them increasing responsibility. By middle school, it's routine to expect that students can read a chapter from a textbook at home and come to school the next day having learned the contents, ready for a discussion and later, a test. So, by this age, we're asking students to teach themselves. How do they learn this skill?

Researchers have asked college students how they study, and the results show that most use inefficient strategies (Hartwig & Dunlosky, 2012; Kornell & Bjork, 2007). They haven't really learned the skill of reading complex text, figuring out what's important, and committing it to memory. Interestingly enough, the initial studies queried students who had been quite successful, having gained admission to selective colleges. These students seem to have used inefficient means to get there.

These results fit well with another, highly informal finding from my own teaching. Each year, I ask the 350 students in my Introduction to Cognition class at the University of Virginia whether they were taught study techniques in K–12. Typically, 80 to 90 percent say they were not.

What Students Typically Do

So how do students usually study—and what's wrong with it?

The typical student employs four study strategies. First, he reads the assigned chapter, trying to understand individual sentences as he goes but not necessarily ensuring he's got the overall gist. Second, as he reads, he marks what he takes to be important points with a highlighter. Third, he doesn't look at the chapter again until a day or two before the test. Fourth, in preparation for the test, he rereads the chapter, focusing on what he highlighted earlier.

Clearly the first strategy is not optimal. Students need to be sure they extract all the meaning from their reading. The fact that not all do should make us suspicious of the second strategy, highlighting. How can you know what's important enough to highlight if you don't understand everything you read? And indeed, experiments indicate that students—especially poor readers—don't highlight what experts agree are the most important parts of texts. One might think, then, that highlighting would work better if an expert marked the important passages, but experiments show mixed results for that strategy as well. It may be that using someone else's judgment of what's important is mentally passive; it's the act of deciding what to highlight that provides a memory boost (Callender & McDaniel, 2009).

We want students to learn efficiently when we ask them to study on their own.

When they return to the chapter in preparation for an exam, most students' go-to strategy is rereading. As we'll see, rereading provides a relatively weak boost to memory compared with other study techniques they might use. But it helps enough that students can squeak by on an exam.

It's in that narrow sense that the third strategy—not studying until the last minute—pays off. We've all overheard students saying that they passed a test but forgot everything in a day or two. They aren't kidding. In one experiment, college students took the final exam for their course and then three days later took a different final exam that wouldn't count toward their grade. Students averaged 74 percent correct on the real final exam, but in three days they forgot so much that they scored, on average, just 29 percent (Rawson, Dunlosky, & Sciartelli, 2013). No wonder, then, that teachers so often see blank faces when they mention a concept that a colleague assured them was covered the previous year.

So what can we do to ensure learning that lasts?

Four Good Ways to Learn

In a recent review of the learning literature, my colleagues and I (Dunlosky, Rawson, Marsh, Nathan, & Willingham, 2013) identified four useful study techniques, each with a substantial research base of both laboratory and classroom studies. Let's take a look at each one.

Elaborative Interrogation and Self-Explanation

Students use these two techniques as they're reading. With *elaborative interrogation*, you periodically consider the relationship between what you're reading and what you already know. With *self-explanation*, you periodically (say, every few paragraphs) explain to yourself *why* assertions in the text are justified (Rosenshine, Meister, & Chapman, 1996).

For example, suppose a high school junior read the following:

> By the year 1650, the center of gravity of the civilized world had shifted from Italy to Northern Europe. The obvious reason is that the trade routes of the world were different since the discovery and exploitation of America. (Bronowski, 1973, p. 221)

The student using elaborative interrogation would ask herself how this passage relates to what she already