

Sharing Now Might Help Kids Learn Advanced Math Later

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Sharing might help young children become better people, but it might also make them better at math, according to preliminary findings of a study being conducted at North Carolina State University.

The study, funded by a \$1.65 million grant from the National Science Foundation, aims to develop a diagnostic system for teachers to use in assessing their third- to eighth-grade students' understanding of how to solve problems that use fractions and ratios and build on the knowledge of multiplication and division, known as rational number reasoning.

The findings could signal significant changes in the way math is taught in elementary school.

The very earliest math capabilities exhibited by children is the ability to split between two people or share a group of objects, says Dr. Jere Confrey, Joseph D. Moore Distinguished Professor of Mathematics Education at NC State. "Kids are very sensitive to the notion of 'fair shares' and are very adept at making sure the shares come out even," she says. "That's an early characteristic that should be much more heavily leveraged in early education.

"If the students' counting and splitting skills were developed in parallel to each other, we believe they would be much more successful in all areas of rational number reasoning," she adds. "As these partitioning or splitting activities become more complex, they set up fractions, division, ratios - all of the topics that tend to be delayed until 3rd or 4th grade, but

that should be done earlier because they can lead to more success in advanced math subjects down the road."

Confrey and Dr. Alan Maloney, NC State associate professor of mathematics, science and technology education and a co-investigator on the grant, also say that teachers need to examine how and in what order they teach math concepts to students. "In many schools multiplication is taught and then a couple of months later division is taught," Maloney says. "Part of what we stress in the 'splitting' world is that division and multiplication are very tied to each other and should be taught at the same time. So as the students are learning multiplication they should also be learning division.

"Teachers have this whole counting mentality that says you always teach the ones, then twos, then threes, etc. in that order," Maloney says. "But that's not necessarily the case with splitting. So one of the implications of this is that when teachers teach multiplication, they should think about it in terms of splitting, not counting. They should teach the twos as doubles, and then the fours as doubles of twos, and then eights and then 10 - and then five as half of 10. Then you can go back and pick up the threes, the sixes, the nines, and finally the sevens. This also holds true for division. This approach builds relationships within multiplication and division, rather than only memorization."

The five-year study will examine six different math subjects that involve rational numbers: partitioning; multiplication and division; ratio, proportion, and rate; fractions, decimals, and percents; similarity and scaling; and area and volume. The researchers plan to build precise measures that can show teachers which subjects are most troublesome to students.

"Students are taking these high-stakes multiple-choice tests which are very crude measures of what the students really do and don't understand

about a topic," Confrey says. "Teachers need precise information about what students have learned, what they are proficient at and what they still need to learn. So that's what we hope to accomplish with this study."

Source: North Carolina State University

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