

New 'science of learning' could reinvent teaching techniques

The field integrates brain, social patterns

By Dan Vergano
USA TODAY

Scientists are quietly tackling education, offering up new tools, new approaches and even a new discipline.

"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, co-director of the University of Washington's Institute for Learning and Brain Sciences in Seattle. The review in the current *Science* journal makes the case that psychologists, neuroscientists, roboticists and teachers should 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

Science by John Gabrieli of the Massachusetts Institute of Technology shows 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 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," the study says.

Politicians and educators increasingly worry about learning for all children, citing tests such as the 2007 Trends in International Mathematics and Science Study, which found U.S. fourth- and eighth-graders trailing 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 scores.

Three principles are espoused in the



2001 photo by Jerry Larson, Temple (Texas) Daily Telegram, via AP

Good lesson: Children learn best by social cues, says expert Andrew Meltzoff.

proposal for a field of learning research:

► **Learning is computational.** Even infants and toddlers have innate capabilities to see and hear patterns, something psychologists doubted decades

ago. Reinforcing those capabilities by teaching patterns early might sharpen kids' 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 lifelong learning — new social technologies (for example, text messaging, Facebook, and Twitter) tap humans' drive for social communication," they add.

► **Learning is driven by brain circuitry.** Brain cells fired up during both perception and action overlap in people, which allows students to identify with their teachers and speeds learning.

"The 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 researchers say, the goal for education in this century is to create teaching tools — such as robots, computer programs or science fairs — that produce the same benefits of the very best teaching situation, one-to-one tutoring.