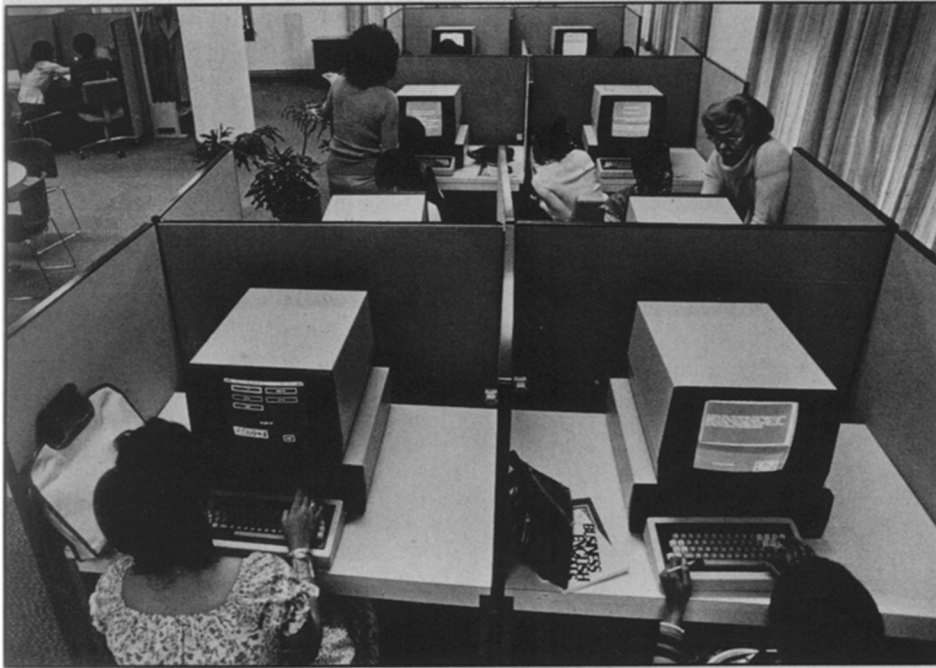


You're Never Too Old

Computers are helping classic underachievers change their lives

BY JANET RALOFF



Computer carrels at the Baltimore Learning Center (left). Scenes from the fish-and-tub sequence (below) that Clever, the robot-like character, uses to introduce the concept of addition.

TEACHER: "What do you want to do today?"

Sandra, quite shy, indicates her choice by touching a box displayed before her titled Basic Math Skills.

