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ELECTRONIC education

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A close look at people shaping educational computing

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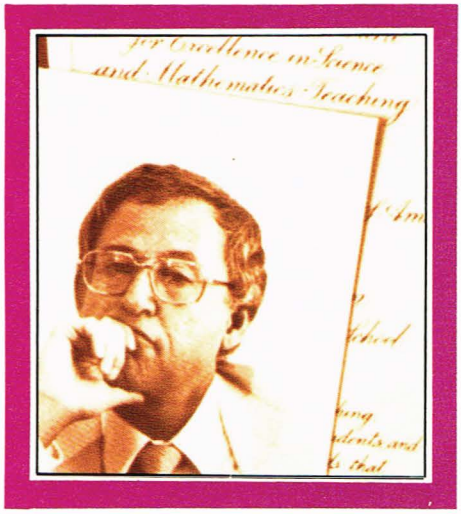
(See page 9.)



Irwin Hoffman, a math and computer science teacher at George Washington High School in Denver, Co., may not be the most recognizable face on our cover, but that hasn't made his impact on educational computing any less powerful. In fact, all of the famous and not-so-famous individuals pictured on our cover have a common element tying them together—their unyielding efforts to see computers work effectively in the classroom. Our cover story beginning on page 14 describes these individuals and their efforts.

DEPARTMENTS

AROUND THE CIRCUIT

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- **Kids' corner**—How students really feel about the software they're using is revealed through their candid reviews. This article gives the real user a chance to speak out.

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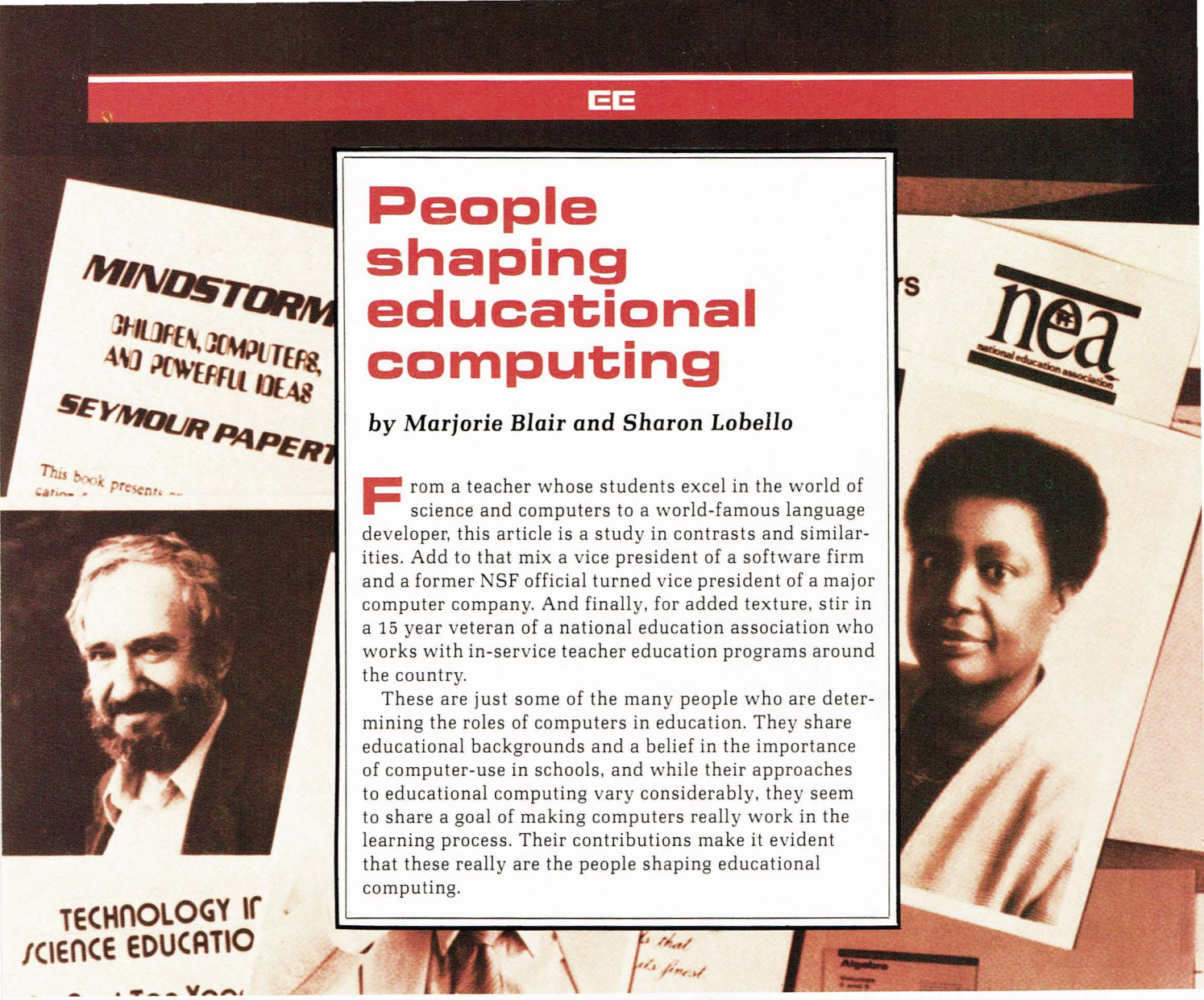
People shaping educational computing

