FORUM

Algebra taken early can be key for students

As part of a research project 12 years ago, one generation in the life cycle of public-school students, five second-grade teachers in the Cleveland Municipal School District and three of their counterparts in an upper-middle-class suburb gave their students work sheets, each with 42 problems, all on two-digit addition and half of them required carrying.

The median score in Cleveland was 56 percent; in the suburb, 95 percent. The median time of completion in Cleveland was 22 minutes; in the suburb, seven minutes.

At that same time in 1991, I was teaching first-, second- and third-graders with learning disabilities in Cleveland schools, and I gave them the same work sheets. My students matched the scores and times of the suburban students. Why?

One key reason is that I had taught them the algebraic relationships of numbers. In 2001, Roland Good, Deborah Simmons and Edward Kame'enui published a study that indicated a high correlation between how quickly and accurately students can read a passage and how well the students do on standardized reading tests. I believe my 1991 research, plus subsequent formal studies, demonstrate that the same correlation exists between arithmetic “fluency” and performance on standardized math tests.

The importance of doing better was brought home in Radical Equations: Math Literacy and Civil Rights, a recent book by two veterans of the 1960s Freedom Rides for voting rights. In the book, Robert Moses and Charles Cobb argue that the next civil-rights movement should be to ensure that black and other at-risk students take algebra in the eighth grade. They point out that those who don’t are forever condemned to second-class scholarship because they perform terribly on college-placement exams.

In 2001, the National Research Council published "Adding It Up." The study’s authors suggest that developing understanding must not be treated as a pedagogical opposite of learning basic facts and developing computational fluency but that understanding must be intertwined with memorizing facts and developing computational fluency. Furthermore, the authors argue that few elementary-school arithmetic programs lead to algebra in eighth, ninth or even 12th grade. They point out that teaching students to solve 14 minus 7 by counting backward is not only a dead-end proposition but also that the logic most teachers teach doesn’t even work. Instead, students need to see the algebraic relationship between their basic arithmetic facts. For example, once students come to understand and memorize that 7 plus 7 equals 14, they need to be led to see how this simple fact is algebraically related to 7 plus X equals 14, and 14 minus 7 equals 7, as well as 7 times 2 equals 14 and 14 divided by 2 equals 7.

Yet, it’s also important to realize the need to modify high-stakes tests and curricula to accommodate not only a better curriculum but also to address developmental and social realities. That’s because at-risk stu-

Richard Oldrieve is an educational researcher in Westlake, Ohio.
oldrieve@aol.com