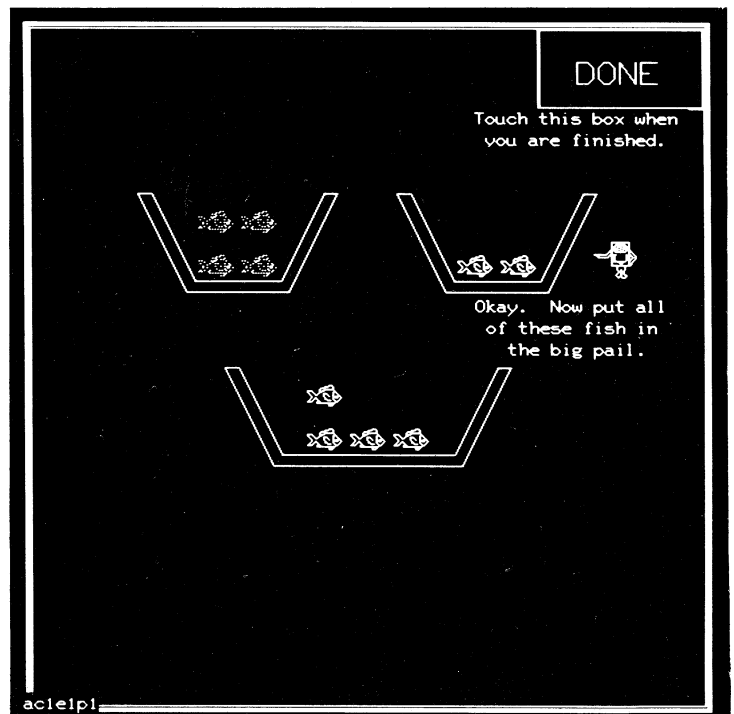
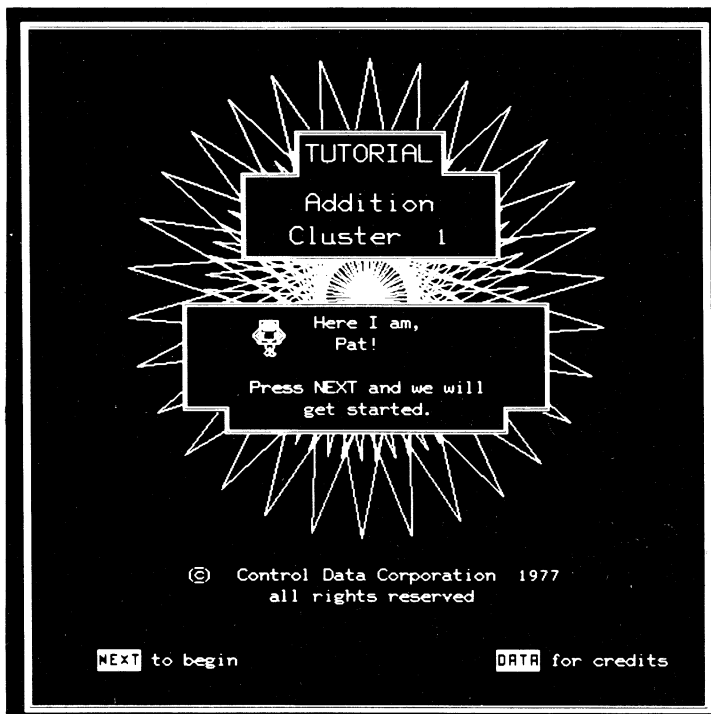
TEACHER: "What do you want to work on?"

Sandra looks over a list of options and

points to the first one on the list, Basic Number Ideas.

TEACHER: "Today Sandra, this is your goal: to learn the meaning of addition and to learn the words used in addition." The teacher then points to a tub of fish. "Touch this tub, Sandra." As she does, the fish immediately disappear. "Good, the fish are

now on your finger. Place your finger on the empty tub below." Sandra does and the four fish reappear. Upon instruction, Sandra repeats the process to transfer two more fish from another tub into the lower one. Then her teacher explains that four fish plus two more equals six fish. The process is called addition.



That scene might have taken place between an elementary-school teacher and a young child, but it didn't. The "teacher," Clever, is an animated robot-looking cartoon character, and the student is a 30-year-old mother of four. Both met above the keyboard of the terminal Sandra uses at the Adult Learning Center on the fourth floor of the Central YMCA in downtown Baltimore. They meet here often and converse regularly, but not verbally. Clever's words appear in speech balloons beside his mouth. Sandra types responses on her terminal's keyboard. What's more, Clever doesn't confuse Sandra with his dozens of other students at the learning center. He "knows" what she knows, and he helps her through lessons to learn what she doesn't know yet.

Sandra is part of a federally funded CETA (Comprehensive Employment and Training Act) program run jointly by the Mayor's Office of Manpower Resources in Baltimore and by Commercial Credit Co., a wholly owned financial-services subsidiary of Control Data Corp., one of the nation's largest computer manufacturers. (CETA contributes close to \$200,000 for the center; Commercial Credit has committed close to \$450,000 more to lease computer terminals, staff the center and provide technical support.)

