the traditional stages of development.

The idea, described by one critic as putting "a computer in every hut," is that the microcomputer will soon be as inexpensive as a portable television set and will respond to spoken commands--and therefore will offer third-world countries access to the information they need to increase literacy and become economically self-sufficient.

But with the center embroiled in political controversy, Mr. Papert quit as chief scientist last November and returned to his projects in the United States. If he can't pursue his ideas for an "educational utopia" in Paris, he said, he will pursue them in the U.S.

Logo Is Key

At the center of Mr. Papert's educational utopia is logo, the language that grew out of his five years of study with the Swiss child psychologist Jean Piaget.

Using logo, which was developed during the 1970's, students use a keyboard to manipulate a triangular cursor (the electronic directional signal found on most computer-terminal screens) called a "turtle."

Through trial and error with the turtle--"discovery," Mr. Papert calls it--children can understand concepts such as large numbers, angles, and curves that traditionally are taught to older students.

A child as young as three or four can design objects on the computer, line by line. For example, to program a box, the student might instruct the computer's cursor to go forward a set number of spaces four times and make a 90-degree right turn three times.

The student, by pulling together many such simple sets of instructions, or "subprocedures," eventually can write programs that become as complicated as variations of "Pac-Man" and other video games, according to the MIT scientist.

In the process of programming, Mr. Papert said, students create their own "microworlds." The microworld involves a physical object--in this case, the turtle--that a student can use to play with and to become familiar with larger numbers and the ideas that go with them.

Microworlds, Mr. Papert said, enable children to learn much faster. "Why is it that children have to do 98,000 repetitions of this?" Mr. Papert said, pointing to an addition problem. "One reason is that they don't know what they're looking at. They need an object to think about other things with."

Mr. Papert contends that the ease with which students grasp logo and their own microworlds

eventually could lead to a kind of educational utopia.

In that perfect world, all children would have access to a computer and logo programs throughout their years in school. They would use the computer to learn "powerful ideas," not only in mathematics but also in physics, English, art, and music. The computer would make them significantly more curious and capable of understanding other fields, such as history and science.

Also in this perfect world, the traditional teacher-student relationship would change. Instead of attending several classes daily, children would be given sets of academic goals that they would be required to achieve. There might be one lecture per week in each area of study, and during the rest of the week the students would direct their own studies.

Such a vision is controversial--"subversive" is the word Mr. Papert uses--and he said he has no illusions about achieving it in the near future. But he added that he is confident that some programs under way in the U.S.--in New York City's "Computers in the Schools" program and at the Lamplighter School in Dallas--will start to convince educators that such changes are desirable.

"This computers-in-the-schools project in New York [does not have] the shock of sudden change," he said. "We started off by training some teachers ... and then increasing [computer use] to two or three in the classroom, and now there are a few classrooms where there are 15 or 16 computers.

"It takes a little bit of time, but you begin to see in these contexts quite dramatic results," he added. "It's seeing those results, documenting them, making them as visible as possible" that eases the worst fears of teachers.

For the time being, Mr. Papert said, educators should "start clearing their heads about notions that computers are expensive. Every child should have a computer like an Apple II."

Mr. Papert noted that New York City schools spend more than \$30,000 on a student over the course of his 13 years of public schooling. If the computer were priced at its manufacturing cost, he said, it would cost no more than \$1,000 to equip a student throughout his formal schooling.

"For a negligible cost, you can have this change that can transform education," he said. "Get rid of any ideas that this is mythology."

Plan for Development

It is the relatively low cost of computers and the lack of established educational systems in developing countries that attracted Mr. Papert to Jean-Jacques Servan-Schreiber's ideas for the third world.

The idea for the Centre Mondial Informatique et Ressources Humaines grew out of Mr. Servan-Schreiber's involvement with the Paris Group, a collection of international economists, politicians, and scientists formed in 1979 to study problems of world development. The Paris

Group concluded that the microcomputer could be decisive to third-world development.

Mr. Servan-Schreiber convinced French President Francois Mitterand in the fall of 1981 to support the idea of an international center to use computers in third-world development, and the center opened its doors last March. But it has been embroiled in controversy ever since.

Mr. Papert and others blame Mr. Servan-Schreiber and their own political inexperience for the problems. The problems began, the participants said, when Mr. Servan-Schreiber took strong control of the organization and irritated officials from Kuwait, India, Saudi Arabia, and the Philippines who had expressed an interest in the project.

The problems continued when researchers, who Mr. Papert said were promised that they would be able to use whatever equipment they felt was necessary, were criticized for using non-French products.

"This was an example of how fundamental research gets diverted into something more trivial," Mr. Papert said.

"There had been a very formal though verbal agreement that the center would never be restricted to use technology because it's French, or for that matter to choose people who were French. But very quickly we were very severely criticized for accepting a gift from Digital Equipment Corporation."

The pressure to buy French never abated, Mr. Papert and others said. Finally, the center passed from the control of the Ministry of Research to the Ministry of Communications--without the consultation of Nicholas Negroponete, the executive director, or Mr. Papert. It was considered a coup for the French electronics industry, and the ultimate defeat for the center's foreign researchers.

World Center Projects

But before that development--which led both Mr. Negroponete and Mr. Papert to announce their resignations--the center had started work on research and pilot-development projects in Marseille, France, and Dakar, Senegal.

In both places, officials from the center sought out members of the community who expressed an interest in using computers and gave them training in everything from programming to repairing a broken computer. The job of those "vectors" was to introduce computers to every segment of society possible.

If residents of the community expressed a desire to use computers to plan agriculture or medical programs, Mr. Papert said, the researchers in Paris set out to either find the appropriate software or to create new software.

The project now "is going at a snail's pace," Mr. Papert said. If it were on schedule, he said, the World Center's projects would be moving from the cities to smaller towns--"ultimately aiming at the most un-urban, traditional village, with a low level of literacy."

A training program for unemployed youths in Paris using logo, Mr. Papert said, showed the

promise of computers for the most desperately troubled people.

"My experience working with this group is really quite moving," Mr. Papert said. "Generally, their attitude to computers is very negative--they blame the computer for bureaucracy, for putting people out of work. They are very militant about it. They are very angry.

"The other element, the paradoxical element, is that they absolutely can't keep their hands off. In the end, bit by bit, some of the people were expert enough to be able to go out and work with [unemployed people] on their own. [Such programs] can magnify literacy."

The ability to achieve some success with these youths is not that surprising, Mr. Papert suggested, when one considers the way children of all ages and backgrounds enjoy playing "Pac-Man."

"There's no question that there's a certain real holding power," he said. "This tells us that we can harness these powers. We have to think in terms of what will make children fall in love with learning."

WEB ONLY