by Marjorie Blair and Sharon Lobello

From a teacher whose students excel in the world of science and computers to a world-famous language developer, this article is a study in contrasts and similarities. Add to that mix a vice president of a software firm and a former NSF official turned vice president of a major computer company. And finally, for added texture, stir in a 15 year veteran of a national education association who works with in-service teacher education programs around the country.

These are just some of the many people who are determining the roles of computers in education. They share educational backgrounds and a belief in the importance of computer-use in schools, and while their approaches to educational computing vary considerably, they seem to share a goal of making computers really work in the learning process. Their contributions make it evident that these really are the people shaping educational computing.



Only once in a lifetime can an individual make as great an impact on an institution as large as education as Seymour Papert has made with Logo. Talk with Papert and he'll tell you about the MIT team who worked on Logo, but the images that the mention of Logo evokes are only two: Papert and turtles.

Papert, with multiple Ph.D.s (one from Cambridge), worked with Jean Piaget before co-founding MIT's Artificial Intelligence Laboratory in 1967 with Marvin Minsky. In 1982 he was named the scientific director of the World

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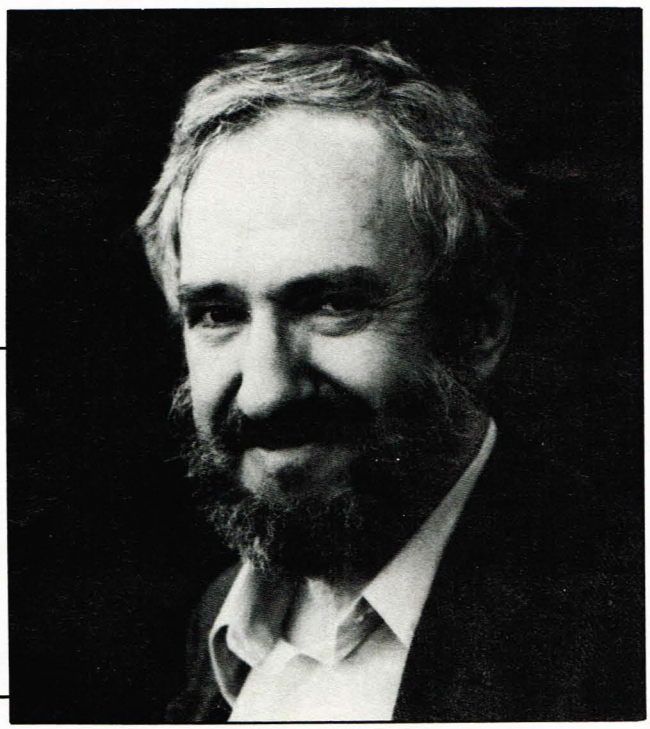


Center for Computation and Human Resources in Paris. On the educational computing scene since 1968, Papert first came to national—and, later, international—prominence with the 1980 publication of his book *Mindstorms—Children, Computers and Powerful Ideas.*

A book that challenges some closely held educational philosophies, *Mindstorms* develops the metaphor "computer as pencil" and outlines Papert's belief that the computer of the future will be as small as a paperback book. As farsighted as that observation may have been when Papert wrote the book, his statement that "Most of the purposes served by the computer of the future are as much beyond our imagination as the computer itself was beyond the imaginations of our grandfathers" makes the book timeless.

