BRAIN-BASED LEARNING

Bringing the Science of Learning Into Classrooms

Years of research prompt a group of scientists to ask whether we should rethink the way we do school.

By Heather Riley, Youki Terada

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New research sheds light on the effects that childhood experiences—both good and bad—have on the developing brain. But are schools keeping up?

“The 20th-century education system was never designed with the knowledge of the developing brain,” says Pamela Cantor, MD, who is part of a cross-disciplinary team of experts studying the **science of learning and development**. “So when we think about the fact that learning is a brain function and we have an education system that didn’t have access to this critical knowledge, the question becomes: Do we have the will to create an education system that’s informed by it?”

Contrary to the long-held belief that brain maturation is largely complete by the age of 6, we now know that our brains are malleable and continue to change dramatically well into our 20s. This has profound implications for learning throughout the school-age years.

Because our neural tissues change in response to our environment, our experiences, and our relationships, a young child who faces persistent adversity at home, for example, will frequently retreat into “fight or flight” mode to protect themselves from violence or abuse. Over time, the brain’s circuitry rewires, favoring aggressive or anxious tendencies at the cost of cognition, reasoning, and memory. These children are also more likely to be placed in special education programs, be held back a grade, and have behavioral issues at school, according to **recent research**.

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The good news is that while toxic stress and abusive relationships can inhibit learning, positive and supportive learning environments can stem the tide. A trusting relationship with an adult—a teacher or guidance counselor, for example—can be a protective buffer against the negative effects of stress.

And because the brain is malleable and continually developing well into adulthood, a student can still meet his or her full potential, despite initial—or even ongoing—negative experiences. According to a **2015 Harvard report**, having at least one adult in a child's life who provides a stable, caring, and supportive relationship is one of the strongest ways to build resilience and help stack the scale against adversity.

Another key takeaway for teachers is that the science confirms that variability in a developing brain is actually the norm, not the exception. A room full of 5-year-olds spans the gamut of skills, developmentally speaking, and that continues to hold true for 10- and 16-year-olds. But while we are all highly variable, we are all on similar paths—eventually acquiring the same sets of skills in roughly the same order.

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WHAT SCHOOLS CAN DO

“The science says to us that, in fact, the way the brain functions and grows, it needs safety, it needs warmth, it actually even needs hugs,” explains Stanford professor Linda Darling-Hammond. “We actually learn in a state of positive emotion much more effectively than we can learn in a state of negative emotion. That has huge implications for what we do in schools.”

According to Darling-Hammond, there are a few ways school can shift to better align with these insights.

Seize the opportunity: Because of the amount of time children spend there, schools have an incredible opportunity to shape the developing brains of their students. Strong, long-lasting relationships between grown-ups and children in schools can override persistent negative experiences, priming a developing brain to learn and acquire more complex skills.

Expect variability, and embrace it: Our brains do not mature on precisely calibrated schedules, and students throughout the school-age years arrive in classrooms representing a wide spectrum of cognitive, social, and emotional development. Personalization is understanding where each student is developmentally, and scaffolding a learning experience that begins at their current level.

Integrate practices that explicitly address belonging and safety: We now know that when schools are safe, supportive places that affirm

individual identity, create paths for belonging for every student, and intentionally build strong, long-lasting relationships, they open the opportunity for greater intellectual learning because our brains are more responsive and open to learning in safe environments.

Both pedagogical and social strategies can be integrated into classrooms and school systems in ways that are consistent with the emerging science. According to a **2018 study**, starting the day off with a simple relationship-building activity—welcoming students at the door—can increase academic engagement by 20 percentage points while decreasing disruptive behavior by 9 percentage points. And at King Middle School in Maine, for example, eighth-grade English language arts teacher Catherine Paul teaches **talk moves**—short sentence starters such as “I disagree because...”—to build a culture of tolerance and respect while maintaining rigorous academic standards. “I do talk moves because, in order to have a great discussion, everyone has to feel like they’re a part of it, and valued,” Paul explains. “And when they walk away, they really have bridged a gap with someone that maybe they wouldn’t necessarily have talked to, or talked to on that level.”

Other strategies from diverse schools representing a broad range of grade levels can be found in our video series on the science of learning and development, ***How Learning Happens***.

What we now understand about human development and learning has come a long way since we began designing schools, and a shift can better align the way we teach with the way students learn. It should be noted, however, that for years great teachers have been doing things in classrooms that embody what the science now confirms. In a nutshell: Relationships matter deeply, learning happens when the brain feels safe and supported, and no child is a lost cause.

“What is so true in the science of human development is that it is an optimistic story,” Cantor says. “It tells a story that no matter what a child’s starting point is, that development is possible if it is intentionally encouraged in the experiences and relationships that children have.”