EDUCATION WEEK
VOL 28, NO. 23 • MARCH 4, 2009 • $3
AMERICAN EDUCATION'S NEWSPAPER OF RECORD

edweek.org: BREAKING NEWS DAILY

Study Gives Edge to 2 Math Programs

Experiment Involving Popular Curricula Unlikely to Spawn Truce in 'Math Wars'

By Debra Viadero

Two programs for teaching mathematics in the early grades—Math Expressions and Saxon Math—emerge as winners in early findings released last week from a large-scale federal experiment that pits four popular, and philosophically distinct, math curricula against one another.

But the results don't promise to end the so-called "math wars" anytime soon, according to experts. That's because the two most successful programs embody different approaches to teaching math in grades K-2.

The Saxon curriculum, published by Harcourt Achieve of Austin, Texas, is a more traditional, scripted program in which teachers offer explicit instruction on effective mathematics procedures.

The Boston-based Houghton Mifflin Co.'s Math Expressions curriculum, in comparison, integrates a more reform-oriented emphasis on student reasoning with direct teaching that is aimed at moving students to more-advanced mathematical strategies. "One of the things this says to me is that we're not going to find a unique curriculum that all teachers can use with the same degree of effectiveness," said Hank Kepner, the president of the National Council of Teachers of Mathematics, in Reston, Va.

> "The math panel said it's no longer at all sensible to talk about teacher-directed versus student-directed approaches. … This confirms that."
>
> STEVEN J. LEINWAND
> Principal Research Analyst, AIR

Involving 1,309 1st graders in 39 elementary schools, the four-state study is considered the largest experiment to test some of the nation's most widely used commercial math programs. It was commissioned by the Institute of Education Sciences, the primary research arm for the U.S. Department of Education. Mathematica Policy Research Inc. of Princeton, N.J., headed up the project.

The eagerly awaited results, which were posted online Feb. 24, come from the first of three reports on the 3-year-long study. It has since enlisted 71 more schools.

Besides Saxon Math and Math Expression, the researchers also tested Investigations in Number, Data, and Space as well as Scott Foresman-Addison Wesley Mathematics, both published by Pearson Scott Foresman, based in Glenview, Ill.

In all, publishers submitted eight programs for the study, said Audrey Pendleton, the IES project officer for the study. An expert panel chose the four programs based on their popularity, publishers' capacity to provide teacher training, and the diversity of teaching approaches they represent as a group.

The Investigations program, for example, is considered the most student-centered of the four curricula, while Scott Foresman-Addison Wesley Mathematics is a basic-skills curriculum that combines teacher-led instruction with a variety of different materials and teaching strategies.

Researchers randomly assigned each of the programs to 10 different schools for use over the 2006-07 school year, and teachers later reported that the assigned curricula served as the backbone of their math instruction that year.

To determine how much math the students learned, the researchers used a nationally normed exam that was developed for the federal Early Childhood Longitudinal Study. Roberto Agodini, Mathematica's lead investigator on the project, said researchers chose that test because children could take it individually, and because it adapts questions to children's abilities by adjusting questions' level of difficulty. "Asking young kids to take a paper-and-pencil test would probably not be a good idea," Mr. Agodini said, "and we wanted to capture the wide range of students' abilities."

At the end of 1st grade, investigators found, children in classes using the Saxon and Math Expressions curricula scored 9 percentile points to 12 percentile points higher on those tests than their counterparts in other classrooms.

Publishers were quick to note that students in the study were not nationally representative. Among the reasons: By design, the testing population included a high number of high-poverty schools.

While experts cautioned against drawing sweeping conclusions, several said the results seem to validate the National Mathematics Advisory Panel's call last year for integrating a focus on promoting students' conceptual understandings of the subject with instruction on simple procedures.

"The math panel said it's no longer at all sensible to talk about teacher-directed versus student-directed approaches; that quality infers both," said Steven J. Leinwand, a principal research analyst for the American Institutes for Research, a Washington research group not connected with the study. "This confirms that," he added.

Yellow Flags Raised

Mr. Leinwand and others also raised possible caveats. For one, the teachers using the Saxon Math program reported spending an average of an hour more per week teaching math than their counterparts in the other curriculum groups. The question is: Were Saxon pupils' gains due to the extra time on task or the program itself?

Mr. Agodini said the study did not adjust for those differences: "We wanted teachers to use the assigned curricula in the way that the publishers wanted them to."

Also, while all the teachers received similar amounts of training to teach the programs to which they were assigned, only 53 percent in the Investigations group had access to math coaches in their schools, Mr. Leinwand noted. By contrast, 78 percent of the Saxon teachers and 86 percent of the Math Expressions teachers could rely on coaches, the report says.

"You have what is singularly the hardest of the four programs to implement with the least amount of support," Mr. Leinwand added, referring to Investigations.

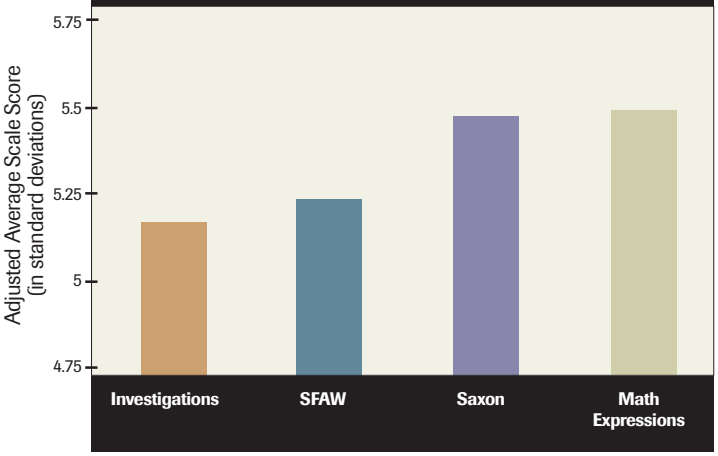
Also, differences in teaching approaches among the four curricula may be narrower in the early grades than in the upper-elementary or middle school grades. Experts said the Saxon program, in particular, is less drill-oriented in the early grades than is widely believed.

"From what I've seen, there is much more support for promoting children's understanding in there than there are in the upper-grade materials," said Karen C. Fuson, the Northwestern University researcher who developed the Math Expressions curricula.

There are differences among programs and districts, however, in the grades at which particular math skills are tackled, noted the NCTM's Mr. Kepner, who is also a mathematics education professor at the University of Wisconsin-Milwaukee. "What's going to be really interesting is looking at the results at the end of 3rd grade," he said. "Are curricula that look poor now going to look different then?"

Effect of Math Programs on Students' Scores

A study compared test scores of students taught using four math curricula used in the early grades.



NOTE: Scores for Investigations and SFAW are statistically different by a significant amount from those of Saxon and Math Expressions, researchers say.

SOURCE: Mathematica Policy Research Inc.

Editorial & Business Offices:
Suite 100, 6935 Arlington Road
Bethesda, MD 20814
(301) 280-3100
FAX Editorial (301) 280-3200
FAX Business (301) 280-3250

Education Week is published 37 times per year by Editorial Projects in Education Inc. Subscriptions: U.S. $79.94 for one year (37 issues). Subscriptions: Canada: $135.94 for one year (37 issues).