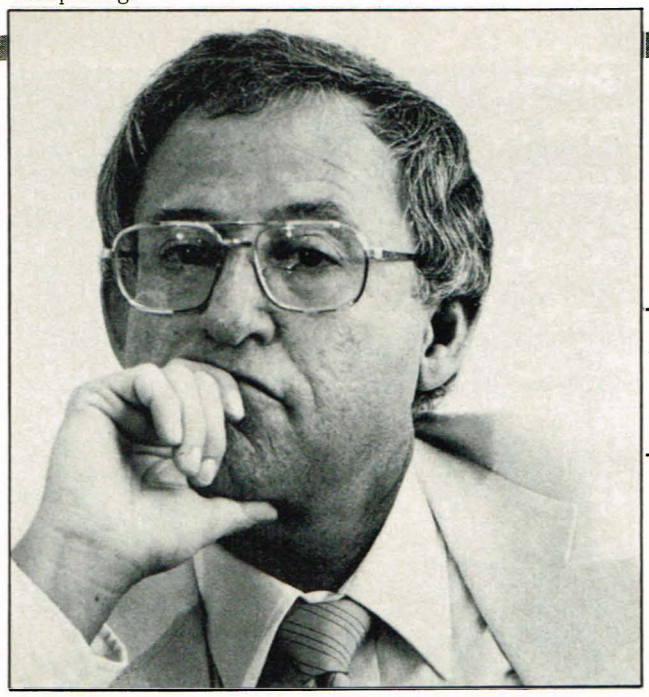
In a 1981 interview with *EE* shortly after publication of *Mindstorms,* Papert made a statement that has become our most-often requested quote: "I believe that the image of a computer per classroom is quite unrealistic for the future. A more accurate formula will be one computer per child. The computer can and should become as commonplace as the pencil." This statement, nearly revolutionary in 1981, has been the subject of more papers and national debates than any other single topic in educational computing.

But Papert, unassaulted by the storm that sometimes rages around him, says he is devoting his time now to practising what he has been preaching for years. He encourages educators to demand more computers and advises, "The vision of the computer I am presenting is not one of improving present day instructional practises. It leads to a fundamental change in the way certain knowledge, such as written languages, is acquired."

Papert believes that elementary and pre-school children benefit most from computer learning because it opens new dimensions in their thinking and allows them to overcome or totally avoid many of the stigmas associated with learning some subjects.

"The computer presence will enable us to so modify the learning environment that much if not all of the knowledge schools presently try to teach with such pain and limited success will be learned, as the child learns to talk, painlessly and successfully," according to Papert.

When someone dares to have ideas like these, he will either rise to the top or be instantly crushed between the forefingers of fate. It's a tribute to Papert, a usually mild and unassuming man, that his ideas are so well-founded and his own knowledge so extensive that he has made Logo instantly recognizable to educators everywhere.



Because of his early integration of computers into the curriculum, Hoffman is often cited as the father of the first high school-based computer education program in the country. And, since his days of scrounging for computers to use in his classes, Hoffman has also become known as the patriarch of George Washington High's computer lab which houses 54 microcomputers—most of which were donated.

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Irwin Hoffman became a teacher because he wanted his summers free to pursue his real desire—being a tennis pro. More than 20 years later, Hoffman has his wish—he spends his summers on the courts, but his real passion now is being a school teacher.

Hoffman, 52, has his doctorate in mathematics and has taught at George Washington High School in Denver, Co. since the school opened in 1960. He's been using computers in his classes almost as long.

Since then, Hoffman says, "We've always been two to five years ahead of other schools in terms of computer technology, putting us on the leading edge of researching the appropriateness of this technology in the curriculum."

