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Trying to learn how learning works

By Dan Vergano, USA TODAY

Is our [children learning](#)? Bad grammar, but still a good question.

Long before [President George W. Bush](#) posed his ungrammatical query on the 2000 campaign trail, debate simmered over school testing, vouchers and teaching. And just like in a lot of modern debates, scientists have quietly tackled the underlying questions, offering up new tools, new approaches and even a new discipline, while the political folks argue away.

"New insights from many different fields are converging to create a new science of learning that may transform educational practices," begins a report led by Andrew Meltzoff of the [University of Washington in Seattle](#). The [review](#) in the current *Science* magazine makes the case for psychologists, neuroscientists, roboticists and teachers combining to quietly create a new field that combines everything from how brains grow to how classrooms work into a new kind of learning research.

For example, a [companion study](#) in the current *Science* by John Gabrieli of the [Massachusetts Institute of Technology](#), illustrates how neuroscience and education researchers have teamed up to tackle dyslexia, a difficulty with reading and vocabulary that afflicts 5% to 17% of children. Behavioral and brain measures can now identify dyslexic tendencies in infants, and lead to teaching that can "prevent dyslexia from occurring in the majority of children who would otherwise develop dyslexia," according to the study.

Politicians and educators increasingly worry about learning for all children, citing tests like the 2007 Trends in International Mathematics and Science Study ([TIMSS](#)), which found U.S. 4th and 8th graders trailing some Asian and European peers in science and math. In April, President [Obama](#) called on [National Academy of Sciences members](#) to "think about new and creative ways to engage young people in science and engineering" and announced an initiative to raise those TIMSS scores.

So, how could that work? Three principles, "across a range of areas and ages" come across in the new learning research:

- Learning is computational. Even infants and toddlers possess innate capabilities to see and hear patterns, something psychologists doubted decades ago. Reinforcing those capabilities by teaching patterns early might sharpen kid's brains.
- Learning is social. People, even infants, learn better through social cues. We "most readily learn and re-enact an event when it is produced by a person," Meltzoff and colleagues write. "Social factors also play a role in life-long learning — new social technologies (for example, text messaging, [Facebook](#), and [Twitter](#)) tap humans' drive for social communication," they add.
- Learning is brain-circuitry driven. Brain cells fired up in both perception and action overlap in people, which allows students to identify with their teachers and speed learning.

"Young learn best from people in human social interaction. But one of the fundamental characteristics of the human

mind is our flexibility and our inventiveness — our capacity to invent tools to amplify our own sensory and motor abilities," Meltzoff says, by e-mail. So, the goal for educators in this century is to create teaching tools, robots, computer programs science fairs or whatever that produce the same benefits of the very best teaching situation, one-to-one tutoring.

Now where does that leave older students and adults in an era of retraining? One interesting effort to harness so-called social media is [Scitable](#), a free science library and Internet forum website that teaches college-level genetics, offered by the Nature publishing group. Anyone can join and often entire classes are signed up at colleges to hand around and discuss work.

"We only had a limited time in class, so we had to concentrate on key questions," says Erik Lykken, a beginning PhD student in immunology at [Duke University](#), who was signed up, somewhat reluctantly, for Scitable in a genetics seminar earlier this year. "Scitable worked really well to bring everyone up on the background, and to agree on those key questions before class."

The site offers experts to answer questions from students and is moderated to keep the crazy question level down. "I have never really encountered a resource quite like this one that combines both knowledge and questions," Lykken says.

He may soon.

Social network "technology allows students to tap a 'distributed knowledge base' — they can engage in collaborative learning and inform each other, even work in groups, at great distances," Meltzoff says. "This is great preparation for the 'real world' in the [21st Century](#), because the 'real world' now includes technology."

Of course, infants don't need a web browser or a Facebook account, Meltzoff adds. "Very young children learn socially and need people, not technology to thrive. After infancy, the world of technology opens up and they expand to use the new tools."

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