The purpose of the center is to reach and educate "functionally illiterate" adults — persons with reading and math skills below those expected of the average eighth grader — to the point where they can successfully compete for and maintain jobs and skilled training. Without such basic learning and communication skills, these adults generally have a difficult time functioning in society, a low sense of self-esteem and, more important econom-

ically, a very difficult time earning a supporting income.

According to the U.S. Office of Education, approximately 23 million American adults read at less than the eighth-grade level. Many are unable to read, much less comprehend, newspaper want ads listing jobs for which they might qualify. And the problem is serious: In some urban areas, the illiteracy rate runs as high as 40 percent.

Comprehension is another problem. For example, an estimated 39 million American adults cannot interpret a payroll-earnings statement well enough to find how much was deducted for Social Security. Government agencies frequently encounter adults who cannot comprehend instructions on food labels, tax forms or job applications. And an estimated 52 million American adults cannot handle the simple math required to determine the correct change when given a cash register receipt and the denomination of currency used to pay for the purchase.

Such functionally illiterate adults tend to come from broken homes, correctional institutions or school systems that were unable to provide the sensitivity, individual attention and support that slow learners or socially disenfranchised youths may require. Some dropped out of school to have a baby or to support a family.

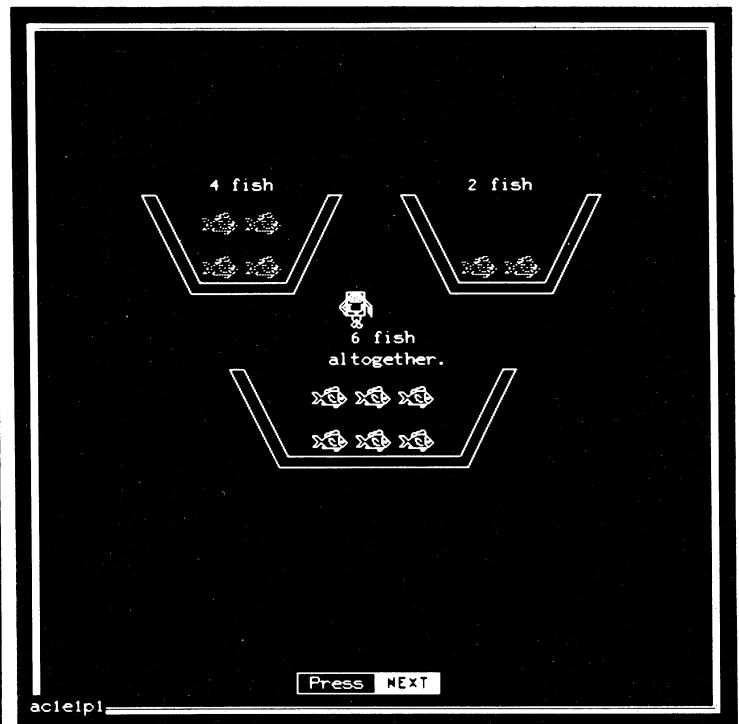
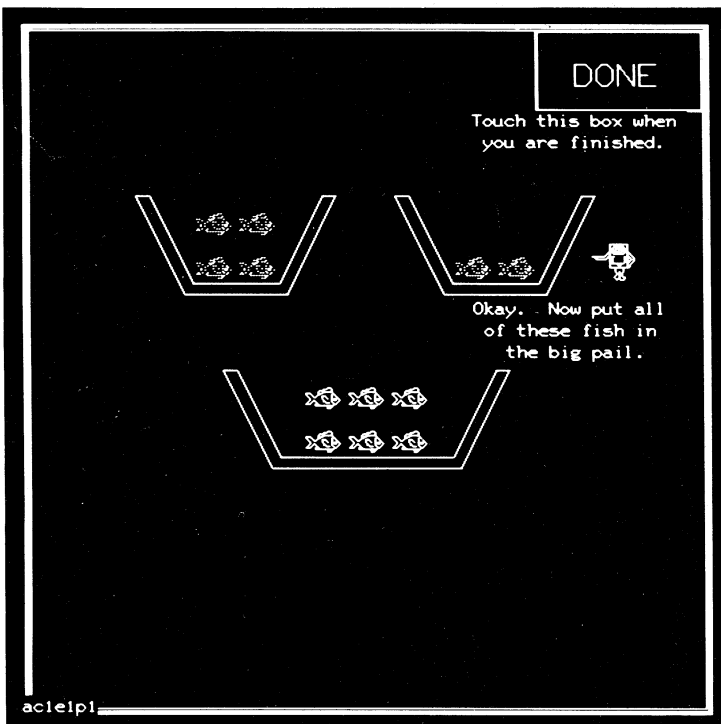
The core of the first group to use the Baltimore center, which opened in February, were 30 adults with "no marketable skills," says Commercial Credit's Robert Irvine. None had graduated from high school, none typed faster than 20 words per minute and their reading levels ranged between those of third and eighth graders as measured by the ABLE (Adult Basic