In recognition for his accomplishments with teaching and computer-use in the classroom, Hoffman was presented the 1983 Presidential Award for Excellence in the Teaching of Mathematics. But, despite this accolade, Hoffman insists on taking a back seat to the achievements of his students—many of whom are working on projects that only researchers and highly-paid professionals do elsewhere. Hoffman's students usually don't use commercially available instructional manuals. Instead, they write their own. According to Hoffman, their first CPM manual was written by students two years before the first book was published on the topic.

These students are also actively engaged in research and curriculum development projects, many of which are tied to grants awarded to the lab or to individual students. Chuck Tucker, a 17 year old junior at George Washington High, was contacted by the Dade County, Fl. schools to show them how to run Pascal on Atari microcomputers. Another student, Steve Kelly, is developing ways to overlap images on computer screens. And about 20 of Hoffman's students are working on a Federal Title

VII Research Grant in which they are programming 40 bi-lingual lessons that teach English as a second language. On the industry side in 1982, Atari awarded a grant to the lab to develop Forth for the Atari 800 microcomputer. The list goes on and on.

What makes so many of this school's students so exceptional? According to Hoffman, it's because "We're not afraid to open their minds." He says that many of his students are good enough to teach him. "I could sit and learn from about 15 or 30 of my kids who are experts in their specific areas."

But not all of George Washington High's students excel to this degree. In fact, the school is ranked as "average" among the nation's public schools with NTS scores in the 50th percentile. But even the average students among the school's 1,400 population find computers useful in their studies, with the most popular use being word processing.

Hoffman's philosophy of teaching and using computers in the classroom is something that has been having positive results in the classroom from the very start. In 1964 Hoffman taught a blind student, John Stevenson, how to program a computer by reading the text to him. Stevenson has since developed software to convert braille to print and worked two years on a language bank which won him an award from Johns Hopkins University for personal computer programming for the handicapped. Others who have come under Hoffman's tutelage include Dr. Sharon Long, a biochemistry professor at Stanford University who won last year's Presidential Award as Outstanding Young Scientist, and Dr. Fred Ris who holds a Ph.D. in mathematics and is senior manager of computation-intensive systems at IBM's Computer Science Department at the Thomas J. Watson Research Center in Yorktown Heights, N.Y. Then there is Randy Levine, a Ph.D. in physics, who is one of the world's leading experts on the solar magnetic field. And Dr. James Rosenberg, author of the *Introduction to IBM/360 Assembler Language*. And, finally, Bob Kahn, winner of the National Science Foundation's Hummro Award—the same year that his former high school teacher, Irwin Hoffman, also won the award. This list, like the current list of students, goes on and on.

It's obvious that these achievements not only speak well of the individuals who have gained them, but also of the man who played a part in all of their lives. Hoffman sees his role in all of this as an educator. According to him, "It's the duty of educators to open the minds of students and mirror the world they're going to live in. If our students are going to work in the Information Age environment, we have an obligation to develop curricula that fill these needs."

What all this says about Hoffman is that he has what it takes to make a teacher great—the ability to meet new ideas with a mind as open as he wants his students' to be.

After nearly 10 years with the National Science Foundation, Dr. Dorothy Deringer recently made the decision to move to private industry, leaving behind her a legacy of support for some of the most notable educational computing projects ever to receive government funding.

As a program officer with the NSF, Deringer monitored grants for numerous educational computing research and development projects including MIT Logo (Seymour Papert's development of the Logo language), Rocky's Boots (an educational computing game with the content of a logic course designed for third graders but suitable for students through graduate levels) and *Computer-Town: Bring Computer Literacy to Your Community* (a book outlining the steps for starting your own community-wide computer literacy project modeled after Computer-Town USA!).

This new way of thinking for the teacher is challenging, but it is crucial in effectively using the enthusiasm that the computer generates in students and in creating an environment in which young people are active participants in their own education.

Deringer was supportive of all of these projects and others because she believes that "They stimulate creative and logical thinking, build intuition and analytical skills and create a computer culture in the school and community."

One of the accomplishments of which Deringer is most proud is a program she was responsible for establishing which involved the NSF, private industry and universities in a cooperative effort to fund projects promoting educational uses of computers in science and engineering. This $2.6 million program, established in February 1982, supported creative, innovative prototypes of

Continued on page 26.