Memorize or analyze? In my experience—corporate and academic—analyzing always takes precedence over memorizing. It is the foundation of critical-thinking skills. For example, managers who can think through problems and anticipate alternative scenarios are invaluable.

When we think through problems or make connections, we create new, or reinforce existing, neural pathways in the long-term memory portion of our brains. Children are born with far more neurons in their brains than they will use in adulthood. This is because if a neuron goes unused and never becomes part of a brain pathway, it either dies or becomes unusable (www.brains.org/path.htm). So a major task for educators is to help students reinforce and create as many pathways as possible, because by doing this, they create long-term storage of pathways and develop a better system of recollecting and using memory.

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Research at UCLA shows that the digital generation has different neural networks designed for rapid cybersearching. But educators need to ensure that this modified brain still has the capacity to understand the relevance and significance of the retrieved data.

Calculators, for example, represent the epitome of “knowledge at your fingertips.” Yet allowing students to use calculators instead of learning basic mathematical facts has created a generation that lacks the ability to estimate the reasonableness of their answers.

As a teacher of both technology and algebra, I have observed that students who fail to memorize multiplication facts are at a disadvantage. Some students grasp only the “possible” answer with the calculator, whereas others are able to grasp the entire concept because they can call upon their store of mathematical knowledge. Students who are factoring, for example, need to realize that the numbers 11 and 28 have something in common: One represents the sum of the numbers 7 and 4, and the other represents the product of those same numbers. Students who lack this factual knowledge because they have learned to rely on technology fail to make that association.

As educators, we should help students develop a “road map” of factual knowledge upon which they can build their critical-thinking skills. To develop these skills, students must have a base of adequate knowledge so they can properly interpret and filter content. Critical thinking and higher-order thinking skills are like the destinations on the map, with stops along the way to acquire the requisite factual knowledge.

To develop critical-thinking skills, students must have a base of adequate knowledge so they can properly interpret and filter content.

If our students learn to find, organize, and analyze information, they will continually challenge their brains and reinforce their neuron pathways. Their long-term memory storage will work more efficiently, and memorization will occur because they will be thinking about information rather than storing data. And when they become tomorrow’s managers and workers, they will be equipped to make informed decisions based on analysis of a situation and its ramifications rather than off-the-cuff decisions based on whatever data is thrown in front of them.

Robert E. Mahoney, a math and technology teacher at Dallas High School in Oregon, is also an adjunct instructor at Western Oregon University, where he received his MSEd in information technology while researching developmentally appropriate technology acquisition.

Carmela Curatola Knowles is an elementary technology teacher for the Hatboro-Horsham School District in Pennsylvania, an instructional technology specialist, and a Pennsylvania Keystone Integrator.

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