

Memories and

by Carl Binder

Do you remember trying to “memorize” a poem at school or a verse at church? Recall how many times you had to review the lines before you could recite them without looking at the book. Yet even if you haven’t thought about that poem in years, you can probably say some of its lines right now. And if you wanted to be able to recite it again, you could very quickly do so, after just a brief review. What does it mean to memorize something, and what place does memory play in education? In academic journals, these questions are related to the topics of retention and maintenance of skills and knowledge, and they are at the heart of effective learning and teaching methods.

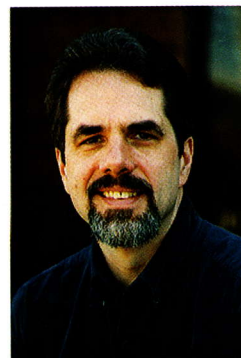
Remembering

Each fall, a major problem facing teachers in schools and homeschoolers alike is that their students are often unable to recall skills or knowledge that they had supposedly learned before their summer vacations. Spelling words, science facts, math skills, language arts, and other content seem to disappear after periods as short as a few weeks. Teachers in schools spend large portions of each school year – many hundreds of teaching hours – reviewing topics and re-instructing skills covered earlier. Many homeschoolers experience this problem, too. And this apparent need to teach the same topics over and over again clogs the entire educational system, whether in a school or at home, eating up precious time with little to show for the effort. But it's a necessary effort. If teachers and homeschoolers don't re-instruct, students may find themselves lost and unable to progress further through the curriculum. And even when teachers and homeschoolers do "give" students the knowledge, they may not see the expected improvements in their students' performance.

Why is so much re-work and repetition required? Is it the nature of human learning, or could a different understanding of the problem yield a more lasting result?

A growing group of educators called Precision Teachers have found a missing ingredient called fluency, defined as the ability to perform quickly and without hesitation. The term "fluency" is usually familiar only to students trying to learn a foreign language: their goal is to become fluent so they can read the new language and converse comfortably with other speakers. Not all skills need to be fluent, of course. Skills used only once a year, like filling out federal tax forms, needn't be fluent; performers may follow guides to do their taxes and forget them completely until next year, but not so with basic skills. Fluency is the missing ingredient in efforts to ensure retention and maintenance of all other basic skills and knowledge: learning to drive, learning grammar; learning to read music, or learning to play the violin.

Learning basic mathematics illustrates how fluency can make the important difference between remembering and forgetting. Although competent adults can typically write the correct answers to simple math problems



Dr. Carl Binder, President of The Fluency Project, Inc. (www.Fluency.org), has been at the forefront of educational research and practice since the 1970s. He has developed fluency-based learning programs for students of all ages, including regular and disabled children, adult learners, and corporate employees. He also continues a 30-year professional association with Elizabeth Haughton of the HaughtonLearningCenter(www.HaughtonLearningCenter.com) as a consultant and support for her pioneering efforts to bring Precision Teaching methods to children and their parents.

(e.g., $7+2$) at between 70 and 110 per minute – even if they haven’t practiced the skill for months or years – many children have never had the opportunity to perform that skill any more rapidly than 20 or 30 answers per minute. They seldom get the chance to practice the skill until they can achieve that 70 to 110-minute level of performance, because they must move on to more advanced math. At the lower rate of 20 to 30 answers per minute, they need $1\frac{1}{2}$ to 2 seconds to “remember” each answer. This lower rate isn’t good enough to support an easy transition and application to more complex math, or to word problems. Besides, if students have achieved only 20 to 30 answers per minute on basic math facts, they’re likely to completely forget many of the answers—particularly if they go weeks or months without using the knowledge (e.g., during the summer vacation). They’ll find it difficult, and therefore unpleasant, to apply the skill, and they will then avoid opportunities that arise in their daily lives to do mental math or to compute without an electronic calculator. As a result, the natural reinforcement that comes from successfully applying a learned skill will not be available to them, so that these children are even less likely to maintain this important foundation skill. Each time they need to use basic facts in homework or other activities, they’ll struggle to recall, use their fingers, look it up, turn on the calculator, or avoid doing the work. Once again, teachers and homeschoolers will decide to “teach” it again, or—even worse—let students pass without ever mastering the skill, with perhaps the assumption that they’ll get it, eventually. But this also means

that the students will continue to struggle, probably dislike math, and ultimately miss the fun and inherent rewards of a continuing, smooth progress through the math curriculum.

This “forgetting” problem in math applies to nearly every other subject in the educational foundation. Precision Teachers see the results of such educational failure every day, in students who don’t enjoy learning and don’t have

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the foundation for learning success. And homeschoolers are not immune to these consequences either, although the issue is exaggerated in schools because of an error in the field of education that began in the 1960s or 1970s.

At the dawning of the Age of Information, many educators concluded that so-called “rote” learning would no longer be necessary, since all possible knowledge would soon be at our fingertips and we’d need only to look it up, consider it critically, and apply it appropriately. What followed was wholesale rejection of “drill and practice,” the phrase used to describe education during the Age of Industrialization. So, rather than requiring students to truly master (achieve fluency in) essential skills and knowledge before progressing to more advanced curriculum, many educators preferred to “cover” the

material by emphasizing concepts and understanding. They failed to realize that by depriving students of essential fluency, they undercut the foundation of the very “higher” skills they preferred to emphasize. Without practice to fluency, students did not remember or maintain newly learned skills and knowledge. Consequently, the teachers tried to build higher-order skills and knowledge on what became a weak and crumbling foundation—one that required “rebuilding” over and over again because of forgetting.

Precision Teachers have found that when students achieve fluency in important prerequisite skills and knowledge, they do not forget. Instead, they find learning more advanced work easier rather than harder, and learning becomes fun rather than tedious. Precision Teachers watch children’s educational limitations turn to learning success because they can now remember and apply what they have learned. Often, to everyone’s surprise, the children don’t require re-instruction after each vacation period.

Fluency, including the practice that helps students achieve fluency, is the key to remembering and applying newly learned skills and knowledge. Homeschoolers who apply the methods of Precision Teaching may see improvements in their children’s learning that are not truly “magic,” but sometimes may seem to be magical.



Clue #2 (See Page 3)