Learning Examination) achievement tests.

Under the experimental nine-month CETA program, they were paid minimum-wage salaries for a 37-hour week. Two hours daily were spent in Control Data's computer-assisted education program (involving work on the computer terminal supplemented with workbooks and video tapes). The remainder of their time was spent in clerical training taught by a local business school, subcontracted for the program by the city.

Control Data is the granddaddy of computer-based education. Development of its PLATO (Program Logic for Automatic Teaching Operations) system began in 1960. By 1976, more than 2,000 users were preparing new courseware to use with or add to the PLATO-course catalogue, and more than 20,000 students were enrolled in PLATO courses ranging from simulated airline-flight navigation to graduate courses in chemistry, calculus and business management. The Basic Skills program that Sandra and her classmates are using, however, was introduced only last February and is still in the process of being revised.

She and her classmates (180 or more students now use the Baltimore center) consider themselves privileged guinea pigs for Control Data's course-development consultants. The fact that an adult learning center is necessary and generally filled to capacity (there's currently a waiting list to use the Baltimore center) results because traditional public schools fail so many. The PLATO developers seek to recapture those who fall through traditional education systems and motivate them to return to study with quick, practical and entertaining lessons that virtually teach themselves. Finding out what it takes to



stimulate, motivate and educate this special class of adults is what experiments like Baltimore's Adult Learning Center are about.

For example, what introduction is necessary to overcome fears that students who can't multiply might have in using awesome high-technology computers? What will make grammar and math drills interesting — if not compelling — to adults? For classic underachievers, the thought of tests, homework and teachers' expectations can be paralyzing. The Basic Skills package seeks to alleviate these fears and pressures by personalizing education.

For some students, nobody has paid much personal attention to them since they've been out of diapers, says Irvine. "All of a sudden some *thing* gets interested in them." Speedy, Clever and the other animated teachers carry on a one-to-one dialogue with the student, always speaking on a first-name basis. *No one else* — student or teacher — gets involved or watches their day-to-day progress unless invited to do so by the student. It's a private tutor who speaks their language, paces himself at their speed and who never gives up. Speedy and his pals instruct in an entertaining fashion. Arithmetic is taught within a lesson on how to balance a checkbook, for instance. Grammar is taught via the sports page of a hypothetical newspaper, which magically draws itself on the viewing screen. Practical lessons help students appreciate the importance of skills without being dull or pedantic.

Most of these students are far from stupid, just disadvantaged. But with years of negative reinforcement — from teachers, family, job interviewers, peers — they now think of themselves as stupid, as failures, as being incapable of learning. That's where Speedy and the other animated lesson guides come in, says Irvine. Their positive reinforcement breaks down the students' "I am a knucklehead" attitude, he says, which might otherwise discourage them from sticking with the lessons. Convincing students that they can learn is often a bigger problem to overcome than their lack of skills. To do it requires restoring their confidence, and encouraging them to be more assertive, to take the initiative more, he says.

