Educational neuroscientist John Almarode bridges brain science and education to accurately translate the work of neuroscientists so he and other educators can contribute their research — coupled with expertise in pedagogy — to improve student learning.

THE SCIENCE OF LEARNING

Brain trust

Who researches to improve education? By JANET L. SMITH ('81)

"My brain's not wired to understand math." "I'm artistic, so I can't learn math."

All myths, according to John Almarode, JMU interim head and professor of educational foundations and exceptionalities. Almarode is also co-author, with Ann M. Miller of Waynesboro Public Schools, of *Captivate, Activate, and Invigorate the Student Brain in Science and Math, Grades 6-12.*

"Everyone is capable of doing math," Almarode says. "You're born with certain natural abilities to process numbers, and numbers are a way we communicate." Indeed, math is essential for survival.

"As we evolved, we had to know developmentally that there was one woolly mammoth, there are two saber-toothed tigers, there are six people in my family and I have this much food. So there are certain quantitative reasoning skills that have evolved in our brains over time," he says. "Where it starts to become based on experience and not natural talent are the more complex quantitative reasoning skills."

That's where early and better education comes in. "When students say, 'I'm not good at math,' it's actually that their skill set wasn't developed," Almarode explains.

To borrow from brain terminology, Almarode's research can be likened to the synapse, that small distance between brain cells, which is critical to the amazing chemical and electrical process that is the main method of communication in our brains.

As an educational neuroscientist, Almarode's role is to bridge the "cells" of brain science and education.

"My goal is to focus on how we best develop environments that optimize K-12 learning in science, technology, engineering and math. The foundation for that is brain science. That's the mantra I operate under. What I do is take the body of neuroscience and make sure I have credible, reliable colleagues and sources on brain science. And then I try to figure out what, if anything, might apply to the K-12 classroom."

While he does not engage in bench-level neuroscience work, Almarode depends on the expertise of specialists who conduct research with live or dead brains. He deeply studies their findings, asks follow-up questions of them and, when invited, observes in their laboratories.

With responsibility to translate accurately the work of neuroscientists and to contribute their own research from the realm of pedagogy, Almarode and other educational neuroscientists serve as important researchers in improving student learning. "I would describe my work as figuring out what might provide some insight — such as research in the memory and learning process and the role environments play on brain development — into how we might structure our classrooms and schools."

Almarode's expertise in the field is well respected. So much so that he was invited to present sessions and lead preconference workshops at two Learning & the Brain conferences — one in November 2013 and one in May 2014. At the 2013 conference, Almarode concentrated on the cognitive and brain components of engagement and how teachers foster that engagement in their classrooms.

Almarode draws from a lifetime affiliation with educators and an early interest in science to achieve the professional reputation necessary for invitation to Learning & the Brain conferences. After teaching at Stuarts Draft High School, in Stuarts Draft, Va., and the Shenandoah Valley Governor's School, Almarode earned a Ph.D. in science education at the University of Virginia. Combining classroom teaching experience and a strong educational program, Almarode shares his expertise in methods classes filled with JMU students who are a year and a half away from teaching in their own classrooms. This "coolest part" of his JMU responsibilities is paired with an extensive schedule of providing professional development sessions for teachers and administrators in various school districts, both locally and internationally.

With all his fellow educators, Almarode urges them to ask, "What does the research say works and doesn't work? Who does it work for? What do you need to know as a teacher to make that decision?" The understanding of attentional limitations is an important matter for all educators, one that stems from brain research.

As Almarode explains, "There are certain structures and characteristics that limit how long we can pay attention and limit how much information we can take in during one given setting. On average, we can handle about 10 to 12 minutes of new information or three to four chunks of information before we need to come up for air."

Taking that "break" does not mean the teacher needs to stop instruction, Almarode clarifies. A well-prepared teacher knows to stop lecturing and to ask her students to break up into pairs to share with each other what was just presented. "Teaching is about so much more than just knowing the material," he says. M

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