

# Calculators okay in math class, if students know the facts first

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Calculators are useful tools in elementary mathematics classes, if students already have some basic skills, new research has found. The findings shed light on the debate about whether and when calculators should be used in the classroom.

"These findings suggest that it is important children first learn how to calculate answers on their own, but after that initial phase, using calculators is a fine thing to do, even for basic multiplication facts," Bethany Rittle-Johnson, assistant professor of psychology in Vanderbilt's Peabody College of education and human development and co-author of the study, said.

The research is currently in press at the *Journal of Experimental Child Psychology* and is available on the journal's Web site: <http://tinyurl.com/5f8tgd>.

Rittle-Johnson and co-author Alexander Kmicikewycz, who completed the work as his undergraduate honors thesis at Peabody, found that the level of a student's knowledge of mathematics facts was the determining factor in whether a calculator hindered his or her learning.

"The study indicates technology such as calculators can help kids who already have a strong foundation in basic skills," Kmicikewycz, now a teacher in New York City public schools, said.

"For students who did not know many multiplication facts, generating

the answers on their own, without a calculator, was important and helped their performance on subsequent tests," Rittle-Johnson added. "But for students who already knew some multiplication facts, it didn't matter -- using a calculator to practice neither helped nor harmed them."

The researchers compared third graders' performance on multiplication problems after they had spent a class period working on other multiplication problems. Some of the students spent that class period generating answers on their own, while others simply read the answers from a calculator. All students used a calculator to check their answers.

The researchers found that the calculator's effect on subsequent performance depended on how much the students knew to begin with. For those students who already had some multiplication skills, using the calculator before taking the test had no impact. But for those who were not good at multiplying, use of the calculator had a negative impact on their performance.

The researchers also found that the students using calculators were able to practice more problems and had fewer errors.

"Teachers struggle with how to give kids immediate feedback, which we know speeds the learning process. So, another use for calculators is allowing students to use them to check the answers they have come up with by themselves, giving them immediate feedback and more time for practice," Rittle-Johnson said.

And, for many of the students, using calculators was simply fun.

"Kids enjoyed them. It's one way to make memorizing your multiplication facts a more interesting thing to do," Rittle-Johnson said.

"So much of how you teach depends on how you market the material --

presentation is very important to kids," Kmicikewycz added. "Many of these students had never used a calculator before, so it added a fun aspect to math class for them."

"It's a good tool that some teachers shy away from, because they are worried it's going to have negative consequences," Rittle-Johnson said. "I think that the evidence suggests there are good uses of calculators, even in elementary school."

Source: Vanderbilt University

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