"As a former teacher, I know that you can only help students so many times until the teacher's and class's patience wears out," Irvine continues. But Speedy has infinite patience. He and the other characters teach the lessons, ask the student questions, congratulate the student upon successful completion of each exercise. Students find they soon get deeply involved in conversations with the cartoon characters and frequently refer to them as people. Speedy never gets angry, never ceases to encourage. He's programed that way. He can even be programed to speak in the jargon of his students or to register

indignation when students hurl obscenities (and that's been done).

The approach seems to pay off handsomely. Although results of the Basic Skills program, still less than a year old, are incomplete, preliminary findings are encouraging. "Adults gained, on the average, one school year in reading in less than 12 hours — 7.5 hours on the PLATO computer-based education system, plus 3.75 hours of outside study. A jump of 1.5 grade levels was made in math in less than 20 hours — 13 on the PLATO system and 6.5 hours in outside study," according to a six-month nationwide trial conducted with students from the Baltimore center, the Bexar County jail in San Antonio, Tex., and several schools and correctional institutions.

Data from the Baltimore learning center alone showed that students completed an 0.8-grade increase in reading competency, equivalent to roughly 120 instructional hours or eight months of conventional school study, after spending no more than an average of 23 hours in the PLATO curriculum — 15 of them at the computer terminal. Math gains were slightly better. Students averaged a 1.2 grade-level-equivalency increase for 30 hours of PLATO instruction — 20 of which were spent at the terminal. This corresponds to skill gains normally expected of students receiving 180 hours of conventional instruction. Unlike the reading gains, "growth in mathematics ... did not show a steady rate of increase," according to Peter J. Rizza Jr. and Peggy Walker-Hunter, who conducted the study. They found the most substantial growth (amount learned per time spent) occurred as students completed drills on fractions and moved into decimal and percent problems.

Many who entered with no confidence and who expected to learn nothing ended up deciding to go on and train for their GED (General Educational Development) certificate, the equivalent of a high school diploma. At least two of the initial entrants, whose class graduated October 25, have obtained that GED and registered for classes at the University of Maryland. Several others have taken jobs or received job offers. Many have even overcome their fear of speaking up in public as a result of a new confidence in their ability to communicate articulately, says Yvonne Trusty, the learning-center technician and the closest thing to their teacher. Others have started reading newspapers, even taken an interest in current events and politics, she says enthusiastically.

Sandra dropped out of school when she became pregnant. Over the years, while raising four children (the youngest is now 10), she worked as a cook in a hospital, college, bar and department store. "I was good at it, but I don't want to spend the rest of my life cooking," she told SCIENCE NEWS. "I want a job I can be satisfied with. I want something I can put myself into, not some \$1.20-an-hour job." As a result of her

classes at the learning center, she now plans a career in keypunching or computer operations.

Enthusiasm for the Basic Skills program fairly bubbles out of her. She looks forward to class eagerly, saying that nothing short of hospitalization would keep her away. "My kids don't understand why I'm having so much fun in school when they aren't," she says. But those years as cook gave her an appreciation for the importance of a high school diploma and the mastery of basic skills it represents. Although the class costs her nothing, she said she would be more than willing to pay for it. And like many classmates, the night-school alternative was out of the question. "You can't get the individual attention you need there," she says. And the computer is much more interesting than sitting in the back of a class passively listening to teachers lacking Speedy's wit and patience, she says. She is not alone in appreciating the learning-center opportunity; 90 percent or more have expressed that they liked the PLATO classes "all or most of the time."

Peter Rizza, responsible for developing the Basic Skills program, summed up the first nine months of the Baltimore program. "The significance of the Basic Skills Learning System is that it provides the opportunity for adults to finally succeed at learning. Many functionally illiterate adults never have experienced success before in the classroom. As a result of the positive reinforcements built into [this program], these students now have both the educational skills and the self-confidence to succeed in productive jobs." □

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