Learning Math Facts – Memorization or Relationship?

By Ann McCue, Instructional Coach

Learning math facts is a skill addressed at every grade level. Teachers continuously stress how important this foundational learning is to all other math learning. Families understand how important learning these facts are in day-to-day life. Students reflect on this when they see “fact fluency” on their report cards. But did you know that learning math facts is also a hot-topic for debate? The question has always been, what is the best way to teach these addition/subtraction and multiplication/division facts? There are two main sides of this fence - those who advocate using speed drills, flashcards and such to strictly memorize the facts, and those who only teach strategies to help build number sense relationships for automatic recall. I believe the answer lies in tearing down the fence entirely.

If you’re like me, when you were in school, you likely experienced flashcard drill or timed tests that would encourage you to build speed as you became quicker and quicker at recalling the facts. These types of techniques rely almost entirely on memorization.

The true goal of drill and timed test is to build speed while maintaining accuracy. That’s a great goal. Somewhere along the way, though, it has also become the way in which students learn their facts –relying entirely on memorization. Admittedly memorization is likely to occur as students have repeated exposure to the facts. However, if quick recall is based on number relationships built through strategy use, the memorization becomes an extension of the process and not the process itself. Let me share an excerpt on this topic from a book by Twomey-Fosnot and Uittenbogaard, leading math researchers.

“Memorization of basic facts usually refers to committing the results of unrelated operations to memory so that thinking through a computation is unnecessary. Isolated facts are practiced one after another as if there were no relationships among them; the emphasis is on recalling the answers. Teaching facts for automaticity, in contrast, relies on thinking. Answers must be automatic, produced in only a few seconds; but thinking about the relationships among the facts is critical. A child who thinks of 9+6 as 10+5 produces the answer of 15 quickly, **thinking** rather than memorization is the focus (although over time these facts are eventually remembered.) The issue is not whether facts should be memorized, but how this memorization is achieved: by drill and practice or by focusing on relationships.

Isn’t memorization faster? Interestingly, no! In one study researchers compared classrooms in the same school. In one, the teacher focused on number relationships to work toward automaticity. In the other, children memorized facts with the help of drill sheets and flash cards. The children in the class in which number relationships was the goal significantly outperformed the memorization-only group in being able to produce correct answers to facts within three seconds, 76% to 55%.”

I believe there is a place for flashcard practice at home and in the classroom. These types of materials are tools. Parents and teachers need to help their students understand the relationship between numbers first and *then* use these tools to build speed. If the tools become the means to memorization, accuracy is often compromised as children rely solely on their memory, rather than the relationships numbers have with each other. So to put it simply, teaching number relationships (a technique) helps students understand numbers and promotes accuracy, while using flashcards, timed tests, and drills (a tool) helps promote speed once children understand those relationships. Understanding the purpose for what we teach and the tools we use to assist us helps students gain a deeper understanding of numbers, so that more difficult mathematical concepts have a sure foundation on which to rest. If you would like ideas to help promote the learning of math facts, please feel free to reach out to me or your child’s teacher at any time.