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Math education should fuse old, new techniques

A recent article discussed new math in Vermont (Free Press, March 16). It explained the emphasis placed by Vermont's math standards on understanding math reasoning, using models and applying math concepts to complex problems. The article noted the serious concern of many parents over the lack of basic math skills among their children.

I must assume teachers believe this is an either-or situation. Either you teach math the new way, or you give drills and formulas, but there's not time for both.

There is time for both, and both are essential. It's ridiculous to debate this as though it were a choice.

My conclusion is based on a body of research that began at Harvard in the 1950s and '60s and subsequently developed into



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IT'S MY TURN

an educational practice called precision teaching, further developed at labs and schools in the 1970s. This research demonstrates, for example, that unless students could perform basic math facts — such as 8 times 6 — at the rate of 70-90 per minute, further progress in math would be slow and frustrating. At 70-90 per minute, a person is performing fluently — that is accurately and without hesitation.

Precision teachers typically find that, prior to practice, fifth- to eighth-graders can perform addition facts at 30-40 per minute, subtraction at 25-35 per minute, multiplication at 25-35 per minute and division at 15-25 per minute. Frequently, students are unable to write digits fast enough to keep up with a math discussion. The fluent rate would be 100-120 per minute.

I have observed in my children's classrooms over the years that the first two months of the year are spent reviewing math from the previous year. That's 20 percent of the year wasted. Teachers of fifth to eighth grades recognize they must move slowly and repeat explanations many times. Many students become lost in the discussion when explanations assume they can move

through the calculations at the speed of normal conversation.

The research also demonstrates that fluent basics improve retention, increase the student's resistance to distraction and increase endurance, all of which improve learning efficiency. The research showed students who were fluent in basic skills were much more capable of applying their knowledge to complex situations.

Building fluency through practice is different from old-fashioned drills in several important ways. The practice periods are short, ranging from 15 to 60 seconds. There are lots of opportunities to respond without interruption, and weekly aims are set for improvement in correct answers per minute. Results are measured and charted daily. If the rate of

increase in correct answers per minute is less than 25 percent per week, then the teacher knows a change is needed. Often, there is some component skill that is not fluent. For example, a component skill for performing math story problems is being able to equate phrases such as "in all" and "left over" to math operations. Instead of wasting time trying to get the story problem task, the teacher steps back to the component skill, builds fluency on that, and moves on.

Precision teachers say spending 10 minutes per day building fluency enables students to become fluent on basic skills and makes the creative work within reach for everyone. One tutor told me her algebra students typically can achieve fluency in math facts during summer. Students become partners in their educa-

tional progress when they learn how to analyze their charts and step back to component skills when necessary.

Because precision teaching is highly efficient and because fluency in math skills prepares students for complex work, time is saved, repetition is reduced and there is time for both.

I would like to see fluency standards incorporated in the Vermont Frameworks, so instead of saying a student can "consistently and accurately add, subtract, multiply and divide rational numbers," we would have standards for correct answers per minute at the various levels of problem complexity.

Each district should select teachers to learn the precision teaching tools, gain experience and teach them to others.

Betsy J. Walkerman lives in Underhill.