

# Can Computer-Assisted Instruction Solve the Dropout Problem?

After installing a Computer Assisted Instruction system, officials in Escambia, County, Florida, are decreasing the high dropout rate and giving at-risk students the skills to survive in the work world.

Fifteen-year-old "Darrell" was getting by with "D's" until 9th grade, when his attendance and his academic average went down even further. Darrell's teachers found his attitude defensive. He found *them* hostile and discouraging. Like other minority youths in Pensacola High, Darrell was "at risk," likely to drop out and end up either in jail like his brother or on welfare like his sister, who had left school before she was 17 to take care of her infant daughter.

In 1984, nearly 40 percent of the youngsters in Pensacola High dropped out. That figure was lower than in other Florida communities with large at-risk populations, in which over 50 percent never graduate. But it distressed Mike Holloway, then Superintendent of the Escambia County Schools. "Even *one* is one too many," he felt. "Compounding the tragedy that they will never read is the tragedy that they will probably never work."

## The Dropout Problem

It has always been difficult to keep students like Darrell, who find school-work difficult and are beset by problems at home, from leaving school. But about five years ago, what was a bad situation became worse. When

Florida mandated minimum competency graduation requirements, SAT scores soared, but so did dropout rates. "We began losing the marginal kids and those with learning problems in addition to the seriously disadvantaged kids," explained John DeWitt, Escambia's Director of Research and Grants.

In schools across the country, a variety of innovative approaches to school retention have been devised to induce students to remain in school; for example, increased counseling, alternative settings and alternative routes to a diploma, graduation incentive-payments, and peer counseling. The assumption has been that with a strong support

Photograph courtesy, Calvert County Public Schools, Calvert County, Maryland



*In Calvert County Public Schools, Calvert County, Maryland, students begin computer-assisted instruction as a routine part of their schooling before they have academic difficulties; now more than 82 percent score above national norms on achievement tests.*

system and sufficient motivation, skills and commitment will follow. DeWitt explained:

We tried many of these programs, and still have some in place, but we find them "stop-gap" measures. They worked only as long as a caring adult held the youngster's hand. As soon as individual care diminished, students dropped out. And too often those who stayed to graduate did not leave with sufficient skills to get or hold jobs.

Darrell had begun seeing a school counselor, but he had one foot out the schoolroom door. Then Computer-Assisted Instruction (CAI) came to Pensacola High.

### The Search for a Solution

"We sought a system that would assure that all youngsters leave school with sufficient skills to earn a living and, if we were lucky, one that would qualify for state and federal funding to help us defray start-up costs," recalled DeWitt.

Jerry Spurlin, Florida's Job Training Partnership Act (JTPA) Training Program Director at the Department of Education, teamed up with DeWitt to find the ideal program for the county. They started with an ERIC-search at Florida State University, followed by visits to schools using CAI with at-risk populations.

After considering a number of CAI programs, DeWitt and Spurlin concluded that the best program for Escambia would, first of all, be based on sound learning theory and validated by records of student progress and would not add extra work for teachers. It would not only help students with generic skills development but would correlate with Florida's Student Assessment Test by providing practice in the types of questions on the competency test required for graduation. The program they envisioned would give students immediate feedback and offer teachers an on-demand readout of a student's status and progress. In addition, it would serve the needs of students in grades 1-12, of adults returning for their GEDs, and of gifted students as well as those in need of remedial help. Finally, the program would diagnose performance levels for each student and prescribe work in

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separate skill areas within each subject. For example, for an 8th grader with uneven development, it would provide problems at a 4.8 grade level in division, at a 6.2 level in addition, and at a 3.7 level in fractions.

The only system DeWitt and Spurlin found that met all their criteria was one produced by the Computer Curriculum Corporation of Palo Alto, California. Initiated by Stanford University's Patrick Suppes, the system had been used with success in hundreds of school districts. The Escambia evaluators looked closely at the results reported by two of these districts that had rigorously evaluated their results: Calvert County, Maryland,<sup>1</sup> and Lafayette Parish, Louisiana.<sup>2</sup> The Louisiana site, which focuses on high school at-risk students, had been selected in 1982 as a Lighthouse Project by the Department of Education's National Diffusion Network.

### An Infinitely Patient Teacher

In 1985, the district installed 16 terminals in Pensacola High, which had twice as many disadvantaged students as any other in the county. In the first six months, only two of the 374 at-risk students assigned to the program dropped out.

There was only one explanation for this dramatic turnaround. Students who had failed throughout their school years were, for the first time, experiencing academic success. That success

kept them coming back. In only six months the youngsters covered from one to two academic years merely by spending 20 minutes of each school day on CAI.<sup>3</sup> The results were so encouraging that the district increased the number of terminals to 88 in six area schools. At this writing, 2,000 students are served at 128 terminals divided among 9 settings, including a juvenile justice detention center. As of 1988, less than 1 percent of the JTPA-verified at-risk students have dropped out of school.

And the youngsters loved it. At first, some came to school only to use the computer—and left after their CAI time was over. According to LaDon Boyd, Escambia's JTPA Director,

Darrell, who began attending school regularly when he started working on the computer, actually stayed out of school for a week while the mainframe was down and then returned when told it was up-and-running again. . . . Only after he had been on the program for several months did his teacher see some in-class carryover.

Students' remarks are revealing: "The machine doesn't know I'm black," "It doesn't hate me," "It gives me a second chance," and "I can do it!" are typical of the comments reported by computer proctors. The sense that the machine is on the student's side probably can be attributed to three features.

First, because the program drops to an easier level if students, despite the program's tutorial help, miss several consecutive exercises of one type, they don't get discouraged. And because it advances them if they get several consecutive questions of one type right, they don't get bored.

Second, the program creates new problems by choosing numbers at random, so even students who need a great deal of practice in a specific skill never have a sense of *déjà vu*.

Third, the program's supportive comments—"Well done, Darrell," and "Good work, Darrell!"—come at random times, interspersed with award ribbons indicating correct answers. And of course mistakes are nonpublic, and corrections are administered with infinite patience.

In addition to becoming more skilled, students are seeing an important and hitherto missing link—the relationship of effort to success. According to Shirley Thornton, who administered the "Locus of Control: Intellectual Academic Responsibility Questionnaire" to determine the effects of the CCC program on youngsters of color in the San Francisco Bay Area (Thornton 1985):

Six weeks on the CCC system convinced them that it wasn't fate or popularity but their work that would affect their advancement in life. Their locus of control had shown remarkable shifts from the outside in.

### How Consistent Are the Gains?

Six years ago Calvert County's school system ranked 12 out of 24 in Maryland in California Achievement Test scores. Today it is third from the top, with better than 82 percent of the students scoring above the national norm, 25 percent in the ninth stanine in math, and nearly 11 percent in the ninth in reading. Scores in the lowest three stanines have been virtually eliminated, with only 2.5 percent of the students placing in that category. Eugene Karol, Calvert County's School Superintendent, explained:

[The] CAI results tell the story. The average 8th grader is performing in language arts at the 12th grade level, reads at the 11th grade level, and computes at the 10th grade level. That's the average! Our average I.Q. is 107. It's ordinary kids doing extraordinary work.

Karol attributed his county's success to the sophisticated sequential system and to starting the youngsters on it *before* they run into difficulty.<sup>4</sup>

In Lafayette, Louisiana, Marion J. Cortez, Supervisor of Federally Supported Programs, attributed the JTPA summer program's educational results to their use of the CCC system. The summer program was modeled on nationally published programs sponsored by JTPA (SAIL from Baltimore and Public Private Ventures, STEP from Philadelphia) that provide eight weeks of academic, part-time employment and attitudinal inspiration to 100

high-risk adolescents and young adults above 14 years of age from economically deprived backgrounds. Specifically, the students gained 1.5 grade equivalents in math and 1.2 in reading in eight weeks. (A total of 15 hours was devoted to computer math instruction and a total of 14.2 hours to reading instruction.) The criterion-referenced post-tests showed that students could work problems they had never seen before and that they would be considered sufficiently competent in math for many skilled or semi-skilled jobs. Over and above the academic gains were the attitude changes. Students worked hard and were highly motivated. Their self-concept and self-confidence were positively changed (Hotard and Cortez 1987).

### Life After High School

To answer the question asked in the title, yes, there are powerful CAI systems available that will keep youngsters in school and can assure that those who devote a mere 20 minutes a day to reading and math will graduate with sufficient skills to get jobs.

This is great news, but is it enough? Can we plug students into computers for a third of an hour and feel that we have done well by them? Of course not. Students need a balanced program. To get and keep jobs, they must learn to get along socially, to ask ques-

tions and elicit feedback, to deal with situations that don't have a "right" answer. Some school critics feel we haven't time to focus on "frills"—music, art, literature, and the thrill of scientific discovery. But with skills development virtually guaranteed by a good CAI system, teachers and students are freed to expand on the creative, mind-stretching, and interpersonal experiences that make life worth living. And when low-achieving students choose to spend their lunch hours in the computer room rather than playing outdoors, it's time to take a closer look at Computer-Assisted Instruction as a means of keeping them from becoming dropout statistics. □

1. "Computers in Calvert County Public Schools" and other materials about the project are available. For more information, write: Eugene M. Karol, Superintendent of Schools, Dares Beach Rd., Prince Frederick, MD 20678.

2. For more information about the Louisiana project, see Hotard and Cortez (1987).

3. The California Achievement Tests were given for pre- and post-test comparisons as required by a contract with the Private Industries Council. For documentation, write: John DeWitt, Director of Research and Grants, The School District of Escambia County, 30 E. Texar Dr., Pensacola, FL 32503.

4. This finding has been validated by Gilbert Austin of the University of Maryland (Baltimore County), who has been conducting an independent study of the correlation between CAI and student learning in Calvert County, Maryland.

### References

- Hotard, S., and M. Cortez. (1987). *Evaluation of Lafayette Parish Job Training Summer Remedial Program 4*. Lafayette: University of Southern Louisiana, Federally Supported Programs.
- Thornton, S. (1985). "Assessing Achievement Gains of Children of Color as Related to Internality and Affected by Ethnicity, Gender, and Knowledge of Taking Standardized Tests." Doctoral diss., University of San Francisco.

Beatrice Gross may be contacted at 17 Myrtle Dr., Great Neck, NY 11021.

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